

## ORIGINAL ARTICLE

# Growth, inequality and poverty in Vietnam: How did trade liberalisation help the poor, 2002–2008

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**Abstract**

Using the Vietnamese Living Standards Surveys for 2002, 2004, 2006 and 2008, we explore how provinces with differential access to trade liberalisation reforms differ in their pro-poor growth performance in Vietnam. Using both non-parametric and parametric estimation, we find strong, robust evidence of pro-poor growth in provinces with greater exposure to trade liberalisation. Using censored and uncensored regressions, the study also shows that increased wages play a critical role in this outcome. Our analysis enables identification of the core mechanisms through which the poor materialise their gains from trade-driven growth in a transition economy.

**KEYWORDS**

censored estimation, growth, inequality, poverty, Vietnam

**INTRODUCTION**

Poverty has attracted the interest of development economists as well as international observers. Trade liberalisation and rapid technological progress have significantly promoted economic growth across the world. Strong economic growth has helped millions of people move out of poverty. However, the poor may benefit least from the fruits of strong economic growth. Son and Kakwani (2008) showed that positive economic growth can go together with an increase in poverty, and negative economic growth can be associated with poverty reduction. Meanwhile, inequality can have a detrimental impact on economic growth, thereby impeding poverty reduction (Alesina & Rodrik, 1994; Deininger & Squire, 1998; Persson & Tabellini, 1994). This consequence has led to the links between growth, poverty and inequality. The core argument in this debate is that for growth to favour the poor, the latter must experience positive income growth. In the most favourable case, the income growth rate of the poor should exceed the average growth rate and the distribution of

growth across the population is therefore crucial (Kraay, 2006).<sup>1</sup>

A body of empirical work estimating the responsiveness of poverty to economic growth has found that the magnitude of this responsiveness (i.e. the growth elasticity of poverty) varies significantly across studies. Ravallion and Chen (1997, p. 378) estimated the elasticity to be  $-3.12$  in 67 developing and transitional economies, which implies that a 1% increase in economic growth is associated with a 3.12% reduction in poverty. Ravallion (2001, p. 1086) estimated an elasticity of  $-2.50$  in the case of 47 developing countries in the 1980s and 1990s. In two separate studies, Collier and Dollar (2001, p. 1789; 2002, pp. 1487–1489) reported elasticities close to  $-2.0$ . Adams Jr (2004, p. 2009) noted elasticities ranging between  $-1.73$  and  $-5.02$  among different groups of countries using data from 60 developing economies. Kalwij and

<sup>1</sup>Ferreira et al. (2010) showed that a low growth rate is one of the causes of Brazil's disappointing record in poverty reduction over the 1985–2004 period. Gasparini et al. (2007) demonstrated that, on average, an annual growth rate of more than 1% could reduce poverty in Latin America and the Caribbean.

Verschoor (2007, p. 818) reported elasticity of  $-1.31$  for 58 developing countries over the 1980–1998 period. Furthermore, focusing on data from the 1990s and early 2000s, Ram (2011) estimated the elasticity to be  $-0.84$ , which is much smaller than that found in the studies mentioned. These results show wide variations in elasticity estimates in these earlier studies.<sup>2</sup>

A common feature of the above studies is that they are based on countrywide data. Although country-level comparisons can paint a useful picture of the poverty–growth–inequality nexus, they are often questionable. This study takes a disaggregated approach, and explores the poverty–growth–inequality nexus across the Vietnamese provinces. An intra-country investigation offers the advantage that the policies triggering pro-poor mechanisms can be defined consistently. This feature also situates our study among a small number that analyse the poverty–growth–inequality relationship across different jurisdictions within one country.

Notably, in a series of studies, Datt and Ravallion (1998, 2002, 2011) and Ravallion and Datt (2002) investigated pro-poor growth across Indian states. Among other things, they found that states that initially scored higher in literacy, farm productivity and land ownership achieved overall better outcomes in poverty reduction.<sup>3</sup> Recently, Gibson et al. (2017) used night lights as the basis for measuring urban growth and found that the economic growth of India's secondary towns has had a greater effect on rural poverty than the growth of large cities. In the Vietnamese context, Kang and Imai (2012) explored pro-poor growth, poverty and inequality, but with a focus on ethnicities and how different ethnic groups fared in pro-poor growth in rural Vietnam during 2002–2006.<sup>4</sup> They found that the effects of economic growth on poverty varied widely across ethnic groups.<sup>5</sup> Nguyen and Pham (2018) showed that economic growth in Vietnam favoured the poor more in the 2000s than in the 1990s. Gibson (2016) analysed the shape of the poverty incidence curve (PIC) in Vietnam and found that with poverty rates of 40%–50%, the PIC is

almost a straight line, so inequality does not alter the headcount, but growth does. Once the poverty rate is down to around 10%, the PIC is strongly curved and it is inequality that makes the biggest difference.

We differ from the aforementioned studies in two major respects. First, our main focus is how trade liberalisation influenced pro-poor growth across the Vietnamese provinces during the 2002 to 2008 period. Our regressions exploited the widespread heterogeneity exhibited by the Vietnamese provinces in their growth, poverty and trade liberalisation over the period. We aim to answer the question whether a province more exposed to trade liberalisation would experience more pro-poor growth. To this relationship, we use growth incidence curves to explore the welfare of the poor, the middle-class and the rich with respect to trade liberalisation. We then decompose the changes in growth into changes in inequality and in poverty in relation to the exposure to trade liberalisation. To check the robustness of the results, we use an econometric model to calculate the magnitude of the impact of growth on poverty in the provinces more exposed to trade liberalisation. Our paper focuses on people whose expenditure per capita below certain poverty lines in Vietnam and the term ‘the poor’ is used as a brevity throughout the paper.

Second, more specifically, we placed the labour market mechanism under the microscope to determine the effects by which trade liberalisation might have reached the poor.<sup>6</sup> Our approach highlights the heterogeneous outcomes in the labour market experiences of different education groups, including those with no education, with primary schooling, lower and upper secondary schooling and vocational schooling.

We identified structural changes in trade liberalisation that may potentially affect the distributional impact of growth in Vietnam. In the celebrated Stolper–Samuelson theorem of factor endowments, switching from autarky to trade may help reduce poverty by increasing the demand for unskilled labour, abundant in Vietnam and bringing with that demand an increase in real wages. Since unskilled labourers are more likely to be poor, trade liberalisation is expected to contribute to poverty reduction in Vietnam. However, the positive effect of trade liberalisation can only materialise under perfect inter-sectoral factor mobility.

