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Trade openness and household welfare within a country: A microeconomic analysis of Vietnamese households

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ABSTRACT

The positive effects of trade liberalisation on several dimensions of poverty have initiated studies of the trade–poverty relationship. Trade liberalisation accompanies institutional reforms that help to reduce institutional barriers against the poor. This study examines the impacts of trade openness and institutional reforms on rural household welfare at the provincial level through the analysis of the determinants of welfare of rural households in Vietnam. The study employs a model of micro-determinants of growth and tests it on the data from the Vietnam Household Living Standards Surveys (VHLSSs) of 2006 and 2010. What makes the study different from some other studies of the same vein is that it attempts to directly capture the institutional effect on welfare. The study finds that, in the provinces with high institutional reforms and trade openness, the welfare of rural households improved. Institutional reforms in Vietnam appeared to be sluggish in the late 2000s. In particular, both access to land and lower informal charges were the important determinants of welfare improvement over time. These findings suggest that Vietnam should maintain its development by accelerating the process of institutional reforms, thereby helping poor households to improve standards of living.

1. Introduction

The impacts of trade liberalisation on households and poverty have long been of concern in economics of development. Several studies have agreed that people in open economies benefit more from trade than those in closed economies, at least in terms of standards of living (World Bank, 1990, 2001). The empirical literature on the relationship between trade liberalisation and poverty has widely been criticised for its inadequate methodology and inconclusiveness (Pacheco-Lopez & Thirlwall, 2009; Rodriguez & Rodrik, 2001; Singh, 2010; Wacziarg & Welch, 2008). Some studies argue that the tradepoverty linkage is largely case- and country-specific (Berg & Krueger, 2003; McCulloch, Winters, & Cirera, 2001; Pacheco-Lopez & Thirlwall, 2009). McCulloch et al. (2001) also contend that, although trade liberalisation is believed to have a large potential impact on welfare and poverty, the direct effects on poverty for many dimensions of trade liberalisation are negligible. Generally, and practically, Winters suggests four main channels through which trade liberalisation reaches households: economic growth, employment, market, and government revenue (Winters, 2002; Winters, McCulloch, & McKay, 2004). These four main pathways link trade liberalisation with household welfare, and thereby poverty; they also cover the main

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stakeholders of a market economy: households, enterprises and government. Using the outline of channels as an analytical framework, Winters et al. (2004) conducted an intensive survey of the literature on the relationship between trade liberalisation and poverty.

Trade liberalisation is closely related to institution reforms (Rodrik, 2002). Institutions are the rules that shape the interaction between citizens, firms, and the state (World Bank, 2010). The literature on the trade–poverty relationship also shows that institutions are crucial to the impacts of trade liberalisation on welfare. Acemoglu and Robinson (2012) conflate experiences of the development of nations and suggest that a country's own institutions determine its success or failure. Institutions become an important dimension of poverty (World Bank, 2001) and underpin the linkage between trade liberalisation and poverty.

Many studies of the tradepoverty link for Vietnam can be included in Winters' framework (e.g. Coello, Fall, & Suwa-Eisenmann, 2010; Glewwe, Gragnolati, & Zaman, 2002; Justino, Litchfield, & Pham, 2008; Minot & Goletti, 1998; Niimi, Vasudeva-Dutta, & Winters, 2007; Seshan, 2005). These studies primarily examine the effects of price and employment on households and poverty, as these effects are prominent in the framework. Niimi et al. (2007) use the household panel data from Vietnam over the period 1993–1998 in a multinomial logit model to evaluate the impact of trade liberalisation on poverty dynamics. Their study finds that trade liberalisation substantially reduced poverty over the period. Glewwe et al. (2002) and Justino et al. (2008) employ a model of micro-determinants of growth to investigate the impacts of price and employment on household welfare, using the same panel data set. Glewwe et al. (2002) reveal that the impressive poverty reduction in the 1990s was a result of the high economic growth and the accelerating trade liberalisation in that period. Justino et al. (2008) provide evidence that trade liberalisation had a material and positive effect on rural household welfare. These studies, however, do not address the institutional effects on welfare. Generally, although institutions have been an important dimension of poverty, few studies of the trade–poverty relationship take into consideration the effects of institutional reforms on household welfare and poverty.

This study attempts to demystify the impacts of trade liberalisation and institutions on welfare in Vietnam through examining the determinants of rural household welfare. It focuses on rural areas because of the high incidence of poverty often found in these areas. The study differs from previous similar studies. Firstly, it draws on the contention of Abbott, Bentzen, and Tarp (2009) that those models using cross-country data or focusing more on tariff changes as a key element of reforms may be flawed and have failed to incorporate the influence of institutional reforms. Secondly, this study uses internal trade transaction and indices of institutional reforms to capture straightforwardly the effects of institutional reforms on welfare that appear to be ignored by the studies in the field. Both institutional reforms and local trade openness are discernibly important to rural household welfare. This study is expected to shed more light on the institutional effect of trade liberalisation on welfare in Vietnam. Its primary purpose was to analyse the impacts of local trade openness and institutional reforms on rural welfare at the provincial level, using a model of micro-determinants of growth, based on the household survey data over the period 2006–2010. The rest of the study is planned as follows. Section 2 provides an overview of the literature on the link between trade liberalisation and poverty, thereby setting an analytical framework for the study. Section 3 overviews the impacts of trade liberalisation on the economy and the households of Vietnam. Section 4 explains the methods used in the study. Section 5 analyses the results of the model. Section 6 concludes the paper and discusses some policy implications.

2. Trade liberalisation and poverty: an overview of literature

The literature on trade and poverty acknowledges the difficulties in establishing the relationship between the two. The main reasons are that both these concepts, trade liberalisation impact and poverty, are multidimensional (Winters et al., 2004), and that the measures of trade openness and poverty remain contentious. Many channels through which trade can affect households and poverty have been recognised in the literature about the tradepoverty nexus. Several studies examined them both theoretically and empirically (e.g. Athukorala, Bandaralage, & Kelegama, 2011; Athukorala, 2010b; Bandaralage, 2009; Berg & Krueger, 2003; Harrison, 2007; McCulloch et al., 2001; Nissanke & Thorbecke, 2007; Winters et al., 2004; Winters, 2002). In Winters' framework, trade liberalisation affects households, and thereby poverty, via economic growth, price and/or market distribution of tradeable goods, employment, and government spending.

In Winters' first channel, trade development benefits the poor through the contribution of trade to economic growth. Bhagwati and Srinivasan (2002) divide this process into two stages: that trade stimulates growth through accumulation and innovation; and that growth reduces poverty by providing the poor with more employment. Many studies conclude that a high level of trade openness is associated with high average income and high standards of living in the long run; for instance, Balassa (1978), Krueger (1978), Tyler (1981), Ram (1985), Ram (1987), Sachs and Warner (1995), Frankel and Romer (1999), Hallaert (2006), Foster (2008), and Singh (2011). With respect to the effect of growth on poverty, growth can generate the trickle-down effect that benefits people in general, including the poor (Winters et al., 2004). Several studies provide evidence that economic growth is associated with poverty reduction (e.g. Dollar & Kraay, 2002, 2004; Goldberg & Pavcnik (2004); Perkins, Radelet, & Lindauer, 2006; Roemer & Gugerty (1997)). In this first channel, trade benefits poor households indirectly through economic growth.

