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

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Abstract: Can a developing country reduce poverty by gaining increased market access to a large, rich country? The 2001 U.S.-Vietnam Bilateral Trade Agreement (BTA) 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. Using variation in the structure of the labour force across provinces prior to the trade agreement, I construct provincial measures of U.S. tariffs. To address concerns over confounding trends between changes in provincial poverty and changes in provincial tariffs I follow two approaches: controlling for trends based on observable initial conditions and differencing away time invariant trends using pre-BTA data. I find that provinces that were more exposed to the U.S. tariff cuts experienced faster decreases in poverty between 2002 and 2004. Additionally, I document that the movement of workers across provinces is limited in scale, particularly for those with the low levels of education. Finally, I show that the most exposed provinces experienced faster wage growth for workers with low levels of education, but not for highly educated workers.

JEL codes: F14, F16, I32, O11

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I. INTRODUCTION

Can a developing 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 manufactured goods. The reductions are predicted to stimulate exports from developing countries with an assumed comparative advantage in the production of these goods. Unfortunately, little ex post empirical evidence exists to support this line of reasoning. 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 tariff changes 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 instead of 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 category of articles of apparel and clothing accessories. This product 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 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 products that are conventionally classified as being low-skilled labour intensive. As low-skilled workers are more likely to be poor than skilled workers, 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 28.9 to 19.5 percent. 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.

\(^2\) According to the GSO, exports of goods and services in 2004 were 65.74 percent of GDP.
In this paper I measure the short-run impacts of U.S. tariff cuts on provincial poverty in Vietnam using variation across provinces. Following Topalova (forthcoming), I construct provincial measures of U.S. industry tariffs by weighting the tariffs 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 prior to the BTA) experienced more rapid decreases in poverty. The impact on provincial poverty rates between 2002 and 2004 is large. The effect is robust to underlying trends based on observable differences in initial conditions and to time invariant trends. This result suggests there might be limited migration across provinces in Vietnam. I find that overall migration rates are low, on the order of 1 or 2 percent of the population, and that migration flows are positively related to the drop in provincial tariffs. However, workers with low levels of education are less responsive to cross-province differentials, which may be one of the reasons for the differential impact of the BTA on provincial poverty. Finally, consistent with the reductions in poverty and low levels of migration, I find that wages grew more quickly for the least educated workers in the most exposed provinces, but that there is little effect on the wages of the most educated workers.

The paper proceeds by first providing a brief overview of the literature on trade and poverty and a discussion of the impact of changes in foreign market access on labour demand. 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 \textit{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. It generally 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 unfavourable changes in wages for unskilled workers, with trade liberalization, often focusing only on urban and or manufacturing workers.\footnote{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.} A notable exception is Topalova’s (forthcoming) study of 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. The current study follows a similar methodology to examine provincial differences in poverty reductions after the implementation of the BTA in Vietnam.

Most of the studies on trade and poverty use domestic 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: What impacts do changes in foreign trade policy have on poverty and living standards in developing countries? One exception is Brambilla, Porto and Tarozzi (2008) who analyze the impacts of U.S. anti-dumping duties applied to exports of Vietnamese catfish products. They show that the imposition
of anti-dumping duties significantly decreased income for households that were relatively specialized in the production of aquaculture products and also led to the reallocation of labour away from aquaculture production. However, the impact of increased foreign market access remains an underexplored research question given its prominence in policy discussions. My paper provides empirical evidence from a large trade shock induced by a trading partner. Specifically, it uses the 2001 U.S.-Vietnam Bilateral Trade Agreement as an example of a dramatic increase in foreign market access for a developing country.

The empirical section focuses on the impact of increased market access on poverty. It is thus worth discussing some of the theoretical channels through which increased access to the U.S. could influence the allocation of labour, and thus relative labour demand for unskilled workers, the predominant employment category of the poor in Vietnam.

Romalis (2004) proposes a model of trade with the key prediction that “countries capture larger shares of world production and trade in commodities that more intensively use their abundant factor.” The model features a continuum of goods, where goods can be ranked by the intensity with which they use skilled labour. It is assumed that countries can be grouped as relatively abundant in skilled labour, the North, or in unskilled labour, the South. Different varieties of each good are produced under monopolistic competition and international trade features transportation costs. Romalis models the trade costs as standard iceberg trade costs (i.e., \( \tau \) units of a good must be shipped in order for 1 unit of the good to arrive in the importing country). In this setup, a reduction in trade costs leads to an increase in the price of the exported good, to an increase in the share of unskilled labour intensive goods being produced in the South, which has a relative abundance of
unskilled labour, and hence of exports of unskilled labour intensive goods from the South to the North.

What effects would this model predict the BTA should have on the structure of production and trade in Vietnam? First, it is plausible to assume that Vietnam is abundant in unskilled workers relative to the U.S. This seems a reasonable assumption given the pattern of Vietnamese exports, which, as documented above (see Table 2), is dominated by goods that intensively use unskilled labour, such as clothing and footwear. Hence, in the Romalis model Vietnam would fit into the South group of countries and the U.S. into the North group of countries.

Second, the U.S. tariff cuts were not uniform across all industries (see Section IV.1 for details). If industries that received the highest tariff cuts were skilled-labour intensive industries, exports of unskilled labour intensive goods might not increase and thus the demand for unskilled labour would not increase. However, there is little relationship between the tariff cuts, in percentage points, and skill intensity across Vietnamese industries. Figure 1 plots U.S. tariff cuts versus the share of unskilled workers by industry based on workforce information from the 1999 census. I use two alternative measures of the share of unskilled workers: workers with five or fewer years of education (i.e., at most a primary education) and workers with nine or fewer years of education (i.e., at most a lower secondary level of education). As can be seen from the two panels, there is little correlation between industry tariff cuts and the share of unskilled workers. Hence, on average, the U.S. tariff cuts were as large for unskilled labour intensive goods as they were for skilled labour intensive goods. Combining these two threads, the assumption that Vietnam is relatively abundant in unskilled labour and
the nature of the relationship between the size of the tariff cuts and skill intensity by industry, the BTA is predicted to increase production and exports of unskilled labour intensive goods in Vietnam, as their prices are expected to rise. The growth of unskilled labour intensive exports is consistent with Table 2.

Hence, the growth in demand for unskilled labour should cause the wage rate for unskilled labourers to increase. This could lead to a reduction in poverty because unskilled workers are more likely to live below the poverty line.

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.\textsuperscript{4} 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, with cuts 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.

\textsuperscript{4} This section draws heavily on the STAR-Vietnam report “An Assessment of the Economic Impact of the United States – Vietnam Bilateral Trade Agreement.”
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 to be implemented until up to ten years after entry into force of the agreement. 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, liberalization and streamlining of trading rights, liberalization of trade in services, and liberalization and safeguarding of foreign investment, among others. As for trade policy commitments, the BTA requires Vietnam to cut tariffs on only approximately 250 tariff lines out of more than 6,000, typically by 25 to 50 percent, 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.

Although the agreement is bilateral, the timing of U.S. commitments relative to Vietnamese commitments creates a unique opportunity for exploring the impacts of foreign trade policy on developing countries. The U.S. tariff cuts were fully implemented as soon as the BTA came into force. In contrast, Vietnam’s commitments were not
required to be immediately implemented and indeed most of them were not. Instead, Vietnam’s commitments are to be phased in over a period of three to ten years. As such, this trade agreement provides an opportunity to study the impact of U.S. tariff cuts in isolation from Vietnam’s BTA commitments.  