The process by which the Vietnamese economy shifted from central planning to a market economy is worth brief elaboration. The *Doi Moi* paradigm implemented in Vietnam in the 1980s led to a period of high economic growth and

<sup>2</sup>Inequality is also thought to be a crucial factor affecting poverty reduction, generally playing a countervailing role (Kakwani, 1993). See Fosu (2009) and Kalwij and Verschoor (2007). A multitude of arguments suggest that in the presence of inequality, the sustainability of economic reforms is not assured and pursuing pro-poor policies becomes politically more difficult (see Fritzen, 2002).

<sup>3</sup>Glewwe and Dang (2011) documented that growth was pro-poor in Vietnam in the 1990s. However, their focus was on methodological issues in pro-poor growth, such as measurement error in survey data and the intertemporal comparability of quintiles. Ayala and Jurado (2011) explored the distribution of growth across Spanish regions.

<sup>4</sup>Using the Vietnam Living Standard Survey (VLSS) of 2002 and 2004, McCaig (2011) empirically investigated the poverty consequences at the provincial level of the increased access of Vietnamese exports to the U.S. market following the 2001 U.S.–Vietnam Bilateral Trade Agreement.

<sup>5</sup>See similar findings in other studies (Imai et al., 2011a, 2011b).

<sup>6</sup>Strictly speaking, we did not aim to assess the impact of reforms on poverty as this would require identification and be counterfactual to what would have happened to poverty without reforms (see Datt & Ravallion, 2002). Rather, we exploited the sizeable variations in the reforms, growth and poverty experiences of the Vietnamese provinces to tease out the channels through which the poor may materialise gains from structural changes.

acted as the primary engine of poverty reduction in the subsequent decade. The poverty rate decreased dramatically from 58.1% in 1993 to 37.4% in 1998 (Glewwe et al., 2002). The 2000s saw further poverty reduction, from 27.9% in 2002 to 14.2% in 2008. The 2002–2007 period witnessed a concomitant increase in economic growth realised at an annual average rate of 8.1%. A myriad of reforms in the 2000s, characterised by firm steps towards private sector development, establishment of the market economy and integration into world markets, cemented the foundation for Vietnam to become an emerging market economy. Among these reforms, for example, were the promulgation of the Enterprise Law, the amendment of the Law on Foreign Investment in 2000, the signing of bilateral and multilateral trade agreements with the United States, the establishment of the ASEAN-China Free Trade Area in 2002 and the ASEAN-Japan Comprehensive Economic Partnership in the early 2000s.<sup>7</sup> Together with other structural reforms and strong economic growth, all these signified fundamental changes in the country's economic activity. Last but not least, the 2000s also witnessed the enhancement of the decentralisation trend precipitated in the 1990s, due to the move from a command economy to a market economy (Painter, 2008), giving the provincial authorities a greater role in poverty alleviation. Obviously, trade liberalisation occurred dramatically during the decade of the 2000s and the poverty rate also decreased significantly during this period. This context provides us an excellent setting to document the impact of trade liberalisation on pro-poor growth in Vietnam.

As the preceding abridged background hints, the reform process of the 2000s in Vietnam presents an excellent set of policy changes for analysing some of the core channels behind pro-poor growth. Utilising non-parametric methods and the Vietnamese Household Living Standards Surveys (VHLSSs) of 2002, 2004, 2006 and 2008 aggregated at province level, we first take a descriptive approach and examine pro-poor growth through growth incidence curves (GIC).

The GIC is a useful tool to evaluate the growth rate in income or consumption between two periods at each percentile of the distribution (Ravallion & Chen, 2003). Next, we use Datt and Ravallion's method (1992), which decomposes the change in the poverty index between two periods into a growth component and a redistribution component. We then investigate the contribution of the growth component to poverty reduction in provinces more exposed to trade liberalisation. This method allows us to identify whether economic growth or inequality plays a larger role in poverty reduction in Vietnam. Finally, we run the regressions to estimate the growth elasticity of poverty resulting from trade liberalisation. In this study, we measure trade liberalisation in terms of tariff reductions on imports in Vietnam. Previous studies,

including Edmonds et al. (2010), Topalova and Khandelwal (2011), Topalova (2010) and McCaig (2011) used tariff reductions as proxies for trade liberalisation. Given the prominent role of income and employment in poverty alleviation, the major avenue for trade liberalisation to trigger distributional mechanisms is likely to be enhanced labour market opportunities through improved wages for a given job.<sup>8</sup> Thus, we took a parametric approach to highlight the key role that labour markets play in pro-poor growth by exploring how hourly wages for individuals have been affected by trade liberalisation.

## DATA: POVERTY, EXPENDITURE AND TRADE LIBERALISATION

The VHLSS's of 2002, 2004, 2006 and 2008 were implemented by the Vietnamese General Statistics Office (GSO) with technical assistance from the World Bank, and were funded by the UNDP. The surveys cover 29,526 households in 2002, 9189 in 2004, 9189 in 2006 and 9189 in 2008.<sup>9</sup> This study considers only rural poverty because poverty is mostly a rural phenomenon in Vietnam.<sup>10</sup>

VHLSS's include two kinds of samples: consumption and income samples. The size of the income sample is much larger than that of the consumption sample. However, the present study uses consumption samples for the following reasons. First, expenditure data can be tracked more accurately than income data, because it is obviously much easier to answer questions on expenditure. Moreover, many households do not want to reveal their true income and it is difficult to compute the exact income of an individual in self-employed households. Second, household welfare only increases with increased income when they use that income for their consumption. Past income (savings) or borrowing is also likely to be utilised for consumption purposes. Finally, the GSO uses VHLSS's to calculate the poverty line based on real expenditure on consumption, and thus, the analysis will be consistent if we use the GSO definition of poverty.

We used the Vietnamese GSO poverty line to calculate the number of poor households. This poverty line is based on the

<sup>8</sup>There are, of course, several other possible avenues for trade liberalisation to affect poverty, such as reduced prices of staple foods, increases in government transfers and so on. However, it is largely agreed that higher pay generally constitutes the key component of poverty reduction.

<sup>9</sup>These surveys are consistent in methodology and comparability over time. Note that according to World Bank (2012), the design of the 2010 VHLSS and subsequent rounds was improved to adapt to the change in economic conditions and the consumption patterns of poor households, and the assessment of per capita consumption was revised to reflect a more comprehensive measure of welfare.

<sup>10</sup>About 75% of the Vietnamese population live in rural areas.

<sup>7</sup>Vietnam joined the World Trade Organisation in 2007.

minimum level of expenditure required to satisfy basic nutritional and other needs. The poverty lines are adjusted for spatial (i.e. regional) and temporal differences. The estimated poverty lines were 1,915,000 VND per person per year at January 2002 prices, 2,077,000 VND per person per year at January 2004 prices, 2,559,000 VND per person per year at January 2006 prices and 3,358,000 VND per person per year at January 2008 prices. We defined a household as poor when the consumption of that household was below the poverty line. This study used the ‘head-count’ measure of poverty.