In the second channel, trade liberalisation affects households and alleviates poverty via prices and/or market distribution of tradeable goods (Justino et al., 2008; Minot & Goletti, 1998; Seshan, 2005). Price changes and/or the characteristics of market distribution greatly affect the poor. One of the most important conditions for the outward-oriented strategy in an economy to be successful is to maintain macroeconomic stability that is indirectly beneficial for the poor (Bhagwati & Srinivasan, 2002). In this linkage, trade policy can cause price distortions that result from trade

monopoly, the marketing system, and transaction costs. The poor are therefore unlikely to benefit from trade liberalisation, due primarily to the ineffective transmission of prices to households as a consequence of inadequate trade policies (Winters et al., 2004).

In the third channel, adding or detracting jobs is one of the most visible effects of trade liberalisation. The high level of trade activities and/or production will boost the demand for labour. Other factors, such as policies for solving unemployment, reforms of labour market, and education, can also help to increase the labour demand. Studies show that the effect of trade liberalisation is largely positive for employment, the key income source of the poor (Justino et al., 2008; Krueger, 1983; Niimi et al., 2007; World Bank, 2001). If properly developed, trade expansion can establish backward and forward linkages that help to sustain employment and growth in the long run. The poor can also benefit from employment created through regional production networks in manufacturing, such as textile and shoe processing (Athukorala, 2010a). Trade-induced employment is therefore crucial to poor households.

In the fourth channel, trade policy reforms may shrink the government budget, thereby potentially restricting governmental spending for social security and poverty alleviation programmes (Baunsgaard & Keen, 2005; Heo & Nguyen, 2009). For reasons of social stability, government usually gives top priority to public expenditure (Winters et al., 2004). Trade reforms may also result in increases in government revenue. The revenue effect of trade liberalisation on poverty, which can be positive or negative, mainly depends on the effectiveness of trade reforms and poverty reduction policies.

Although not stated explicitly, institutions underpin the channels through which trade liberalisation affects poverty. Trade policy reforms accompany institutional reforms (Rodrik, 2002). These reforms help the poor to reduce social costs relating to institutional barriers (World Bank, 2001). According to North, institutions are the humanly devised constraints that shape political, economic, and social interaction. They comprise informal constraints (sanctions, taboos, customs, traditions, and code of conduct), and formal rules (constitutions, laws, and property rights) (North, 1989, 1991). The impacts of institutions on poverty are pervasive (Deolalikar, Brillantes, Gaiha, Pernia, & Racelis, 2002), and are seen to be the main determinants of the differences in prosperity across countries (World Bank, 1997; Acemoglu & Robinson, 2008).

Trade policy reforms are not enough. Establishing effective institutions, such as copyright protection, law systems, and an institutional framework for macroeconomic stabilisation, social security, and conflict settlement, is necessary to facilitate markets. Appropriate institutions are crucial to the development of a nation (Rodrik, 2002, 2008). They are termed *institutional innovations* (Perkins et al., 2006). Adding to this, Sachs and Warner (1995) maintain that the inherited structure of the economy will significantly determine the very short-term growth outcomes of a trade reform. Dollar and Kraay (2003) posit that rapid growth, a high trade level, and good institutions go together in the very long-term. More particularly, Levchenko (2004) points out that institutional differences are an important determinant of trade flows. With respect to welfare and poverty, Gaiha and Imai (2005) reveal that institutions have a significant effect on income. Kandil (2009) finds not only that institutional quality increases real GDP growth significantly across Middle East and North Africa (MENA) countries, but also that institutional quality negatively impacts the growth of private credit and private investment. In summary, Institutions are regarded as underpinning the relationship between trade, growth, and poverty. Appropriate institutions are crucial to the relationship in developing countries. A main hindrance to the development process of Vietnam is the inadequate institutional framework.

3. Overview of trade liberalisation and household welfare in Vietnam

Vietnam is basically a developing country with a transitional economy. In 1986, Vietnam conducted a renovation programme, *Doi Moi*, to transform a centrally planned economy (CPE) into an open and market-driven economy. The economy subsequently attained several important economic outcomes. It annually averaged economic growth of 8 per cent in the 1990s and 7 per cent in the 2000s. The poverty rate declined sharply, from 58.1 per cent to 37.4 per cent over the period 1993–1998 (Fig. 1). This trend appears to have continued throughout the period 1993–2008. Vietnam thus obtained one of the first millennium development goals (MGDs)[1] in 2008, by reducing the poverty rate to below 15 per cent (Table 1). By the end of 2010, Vietnam had become a lower middle-income country, with per capita income of about US$1130. Vietnam has also achieved, and in some circumstances surpassed, many of the MDGs (Government of Vietnam, 2010; World Bank, 2012). This economic development is arguably the result of economic reforms and openness to trade and investment.

These economic achievements have not been sustained, however, and the economy invariably faces problems of development. Though the transition to the market economy has lifted many out of poverty, the gap between the rich and the poor appears to be growing, as does the economic disparity amongst different regions in the country. Poverty headcount rates declined substantially from 2002 to 2008 and slightly increased in 2010 (Table 1). The incidence of poverty in rural areas was always higher than in urban regions. Notably, the Gini coefficients tend to increase over time, and income disparity is invariably higher in urban regions in the period.[2] The income gap between the poorest quintile and the richest quintile was only 4.1 times in 1998.[3] This gap doubled in 2002 (8.1 times) and reached 9.2 times in 2010. The World Bank (2012) also

[1] The first goal of the MGDs is to halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day (United Nations, 2010).
[2] Note that the national Gini coefficients are higher than those of the urban areas or rural areas, or regions because the income gaps amongst regions or areas are larger than those within an area or a region.
[3] Author estimates the income gap in 1998, based on the income data from the Vietnam Living Standards Survey 1998 (VLSS).

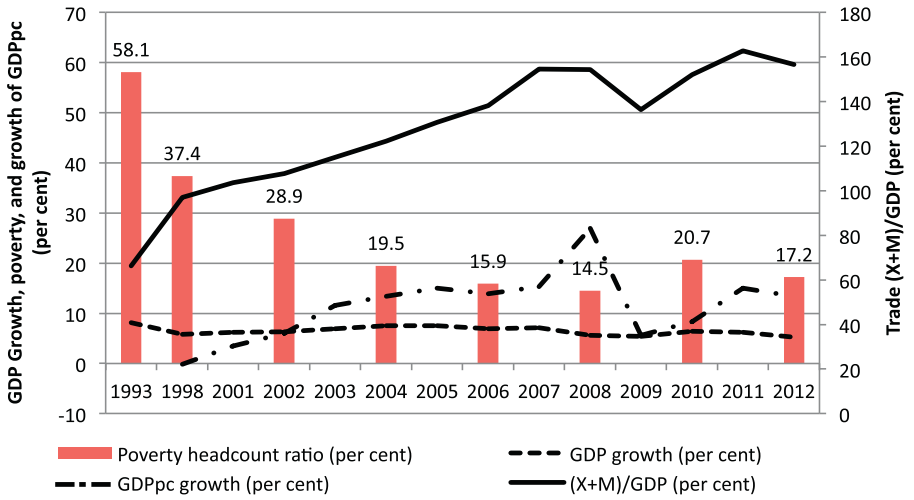

Fig. 1. Economic growth, trade and poverty in Vietnam, 1993–2012. *Note*: The poverty rates are based on expenditure data, using the World Bank and GSO poverty line (GSO-WB poverty line).
Source: Data for GDP growth, growth of GDP per capita (GDPpc growth), and trade share in GDP are drawn from World Development Indicators. Data for poverty from the World Bank (2012).

Table 1
Some indicators of poverty and inequality, 2002–2010.