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 and wage estimates derived from the 1998 Vietnam Living Standards Survey (VLSS) and 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 U.S. tariffs downloaded 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 immediately 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 McCaig (2009). I then match the tariff lines to industries by the concordance

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5 Although Vietnam’s tariff cut commitments were not implemented within the period studied in this paper, the possibility exists for impacts related to producers reacting in anticipation of the coming tariff cuts. I find no evidence of a statistical relationship between Vietnamese tariff cut commitments and changes in provincial poverty rates between 2002 and 2004 (see McCaig (2009)).
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 2, 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 and 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). As will become clear below, the variation in tariff cuts across industries is important for the identification strategy.
IV.2 Household surveys

The primary period of focus of this study is 2002 to 2004, but where available I also use data from 1998. 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, 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. 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.\textsuperscript{6} 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 the 2002 and 2004 VHLSS. Details of the expenditure variables and sample weights used can be found in McCaig (2009).

\textsuperscript{6} See World Bank (1999).
There is substantial variation in provincial poverty rates as well as the proportional drop in poverty between 2002 and 2004. 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. At the extremes, two provinces, Khanh Hoa and Bac Lieu, experienced measured increases in the incidence of poverty, 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 subsequent decreases in poverty.

Where sufficient observations permit, the 1998 VLSS is also used to construct estimates of poverty. However, due to a number of factors, the use of the 1998 VLSS is partially limited. First, the sample size, 6,000 households, is noticeably smaller than either of the latter surveys. Second, there were two provinces in which no households were interviewed. Third, in approximately one half of the provinces no urban households were interviewed. These three factors combine to limit the ability to produce reliable estimates of provincial poverty. Instead, direct estimates of poverty are only calculated for rural households. More detail is provided in the empirical section. Fourth, for many of the provinces there are a very small number of observations on wage workers. This also
limits the ability to produce reliable estimates of provincial wages. Nonetheless, where possible, I use the 1998 VLSS data to help control for underlying trends.

IV.3 1999 census

For constructing provincial tariffs based on U.S. industry tariffs, 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 website. 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.\footnote{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 McCaig (2009) for further details.} 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 (forthcoming), 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 U.S. tariffs based on employment weighted average
industry tariffs using time-invariant pre-BTA employment data. For each industry $i$ in province $p$ I estimate the number of employees, $L_{ip}$, using the 1999 census. From this, I calculate the employment weights according to $\omega_p = L_p / \sum_i L_i$. The province tariff at time $t$ is then calculated according to:

$$\tau_{pt} = \sum_i \omega_{ip} \tau_i,$$

(1)

where $\tau_i$ is the tariff in industry $i$ at time $t$. The summation is over all workers, including workers in non-traded sectors. Workers in non-traded sectors are assigned a tariff of 0.\(^8\) Note that this variable is constructed in a manner analogous to that used by Topalova (forthcoming) in her study of trade liberalization and poverty and inequality across Indian districts; Edmonds, Pavcnik and Topolova (forthcoming) in their study of tariff reform and child labour; and Ebenstein et al. (2009) who construct measures of exposure to globalization for U.S. workers based on their occupation.

An important point is the use of time-invariant, pre-reform employment weights. In the empirical framework discussed below, the idea is to control for the unobserved counterfactual of what would have been the evolution of poverty across Vietnamese provinces in the absence of the trade agreement. Thus, changes in employment that are a consequence of the trade agreement should not be included in the calculation of provincial tariffs. Hence, provincial exposure to the BTA is based solely on the tariff cuts and the pre-existing structure of employment within a province. Note that the use of pre-

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\(^8\) Topalova (forthcoming) and Edmonds, Pavcnik, and Topolova (forthcoming) construct a second measure of trade exposure for Indian districts which is based solely on workers in traded sectors. This has the advantage of removing any correlation between the exposure measure and underlying trends associated with the share of the population working in non-traded sectors. I have constructed an analogous measure and found that the results presented below are not significantly influenced by the choice of exposure variable and hence are not being driven by the share of workers in the non-traded sector. The results are available upon request.
reform time-invariant weights is common in many empirical micro literatures (see Bernard and Jensen (2004) as an example of the impact of exchange rate fluctuations on trade patterns and DiNardo, Fortin and Lemieux (1996) and Lemieux (2002) in the wage distribution literature).

The focus on provincial tariffs, as opposed to industry tariffs, is motivated by recent findings in the literature. First, sector mobility appears to be limited in many developing countries in response to trade shocks (see Revenga (1997), Hanson and Harrison (1999), and Feliciano (2001) for Mexico; Attanasio, Goldberg, and Pavcnik (2004) for Columbia; Currie and Harrison (1997) for Morocco; and Topalova (forthcoming) for India). Second, spatial mobility is also low in some developing countries (see Munshi and Rosenzweig (2009) and Topalova (forthcoming) for India and Chiquiar (2008) for Mexico). Inter-provincial mobility appears to be limited within Vietnam as well as only 2.2% of household heads permanently migrated across provincial borders in Vietnam between 1994 and 1999. Hence, it is not unreasonable to investigate the impacts of the BTA assuming that the relevant labour market is a province, not a national industry. Since the geographic distribution of industries varied across Vietnam’s provinces prior to the BTA, under conditions of limited mobility, the reductions in U.S. tariffs will differentially affect Vietnam’s provinces. Note that if the relevant labour market is not a province but is instead national, this does not invalidate the empirical investigation. It just implies that there should be no differential impacts of the BTA across provinces. Finally, note that the use of provincial tariffs implicitly assumes that the province defines the relevant labour market.
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 neither U.S. nor Vietnamese industries had 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 variation in Column 2 tariff rates is 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. At the time of the U.S.-Vietnam Bilateral Trade Agreement, the only remaining countries on Column 2 were Afghanistan, Cuba, Laos, and North Korea, while Cambodia had recently been granted MFN access in 1996. 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 5 presents simple autocorrelations 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 autocorrelation 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 in 2001 were exogenous to Vietnam.