There was a province split between 2002 and 2004, increasing the total number of provinces from 61 in 2002 to 64 in 2004. The number of households that were surveyed in 2002 is large, and we therefore created new provinces in the 2002 data, based on the households belonging to the new provinces in 2004. Thus, we observed 64 provinces over 4 years.

To measure the intensity of trade liberalisation, we utilised trade data from the United Nations COMTRADE database with six-digit harmonised system codes. These codes were then matched with International Standard Industry Classification – Revision 3 sectors in the VHLSS questionnaires. Our measure of trade liberalisation was tariff reductions. To construct tariff reductions, tariff lines were taken from the World Integrated Trade System. As with the VHLSS’s, the lines were at the two-digit industry level. We constructed a provincial measure of tariff reductions by calculating the change in tariffs between 2002 and 2008, with employment at the industry-level serving as the weights. That is, for each industry  $i$  in province  $p$  we calculated the number of workers,<sup>11</sup>  $L_{ip}$ , using VHLSS 2002, then, estimated the provincial reduction in tariffs between 2002 and 2008 as follows:

$$R_p = \sum L_{ip} (t_{i2008} - t_{i2002}) / L_p \quad (1)$$

where  $t_{i2002}$  and  $t_{i2008}$  are the tariffs in industry  $i$  in 2002 and 2008, respectively, and  $L_p$  is the total number of workers in province  $p$ . The tariffs in non-trade sectors and agriculture were set at zero. Note that the way this measure was constructed is analogous to that used by McCaig (2011) in his study on U.S. market access and poverty in Vietnam, and Topalova’s paper (2010) on evaluating the impact of district-level tariff reductions on poverty reduction in India. Between 2002 and 2004, the average tariff reduction was 0.99.

As noted, our focus on Vietnam was predicated on the ample evidence that the Vietnamese provinces differ noticeably in their growth, poverty and trade liberalisation. For example, the heterogeneity of Vietnamese provinces may be reflected by migration patterns. Nguyen and McPeak (2010), who used annual survey data on migration during the 5 years prior to the 2009 census, documented that inter-provincial

migration in Vietnam was driven primarily by moving costs, expected income differentials, disparity in the quality of public services offered by provinces and the demographic composition at destination and source.<sup>12</sup>

Our study considered a set of independent variables at the individual, household and community levels. At the individual level, we considered the following: respondent’s education (i.e. primary education incompleteness as the reference group, primary education completion, lower secondary education completion, upper secondary education completion and vocational education completion or above), age and age squared, and gender (males vs. females as the reference group). At the household level, we considered the household head’s education (i.e. primary education incompleteness as the reference group, primary education completion, lower secondary education completion, upper secondary education completion and vocational education completion or above). At the community level, we considered a set of dichotomous variables indicating if the community has a car way, upper-school, post office or market, as well as a set of dichotomous variables representing seven regions (i.e. Red River Delta, Northern Uplands, North West, South Central Coast, Central Highlands, South East, Mekong River Delta and North Central Coast as the reference group).

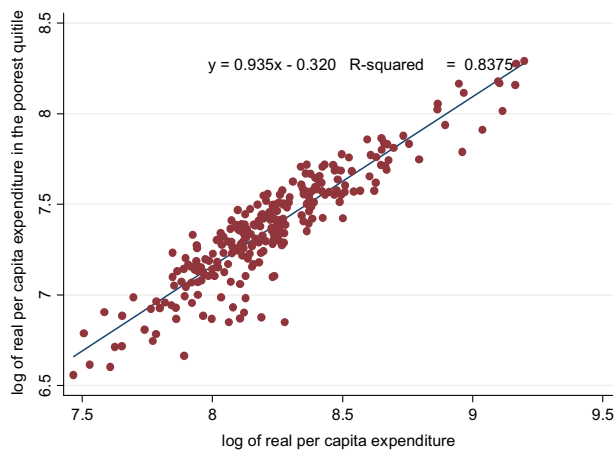
## DID GROWTH FAVOUR THE POOR IN VIETNAM IN THE 2000s?

### Expenditure growth and poverty reduction

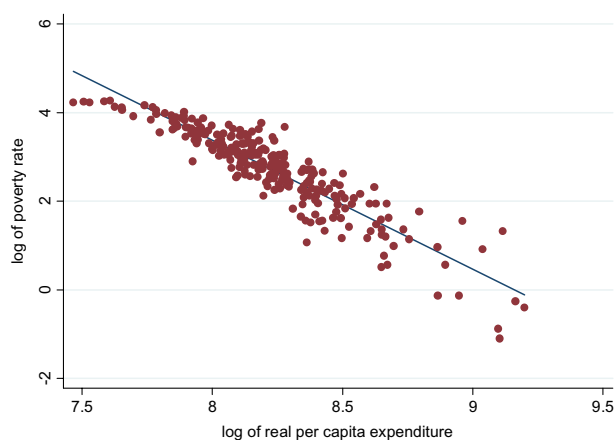
We start by examining whether the growth in mean expenditure was associated with poverty reduction. To illustrate this growth, we take log of real per capita expenditure. Figure 1 illustrates the relationship between the logarithm of real per capita expenditure of the poorest quintile, and the logarithm

<sup>12</sup>Despite the notable success in growth favouring the poor that Vietnam achieved during the years of *Doi Moi*, there was ample evidence of vast discrepancies among provinces in poverty alleviation outcomes. Epitomising these disparities, for instance, was the major peasant disturbance that rocked the Thai Binh province in northern Vietnam in mid-1997. This area is the most important northern rice basket and has always been regarded as a strong bastion of the communist regime. In 2001 and again in 2004, unprecedented protests and uprisings took place in the Central Highlands region, followed by a massive migration of thousands of people from different ethnic minorities into Cambodia. All these protests and uprisings in Vietnam, a country well-known for its stability and discipline, clearly attest to the existence of deep discontent within the population. The documented protests and uprisings were undoubtedly rooted in the high levels of minority poverty, environmental degradation and unequal distribution of natural resources. See the Writenet Report commissioned by United Nations High Commissioner for Refugees (Saleminck, 2002). Kleinen (1999) provides an excellent micro-analysis of problems facing a traditional northern Vietnamese village.

<sup>11</sup>Because we used household data, we were unable to utilise output or revenue share in this calculation.