Poverty and inequality indicator	2002	2004	2006	2008	2010
Poverty					
Poverty rate (per cent)	23.0	18.1	15.5	13.4	14.2
Urban	10.6	8.6	7.7	6.7	6.9
Rural	26.9	21.2	18.0	16.1	17.4
Inequality					
Richest to poorest ratio	8.1	8.3	8.4	8.9	9.2
Gini coefficient by area	0.418	0.420	0.424	0.434	0.433
Urban	0.410	0.410	0.393	0.404	0.402
Rural	0.360	0.370	0.378	0.385	0.395
Gini coefficient by region					
Red River Delta	0.390	0.390	0.395	0.411	0.409
North East	0.360	0.390	0.407	0.415	0.418
North West	0.370	0.380	0.392	0.403	0.401
North Central Coast	0.360	0.360	0.369	0.371	0.371
South Central Coast	0.350	0.370	0.373	0.380	0.393
Central Highlands	0.370	0.400	0.407	0.405	0.408
South East	0.420	0.430	0.422	0.423	0.424
Mekong River Delta	0.390	0.380	0.385	0.395	0.398

Source: GSO (General Statistics Office, 2004, 2006, 2008, 2010, 2012).
Notes: Data for poverty rates and Gini coefficients are based on income data and the national official poverty lines. These poverty rates are somewhat different from those calculated using the GSO-WB poverty lines illustrated in Fig. 1. See the World Bank (2012) for more discussions about the difference in the overall methodological approach to calculate poverty rates between the World Bank and the GSO.

concludes that income inequality has increased, lessening the benefit of growth to poorer households, which are being left behind in the growth process. The past decade has actually made the lives of most people very difficult, with prices soaring and average wages remaining too low to meet people's basic needs in general.

High and chronic inflation results from several inadequate policies, of which an inefficient monetary policy and an underdeveloped banking system are the commonly claimed causes. However, trade policy and industrial policy, performing well, can help to contain inflation. Prices of food are the main contribution to a high consumer price index (CPI). As an agrarian country, Vietnam has not taken advantage of using the production of food staples to sustain food supply that helps to contain inflation and avoid the fluctuation of the world food prices. Adding to this, low value-added and quality agricultural exports have lowered farm household incomes. The government resists key reforms by maintaining the leading role of state-owned enterprises (SOEs), especially in rice exports. Trade policy in Vietnam is thereby inadequate. Chronic inflation has offset the benefits of trade-induced growth for many people, especially those who live in poverty. Farm households benefit little from agricultural production due to the SOE monopoly of rice exports. Trade reforms in agriculture have been too slow to help farm households to improve income.

As institutions constitute an important dimension of poverty, Vietnam's weak institutional framework renders resource allocation inefficient and dampens business incentives. The establishment of a business took 11 administrative procedures

and 45 days in 2006. The number of procedures and the length of time to start up a business in 2010 were 11 and 39, respectively. In 2014, it took on average 34 days and 10 procedures to start up a business in Vietnam, compared with an average of 37.8 days and 7 procedures, respectively, in East Asia and the Pacific.[4] Although having made considerable progress in institutional reforms, Vietnam has been still less attractive to foreign investors. Inadequate institutions make business costly. Consequently, the poor benefit only modestly from trade liberalisation and economic growth.

4. Methods and data

4.1. Methods

Ravallion (1998) and Haughton and Khandker (2009) consider that static regression analysis is by far the most widespread tool used to identify the contributions of different variables to poverty. This method of poverty analysis is based on the income equation that postulates real consumption (income) as a function of observed household characteristics. Using this approach, two common types of model are used to analyse poverty: the levels regression model and the binary regressand model. The levels regression model is used to explain the level of expenditure or income per capita. Accordingly, the dependent variable, which is a function of characteristics of individuals, households, communities, and regions, is a continuous quantitative variable. The binary regressand model is used to account for whether a household is poor, using a logit or probit regression. In this method, the dependent variable is a discrete qualitative variable, and the independent variables are similar to those in the levels regression model. While the continuous approach faces concern about its inability to distinguish between poor and non-poor households, the discrete method is confronted with the possibility of losing information, because of the use of a binary dependent variable. Some similar studies for Vietnam employ both approaches; for instance, Glewwe et al. (2002) and Justino et al. (2008). These studies utilise a panel data set from Vietnam for the period 1993–1998. As discussed, they neither focus on nor capture institutional impacts, because this kind of data contains no information about institutions. This study prefers the continuous approach to avoid losing information. Since the study focuses on rural households that are primarily the poor in Vietnam, it has no concern with distinguishing between poor and non-poor households.

The model specification used in this study follows Glewwe, Gragnolati, and Zaman (2000) and Justino et al. (2008). Both these studies are based on a model of micro-determinants of growth, using a panel data set over the period 1993–1998. They try for the most part to capture the determinants of household welfare and the dynamics of poverty under the impact of a wide range of variables in order to assess progress of poverty reduction in Vietnam during the 1990s. This study differs from other similar studies in that it focuses on the impacts of institutional reforms and local trade openness on rural household welfare at the provincial level and that it uses more recent data. The model of micro-determinants of growth can be expressed in a simple log linear form:

$$\log(y_i) = \beta X_i + U_i \tag{1}$$

where y_i is commonly real per capita consumption expenditure, β is a vector of estimated parameters, X_i is a vector of independent variables, and U_i is a vector of error term. In this study, the dependent variable is per capita income, measured in logarithm (log of per capita income). The study follows the monetary approach to measuring welfare and poverty.[5] Income per capita is used as a proxy for welfare, because income may better reflect potential household wealth. Both income and consumption are actually the main alternatives for measuring welfare (Deaton & Zaidi, 2002; Haughton & Khandker, 2009).

The independent variables are the conventional characteristics of individuals, households, communities, and regions. Several alternative sets of independent variables are used to explain household welfare. The empirical literature of the relationship between trade liberalisation, welfare, and poverty usually divides these variables into two broad groups: non-trade-related and trade-related. Haughton and Khandker (2009) split the former variables into four general groups: regional, community, household, and individual characteristics. According to Ravallion (1998), the non-trade-related variables can be classified as internal (households and individuals) and external or area characteristics. This study also organises the independent variables into two broad groups: The non-trade-related variables measure household and regional characteristics; the trade-related variables measure local trade liberalisation and institutional reforms. The former group covers the sub-groups of variables measuring the characteristics of households and household heads, such as demographic traits, education, occupation, household agricultural production, and regional difference. This study draws on Glewwe and Hall (1998), Glewwe et al. (2002), and Niimi et al. (2007) to choose the independent variables, by selectively confining them to pre-determined variables that are likely to be exogenous to per capita income in order to avoid the problem of endogeneity.

For the non-trade-related variables, the pre-determined variables are chosen. These variables are not likely to be determined by the current level of incomes (Glewwe et al., 2002; Niimi et al., 2007). According to Glewwe and Hall (1998), the characteristics of household heads that are determined by the age of adulthood, such as age, education, and occupation, are assumed to be exogenous. The variables that measure agricultural production, such as rice productivity, net rice

[4] The data are taken from The World Bank's Doing Business in Vietnam, available at: http://www.doingbusiness.org/data/exploreeconomies/vietnam/.
[5] See the UNDP (2005), Ravallion (1992), and Deaton and Zaidi (2002) for more discussions about the approaches to measuring poverty.

producers and fertiliser used in agricultural production, are assumed to be exogenous, because they depend primarily on farm technology, land quality, and weather. Household assets, such as durable goods, savings, and houses, are clearly endogenous. The study chooses access to electricity and safe drinking water as household assets. These variables are assumed to be exogenous, as they depend largely on regional characteristics, rather than on household incomes. Regardless of income levels, people tend to acquire electricity and safe water for the sake of health, if these basic needs are available in the region where they live.