The final 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 Econometric framework

To examine the impact of U.S. tariff cuts on provincial poverty, consider the following linear model:

\[ y_{pt} = \theta_t + \beta \tau_{pt} + \alpha_p + \varepsilon_{pt} \]  

(2)

where \( p \) denotes a province, \( t \) denotes the year (2002, 2004), \( y_{pt} \) denotes the natural logarithm of poverty, \( \tau_{pt} \) is the provincial tariff, \( \theta_t \) is a time period effect, \( \alpha_p \) is a time-invariant unobserved provincial effect, and \( \varepsilon_{pt} \) is an error term. First differencing of the model removes the unobserved time-invariant provincial effect and leads to:
\[ \Delta y_p = \gamma + \beta \Delta \tau_p + \Delta \varepsilon_p \]  

(3)

where \( \gamma \equiv \theta_{2004} - \theta_{2002} \). Although this model may seem simple, as it does not include any additional controls, its simplicity allows for a straightforward discussion of identification assumptions. First, given the manner in which provincial tariffs are constructed, reverse causality is unlikely to be a concern. As discussed in Section V.1, it is reasonable to treat the drop in industry tariffs as exogenous to Vietnam. Furthermore, the provincial tariffs are constructed using employment weights that are time invariant and pre-date the BTA. These two factors combine to suggest that changes in provincial poverty between 2002 and 2004 are not influencing the change in provincial tariffs. Since reverse causality is unlikely to undermine identification, the most likely problem is the presence of confounding trends (i.e., provinces that experienced the largest tariff cuts were experiencing more rapid poverty reduction in the absence of the BTA and this effect will be incorrectly attributed to the fall in provincial tariffs). I turn now to a detailed discussion of such concerns.\(^9\)

The presence of underlying trends, in and of themselves, does not directly cause a problem for identification. For example, if the cuts in provincial tariffs were randomly assigned to provinces then one could be confident that these would be uncorrelated with any underlying trends and equation (3) could be used to identify the causal relationship between changes in provincial tariffs and provincial poverty. Of course the changes in

\(^9\) Note that Edmonds, Pavcnik and Topalova (forthcoming) directly use the micro data as opposed to aggregated regional data as I do. However, when exploring the impacts of provincial tariff cuts on household poverty it is difficult to model the effects in a manner consistent with theory (see Kovak (2010)) without aggregating over households within a province. Nonetheless, I have explored the impacts of provincial tariff cuts on household poverty using an indicator for household poverty as the dependent variable. The results are broadly consistent with those presented later in the paper, despite concerns of misspecification and are available upon request. I am thankful to an anonymous referee for the useful robustness check suggestion.
provincial tariffs were not randomly assigned and this introduces the possibility of omitted variable bias if they are correlated with underlying trends which are not properly controlled for in the econometric model. Thus, it is important to think about which underlying trends could be correlated with the reductions in provincial tariffs.

First, note that substitution of the definition of provincial tariffs into equation (3) yields the following:

\[
\Delta y_p = \gamma + \beta \left( \omega_{1p} \Delta \tau_1 + \omega_{2p} \Delta \tau_2 + \ldots + \omega_{p} \Delta \tau_1 \right) + \Delta \varepsilon_p
\]  

(4)

This formulation makes it clear that the primary challenge to identification based on underlying trends is the presence of industry trends captured by the pre-BTA employment shares as underlying trends that are not associated with differences in employment will not be correlated with the change in provincial tariffs. To make this simpler to see, suppose that there are only two industries: agriculture and manufacturing. The above equation then simplifies to:

\[
\Delta y_p = \gamma + \beta \left( \omega_{Mp} (1 - \omega_{Mp}) \Delta \tau_A + \omega_{Mp} \Delta \tau_M \right) + \Delta \varepsilon_p
\]  

(5)

where \( \omega_{Mp} \) is the share of workers in province \( p \) that worked in manufacturing according to the 1999 census. Next, suppose that in the absence of the BTA provinces that had a higher share of workers within manufacturing were reducing poverty more quickly. Additionally, recall that the U.S. tariff cuts were larger, on average, in manufacturing than in agriculture (see Table 3). These two points suggest that the change in provincial tariffs will be negatively correlated with the underlying trend in poverty reduction associated with having a larger manufacturing base prior to the BTA. Under the described scenario, the coefficient on the change in provincial tariffs in equation (5) will be biased upwards (i.e., more positive) and thus erroneously attribute a greater share of the
variation in cross-province changes in poverty to the BTA. More critically, the effect of the drop in provincial tariffs cannot be separately identified from these underlying trends.\footnote{The interpretation that I am giving to the introduced bias is based on the idea of underlying trends. However, note that the exact same concern arises if there are contemporary policy reforms that differentially affect provinces based on differences in pre-existing employment structures and the variation across industries is similar to the variation of U.S. tariff cuts across industries. Since the econometric problems are identical, I only refer to the problem of underlying trends for simplicity, as properly controlling for these would also imply controlling for correlated contemporary shocks.} Continuing with the example based only on agriculture and manufacturing employment, this would require estimating a model of the form:

\[
\Delta y_p = \gamma + \beta \left[ (1 - \omega_{Mp}) \Delta \tau_A + \omega_{Mp} \Delta \tau_M \right] + \lambda_M \omega_{Mp} + \Delta \varepsilon_p. \tag{6}
\]

Clearly the effect of the drop in provincial tariffs cannot be separately identified from the underlying trends associated with differences in pre-BTA employment structure as the drop in provincial tariffs is a linear combination of the underlying trends. This simple example is indicative of the overall problem when the complete set of 3-digit industry tariff cuts are used to construct the drop in provincial tariffs. Here too it is impossible to separate the effect of provincial tariffs on poverty from underlying industry trends at the 3-digit level. Note that this problem is not unique to the present question. In a similar empirical setting this is a problem faced by Topalova (forthcoming) and Edmonds, Pavcnik and Topalova (forthcoming) as well as the non-random evaluation literature more generally.\footnote{Industry-specific trends are a problem in any study that uses industry tariffs and an industry outcome.}

What then can be done to try to credibly control for underlying trends in poverty reduction associated with differences in pre-BTA employment structure that may be correlated with the changes in provincial tariffs? First, one could include additional covariates that try to control for underlying trends based on differences in pre-BTA
employment structure across provinces. Second, one could use additional information prior to the BTA as a means to control for underlying trends. Each method has its pros and cons and I discuss them in turn below.

A natural set of additional covariates to include are employment shares at a more aggregate level than those used in the calculation of provincial tariffs:

\[ \Delta y_p = \gamma + \beta \Delta \tau_p + \sum_j \delta_j \omega_{jp} + \Delta \epsilon_p \]  

(7)

where \( \omega_{jp} \) is the share of province \( p \)'s workers in industry \( j \) prior to the BTA and \( j \) is a more aggregated industry level than used in the construction of provincial tariffs. For example, \( j \) could represent agriculture, mining, and manufacturing, respectively, as opposed to the 3-digit industries used to construct the provincial tariffs. In this framework all variation in tariff cuts between major sectors is removed from the provincial tariffs and captured by the employment shares. Hence, this framework controls for underlying trends in poverty reduction based on differences in aggregate employment across provinces. More generally, one could think of including additional initial conditions at the province level to try to further control for any remaining underlying trends that are correlated with changes in provincial tariffs. In particular, one might think of including the initial level of poverty as poorer provinces received smaller drops in provincial tariffs. If variation in initial poverty levels is not sufficiently controlled for by the presence of aggregate employment shares and the regional dummy variables, then any convergence in poverty across provinces will lead to a bias in \( \beta \).