**FIGURE 1** Expenditure per capita of the poorest quintile and log real expenditure per capita



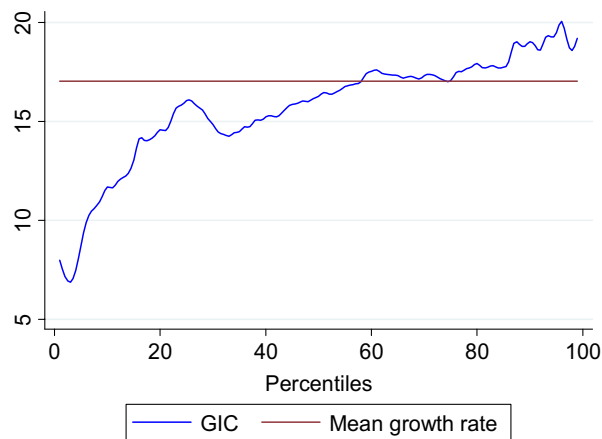
**FIGURE 2** Poverty rate and log real expenditure per capita

of real per capita expenditure for 254 province-year observations. The result shows that there was a strong, positive, linear correlation between the two variables, with a slope of 0.935. In other words, the average per capita expenditure of the poor increases in proportion to the average expenditure per capita. This result is consistent with that of Dollar and Kraay (2002), who used country-level data.

To further analyse the distributional impact of growth on poverty, we used the poverty line, rather than the poorest quintile, in each province. Figure 2 plots the poverty rate against the growth in expenditure per capita (on the horizontal axis). The figure indicates that provinces with higher expenditure growth have lower poverty rates.

### Trade liberalisation and growth incidence curves

The strong correlation between the expenditure of the poor and average expenditure does not necessarily mean that growth increases the expenditure of the poor as much as that



Corresponding percentile	10	15	20	25	30
Rate of pro-poor growth	9.22	10.23	11.22	12.06	12.63

**FIGURE 3** Growth-incidence curves 2002–2008

of the rich. It may be that the rich gain more than the poor in the growth process. In this section and the next, we report on how growth was shared by different segments of the population (poor, middle-class and rich).

The GIC illustrates the growth rate of income (or consumption) for each percentile of the distribution (Ravallion & Chen, 2003). We used this device to explore the welfare of the poor, the middle-class, and the rich in relation to trade liberalisation. As noted, this approach is descriptive and aims to establish the basis for parametric analysis in the next section. Figure 3 shows the GICs for the whole of rural Vietnam over the 2002–2008 period.<sup>13</sup> The figure illustrates heterogeneous growth patterns. We define the poor as those who were situated in the 0 to 20th percentiles of the spectrum of expenditure per capita, the lower middle-class as falling between the 20th and 50th percentiles, the upper middle-class as between the 50th and 80th percentiles and the rich as between the 80th and 100th percentiles. Growth was pro-poor for the whole period 2002–2008, given that the GIC was always above zero. However, the *extreme* poor (10th percentile) did not benefit much from this growth, since the GIC does not decrease monotonically, and the consumption growth of the poorest was less than the overall average consumption growth (the horizontal line). In fact, the GICs show that the richest benefited the most from growth.<sup>14</sup>

<sup>13</sup>See Kang and Imai (2012, p. 532) for a similar GIC for the 2002–2006 period, but at the household level.

<sup>14</sup>The province-based GIC constructed for urban Vietnam (where the poverty rate is 5.88%, 4.00%, 3.47% and 3.44% in 2002, 2004, 2006 and 2008, respectively) suggests that pro-poor growth is stronger in urban than in rural areas. As 75% of the Vietnamese population live in rural areas and poverty in urban areas is critical, we consider only rural areas in this article.

Next, we consider the GICs in tandem with trade liberalisation. To distinguish the provinces with higher versus lower exposure to trade liberalisation, we split the sample into two, based on the intensities of trade liberalisation. Utilising the measure of tariff reductions, as mentioned in Section 2,<sup>15</sup> and notwithstanding the limitations of the descriptive approach, Figure 4 indicates importantly that the consumption growth of the poor was greater in provinces with greater exposure to tariff reductions than in provinces with lower tariff reductions. The rates of pro-poor growth for different percentiles provided beneath the GICs show that the extreme poor, who are between the 0 to 10th percentiles, experienced consumption growth of 13.35% in provinces with higher tariff reductions, whereas provinces with lower tariff reductions are associated with significantly lower growth, in the order of 6.55%. This evidence suggests that trade liberalisation is associated with higher expenditure levels for the poor in provinces with greater exposure to trade liberalisation during the sample period.

## TRADE LIBERALISATION AND THE GROWTH AND REDISTRIBUTION COMPONENTS OF POVERTY

Inequality is also an important factor that affects improvement in the situation of the poor. In a setting with high levels of inequality, all the benefits of strong economic growth may go to the rich, as opposed to the poor. Did economic growth or inequality play a greater role in poverty in Vietnam in the 2000s? To shed light on this question, we first explored the general trend in inequality over the sample period. We decomposed the change in poverty into two components, one relating to the change in expenditure (growth component) and the other to the change in inequality (redistribution component). The magnitude of the two components indicates the contribution of changes in expenditure and changes in expenditure inequality to changes in poverty levels (Datt & Ravallion, 1992).

We followed Foster et al. (1984) in calculating the  $P_\alpha$  class of poverty measures. The general formula for the  $P_\alpha$  is as follows:

$$P_\alpha = (1/N) \sum_{i=1}^N \max \left( 0, \left( \frac{Z - Y_i}{Z} \right)^\alpha \right),$$

where  $Z$  is the poverty line,  $Y_i$  is the expenditure level of individual  $i$ ,  $N$  is the total number of individuals in the survey and  $\alpha$  is a parameter which allows the sensitivity of the depth of poverty to be considered. When  $\alpha = 0$ , this formula becomes the headcount index. When the values of  $\alpha$  are greater than zero, the index is sensitive to the depth of poverty and it becomes increasingly sensitive as  $\alpha$  increases.

Datt and Ravallion (1992) decomposed the change in the Foster, Greer and Thorbecke poverty index between two periods into a growth component—the change in poverty due to a change in the average income or expenditure while holding the Lorenz curve constant—and a redistribution component—the change in poverty due to a change in the Lorenz curve while holding mean income or expenditure unchanged.

The Lorenz curve represents the structure of relative income inequalities. The poverty measure  $P_t$  at period  $t$  is

$$P_t = P(z/\mu, L_t),$$

where  $z$  is the poverty line,  $\mu_t$  is the mean income and  $L_t$  is a vector of parameters which fully describes the Lorenz curve at period  $t$ .

A change in poverty between periods  $t$  and  $t + n$  is as follows:

$$P_{t+n} - P_t = G(t, t + n; r) + D(t, t + n; r) + R(t, t + n; r),$$

where

$R(t, t + n; r)$  is the residual.