The first group of these variables, used to measure demographic traits of households and household heads, or heads for short, includes household size, ethnicity, gender, age, marital status, and household composition. The second group, employed to quantify the impact of human capital, comprises the school years of household heads, spouses, and their parents, as well as the proportion of household members with a technical diploma and post-secondary diploma. All educational variables should have a positive impact on welfare. The third group, which aims to measure the impact of occupation by household heads, includes four kinds of dummy variables (leader or business owner, professional, white collar, and skilled worker) with the reference category of the unskilled. Employment is expected to have a positive effect on welfare. The fourth group, used to measure agricultural production, encompasses rice productivity, the net rice producer, and the total quantity of fertiliser. Net rice producers are farm households that have a surplus in rice production in a year. These agricultural variables should be positively associated with rural income.

The fifth group is used to measure household assets. This study uses some housing characteristics, such as access to electricity and safe drinking water, to explain rural welfare, instead of using the variables of household assets such as house, remittance, and savings, which are obviously endogenous. These variables, relevant to essential living conditions, should have a positive impact on welfare. As pointed out by Perkins et al. (2006), access to safe water is vital for rural households to meet nutritional needs. The sixth group of non-trade-related variables is used to measure the difference in household location. These geographical dummies indicate whether a particular household is located in an urban or a rural region, and in the north central region or the other regions.[6] The north central region is widely considered to be the poorest region in Vietnam. Households in rural regions and in the north central region are expected to be worse off than those in the other regions.

The setting of the trade-related variables is the key to investigating the impacts of trade liberalisation on household welfare and poverty. The various methods used to measure trade openness in the cross-country studies include tariff and non-tariff barriers, as well as the ratios of exports to GDP, and of trade volume (exports plus imports) to GDP. As pinpointed in the literature, none of these is optimal, however, as these measures of trade openness may not link up with welfare and poverty at the household level. According to Justino et al. (2008), to evaluate the impacts of trade openness on household welfare, some specific household characteristics can be linked to trade reforms. These linkages can be based on Winters' pathways, as discussed earlier.

In this study, the trade-related variables include commune employment, provincial trade, and institutional reforms. Employment can reflect a region's level of trade and industrial activities, as well as its level of development of the labour market. The use of employment as a measure of trade openness should be interpreted with caution, as a high level of employment could also result from factors other than trade, as discussed previously. Provincial or local trade is another measure of trade openness used in this study. Although trade openness includes both external trade and internal trade, this study focuses on internal trade, measured by total retail sales per capita, or trade transaction. Local trade transactions can reflect the level of internal trade and production activities.

Studies by Dollar and Kraay (2003), Levchenko (2004), Gaiha and Imai (2005), and Kandil (2009) have attempted to measure institutions. Levchenko (2004) uses the Herfindahl index as a proxy for institutional dependence. Kandil (2009) measures institutional quality using six separate indicators of governance: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. This study uses the Vietnam Provincial Competitiveness Index (PCI) to measure institutional reforms. This index was constructed in 2005 to assess the business environment and the policies on private sector development in provinces, covering nine or ten component indices. It has been used in some research, such as Dang (2010), Dang (2013), and Tran, Grafton, and Kompas (2008). These studies, however, do not focus on the impacts of institutions and trade openness on welfare. By virtue of its aims and components, the PCI is most appropriate for measuring the quality of institutions and institutional reforms in the provinces. In terms of the empirical strategy, drawn on Justino et al. (2008), this study measures trade-related variables at the commune or provincial level; therefore, these variables are likely to be exogenous to household income, which is measured at the household level. Details of measurement and the main descriptive statistics of the model's variables are provided in Table 2.

4.2. Data

4.2.1. Vietnam Household Living Standards Surveys (VHLSSs)

This study makes use of the Vietnam Household Living Standards Surveys (VHLSSs) to analyse the impacts of trade openness and institutional reforms, because these data have high quality and large sample sizes. These nationwide surveys,

[6] The north central region includes Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, Quang Tri, and Thua Thien Hue province, located in the poorest resource region in Vietnam (see Table 3).

Table 2
Descriptive Statistics of the variables.

Variable	Unit	Variable type	Descriptive statistics			
			2006		2010	
			Mean	Std. Dev.	Mean	Std. Dev.
Per capita income	'000 VND	Cont.	6087.740	4932.347	12,422.60	12,121.77
Household size	Person	Cont.	4.445	1.629	4.199	1.504
Heads' ethnicity (Kinh)		Binary	0.785	0.411	0.731	0.443
Heads' gender (male)		Binary	0.824	0.381	0.847	0.360
Heads' age	Year	Cont.	48.207	12.966	47.249	13.015
Heads with spouse		Binary	0.843	0.366	0.856	0.352
Proportion of children	Per cent	Cont.	23.517	21.127	22.510	21.148
Proportion of elderly	Per cent	Cont.	10.900	22.689	9.337	20.672
Heads' years of school	Year	Cont.	6.804	3.406	6.833	3.462
Spouses' years of school	Year	Cont.	5.364	3.910	5.445	3.955
Parent's years of school	Year	Cont.	0.248	1.288	0.299	1.504
Technical diploma ratio	Per cent	Cont.	37.385	29.588	16.304	21.531
Post-secondary diploma ratio	Per cent	Cont.	33.444	29.724	12.882	19.593
Head business owner/leader		Binary	0.021	0.142	0.016	0.125
Head professional		Binary	0.014	0.117	0.012	0.109
Head white collar		Binary	0.006	0.078	0.002	0.049
Head skilled worker		Binary	0.158	0.364	0.324	0.468
Rice productivity	kg/m^2	Cont.	0.486	0.116	0.485	0.120
Household net rice producers	kg	Cont.	3590.665	6967.646	1302.439	1010.484
Total used fertiliser quantity	kg	Cont.	527.275	827.461	522.182	872.149
Access to electricity		Binary	0.946	0.227	0.960	0.196
Access to safe drinking water		Binary	0.052	0.222	0.079	0.269
North central region		Binary	0.138	0.345	0.137	0.344
Urban areas		Binary	0.060	0.238	0.079	0.270
Commune industry labour ratio	Per cent	Cont.	6.747	10.707	10.008	15.726
Commune wage labour ratio	Per cent	Cont.	21.926	14.501	15.890	14.143
Provincial total sales per capita	mill. VND	Cont.	4.711	2.652	12.121	6.862
Provincial competitiveness index	Per cent	Cont.	51.710	6.502	57.317	4.561
Market entry costs	Per cent	Cont.	7.359	0.774	6.585	0.644
Land access	Per cent	Cont.	5.898	0.767	5.843	1.189
Transparency	Per cent	Cont.	5.302	1.145	5.675	0.696
Time costs	Per cent	Cont.	4.472	0.755	6.272	0.950
Informal charges	Per cent	Cont.	6.263	0.711	6.216	0.745
Provincial leadership pro-activity	Per cent	Cont.	4.881	1.312	5.064	1.266
Business support services	Per cent	Cont.	5.000	1.220	5.802	0.898
Labour training	Per cent	Cont.	5.102	1.262	5.253	0.585
Legal institutions	Per cent	Cont.	3.692	0.773	4.729	0.959

Source: Author's calculation based on the VHLSS 2006 and 2010.

conducted by Vietnam's General Statistics Office (GSO), are under the technical auspices of the World Bank. They contain information on households and communes. The survey methodology is based on the World Bank's Living Standards Measurement Study (LSMS). Each survey round has its own core module topic, based on a basket of core module topics. Since 2002, the surveys have been conducted every two years.