A second option would be to use additional data prior to the BTA in an attempt to control for underlying trends that are correlated with changes in provincial tariffs. Specifically, assume that there are unobserved trends in poverty reduction based on
observed differences in pre-BTA employment structure across provinces such that the change in poverty between 2002 and 2004 can be written as:

$$\Delta y_p = \gamma + \beta \Delta \tau_p + \sum_i \delta_i \omega_{ip} + \Delta \epsilon_p$$ \hspace{1cm} (8)

where \(i\) denotes an industry at the same level of disaggregation as used for calculating the provincial tariffs. Next, assume that underlying industry trends are time invariant (i.e., the differences in employment structure had the same effect on changes in poverty prior to the BTA as after the BTA). Define \(s = 0\) as the period before the BTA and \(s = 1\) as the period after the BTA. Then differencing equation (8) across the two periods leads to:

$$\Delta y_{p1} - \Delta y_{p0} = \eta + \beta \left( \Delta \tau_{p1} - \Delta \tau_{p0} \right) + \left( \Delta \epsilon_{p1} - \Delta \epsilon_{p0} \right)$$ \hspace{1cm} (9)

where \(\eta \equiv \gamma_1 - \gamma_0\). Under the assumption that the poverty trends induced by differences in the employment structure across provinces are time invariant, the effect of changes in provincial tariffs can be isolated. Estimation of equation (9) requires pre-BTA data. Thus, in order to implement equation (9) I also calculate provincial tariffs in 1998 as per equation (1), and I use provincial poverty estimates from the 1998 VLSS. Presuming the provinces with larger manufacturing sectors were experiencing more rapid poverty reduction, we’d expect the estimate of \(\beta\) from (9) to be smaller than that from equation (3) where it would suffer from an upwards bias. Relative to the method of including additional regressors that directly control for underlying trends in initial conditions, this method has the advantage of not removing any of the variation in the change in provincial tariffs. Nonetheless, as for adding additional regressors to reflect variation in initial conditions, differencing is not a perfect solution. Identification rests on the assumption of underlying trends being constant across time periods. Again, this problem is not unique to the current study as it occurs in any non-random evaluation exercise.
I have discussed two alternative strategies for attempting to control for the presence of underlying trends that are correlated with the change in provincial tariffs. The first, adding additional regressors reflecting initial conditions, seeks to directly control for the unobserved trends at the province level using aggregate employment shares and allowing for different trajectories across regions. The second strategy, differencing, relies on using data prior to the BTA to difference away underlying trends that are correlated with changes in provincial tariffs. The former procedure is also followed in Topalova (forthcoming) and Edmonds, Pavcnik and Topalova (forthcoming) and the latter is somewhat similar to the falsification test done by these two studies.\footnote{Apart from Verhoogen (2008) and Edmonds, Pavcnik, and Topalova (forthcoming) I am not aware of any studies in trade that actually control for these issues.}

The crux of the matter is how well either procedure controls for underlying trends associated with differences in pre-BTA employment structures across provinces, which cannot be separately identified from the change in provincial tariffs. Recall that the problem of underlying trends is only a problem for those trends associated with differences in pre-BTA employment structure across provinces. I implement both procedures where data availability permits.

VI. EMPIRICAL RESULTS

The primary regression results are reported in Table 6. Column (1) displays results from estimating equation (3), where the only explanatory variable is the change in provincial tariffs. Column (2) displays results from estimating equation (7), which expands the set of regressors to include the following initial provincial conditions: the
natural logarithm of poverty, the rural share of the population, the ethnic minority share of the population, the share of the population with some to complete primary education, the share of the population with some to complete lower secondary education, the share of the population with some to complete upper secondary education, the share of workers in agriculture, the share of workers in mining, and the share of workers in manufacturing. Finally, column (3) displays results from equation (9). The 1998 poverty estimate used here is based on the small area mapping estimates of Minot and Baulch (2004). All three specifications show a positive and statistically significant relationship between provincial poverty and tariffs, indicating that the reduction in U.S. tariffs is associated with a cross province differences in poverty reduction. Additionally, the result is meaningful in an economic sense. The difference in log poverty associated with a one standard deviation decrease in provincial tariffs ranges from a drop of 0.28 to 0.34 log points, based on the results reported in columns (2) and (3) respectively. These correspond to a two-year rate of poverty reduction between 33 and 40 percent. A one standard deviation increase in the reduction of provincial tariffs 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. To help provide some perspective on this result, the average decrease in provincial poverty between 2002 and 2004 was 31 percent. Thus, the impact of an increase in exposure is estimated to be very large in comparison to the average decrease in poverty between 2002 and 2004.

Poverty in Vietnam is increasingly a rural phenomenon. As such, I repeat the analysis in Table 6 focusing on the rate of poverty in rural areas. This has two benefits. First, it allows for more direct comparisons with other papers in the literature that report
results focused on rural areas. Second, it allows for additional measures of poverty to be calculated using the 1998 VLSS to form an alternative estimate of the proportional drop in poverty between 1998 and 2002.\textsuperscript{13}

The results are reported in Table 7. The key explanatory variable, provincial tariffs, is still based on all workers within the province, both urban and rural, whereas the dependent variable is now based solely on rural households. Columns (1) through (3) are analogous to those in Table 6, while column (4) is based on double differencing using poverty estimates directly from the 1998 VLSS.\textsuperscript{14} The results are remarkably consistent with those reported in Table 6. The coefficient on provincial tariffs is slightly larger and still statistically significant. Recall that the employment weights used for calculating provincial tariffs include workers in both urban and rural areas. This implicitly assumes a provincial labour market, as opposed to separate urban and rural markets. Given the small size of many of Vietnam’s provinces, this might not be a bad assumption. To my knowledge there is no empirical evidence available on the size of local labour markets in Vietnam.\textsuperscript{15}

An additional concern with provincial tariffs is that it may be picking up trade 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

\textsuperscript{13} Numerous provinces in the 1998 VLSS did not have any urban households sampled. As such, estimates of total poverty (urban plus rural) must necessarily rely on the small area mapping estimates produced by Minot and Baulch (2004). Focusing on rural poverty allows for direct estimation of provincial poverty rates from the 1998 VLSS. Although the sample sizes are relatively small for numerous provinces, the poverty estimates are nonetheless unbiased.

\textsuperscript{14} The number of observations is 58, as compared to 61, for two reasons. The 1998 VLSS did not include any households in Bac Kan and Lai Chau provinces. I also exclude the observation for Binh Phuoc because the estimated level of poverty using the 1998 VLSS seems unreasonably low.

\textsuperscript{15} Calculating drops in provincial tariffs using employment weights based solely on rural workers leads to a very similar estimate of the tariff cuts experienced by each province. The correlation between the two tariff cut series, using total employment and rural employment weights, is 0.85. Regression results using provincial tariffs calculated using rural employment weights are available upon request.
along with the impact of the tariff cuts. Furthermore, changes in Vietnam’s trade policy could also be correlated with provincial tariffs. These concerns are investigated in McCaig (2009) and do not influence the main results.

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 behaviour 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. 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.

VII. LABOUR MARKET TRANSMISSION MECHANISMS

This section aims to confirm and to explain the above results. Given the extent of poverty reduction, intuitively one would expect to find changes in the labour market, particularly for unskilled workers, which are consistent with this pattern. Furthermore, investigation of these labour market channels helps to explain how the tariff cuts led to reductions in poverty. Below, I examine the reallocation of labour across provinces and changes in wages.
VII.1 Inter-provincial migration

The previous regression results are based on differential responses across provinces to the cuts in U.S. tariffs. Most conventional models of international trade assume perfect mobility of labour across industries. Implicit in these models is the free mobility of labour across geographic units within a country as workers relocate across industries and potentially have to relocate geographically to do so.\footnote{Kovak (2010) provides an interesting extension of a specific factors model that features limited mobility across geographic units within a country.} If, however, workers are limited in terms of their ability to relocate geographically, then this could lead to differential responses in outcomes such as wages and poverty across geographic units in the short-run following changes in trade policy.