Growth component =  $G(t, t + n; r) = P(z/\mu_{t+n}, L_r) - P(z/\mu_t, L_r)$ ,

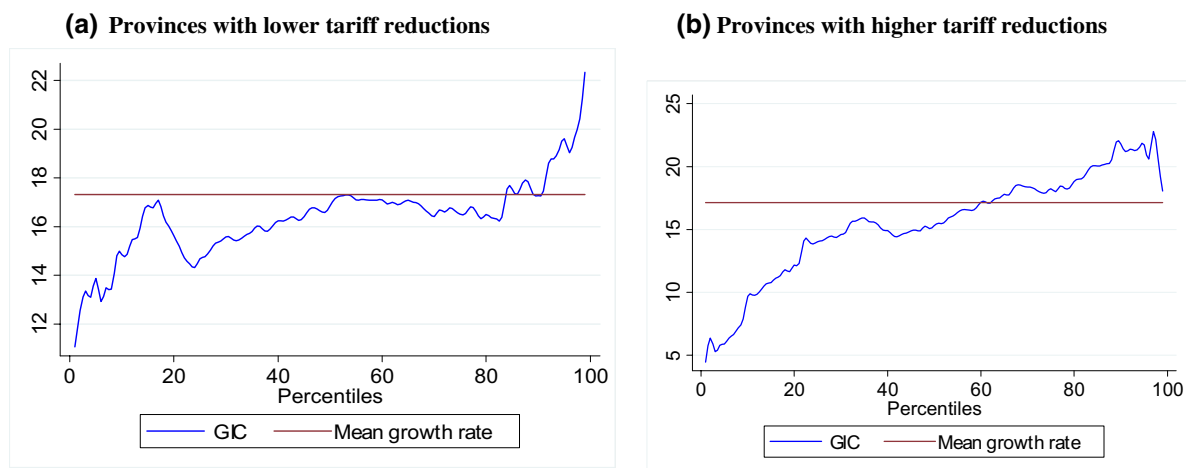
Redistribution component =  $D(t, t + n; r) = P(z/\mu_r, L_{t+n}) - P(z/\mu_r, L_t)$ .

The residual exists whenever the marginal effects on the poverty index of changes in the mean (Lorenz curve) depend on the precise Lorenz curve (mean).

Table 1 reports poverty decomposed into the growth and redistribution components in Vietnam as a whole. Negative figures are associated with the poverty-reducing effect of expenditure growth and inequality. The growth component seems to have played the most significant role in poverty reduction. The redistribution (i.e. inequality) component also contributed to this outcome, particularly over the period 2004–2008. The latter result is likely to have occurred because there was a decline in inequality in Vietnam over this period. Meanwhile, the rise in inequality between 2002 and 2004 increased the poverty rate by 0.3%, but the growth in the same period reduced poverty by 10%, so that the poverty rate still declined dramatically by 9.3% overall.<sup>16</sup> These results concur with those of Kang and Imai (2012).

<sup>16</sup>Regarding the decomposition of poverty in urban areas, the results for urban areas imply that a Gini inequality index of expenditure per capita might not fully capture the measure of inequality (e.g. it would include the value of household durables and assets). The results for rural areas display the decomposition of poverty measures and show that growth in expenditure is an important factor in poverty reduction in rural areas.

<sup>15</sup>The samples are divided with respect to the means of the measures.



Corresponding percentile	10	15	20	25	30
Rate of pro-poor growth	6.55	7.79	8.74	9.73	10.5

Corresponding percentile	10	15	20	25	30
Rate of pro-poor growth	13.35	14.18	14.73	14.72	14.81

Sample split based on the extent of the change in tariffs between 2002 and 2008.

FIGURE 4 Growth-incidence curves: Trade liberalisation

TABLE 1 Poverty decomposition into growth and redistribution components for all Vietnam

Period	Growth component	Redistribution component	Residual	Total change in poverty
Headcount index				
2002–2004	–0.104969	0.00335	0.007714	–0.093905
2004–2006	–0.0364	–0.004485	0.002487	–0.038398
2006–2008	–0.000768	–0.014527	0.000114	–0.015181
Poverty gap index				
2002–2004	–0.033045	0.0098	0.000342	–0.022903
2004–2006	–0.011154	–0.000423	0.000312	–0.011265
2006–2008	–0.000237	–0.003176	0.00002	–0.003393
Poverty gap squared				
2002–2004	–0.013556	0.007071	–0.001182	–0.007667
2004–2006	–0.004767	0.00005	0.000048	–0.004669
2006–2008	–0.0001	–0.000987	0.000007	–0.00108

Source: Authors' calculations, based on the VHLSSs: 2002, 2004, 2006 and 2008.

Table 2 decomposes poverty into growth and redistribution based on tariff reductions. Column (5) provides the initial levels (2002) of poverty, poverty gap and poverty gap squared. We normalised the growth components by these initial levels to account for the fact that provinces with higher versus limited exposure to trade liberalisation may have their own initial levels of poverty. The results suggest that the growth component has a greater association with poverty reduction, the poverty gap and poverty severity in provinces with greater exposure to trade liberalisation (Column 6).

## ECONOMETRIC MODEL OF THE GROWTH AND INEQUALITY ELASTICITY OF POVERTY

Although the tools above provide important insights into the separate direct effects of growth and inequality on poverty, they do not help in drawing conclusions on the responsiveness of poverty to growth and inequality. How much does a given rate of economic growth reduce poverty? To check the robustness of the results above, we used

TABLE 2 Poverty decomposition into growth and redistribution 2002–2008: Trade liberalisation

	<b>Growth component</b>	<b>Redistribution component</b>	<b>Residual</b>	<b>Total change in poverty</b>	<b>Initial level</b>	<b>Relative change</b>
	(1)	(2)	(3)	(4)	(5)	(6) = (1)/(5)
Headcount index						
Lower tariff reduction	−0.242	0.029	0.015	−0.198	0.45	−0.39
Higher tariff reduction	−0.176	0.027	−0.010	−0.160	0.25	−0.97
Poverty gap index						
Lower tariff reduction	−0.083	0.030	−0.001	−0.053	0.12	−0.69
Higher tariff reduction	−0.043	0.008	−0.003	−0.038	0.056	−0.77
Poverty gap squared						
Lower tariff reduction	−0.035	0.022	−0.006	−0.019	0.044	−0.79
Higher tariff reduction	−0.015	0.004	−0.002	−0.014	0.019	−0.79

Source: Authors' calculations, based on the two household surveys: 2002 and 2008. Sample split based on top 50% and bottom 50% of provinces with respect to the level of access to reforms.

TABLE 3 Growth and inequality elasticity of poverty in rural Vietnam (fixed-effects model)

	<b>Dependent variable: ln(rural poverty rate)</b>			
	<b>Higher tariff reduction</b>	<b>Lower tariff reduction</b>	<b>Higher tariff reduction</b>	<b>Lower tariff reduction</b>
	(1)	(2)	(3)	(4)
Ln (rural expenditure per)	−1.358*** (0.100)	−0.973*** (0.065)	−3.177*** (0.641)	−0.879*** (0.187)
Ln (rural inequality)	1.296*** (0.387)	1.036*** (0.260)	1.700*** (0.532)	0.279 (0.296)
Province fixed-effects	Yes	Yes	Yes	Yes
Province-specific time trend	No	No	Yes	Yes
<i>N</i>	120	128	120	128
Adj. <i>R</i> <sup>2</sup>	0.774	0.898	0.796	0.932

Notes: Sample split based on top 50% and bottom 50% of provinces with respect to tariff reduction. Standard errors in parentheses.