The study uses the VHLSS 2006 and 2010: their sample sizes of about 45,945 households, over 3063 communes/wards (VHLSS 2006) and about 69,360, over 3133 communes/wards (VHLSS 2010), are representative of regions, urban areas, rural areas, and provinces. The surveys consist of two types of data: households and communes. The data are organised into many sections, with each containing a certain subject, such as demographic traits, income and expenditure, education, health, employment, agricultural production, and communes. As the data on communes are not yet available in the VHLSS 2010, the effects of commune characteristics cannot be observed. The data from different sets of questionnaires are compiled to gather relevant variables. The samples used in the analysis for the study comprised 4680 households for the VHLSS 2006 and 4221 households for the VHLSS 2010.

4.2.2. Data for trade-related variables

Other sources of data are used in combination with the VHLSSs to generate some important proxies for local trade openness and institutional reforms. These variables are the ratios of industrial employment and wage employment at the commune level, provincial total retail sales per capita, and the PCI. Firstly, industrial employment is the proportion of labour working in the industrial sector, such as seafood, food processing, garment and shoes, and rubber and plastic products, measured at the commune level (Niimi et al., 2007). Wage employment is the ratio of labour receiving wages as working. These ratios are calculated from the VHLSS data.

Secondly, the provincial total retail sales per capita are the total value of retail sales that a province attains over a year, divided by its population (Table 3). This variable measures the level of trade transactions in provinces. The data for the variable are taken from various annual issues of the Statistical Yearbooks of Vietnam.

Table 3
Provincial per capita income, headcount poverty rate, trade and the PCI.

Province	Poverty rate (Per cent)		Mean per capita income (1,000VND)		Sales per capita (million VND)		PCI	
	2006	2010	2006	2010	2006	2010	2006	2010
Ha Noi	1	2	14,047.00	31,339.60	17.526	34.756	50.34	55.73
Hai Phong	2	3	10,257.55	21,906.52	7.679	18.572	49.98	54.64
Vinh Phuc	3	5	7925.83	16,462.49	4.215	16.355	61.27	61.73
Ha Tay	6	–	8039.00	–	6.874	–	40.73	–
Bac Ninh	4	1	8417.83	20,808.44	5.051	16.650	54.79	64.48
Hai Dương	3	5	8415.75	16,763.15	3.179	7.205	52.70	57.51
Hung Yen	4	4	8817.36	19,753.39	3.786	8.710	55.97	49.77
Ha Nam	5	2	6369.22	15,961.27	4.018	9.087	47.27	52.18
Nam Đinh	4	5	8105.59	15,892.80	2.746	6.460	48.89	55.63
Thai Binh	9	7	6710.29	17,633.71	2.986	8.027	50.54	60.04
Ninh Binh	4	7	6860.91	15,839.26	3.957	11.825	55.82	62.85
Ha Giang	31	47	4668.38	8524.91	1.572	3.448	48.49	53.94
Cao Bang	21	40	7090.00	10,075.18	2.892	7.240	46.63	53.55
Lao Cai	22	25	6472.80	13,171.88	3.488	8.975	64.11	67.95
Bac Kan	11	18	5642.71	12,012.71	2.587	5.955	48.73	51.49
Lang Son	2	24	6396.22	11,673.00	4.366	12.605	49.64	50.20
Tuyen Quang	16	30	6014.05	11,393.47	3.481	8.007	47.21	57.90
Yen Bai	16	21	6314.42	12,211.37	2.552	7.113	56.85	60.16
Thai Nguyen	8	12	7596.58	15,203.02	3.597	7.850	52.71	56.54
Phu Tho	4	6	7159.85	13,988.69	2.919	7.507	54.42	52.47
Bac Giang	4	9	7038.21	14,455.93	2.070	4.788	55.99	58.02
Quang Ninh	5	5	11,486.58	21,776.41	10.622	21.757	53.25	64.41
Lai Chau	36	50	3801.65	8887.31	1.336	3.582	36.76	51.77
Đien Bien	35	48	4435.64	10,648.24	2.514	6.634	42.28	55.12
Son La	17	25	6313.47	13,699.52	2.576	7.355	45.22	49.26
Hoa Binh	16	22	6073.16	11,744.11	1.943	6.133	50.17	49.89
Thanh Hoa	14	17	5918.14	11,462.78	2.589	6.998	45.30	55.68
Nghe An	15	17	5880.92	13,434.93	3.179	9.451	54.43	52.38
Ha Tinh	20	15	5743.26	13,381.28	3.733	11.919	42.35	57.22
Quang Binh	12	15	5772.29	13,771.90	4.274	11.269	47.90	55.22
Quang Tri	20	16	5828.82	13,390.82	6.090	15.778	52.18	61.61
Thua Thien-Hue	12	5	7424.09	12,583.91	6.268	13.369	50.53	61.31
Đa Nang	0	2	14,377.68	28,622.44	13.355	36.797	75.39	69.77
Quang Nam	11	11	6404.67	13,165.81	3.348	9.936	56.42	59.34
Quang Ngãi	7	12	6333.68	12,325.31	5.385	14.139	44.20	52.21
Binh Đinh	5	1	7834.86	18,018.52	6.513	15.097	66.49	60.37
Phu Yen	4	7	7671.90	13,779.02	4.476	10.796	54.93	58.18
Khanh Hoa	5	11	9003.13	14,797.83	10.810	24.943	55.33	56.75
Kon Tum	7	15	6358.83	16,496.47	3.158	8.325	41.38	57.01
Gia Lai	20	14	6678.00	15,471.57	3.883	10.069	53.06	53.65
Đak Lak	9	9	7201.06	16,211.93	4.001	14.897	51.65	57.20
Đak Nong	6	9	8505.33	14,081.88	4.079	10.319	38.91	48.91
Lam Đong	13	9	8311.73	17,990.47	6.337	16.831	52.25	58.26
HCM city	0	0	19,660.48	40,682.26	21.056	50.579	63.39	59.67
Ninh Thuan	12	7	6671.20	16,114.47	4.809	11.292	45.82	56.61
Binh Phuoc	4	2	9931.37	20,684.90	5.580	13.765	46.29	57.24
Binh Duong	1	1	10,046.55	16,737.24	11.441	28.162	76.23	57.93
Đong Nai	0	2	15,818.11	48,728.61	9.140	28.090	64.64	65.72
Binh Thuan	0	1	11,645.48	22,956.87	7.269	22.221	52.66	59.49
BaRia-Vung Tau	2	4	8089.27	16,986.76	9.169	14.029	55.95	58.45
Long An	0	4	12,603.30	22,974.36	5.078	23.079	50.40	60.55
Đong Thap	5	4	9158.46	18,638.85	5.621	12.432	58.13	62.74
An Giang	1	7	8486.57	16,946.50	9.045	16.019	60.45	67.22
Tien Giang	2	3	8831.19	18,812.84	6.347	22.838	52.18	61.94
Vinh Long	3	4	8823.03	17,751.44	6.735	12.812	64.67	59.63
Ben Tre	3	7	8246.96	18,764.00	5.089	16.589	53.11	63.40
Kien Giang	3	8	8611.77	16,418.59	7.536	12.372	51.27	63.11
Can Tho	3	10	9337.77	16,417.26	11.105	17.574	58.30	58.90
Hau Giang	0	0	11,982.47	19,897.83	5.239	27.196	52.61	62.46
Tra Vinh	10	5	8563.27	15,351.68	4.982	15.870	56.83	63.91
Soc Trang	4	16	8092.55	13,549.49	5.545	8.517	55.34	65.80
Bac Lieu	5	7	6685.22	16,811.92	7.436	16.751	42.89	61.49
Ca Mau	2	7	7698.84	18,711.47	8.101	13.732	43.99	58.20

Source: Author's calculation using data from the VHLSS 2006 and 2010, the GSO, and the VCCI.