Evidence on inter-provincial mobility within Vietnam is rather limited during the time period in question. Two sources of information on the inter-provincial flow of migrants are available: the 1999 census, which provides information on the movement of workers across provinces between 1994 and 1999, and the 2004-2006 VHLSS household panel, which provides information on inter-provincial mobility between 2004 and 2006. Neither data source covers the period of primary interest, 2002 to 2004, but the information is nonetheless informative and the best available. I discuss each source of migration information in turn below with a focus on the relationship between skill level, as proxied by education, and migration.
Between 1994 and 1999 only 2.2% of household heads reported moving across provincial boundaries.\(^\text{17}\) When the estimates are separated by education level a monotonic relationship between education and the share of household heads that migrated is evident. The shares of household heads moving across provinces are 1.0, 1.2, 2.4 and 4.2 percent, respectively, for those with no formal education, primary education, lower secondary education, and upper secondary education, respectively. Thus, prior to the BTA unskilled workers were less likely to migrate between provinces than skilled workers.

Following the BTA, the pattern is very similar. Using the household panel between the 2004 and 2006 VHLSS, if individuals left the household between the two surveys for work reasons then the survey respondent was asked in which province the individual works. Only 1.6% of the individuals in the 2004-2006 VHLSS reported moving across provinces for work reasons. This estimate is slightly lower than that for the period between 1994 and 1999, but the time period considered is shorter and the definition of migration is restricted to those individuals that reported doing so for work reasons. The census migration estimate, by comparison, included all reasons for migrating, both work and non-work related. As in the census, the estimates monotonically increase with educational achievement. For individuals with no formal education, a primary education, a lower secondary education, and an upper secondary education the migration rates are 0.1, 0.7, 1.7, and 2.8 percent respectively. Thus, whether using migration data prior to or following the BTA, the overall movement of workers between provinces seems rather low given the differences in labour conditions. For example, in 2002, the ratio of the mean wage for unskilled workers, individuals with less than 6 years

---

\(^{17}\) I restrict the analysis to household heads as I do not want to conflate the movement of attached dependents in the migration estimates.
of formal education, between Ho Chi Minh City and Bac Kan, the provinces with the highest and lowest wage rates, was 5.2.

Although overall migration rates are relatively low, on an annual basis they seem to have risen following the BTA and migration is directed towards the provinces that received the largest tariff cuts. Table 8 shows results from regressing the number of migrants received on the change in provincial tariffs. With the sole exception of household heads with no formal education in the 1999 census, there is a strong relationship between changes in provincial tariffs and migration flows before and after the BTA. Provinces that experienced the greatest reduction in U.S. tariffs received greater numbers of migrants before and after the BTA. Interestingly, the point estimates are lower for workers with no formal education or only primary education than for more educated workers. This suggests that unskilled workers are less responsive to differences in economic conditions across provinces than skilled workers, which may be one reason for the differential poverty response across provinces documented above.

VII.2 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 reported working in the past 12
months, while 29 percent of these workers reported working for wages for their most
time-consuming job.\footnote{For both surveys, these are simple averages, unadjusted for sampling weights.}

I examine how the drop in U.S. tariffs influenced provincial wages. If labour is
imperfectly mobile across provinces, as suggested by the discussion above, one would
expect to find a relationship between changes in provincial wages and exposure to the
tariff cuts. I employ the same regression frameworks as above except the dependent
variable is the logarithm of the mean hourly wage and the logarithm of the mean hourly
wage in 2002 replaces the natural logarithm of poverty in 2002 as an explanatory
variable. Specifically, I use equation (7) augmented with the same initial conditions as
used in column (2) of Tables 6 and 7. Unfortunately, for a large number of provinces
there are insufficient observations on wage earners in the 1998 VLSS to construct reliable
estimates of mean wages.\footnote{12 out of 59 provinces have fewer than 10 wage observations and another 9 provinces have fewer than 20
observations. This includes both rural and urban workers.} As such, it is not possible to employ the double differencing
strategy used in the poverty regressions.

The results are reported in Table 9 for all wage earners and subsamples of
workers based on education. For all wage earners the change in tariffs is negatively
associated with growth in provincial wages, suggesting that provinces that experienced
greater reductions in provincial tariffs experienced faster than average wage growth, 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 drop in provincial tariffs is associated with faster growth of the mean provincial wage
and the result is statistically significant. A one-standard deviation increase in exposure to
the U.S. tariff cuts is associated with a 4.6 percent increase in the mean provincial hourly

\footnote{For both surveys, these are simple averages, unadjusted for sampling weights.}
\footnote{12 out of 59 provinces have fewer than 10 wage observations and another 9 provinces have fewer than 20
observations. This includes both rural and urban workers.}
wage for workers with at most a primary education. For workers with some degree of lower secondary education the point estimate is smaller and no longer statistically significant. Finally, for workers with more than a lower secondary education the impact of changes in provincial tariffs on wages is negligible. Note that the estimate of the coefficient on provincial tariffs drops in magnitude as the level of education increases. This is consistent with the large increase in exports of low-skilled labour-intensive goods creating a positive labour demand shock for low-skilled workers relative to more skilled workers. Moreover, this pattern is consistent with the lower inter-provincial migration rates of unskilled workers relative to skilled workers.

I find similar results for workers in rural areas, as reported in Table 10. The estimate of the coefficient on provincial tariffs is negative, but not statistically significant for regressions involving all rural workers, as reported in column (1). However, as in Table 9, the coefficient estimate is largest in magnitude for the least educated workers and decreases with education. Wage growth was highest for the least skilled rural workers, those with at most a primary education, in the most exposed provinces. Medium skilled rural workers, those with some degree of lower secondary education, also experienced more rapid wage growth in association with exposure to the U.S. tariff cuts, but the estimate is smaller than for the least skilled workers and not statistically significant. Finally, the effect of changes in provincial tariffs on the growth of mean provincial wages for the most skilled workers, those with more than a lower secondary education, is fairly close to 0 and is not statistically significant.
VIII. 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 changes in poverty across provinces in Vietnam between 2002 and 2004. I estimate provincial tariffs based on weighting industry tariffs with the share of workers within a province that worked in that industry prior to the BTA. As such, although the changes in U.S. tariffs are arguably exogenous, the weighting of industry tariffs by pre-BTA employment shares introduces the possibility of confounding trends in a regression of changes in poverty on changes in provincial tariffs. As is common in the literature, I attempt to mitigate the problem of confounding trends by including controls for initial conditions, such as aggregate employment shares. Additionally, I use data from a period before the BTA to difference away time invariant trends. Both procedures lead to a similar conclusion: provinces that experienced the greatest reduction in U.S. tariffs experienced faster than average reductions in poverty.

Turning to labour market conditions, I document that worker migration between provinces is not large, either prior to the BTA or following the BTA. Additionally, unskilled workers are less likely to move across provinces than skilled workers. Finally, provinces that experienced larger drops in U.S. tariffs experienced greater inflows of migrants, but the relationship is weaker for unskilled workers than for skilled workers. The low levels of inter-provincial migration, especially of unskilled workers, help to explain why some provinces benefited more than others in the period immediately following the implementation of the BTA.
Finally, I document that wage growth for unskilled workers was more rapid in the provinces most exposed to the U.S. tariff cuts. Wage growth for skilled workers is negligibly related to changes in provincial tariffs. This pattern is consistent with the positive shock to the demand for unskilled labour that the BTA created.