\*\*\**p* < 0.01.

an econometric model to determine the magnitude of the impact of growth on poverty in the provinces more exposed to trade liberalisation.

Our approach was to estimate the growth and inequality elasticities of poverty, following the model suggested by Ravallion and Chen (1997):

$$\ln P_{i,t} = \alpha_0 + \beta_1 \ln \text{EXPEN}_{i,t} + \beta_2 \ln \text{GINI}_{i,t} + \beta_3 \text{TREND} + \mu_i + \varepsilon_{i,t}, \quad (2)$$

where  $P_{i,t}$  is the poverty rate in province  $i$  at time  $t$ , calculated on the basis of the poverty line as described above;  $\text{EXPEN}_{i,t}$  is the mean expenditure of province  $i$  at time  $t$ ;  $\text{GINI}_{i,t}$  is the Gini index of the expenditure of province  $i$  at time  $t$ ;  $\beta_1$  is the elasticity of poverty with respect to expenditure;  $\beta_2$  is the elasticity of poverty with respect to inequality;  $\text{TREND}$  is the province-specific time trend;  $\mu_i$  is a time-invariant province-specific effect; and  $\varepsilon_{i,t}$  is the error term.

We used fixed-effects estimation for the provincial panel data set, which includes 4 years (2002, 2004, 2006 and 2008), to control for time-invariant province effects, such as natural resources, history and geography. Our specific approach to exploring the mechanisms behind pro-poor growth was to split the provinces into two groups, based on their access to tariff reductions. We then explored the magnitudes of poverty elasticities across the two splits in connection with sets of provinces with higher and lower tariff reductions.

Table 3 reports the estimation results of Equation (2) for the rural areas of the provinces.<sup>17</sup> We ran the estimations for

<sup>17</sup>Two provinces have a rural poverty rate equal to zero: Da Nang and Ho Chi Minh, so we take the log of (poverty rate + 1). The results remain unchanged when those two provinces are eliminated from the study. Also, the results are much the same when we use the inverse hyperbolic sine transformation. The results are available upon request.



both model specifications, with and without controlling for province-specific time trends. The results were mostly similar. Without controlling for province-specific time trends, Columns 1 and 2 show that the growth elasticity of poverty was higher in provinces exposed to larger tariff reductions. Specifically, a 1% increase in expenditure per capita led to a 0.97% decrease in poverty in provinces with a lower tariff reduction, and a 1.4% fall in poverty in provinces with a higher tariff reduction. Controlling for province-specific time trends, Columns 3 and 4 also indicate that growth in expenditure per capita made a greater contribution to poverty reduction in provinces more exposed to tariff reductions. The growth elasticity of poverty in provinces more exposed to tariff reductions was greater in the model controlling for province-specific time trends than in the model that did not. A 1% increase in expenditure per capita decreased poverty by 3.2% in provinces exposed to higher tariff reductions and by 0.9% in provinces exposed to lower tariff reductions. These findings suggest that trade liberalisation increases income for the poor.

## WHAT ROLE DO LABOUR MARKETS PLAY?

The evidence so far is that pro-poor growth is likely to be observed in provinces with greater exposure to trade liberalisation. An important question is, what are the mechanisms behind pro-poor growth and how strongly do they work? This section uses an econometric model to answer these questions. The aim is to illuminate the channels through which reforms support pro-poor growth, by accounting for several factors in a rich regression framework.

### Empirical model

A number of studies suggest that an increase in labour income plays a very important role in poverty reductions. For example, McCaig (2011) showed that provinces more exposed to the U.S. tariff cuts experienced faster wage growth for workers with low levels of education—usually the poor in Vietnam. Similarly, Hoang et al. (2019) found strong evidence of the positive impact of good-quality institutions on pro-poor growth in Vietnam and an increase in working hours. Wage-earning and non-farm income are very important components of this outcome. Labour income is also the common denominator upon which to assess the effectiveness of reforms. This warrants a careful investigation of how tariff reductions affect working conditions in the Vietnamese labour market. By employing data that cover nearly 16,000 individuals between the ages of 18 and 60 years in the

VHLSS's, we examined the impact of tariff reductions on hourly wages for the entire sample as well as for different education groups: those without education, and those with primary, lower secondary and upper secondary education, and vocational training or above. Our assumption was that, for the reforms to be pro-poor, tariff reductions would boost the wages of those with no education, who would be much more likely to be at the bottom end of income distribution. Nevertheless, the effect might also be heterogeneous across tariff reductions. Hence, it is important to consider this dimension as well.

To proceed, the following Mincer-type equation is specified:

$$Y_{ijk} = \alpha_1 + \alpha_2 D_k + \alpha_3 X_{ijk} + \alpha_4 D_s + \varepsilon_{ijk} \quad (3)$$

where,  $Y_{ijk}$  is the log real wage per hour for an individual  $i$  living in a household  $j$  and in province  $k$ .  $D_k$  is the provincial reduction in tariffs between 2002 and 2008—( $R_p$ ), as discussed above.  $D_s$  denotes the industry dummies and  $X_{ijk}$  comprises the characteristics of individuals, households and communes. Seven regional dummies ( $D_s$ ) are also controlled for in the model. Standard errors are clustered at the commune level.

Initially, we considered only wage earners and performed an OLS estimation.<sup>18</sup> However, the sample of wage earners (3933 observations) did not cover self-employed workers and the unemployed. The imperfect labour market in Vietnam may be the result of disequilibrium, particularly due to supply shortages, and individuals may therefore be compelled to work in non-wage-earning jobs, as a result of which they may have wages or working hours not reported in the data. These suggest that the hourly wage might be censored. In another estimation, we include all individuals between the ages of 18 and 60 years (14,193 observations), and ran Tobit regressions for hourly wages. The Tobit estimator provided us with two possible censoring thresholds: zero and the minimum values of the hourly wage in the sample. As a robustness check, we applied the Tobit estimator with two different censoring thresholds. Because the hourly wages are in logs, zero as the censoring threshold means that we assigned the value 1 to all missing observations of the dependent variable.<sup>19</sup> Importantly, our estimates of the two Tobit models with alternate censoring thresholds provided a bound for the coefficient estimates with the true but unknown censoring threshold.

<sup>18</sup>For wage earners, corresponding hourly wages were adjusted for regional and monthly inflation.

<sup>19</sup>Since the dependent variable is not a *ratio*, adding 1 is unlikely to substantially influence the coefficient estimates. See Pham et al. (2017), who showed that when the dependent variable is in ratio, adding 1 results in substantially biased and/or inefficient estimates of the Tobit estimates.