Thirdly, the PCI was developed in 2005 by the Vietnam Chamber of Commerce and Industry (VCCI) and the project for Vietnam Competitiveness Initiative (VNCI). It was constructed to assess and rank the business environment and the policies towards private sector development across provinces in Vietnam. The PCI rates provinces on a 100-point scale, using survey data on the enterprise perceptions of the local business environment. It also employs credible and comparable data from officials and other sources of data relevant to local conditions (USAID and Vietnam Chamber of Commerce and Industry, 2006, 2010). The PCI 2006 was established by ten sub-indices that capture key dimensions of the local business environment: market entry costs, land access and security of tenure, transparency and access to information, time costs of regulatory compliance, informal charges, SOE-biased competition environment, pro-activity of provincial leadership, private sector development services, labour training, and legal institutions. The PCI 2010, composed of nine sub-indices, is the same as the PCI 2006, except for the absence of the component index of SOE-based competition environment. For ease of comparison, the sub-index of competition environment in favour of SOEs, which is only in the PCI 2006, is excluded. The classification of provinces based on the PCI 2006 and PCI 2010 is shown in Fig. 2.

This PCI, by virtue of its components of assessment, can capture institutional reforms and thus trade reforms. As previously discussed, it is the most appropriate index to represent the provincial level of trade openness and institutional reforms. Some studies of Vietnam use this index to compare provinces' performance and reforms, but this study uses it in conjunction with household data to study welfare and poverty. Based on the PCI, provinces are classified as excellent, high, mid-high, average, mid-low, and low performing. The index helps provinces to identify their strengths and weaknesses in order to enhance their competitiveness in nurturing trade and private business. The improvement of provincial competitiveness will increase the level of trade liberalisation and the quality of institutions, which will eventually help to raise local households' standards of living.

5. Analysis of results

The model is estimated using the VHLSS 2006 and VHLSS 2010 to observe the changing impacts of local trade openness and institutional reforms on welfare of rural households over time. In terms of institutional reforms, the model uses both the overall PCI and the PCI components. As shown in the results of the estimates for equation (1), most of the coefficients are statistically significant and have the expected signs (Tables 4 and 5). With the mean of the variance inflation factor (VIF) being around 2 for the 2006 regression and 1.7 for the 2010 regression, the model has the minor issue of multicollinearity. The robust standard errors are used to eliminate the problem of heteroskedasticity. The following analysis explains and discusses the impacts of each group of the variables on rural welfare. The non-trade-related variables provide a big picture of the determinants of rural welfare. The trade-related variables focus on the impacts of trade openness and institutional reforms. The coefficients explain the percentage changes in per capita income associated with household characteristics. The analysis begins with the regression results using the overall PCI, and then follows the results using the PCI components.

5.1. Regression results using the overall PCI

In terms of demographic characteristics, only gender and household heads having spouses do not affect welfare; the other variables do have an impact on welfare to varying degrees (Table 4). The insignificance of gender of head is also found in other similar studies, for instance, Glewwe et al. (2002), Niimi et al. (2007), and Justino et al. (2008). Theoretically, households headed by men are better off than those headed by women (Haughton & Khandker, 2009). The World Bank (2012), however, observes that female headship has become less correlated with poverty in Vietnam. Although this result is apparently counter to expectation, it may indicate that the issue of gender inequality appears to be minor in Vietnam. In reality, women are increasingly important in Vietnamese society. The results also show that the variable of household heads living with spouses has no impact on welfare. Household heads may be the primary income source, and spouses may largely become dependent in households. As expected, household size and the dependency ratios appear to diminish welfare significantly. An additional member in a household on average decreased household per capita income by 5.8 per cent in 2006, holding other things constant. This percentage increased in 2010, probably suggesting the sign of the economic slowdown, as a consequence of the 2008 financial crisis. The effects of dependency fall over time. A one-percentage rise in the proportion of children reduced per capita income by 0.5 per cent in 2006 and 0.4 per cent in 2010.

The dummy variable indicating whether a household head belongs to the Kinh, the major ethnicity in Vietnam, has a considerable effect on rural welfare. The coefficient of 0.1177 attached to the variable "Heads' ethnicity (Kinh)" means that, holding other factors unchanged, per capita income of Kinh households was typically 12.5 per cent higher than that of other households.[7] Notably, the effect doubled in 2010. This suggests the widening income inequality amongst ethnicities in favour of the Kinh. In the results, the age of household heads has a positive and significant impact on welfare. A one-year increase in the age of household heads raised per capita income by 0.3 per cent in 2006 and 0.5 per cent in 2010, on average and holding other things equal. In short, household demographic characteristics are important determinants of rural welfare.

With respect to human capital, education has a significant and consistent impact on rural welfare over the period. One year added to household heads' years of school typically increased income per head by more than 2 per cent, ceteris paribus

[7] The percentage increase is given by $e^{0.1177} - 1$, which is about 01249. This calculation is applied for all dummy variables.