One limitation of the paper is its inability to address the overall impact of the BTA as the econometric framework is based on differential responses across provinces. Nonetheless, this is the first paper, to the author’s knowledge, that provides a direct examination of increased foreign market access on poverty in a developing country. Moreover, like Topalova (forthcoming) and Kovak (2010), it demonstrates the importance of sub-national variation in the response to trade shocks. This too is largely overlooked in the existing literature which mostly focuses on variation across industries.

The paper focuses exclusively on the short-run impacts of a reduction in foreign market tariffs for exports from a developing country. It takes advantage of a unique trade shock created by the 2001 BTA which led to an immediate decrease in U.S. tariffs on virtually all Vietnamese exports. While the U.S. tariff cuts are shown to have led to greater decreases in poverty in more exposed provinces, this is not necessarily the net impact of the trade agreement, as many of Vietnam’s commitments were not implemented within the period of study. Indeed, most of these were not scheduled to be completed until three or four years after the agreement came into force and some have ten years before they are required to be implemented. As such, the impact of Vietnam’s BTA commitments on poverty and other outcomes of interest remains an outstanding question.
REFERENCES


Kovak, B. 2010. Regional labor market effects of trade policy: Evidence from Brazilian liberalization.


Figure 1 – U.S. tariff cuts versus the share of unskilled workers by industry
Note: In the upper panel unskilled workers are defined as those with five years of education or less while in the bottom panel unskilled workers are defined as those with nine years of education or less.
Figure 2 – U.S. tariff cuts by 2-digit ISIC industry
Table 1 - Vietnamese exports to and imports from the U.S., 1997-2004

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exports</strong></td>
<td>Value (million USD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>388</td>
<td>553</td>
<td>609</td>
<td>822</td>
<td>1053</td>
<td>2395</td>
<td>4555</td>
<td>5276</td>
<td>6630</td>
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<tr>
<td>Imports</td>
<td>278</td>
<td>274</td>
<td>291</td>
<td>368</td>
<td>461</td>
<td>580</td>
<td>1324</td>
<td>1163</td>
<td>1192</td>
</tr>
<tr>
<td><strong>Growth over previous year (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports</td>
<td>22</td>
<td>43</td>
<td>10</td>
<td>35</td>
<td>28</td>
<td>128</td>
<td>90</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td>Imports</td>
<td>-55</td>
<td>-1</td>
<td>6</td>
<td>27</td>
<td>25</td>
<td>26</td>
<td>128</td>
<td>-12</td>
<td>2</td>
</tr>
</tbody>
</table>

Imports are general imports and exports are FAS exports.
Table 2 - Main commodity exports from Vietnam to the U.S.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td>Articles of apparel and clothing accessories</td>
<td>2571</td>
<td>276.5</td>
<td>48.7</td>
</tr>
<tr>
<td>3</td>
<td>Fish</td>
<td>568</td>
<td>5.9</td>
<td>10.8</td>
</tr>
<tr>
<td>85</td>
<td>Footwear</td>
<td>475</td>
<td>53.2</td>
<td>9.0</td>
</tr>
<tr>
<td>82</td>
<td>Furniture</td>
<td>386</td>
<td>206.4</td>
<td>7.3</td>
</tr>
<tr>
<td>33</td>
<td>Petroleum</td>
<td>349</td>
<td>24.0</td>
<td>6.6</td>
</tr>
<tr>
<td>5</td>
<td>Vegetables and fruit</td>
<td>184</td>
<td>54.2</td>
<td>3.5</td>
</tr>
<tr>
<td>7</td>
<td>Coffee and tea</td>
<td>144</td>
<td>17.3</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Source: Author’s calculations from data downloaded from the U.S. International Trade Commission’s website.
Table 3 - Summary of U.S. tariffs applied to imports from Vietnam

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

Source: Author's own calculations based on the USITC'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>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty Headcount Ratio 2002</td>
<td>0.322</td>
<td>0.182</td>
<td>0.020</td>
<td>0.766</td>
</tr>
<tr>
<td>Poverty Headcount Ratio 2004</td>
<td>0.229</td>
<td>0.157</td>
<td>0.000</td>
<td>0.689</td>
</tr>
<tr>
<td>Proportional Drop in Poverty, 2002 to 2004</td>
<td>0.311</td>
<td>0.221</td>
<td>-0.210</td>
<td>1.000</td>
</tr>
<tr>
<td>Share of workers in:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture, 2002</td>
<td>0.599</td>
<td>0.188</td>
<td>0.072</td>
<td>0.909</td>
</tr>
<tr>
<td>Aquaculture, 2002</td>
<td>0.034</td>
<td>0.063</td>
<td>0.000</td>
<td>0.428</td>
</tr>
<tr>
<td>Mining, 2002</td>
<td>0.008</td>
<td>0.018</td>
<td>0.000</td>
<td>0.136</td>
</tr>
<tr>
<td>Manufacturing, 2002</td>
<td>0.097</td>
<td>0.066</td>
<td>0.004</td>
<td>0.293</td>
</tr>
<tr>
<td>Share of workers with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education, 2002</td>
<td>0.163</td>
<td>0.068</td>
<td>0.090</td>
<td>0.391</td>
</tr>
<tr>
<td>Some degree of primary education, 2002</td>
<td>0.335</td>
<td>0.081</td>
<td>0.161</td>
<td>0.494</td>
</tr>
<tr>
<td>Some degree of lower secondary education, 2002</td>
<td>0.338</td>
<td>0.084</td>
<td>0.175</td>
<td>0.506</td>
</tr>
<tr>
<td>More than lower secondary education, 2002</td>
<td>0.164</td>
<td>0.069</td>
<td>0.044</td>
<td>0.444</td>
</tr>
<tr>
<td></td>
<td>MFN</td>
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<tr>
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<td>-----------</td>
<td>-------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1997</td>
<td>2001</td>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>0.940</td>
<td>1.000</td>
<td></td>
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</tr>
<tr>
<td>2005</td>
<td>0.849</td>
<td>0.912</td>
<td>1.000</td>
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<table>
<thead>
<tr>
<th></th>
<th>Column 2</th>
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<td></td>
<td>1997</td>
<td>2001</td>
<td>2005</td>
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<tr>
<td>1997</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>0.991</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>0.978</td>
<td>0.984</td>
<td>1.000</td>
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</table>