TABLE 4 The impact of tariff reductions on log hourly wages, 2008

	All	No education	Primary	Lower-school	Upper-school	Vocational training
Independent variables	1	2	3	4	5	6
Panel A1: OLS regression: <i>Wage earners only (without controlling for industry dummies)</i>						
Tariff reductions	−0.097*** (0.026)	−0.150*** (0.036)	−0.077** (0.033)	−0.092** (0.040)	−0.121*** (0.040)	−0.046 (0.056)
Observations	3933	618	877	957	439	1042
R <sup>2</sup>	0.176	0.118	0.142	0.061	0.061	0.136
Panel A2: OLS regression: <i>Wage earners only (controlling for industry dummies)</i>						
Tariff reductions	−0.113*** (0.025)	−0.169*** (0.037)	−0.080** (0.040)	−0.092** (0.039)	−0.122*** (0.044)	−0.036 (0.048)
Observations	3933	618	877	957	439	1042
R <sup>2</sup>	0.265	0.241	0.191	0.161	0.146	0.263
Panel A3. OLS regression: <i>All individuals between the ages of 18 and 60 years. The missing values of the dependent variable are set to zero (controlling for industry dummies)</i>						
Tariff reductions	−0.084*** (0.018)	−0.132*** (0.039)	−0.031 (0.026)	−0.067** (0.028)	−0.080 (0.049)	−0.038 (0.051)
Observations	14,193	3140	3949	4226	1327	1551
	0.570	0.376	0.490	0.585	0.583	0.571
Panel A4. Tobit regression: <i>All individuals between the ages of 18 and 60 years. The missing values of the dependent variable are set to zero (controlling for industry dummies)</i>						
Tariff reductions	−0.048**	−0.072**	−0.0048	−0.041***	−0.0313	−0.033
Observations	14,193	3140	3949	4226	1327	1551
Panel A5: Tobit regression: <i>All individuals between the ages of 18 and 60 years. The missing values of the dependent variable are set to minimum value (controlling for industry dummies)</i>						
Tariff reductions	−0.074**	−0.119**	−0.004	−0.067***	−0.037	−0.038
Observations	14,193	3140	3949	4226	1327	1551
Panel A6: OLS regression: inverse hyperbolic sine (or arcsinh) transformation ( <i>controlling for industry dummies</i> )						
Tariff reductions	−0.103*** (0.024)	−0.167*** (0.053)	−0.035 (0.036)	−0.084** (0.035)	−0.087 (0.062)	−0.036 (0.062)
Observations	14,193	3140	3949	4226	1327	1551

Notes: (1) Standard errors in parentheses. \*\* and \*\*\* denote 5% and 1% level of significance, respectively. The dependent variable is the log of hourly wage for the respective sample of workers at the individual level. Column 1 includes the following control variables: at the individual level, indicators for education, age and age squared, gender; at the household level, dummies for the education of household head; at the commune level, dummies for whether the commune has a car way, upper-school, post office, market; plus seven regional dummies. Columns 2 to 6 include all control variables in Column 1 except for indicators for education at the individual level. The model also clusters for communes. (2) The Tobit results report the marginal effect of the explanatory variable on the dependent variable (with two censoring points) at the means of the explanatory variables. (3) When the missing values of the dependent variable are set at zero (its minimum value) the censored point of the Tobit is zero (the minimum value).

In recent years, the inverse hyperbolic sine (or arcsinh) transformation has been widely applied because it is similar to a logarithm and makes it possible to get around the zero problem. Therefore, the inverse hyperbolic sine transformation enables us to use all observations. To check the robustness of the estimation results, we also assign the value 0 to all missing observations of the dependent variable on the hourly wage and then run OLS regressions. Specifically, for the dependent variable on the hourly wage ( $m$ ), taking the inverse hyperbolic sine transformation yields a new variable:  $\text{arcsinh}(m) = \ln\left(m + \sqrt{m^2 + 1}\right)$ .

## Results for hourly wages

Table 4 reports the results for hourly wages. Without controlling for industry fixed-effects in Panel A, the regression results demonstrate that tariff reductions were statistically significant and negatively associated with the hourly wages of all education groups, except for those with vocational training. Considering the results in Panels A1 to A5 altogether, coefficient estimates were also economically meaningful.

On the role of industry effects, the wage earners sample of 3933 in Panel A2 indicates that the effects of tariff reductions

were analogous, with and without industry dummies. For example, column 1 shows that a *wage-earner* living in a province with one percentage point lower tariffs between 2002 and 2008 earned 9.7% higher wages in 2008 without accounting for industry effects, and 11.3% higher wages accounting for industry effects. This result is not entirely surprising, because control variables, such as age, education, gender and so on, are likely to be related to the industries in which the individuals work, and play a major role in the determination of wages. Importantly, the results of both Panels A1 and A2 show that the magnitude of the coefficient of tariff reductions on the hourly wages for the group without education (Column 1) was greatest among other groups. These results are also consistent with Panel A3 when we run industry-level fixed-effects regressions for all individuals between the ages of 18 and 60 years and assign the missing values of the dependent variable to zero. Specifically, the tariff reductions are statistically significant only for the group without education and the group that had completed lower secondary school. Meanwhile the magnitude of the coefficient of the tariff reductions for the group without education is greater than that of the coefficient of the tariff reductions for the group that had completed lower secondary school.

Proceeding with the Tobit estimates controlling for industry fixed-effects (including 14,193 individuals), Panels A4 and A5 report the results with the missing values of the dependent variable set to zero and to the minimum value of the hourly wage, respectively. Both Panels A4 and A5 indicate that tariff reductions are negatively and statistically significant for the hourly wage for workers without education (Column 1). Meanwhile, the magnitude of the coefficient of the impact of tariff reductions on the hourly wage for those without education was greatest among other groups. Specifically, Column 1 of Panels A4 and A5 demonstrates that holding other personal characteristics equal, an individual living in a province with one percentage point lower tariffs between 2002 and 2008 earned 4.8% to 7.4% higher wages in 2008.<sup>20</sup>

<sup>20</sup>An important question here is how self-employed individuals in the extended sample affected the results. First, note that methodologically, the issue of censored wages, hence, the Tobit estimation, was different from that of the self-employed individuals dominating the extended sample. Our Tobit estimation provides a lower and an upper bound for the true Tobit coefficient estimate (irrespective of the sample composition), while the extended sample placed relatively more weight on self-employed individuals with regard to the effects of reforms, compared with the wage-earners' sample estimated with OLS. Second, we observed in general that the OLS estimates and the Tobit bounds overlapped within a reasonable range. Any possible differences in coefficient estimates could meaningfully be attributed to the relative disparities in the effects of reforms across self-employed and wage-earning workers. For example, the results with the full sample in Column 1 imply that tariff reductions are likely to increase the hourly wage of self-employed households (Panels A3 and A4); less, relatively, than those working for wages (Panels A1 and 2).