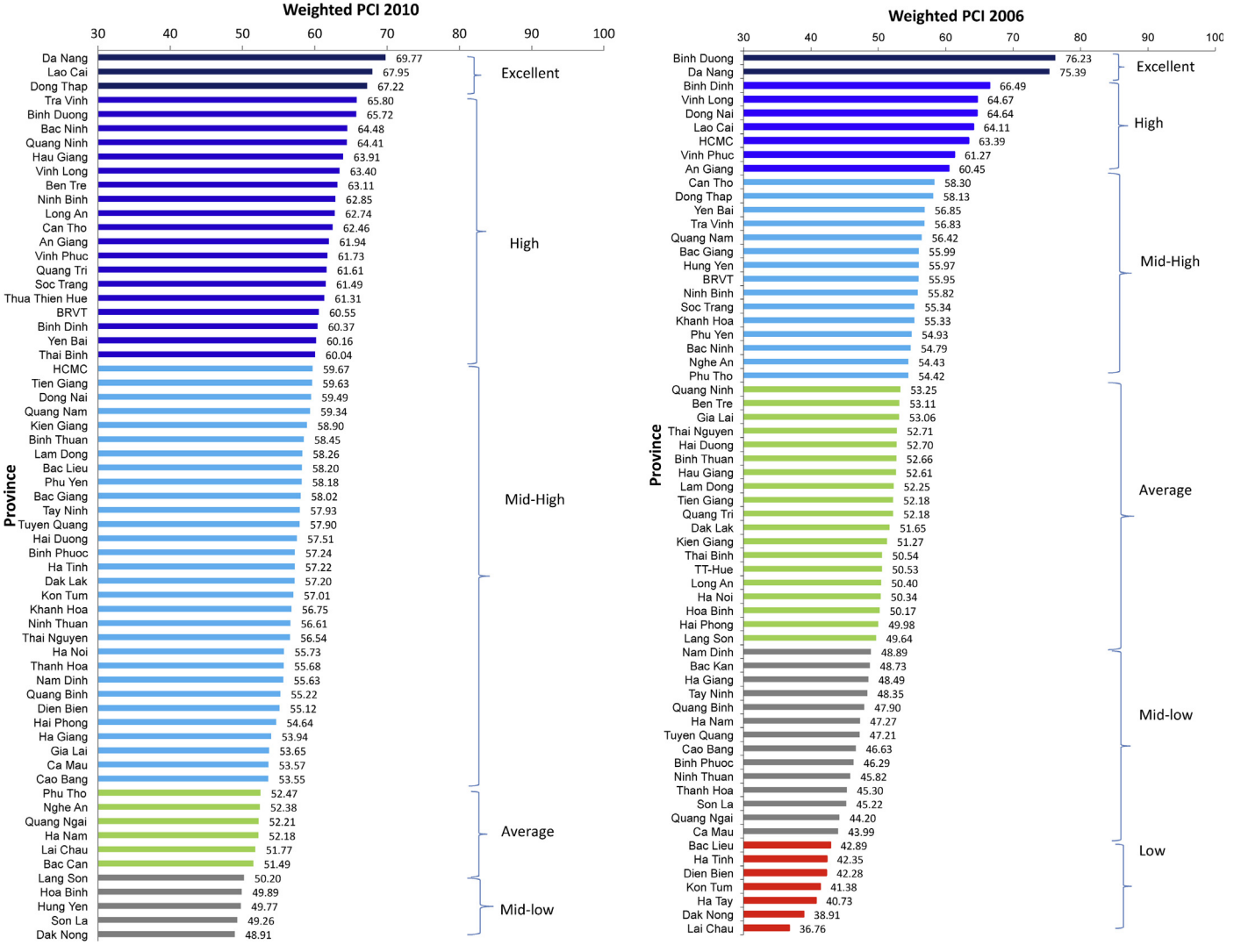

Fig. 2. The Vietnam PCI, 2006 and 2010.
Source: Based on the data collected from the USAID and Vietnam Chamber of Commerce and Industry (2006, 2010)

Table 4
OLS estimates of overall impact of institutional reforms and local trade on per capita income, 2006 and 2010 (dependent variable: log of per capita income).

Independent variable	Exptd. sign	2006		2010		Coef. Change
		Coefficient	*p*-value	Coefficient	*p*-value	
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(5)−(3)
Constant term		7.8723***	0.000	8.1939***	0.000	0.3216
Household and individual characteristics						
Household size	−	−0.0575***	0.000	−0.0655***	0.000	−0.0080
Heads' ethnicity (Kinh)	+	0.1177***	0.000	0.2402***	0.000	0.1225
Heads' gender (male)	+	−0.0177	0.558	−0.0096	0.786	–
Heads' age	±	0.0026***	0.002	0.0046***	0.000	0.0020
Heads with spouse	±	−0.0570	0.128	−0.0479	0.265	–
Proportion of children	−	−0.0046***	0.000	−0.0044***	0.000	0.0002
Proportion of elderly	−	−0.0024***	0.000	−0.0030***	0.000	−0.0006
Human capital						
Heads' years of school	+	0.0225***	0.000	0.0224***	0.000	−0.0001
Spouses' years of school	+	0.0087***	0.003	0.0153***	0.000	0.0066
Parent's years of school	+	0.0191***	0.003	0.0133**	0.010	−0.0058
Technical diploma ratio	+	0.0040***	0.000	0.0025***	0.000	−0.0015
Post-secondary diploma ratio	+	−0.0043***	0.000	−0.0022***	0.003	0.0021
Occupation (reference category is the unskilled)						
Head business owner/leader	+	0.2102***	0.000	0.2632***	0.000	0.0529
Head professional	+	0.2958***	0.000	0.3701***	0.000	0.0743
Head white collar	+	0.2578***	0.001	0.0497	0.703	−0.2081
Head skilled worker	+	0.1066***	0.000	0.1493***	0.000	0.0427
Agricultural production						
Rice productivity	+	0.2207***	0.000	0.4214***	0.000	0.2007
Household net rice producers	+	0.0000***	0.000	0.0001***	0.000	0.0000
Total used fertiliser quantity	+	0.0001***	0.000	0.0001***	0.001	0.0000
House characteristics						
Access to electricity	+	0.0564**	0.038	0.0454	0.266	−0.0111
Access to safe drinking water	+	0.0771**	0.015	0.1369***	0.000	0.0598
Geography						
North central region	−	−0.1863***	0.000	−0.2613***	0.000	−0.0750
Urban areas	+	0.1157***	0.000	0.1543***	0.000	0.0386
Provincial/commune trade and institutional reforms						
Commune ratio of industrial labour	+	0.0058***	0.000	0.0013**	0.021	−0.0045
Commune ratio of wage labour	+	0.0011**	0.041	0.0063***	0.000	0.0052
Provincial total sales per capita	+	0.0216***	0.000	0.0064***	0.000	−0.0152
Provincial competitiveness index	+	0.0046***	0.000	−0.0031	0.131	−0.0016
Adjusted R^2			0.38		0.41	
Number of observations			4680		4221	

Source: Author's estimates using the VHLSS data.
"–": not applicable.
** Significant at 5% level.
*** Significant at 1% level.

The effect of school years is smaller for spouses and parents of household heads. The proportion of household members having a technical diploma is positively associated with a rise in per capita income; accordingly, per capita income on average rose about 0.3 per cent for a one-percentage increase in the share of members with a technical diploma. However, the proportion of post-secondary qualifications of general education shows the opposite. This may suggest that technical training is more important in welfare improvement than general training, which is inefficient and lags behind. Education is thus crucial to rural welfare. The results are consistent with other similar studies suggesting that education is the key to alleviating rural poverty.

As predicted, employment of household heads has a significant impact on rural welfare. On average and other things being constant, the per capita income of household heads who were business owners or leaders was 23.4 per cent in 2006 and 30.1 per cent in 2010, both of which are higher than that of the unskilled (the reference category). For professionals, these impacts, which were even higher, rose from 34.4 per cent in 2006–44.8 per cent in 2010. The effect of skilled labourers on welfare was smaller, but appeared to increase over time. The impact of white collar employment was not significant in 2010, probably mirroring the rise in unemployment from 2010 onwards in Vietnam. The results further suggest that jobs requiring higher qualifications were associated with higher income, and the effect of qualification apparently increased over the period. Employment, which is closely related to education, is increasingly significant for an improvement in rural welfare.

Agricultural production is the main activity in rural areas. The results show that some main agricultural factors, such as rice productivity, rice production surplus, and total quantity of fertiliser used in agricultural production, have a significant

Table 5
OLS estimates of specific impacts of institutional reforms on per capita income, 2006 and 2010 (Dependent variable: log of per capita income).