Note: The autocorrelations are done at the 4-digit HS level.
<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
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<tbody>
<tr>
<td>Change in provincial tariffs</td>
<td>24.021</td>
<td>21.249</td>
<td>25.365</td>
</tr>
<tr>
<td></td>
<td>(6.602)***</td>
<td>(7.602)***</td>
<td>(6.055)***</td>
</tr>
<tr>
<td>ln(poverty 2002)</td>
<td>-0.019</td>
<td>-0.019</td>
<td>-0.019</td>
</tr>
<tr>
<td></td>
<td>(0.177)</td>
<td>(0.177)</td>
<td>(0.177)</td>
</tr>
<tr>
<td>Rural share of the population, 2002</td>
<td>0.992</td>
<td>0.992</td>
<td>0.992</td>
</tr>
<tr>
<td></td>
<td>(0.783)</td>
<td>(0.783)</td>
<td>(0.783)</td>
</tr>
<tr>
<td>Ethnic minority share of the population, 2002</td>
<td>0.210</td>
<td>0.210</td>
<td>0.210</td>
</tr>
<tr>
<td></td>
<td>(0.334)</td>
<td>(0.334)</td>
<td>(0.334)</td>
</tr>
<tr>
<td>Share of population with some to complete primary education 2002</td>
<td>-0.569</td>
<td>-0.569</td>
<td>-0.569</td>
</tr>
<tr>
<td></td>
<td>(1.539)</td>
<td>(1.539)</td>
<td>(1.539)</td>
</tr>
<tr>
<td>Share of population with some to complete lower secondary education</td>
<td>-0.686</td>
<td>-0.686</td>
<td>-0.686</td>
</tr>
<tr>
<td></td>
<td>(0.994)</td>
<td>(0.994)</td>
<td>(0.994)</td>
</tr>
<tr>
<td>Share of population with some to complete upper secondary education</td>
<td>0.392</td>
<td>0.392</td>
<td>0.392</td>
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<tr>
<td></td>
<td>(1.918)</td>
<td>(1.918)</td>
<td>(1.918)</td>
</tr>
<tr>
<td></td>
<td>-1.104</td>
<td>-1.104</td>
<td>-1.104</td>
</tr>
<tr>
<td>Share of workers in agriculture, 2002</td>
<td>(1.107)</td>
<td>(1.107)</td>
<td>(1.107)</td>
</tr>
<tr>
<td>Share of workers in mining, 2002</td>
<td>0.019</td>
<td>0.019</td>
<td>0.019</td>
</tr>
<tr>
<td></td>
<td>(2.004)</td>
<td>(2.004)</td>
<td>(2.004)</td>
</tr>
<tr>
<td>Share of workers in manufacturing, 2002</td>
<td>-1.794</td>
<td>-1.794</td>
<td>-1.794</td>
</tr>
<tr>
<td></td>
<td>(2.004)</td>
<td>(2.004)</td>
<td>(2.004)</td>
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<tr>
<td>Constant</td>
<td>1.626</td>
<td>1.764</td>
<td>2.113</td>
</tr>
<tr>
<td></td>
<td>(0.556)***</td>
<td>(1.167)</td>
<td>(0.567)***</td>
</tr>
<tr>
<td>Observations</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.47</td>
<td>0.50</td>
<td>0.37</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

The dependent variable is the ln change in poverty.

Columns (1) and (2) rely on a single period of data, 2002 to 2004, whereas column (3) uses differences across 2002 to 2004 and 1998 to 2002.
Table 7: Impact of changes in provincial tariffs on changes in rural poverty

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in provincial tariffs</td>
<td>27.415</td>
<td>26.304</td>
<td>28.817</td>
<td>28.277</td>
</tr>
<tr>
<td></td>
<td>(9.586)**</td>
<td>(10.383)**</td>
<td>(8.840)***</td>
<td>(8.403)***</td>
</tr>
<tr>
<td>ln(poverty 2002)</td>
<td>0.006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.197)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural share of the population, 2002</td>
<td>1.123</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.912)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnic minority share of the</td>
<td>0.144</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>population, 2002</td>
<td>(0.359)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of population with some to</td>
<td>-1.173</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>complete primary education 2002</td>
<td></td>
<td>(1.672)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of population with some to</td>
<td>-1.120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>complete lower secondary education</td>
<td></td>
<td>(1.064)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of population with some to</td>
<td>0.114</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>complete upper secondary education</td>
<td></td>
<td>(1.982)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of workers in agriculture, 2002</td>
<td></td>
<td>(1.242)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of workers in mining, 2002</td>
<td></td>
<td>-0.580</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.478)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of workers in manufacturing,</td>
<td></td>
<td>-2.229</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td>(1.774)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1.944</td>
<td>2.934</td>
<td>2.449</td>
<td>2.404</td>
</tr>
<tr>
<td></td>
<td>(0.803)**</td>
<td>(1.602)*</td>
<td>(0.819)***</td>
<td>(0.781)***</td>
</tr>
<tr>
<td>Observations</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>58</td>
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<tr>
<td>R-squared</td>
<td>0.47</td>
<td>0.51</td>
<td>0.39</td>
<td>0.41</td>
</tr>
<tr>
<td>R-squared</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

The dependent variable is the ln change in rural poverty.

Columns (1) and (2) rely on a single period of data, 2002 to 2004, whereas columns (3) and (4) uses differences across 2002 to 2004 and 1998 to 2002.

Column (3) uses poverty estimates in 1998 from Minot and Baulch (2004) while column (4) uses poverty estimates obtained directly from the 1998 VLSS.
<table>
<thead>
<tr>
<th></th>
<th>(1) All</th>
<th>(2) No education</th>
<th>(3) Primary</th>
<th>(4) Lower secondary</th>
<th>(5) Upper secondary</th>
</tr>
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<tbody>
<tr>
<td><strong>Change in provincial tariffs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999 census (pre-BTA)</td>
<td>-36.715</td>
<td>-22.484</td>
<td>-30.496</td>
<td>-38.361</td>
<td>-40.494</td>
</tr>
<tr>
<td></td>
<td>(7.618)**</td>
<td>(18.526)</td>
<td>(9.414)***</td>
<td>(7.723)***</td>
<td>(8.539)***</td>
</tr>
<tr>
<td>Constant</td>
<td>4.994</td>
<td>1.954</td>
<td>3.545</td>
<td>3.796</td>
<td>3.352</td>
</tr>
<tr>
<td></td>
<td>(0.664)**</td>
<td>(1.610)</td>
<td>(0.851)***</td>
<td>(0.689)***</td>
<td>(0.732)***</td>
</tr>
<tr>
<td>Observations</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.24</td>
<td>0.02</td>
<td>0.11</td>
<td>0.23</td>
<td>0.25</td>
</tr>
</tbody>
</table>

|                                      |         |                  |             |                   |                   |
| 2004-2006 VHLSS panel (post-BTA)     |         |                  |             |                   |                   |
| **Change in provincial tariffs**     |         |                  |             |                   |                   |
|                                      | -59.049 | -72.738          | -69.899     | -86.684            | -90.215            |
|                                      | (18.706)** | (25.717)*** | (31.837)** | (22.625)***        | (20.145)***        |
| Constant                             | 2.204   | -5.629           | -2.885      | -2.226             | -1.79              |
|                                      | (1.634) | (2.184)***       | (2.824)     | (2.092)            | (1.909)            |
| Observations                         | 61      | 61               | 61          | 61                 | 61                 |
| R-squared                            | 0.14    | 0.24             | 0.07        | 0.13               | 0.17               |

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

The dependent variable is ln(migrants+1).

The upper panel is based on household heads whereas the bottom panel is based on all individuals that migrated for work reasons.