The results are even more heartening for pro-poor growth. Column 2 documents that the average uneducated individual living in a province with one percentage point lower tariffs between 2002 and 2008 earned 7.1% to 11.9% higher wages in 2008. Numerically, even higher results are observed with lower secondary school graduates (see Column 4). The results were not statistically significant for those with primary school, upper secondary school and vocational training or above. Using the inverse hyperbolic sine transformation, the results of Panel A6 are qualitatively similar to those of Panels A4 and A5. The results are statistically significant for the hourly wage for workers without education and lower secondary completion (Columns 2 and 4). These results overall confirm that tariff reductions are negatively related to the hourly wages of the uneducated, who are likely to be poor. This means that the pro-poor effect of tariff reductions is transmitted through the wage income channel.

One implication of these estimates is that trade liberalisation leads to poverty reduction in rural Vietnam by increasing wage earnings. This finding is consistent with the results of McCaig (2011), who also found that trade liberalisation after the 2001 U.S.–Vietnam Bilateral Trade Agreement decreased poverty in Vietnam. However, our study differs from McCaig (2011), who used U.S. tariff cuts on Vietnamese exports. Our study used tariff reductions on imports to Vietnam. The result of our study is also relevant to the findings of Marchand (2012) in India and Han et al. (2016) in China, which show strong evidence for the pro-poor impact of trade liberalisation. However, the difference between those studies and ours is that our study uses tariff data and computed tariff reductions at provincial level. Marchand's study and that of Han et al. employed tariff data at industry level. Similarly, Hasan et al. (2007) found that trade liberalisation led to poverty reduction in India, especially in urban areas and states with flexible labour markets. It is noteworthy that these findings on the pro-poor effect of trade liberalisation contradict those of Topalova's (2010), who showed that rural districts in India that are more exposed to trade liberalisation—measured by tariff reductions—experienced slower decline in poverty, and that labour immobility due to inflexible labour laws is the main cause explaining this outcome.

## CONCLUSIONS

Pro-growth policy has conventionally focused on improving people's income or increasing the per capita output of goods and services over the longer period. However, there is increasing awareness of widening income disparities among different social groups. Strong economic growth helps to increase the average income of individuals. However, it does not mean that strong economic growth leads to poverty reduction or that it helps the poor increase

their income. Consequently, pro-poor growth has been debated extensively. If inequality rises, the poor will be most seriously hurt.

Furthermore, there is even less consensus on what the determinants of pro-poor growth patterns are. Drawing on the Households Living Standards Surveys of 2002, 2004, 2006 and 2008, this study used both non-parametric and parametric methods to investigate pro-poor growth patterns across the provinces of Vietnam. The distinguishing feature of our study is an explicit focus on the role in poverty reduction of trade liberalisation witnessed in the 2000s, such as drastic tariff reductions undertaken in the realm of bilateral and multilateral trade agreements. Ongoing industrialisation and booming exports and imports in this period all meant rapid economic growth and heightened opportunities for the poor participating in the non-farm sector to increase their income. However, trade liberalisation has affected each province to varying degrees, providing us with useful empirical leverage in econometric analysis. An additional distinction of our study is to explore the labour market mechanism through which the reforms might have affected the poor. Using linear and censored regression models, we investigate in detail the role of trade liberalisation in hourly real wages at the individual level.

This study has documented the fact that, holding other personal characteristics constant, the average uneducated individual (who is likely to be poor) living in a province in which tariffs were reduced by one percentage point during the 2002 to 2008 period earned 15% to 17% higher hourly real wages in 2008 (employing OLS regressions) and 7.2% to 12% higher hourly real wages (employing Tobit regressions). Overall, our results suggest that trade liberalisation has boosted real wages. In general, there is strong evidence that the trade liberalisation of the 2000s has been instrumental in pro-poor growth due to enhanced labour market opportunities for the poor.

We documented that the average expenditure of the poor, as measured for those in the lowest quintile and using a head-count index, increased with average expenditure in Vietnam over the period 2002–2008. Our analysis, initially descriptive using growth incidence curves, highlights the importance of greater exposure to trade liberalisation. The result is analogous when we decompose the poverty component into growth and redistribution components, suggesting that the growth component made a greater contribution to poverty reduction in provinces more exposed to tariff reductions. The finding is also confirmed when we use an econometric model to estimate the growth elasticity of poverty.

Given these findings, the study undertakes a rich parametric investigation by delving into the labour market mechanisms behind this outcome. Our exploration provides critical evidence that the reforms of the 2002–2008 period generated higher labour income. To the extent that wage-earning

income represents a key driver of consumption expenditure, the effects of reforms on the hourly wages of the uneducated may shed light on the factors behind reduced poverty in Vietnam in recent years. Obviously, these are likely to arise from the increased demand for unskilled labour resulting from expanding economic activity, and act as strong drivers mitigating poverty. This outcome is consistent with the well-known Stolper–Samuelson theorem, in which trade liberalisation increases real wages due to the increased demand for plentiful labour. Those findings are consistent with a study by Fukase (2013), who showed that the 2001 U.S.–Vietnam Bilateral Trade Agreement increased the relative wage for unskilled workers in Vietnam. Also, McCaig (2011) noted that the 2001 U.S.–Vietnam Bilateral Trade Agreement reduced poverty between 2002 and 2004 in Vietnam.

During the 2000s, the poor benefited from economic growth and poverty declined significantly in Vietnam. Trade liberalisation contributed substantially to this reduction in poverty during this period and Vietnam continues to promote trade liberalisation, an example of which is the European Union–Vietnam Free Trade Agreement, which came into effect on 1 August 2020. Vietnam also participated in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, which was signed on 8 March 2018 by 11 countries, including Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, Peru, New Zealand, Singapore and Vietnam.

Ongoing trade liberalisation in Vietnam will continue to contribute significantly to poverty reduction and increase income for the poor. To help the poor and poorest benefit from economic growth, measures to decrease inequality in the coming years are necessary. Participation in non-farm activities has played a significant role in poverty reduction. However, the poor, especially the poorest, encounter difficulties in participating in non-farm sectors due to their lack of resources. Meanwhile, the structure of the economy will change dramatically in coming years with the full integration of Vietnam into world markets, leading to a significant change in employment among industries. To create a buffer against this shock and help the poor move out of poverty, the government should provide subsidies for vocational training, and also social safety nets, such as free education for poor children, health insurance for the poor and cash transfers. Finally, since most of the poor are now concentrated in mountainous areas and comprise ethnic minority group, future research on poverty in Vietnam should focus on poverty reduction in mountainous areas.

## CONFLICT OF INTEREST

There is no conflict of interest.

## DATA AVAILABILITY STATEMENT

The data set is available upon request.

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