Independent variable	Exptd. sign	2006		2010		Coef. Change
		Coefficient	*p*-value	Coefficient	*p*-value	
(1)	(2)	(3)	(4)	(5)	(6)	(7) = (5)-(3)
Constant term		7.6113***	0.000	8.3762***	0.000	0.7649
Household and individual characteristics						
Household size	–	−0.0576***	0.000	−0.0670***	0.000	−0.0094
Heads' ethnicity (Kinh)	+	0.1122***	0.000	0.2270***	0.000	0.1147
Heads' gender (male)	+	−0.0132	0.663	−0.0069	0.845	–
Heads' age	±	0.0026***	0.001	0.0046***	0.000	0.0020
Heads with spouse	±	−0.0768**	0.041	−0.0730*	0.083	0.0038
Proportion of children	–	−0.0046***	0.000	−0.0044***	0.000	0.0002
Proportion of elderly	–	−0.0022***	0.000	−0.0028***	0.000	−0.0006
Human capital						
Heads' years of school	+	0.0237***	0.000	0.0242***	0.000	−0.0005
Spouses' years of school	+	0.0110***	0.000	0.0183***	0.000	0.0074
Parent's years of school	+	0.0188***	0.003	0.0130**	0.012	−0.0057
Technical diploma ratio	+	0.0041***	0.000	0.0026***	0.000	−0.0016
Post-secondary diploma ratio	+	−0.0045***	0.000	−0.0023***	0.002	0.0023
Occupation (reference category is the unskilled)						
Head business owner/leader	+	0.2078***	0.000	0.2617***	0.000	0.0539
Head professional	+	0.2855***	0.000	0.3594***	0.000	0.0739
Head white collar	+	0.2354***	0.004	0.0619	0.645	–
Head skilled worker	+	0.1187***	0.000	0.1516***	0.000	0.0329
Agricultural production						
Rice productivity	+	0.2914***	0.000	0.4184***	0.000	0.1270
Household net rice producers	+	0.0000***	0.001	0.0001***	0.000	0.0000
Total used fertiliser quantity	+	0.0001***	0.000	0.0001***	0.002	0.0000
House characteristics						
Access to electricity	+	0.0434	0.119	0.0363	0.370	–
Access to safe drinking water	+	0.0688**	0.031	0.1249***	0.000	0.0561
Geography						
North central region	–	−0.1778***	0.000	−0.2227***	0.000	−0.0449
Urban areas	+	0.1052***	0.000	0.1533***	0.000	0.0480
Provincial/commune trade and institutional reforms						
Commune industry labour ratio	+	0.0063***	0.000	0.0020***	0.001	−0.0042
Commune wage labour ratio	+	0.0007	0.199	0.0062***	0.000	0.0055
Provincial total sales per capita	+	0.0269***	0.000	0.0110***	0.000	−0.0159
Market entry costs	+	0.0092	0.367	−0.0006	0.969	–
Land access	+	0.0342***	0.003	0.0183*	0.063	−0.0159
Transparency	+	−0.0168**	0.049	−0.0194	0.170	–
Time costs	+	−0.0383***	0.000	−0.0111	0.345	–
Informal charges	+	0.0495***	0.000	0.0386**	0.022	−0.0110
Provincial leadership pro-activity	+	−0.0096	0.212	0.0146	0.144	–
Business support services	+	0.0154*	0.094	−0.0070	0.634	–
Labour training	+	0.0078	0.284	−0.0501**	0.038	–
Legal institutions	+	0.0191*	0.058	0.0020	0.841	-
Adjusted R^2			0.38		0.41	
Number of observations			4680		4221	

Source: Author's estimates using the VHLSS data.
"–": not applicable.
* Significant at 10% level.
** Significant at 5% level.
*** Significant at 1% level.

impact on rural welfare. Net rice production, as well as total quantity of fertiliser, appears to be less important for welfare improvement than rice productivity is. A one-unit increase in rice productivity on average raised income per head by 22.1 per cent in 2006, holding other things constant. The effect of rice productivity nearly doubled in 2010, probably reflecting the increasing level of technology in agricultural production. The improvement in rice productivity helps farm households to increase their incomes.

The results have demonstrated the important role of the non-trade-related variables in improving rural welfare. The core interest of the study is the impacts of the trade-related variables. The results indicate that provincial trade openness and institutional reforms had a significant impact on rural welfare, especially in 2006. As expected, the proportion of industrial employment helped to improve rural incomes. On average and ceteris paribus, a one-percentage rise in the ratio of commune

industrial employment increased per capita income by 0.6 per cent in 2006 and 0.1 per cent in 2010. The sharply decreasing impact may reflect the economic slowdown in the late 2000s, as discussed earlier. The effect of commune wage labour appeared to increase over time. In a time of economic recession, people are likely to diversify jobs, as industrial employment is declining.

For local trade, total retail sales per head are significantly and consistently associated with welfare improvement, although this impact falls over time. Per capita income increased by 2.2 per cent for a one-million-VND increase in total sales per capita. The impact of provincial trade declined sharply in 2010, presumably because of the economic downturn. In addition to these effects of employment and local trade per capita, the PCI had a positive and significant impact on rural welfare in 2006. Note that this was just before Vietnam joined the World Trade Organisation (WTO).[8] On average and other things being equal, per capita income rose by 0.5 per cent for one percentage point increase in the PCI. The results may clearly reflect the efforts to reform institutions towards membership of the WTO. These institutional reforms discernibly help provinces to improve welfare. The effect of institutional reforms was insignificant in 2010, possibly suggesting that institutional reforms progressed slowly after Vietnam entered the WTO. The slow pace of institutional reforms may be a cause of the economic recession since 2010.

5.2. Regression results using the PCI components

In addition to the regression that uses the overall PCI, the regression using the PCI components is expected to provide more insight into the effects of institutional reforms. The results of the non-trade-related variables and the other trade-related variables are almost the same as those in the former regression (Table 5). Market entry costs have no impact on welfare, suggesting that firms' entry into or withdrawal from a market is no longer an important issue. More importantly, the results show that access to land has a consistent and significant effect on welfare over time. Land access is very important for a farm household to cultivate and an entrepreneur to establish or expand a business. In the PCI components, informal charges also demonstrate a positive significant impact on welfare. In the weak institutional system, informal costs, such as unofficial customs fees and charges, are a big burden, deterring enterprises from starting up or expanding. The results also show that business support services and legal institutions are significant only in the 2006 results. This may clearly result from the difference in the speed and efficiency of institutional reforms between 2006 and 2010, which is similar to the results using the overall PCI. Other components of the PCI, such as transparency, time costs, and provincial leadership's pro-activity, have either no impact or unexpected impacts. Amongst the PCI components, access to land and informal costs are the important determinants of rural welfare over the period.

To sum up, analysis of the results shows that, in addition to the effects of conventional household characteristics, such as demographic traits, education, employment, agricultural production, household assets, and geography, there is evidence that provincial trade openness and institutional reforms have a positive impact on rural welfare. The significant impacts of internal trade openness and institutional reforms make the study more useful and straightforward in explaining institutional effects on welfare. The results also demonstrate an insignificant impact of institutional reforms in 2010, which suggests sluggish progress in institutional reforms in the period from joining the WTO to the late 2000s.

6. Conclusions

The study has combined the VHLSS data with the Vietnam Provincial Competitiveness Index in a model of micro-determinants of growth of household income to examine the effects of local trade and institutional reforms on rural welfare. It provides evidence that local trade and institutional reforms improved rural welfare and thereby poverty reduction in Vietnam, because most rural households are poor. Notably, several proxies for institutional reforms have a significant impact on per capita income, making the study a direct explanation of institutional effects on welfare. The changing impacts, especially of provincial trade openness and institutional reforms from 2006–2010, reflect the pace and efficiency of institutional reforms in Vietnam, which are useful for policymakers. Institutional reforms and local trade openness are proved to be appropriate for improving rural household welfare and reducing poverty.

Institutional reforms in Vietnam have been progressing slowly since the WTO accession, as suggested by the results. The sluggish process of institutional reforms impedes the pathways through which trade liberalisation affects welfare, as trade policy reforms accompany institutional reforms. Consequently, poor households are unlikely to benefit from trade liberalisation. Stagnant trade reforms and institutional reforms dampen business incentives, bringing about unemployment. In fact, the economy has not taken advantage of having WTO membership, primarily because of the slow pace of reforms.

The study suggests the crucial role of local trade and institutional reforms in welfare improvement and poverty reduction. It predicts that the slow progress of institutional reforms will curb the development of enterprises, and thereby preclude farm households from benefiting from employment. Although considered to be a successful case of economic growth and poverty reduction in the 1990s, Vietnam is unlikely to achieve the similar outcomes in the future, unless there are accelerating reforms of trade policy and institutions. The acceleration of institutional reforms in rural areas is thus the sole way to maintain Vietnam's economic development and to help the poor to escape poverty.

[8] Vietnam became an official member of the World Trade Organisation in January 2007, after more than 10 years' preparation and negotiation.

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