Column (1) includes all migrants, whereas columns (2) through (5) are conditional on the number of years of education of the migrant.
Table 9: Impact of changes in provincial tariffs on changes in mean wages

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in provincial tariffs</td>
<td>-1.264</td>
<td>-3.550</td>
<td>-1.509</td>
<td>0.351</td>
</tr>
<tr>
<td>ln(poverty 2002)</td>
<td>-0.706</td>
<td>-0.860</td>
<td>-0.783</td>
<td>-0.596</td>
</tr>
<tr>
<td>(1.381)***</td>
<td>(0.113)***</td>
<td>(0.077)***</td>
<td>(0.114)***</td>
<td>(0.145)***</td>
</tr>
<tr>
<td>Rural share of the population, 2002</td>
<td>-0.271</td>
<td>-0.384</td>
<td>-0.463</td>
<td>-0.149</td>
</tr>
<tr>
<td>(0.161)*</td>
<td>(0.217)*</td>
<td>(0.161)***</td>
<td>(0.179)</td>
<td></td>
</tr>
<tr>
<td>Ethnic minority share of the population, 2002</td>
<td>0.091</td>
<td>-0.124</td>
<td>0.069</td>
<td>0.006</td>
</tr>
<tr>
<td>(0.057)</td>
<td>(0.116)</td>
<td>(0.060)</td>
<td>(0.065)</td>
<td></td>
</tr>
<tr>
<td>Share of population with some to complete primary education 2002</td>
<td>-0.498</td>
<td>0.739</td>
<td>0.110</td>
<td>-0.338</td>
</tr>
<tr>
<td>(0.404)</td>
<td>(0.422)*</td>
<td>(0.377)</td>
<td>(0.397)</td>
<td></td>
</tr>
<tr>
<td>Share of population with some to complete lower secondary education</td>
<td>-0.913</td>
<td>-0.079</td>
<td>-0.474</td>
<td>-1.092</td>
</tr>
<tr>
<td>(0.293)***</td>
<td>(0.443)</td>
<td>(0.348)</td>
<td>(0.292)***</td>
<td></td>
</tr>
<tr>
<td>Share of population with some to complete upper secondary education</td>
<td>0.600</td>
<td>0.825</td>
<td>0.234</td>
<td>0.180</td>
</tr>
<tr>
<td>(0.470)</td>
<td>(0.632)</td>
<td>(0.384)</td>
<td>(0.458)</td>
<td></td>
</tr>
<tr>
<td>Share of workers in agriculture, 2002</td>
<td>0.657</td>
<td>0.772</td>
<td>0.667</td>
<td>0.527</td>
</tr>
<tr>
<td>Share of workers in mining, 2002</td>
<td>1.878</td>
<td>2.141</td>
<td>2.173</td>
<td>1.393</td>
</tr>
<tr>
<td>(0.357)***</td>
<td>(0.427)***</td>
<td>(0.507)***</td>
<td>(0.461)***</td>
<td></td>
</tr>
<tr>
<td>Share of workers in manufacturing, 2002</td>
<td>0.803</td>
<td>0.575</td>
<td>0.826</td>
<td>1.122</td>
</tr>
<tr>
<td>(0.386)**</td>
<td>(0.530)</td>
<td>(0.407)**</td>
<td>(0.559)*</td>
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</tr>
<tr>
<td>Constant</td>
<td>1.070</td>
<td>0.158</td>
<td>0.877</td>
<td>1.245</td>
</tr>
<tr>
<td>(0.324)***</td>
<td>(0.418)</td>
<td>(0.305)***</td>
<td>(0.361)***</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.73</td>
<td>0.87</td>
<td>0.67</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%
The dependent variable is the change in the ln mean wage for the respective sample of workers.
Table 10: Impact of changes in provincial tariffs on changes in rural mean wages

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Primary</td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Change in provincial tariffs</td>
<td>-2.747</td>
<td>-3.780</td>
<td>-2.179</td>
<td>-0.896</td>
</tr>
<tr>
<td></td>
<td>(1.512)*</td>
<td>(1.812)**</td>
<td>(1.443)</td>
<td>(1.929)</td>
</tr>
<tr>
<td>In(poverty 2002)</td>
<td>-0.824</td>
<td>-0.925</td>
<td>-0.904</td>
<td>-0.717</td>
</tr>
<tr>
<td></td>
<td>(0.116)**</td>
<td>(0.071)**</td>
<td>(0.103)**</td>
<td>(0.153)**</td>
</tr>
<tr>
<td>Rural share of the population,</td>
<td>-0.301</td>
<td>-0.433</td>
<td>-0.464</td>
<td>-0.422</td>
</tr>
<tr>
<td>2002</td>
<td>(0.224)</td>
<td>(0.241)*</td>
<td>(0.175)**</td>
<td>(0.290)</td>
</tr>
<tr>
<td>Ethnic minority share of the</td>
<td>0.140</td>
<td>-0.219</td>
<td>0.098</td>
<td>0.073</td>
</tr>
<tr>
<td>population, 2002</td>
<td>(0.073)*</td>
<td>(0.108)**</td>
<td>(0.095)</td>
<td>(0.085)</td>
</tr>
<tr>
<td>Share of population with some</td>
<td>0.363</td>
<td>0.773</td>
<td>0.402</td>
<td>0.420</td>
</tr>
<tr>
<td>complete primary education 2002</td>
<td>(0.677)</td>
<td>(0.458)*</td>
<td>(0.568)</td>
<td>(0.564)</td>
</tr>
<tr>
<td>Share of population with some</td>
<td>-0.277</td>
<td>-0.089</td>
<td>-0.229</td>
<td>-0.575</td>
</tr>
<tr>
<td>complete lower secondary education</td>
<td>(0.424)</td>
<td>(0.461)</td>
<td>(0.451)</td>
<td>(0.437)</td>
</tr>
<tr>
<td>Share of population with some</td>
<td>1.180</td>
<td>0.694</td>
<td>0.313</td>
<td>0.765</td>
</tr>
<tr>
<td>complete upper secondary education</td>
<td>(0.671)*</td>
<td>(0.592)</td>
<td>(0.492)</td>
<td>(0.607)</td>
</tr>
<tr>
<td></td>
<td>0.785</td>
<td>0.880</td>
<td>0.633</td>
<td>0.807</td>
</tr>
<tr>
<td>Share of workers in agriculture,</td>
<td>(0.295)**</td>
<td>(0.362)**</td>
<td>(0.299)**</td>
<td>(0.433)*</td>
</tr>
<tr>
<td>2002</td>
<td>1.313</td>
<td>2.255</td>
<td>1.182</td>
<td>0.797</td>
</tr>
<tr>
<td>Share of workers in mining, 2002</td>
<td>(0.392)***</td>
<td>(0.404)***</td>
<td>(0.473)**</td>
<td>(0.568)</td>
</tr>
<tr>
<td>Share of workers in manufacturing, 2002</td>
<td>(0.462)</td>
<td>(0.602)</td>
<td>(0.456)*</td>
<td>(0.675)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.367</td>
<td>0.166</td>
<td>0.761</td>
<td>0.795</td>
</tr>
<tr>
<td></td>
<td>(0.481)</td>
<td>(0.408)</td>
<td>(0.429)*</td>
<td>(0.490)</td>
</tr>
<tr>
<td>Observations</td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.76</td>
<td>0.90</td>
<td>0.75</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

The dependent variable is the change in the ln mean wage for the respective sample of workers.