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The Impact of Public Governance on Household Income: A Quantile Panel Analysis

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Compliance with Ethical Standards

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Abstract

This study investigated the role of provincial governance on the growth of per capita income of Vietnamese households, using a balanced panel dataset for the period 2012-2014. Whereas we found no evidence for the influence of provincial governance when a linear fixed-effect regression estimator was used, the results from a fixed-effect quantile regression estimator reveal that provincial governance has a positive effect on several groups (but not the poorest) and the effect tends to be greater for better-off households. In addition, we find that wage employment plays a larger role in the income growth of poorer households, while returns on education are higher for richer households. The findings suggest that a mean regression approach that looks only at the role of explanatory variables on mean household welfare and does not consider differences in the distribution of household welfare, may miss some heterogeneity that is of interest to policy makers.

Keywords: fixed-effect quantile regression; household welfare; public governance; policy makers.

JEL classifications: P48; P35; I3, O43.

1. Introduction

Launched in 1986, the economic and political reforms known as “Đổi Mới” boosted economic growth and transformed Vietnam from one of the world’s poorest nations into a lower middle-income country by 2010 (World Bank [WB] & Ministry of Planning and Investment [MPI], 2016). The proportion of the Vietnamese population remaining below the national poverty line (GSO-WB Poverty line) dropped from about 60% in 1993 to 13.5% in 2014 (WB, 2017). More than 40 million people were moved out of poverty over the course of two decades (WB, 2013). In addition, Vietnam has made significant advances in other dimensions of well-being, ranging from high primary and secondary school enrolments to improvements in health status and reduced morbidity and mortality. Thus, the country has achieved, and in some cases surpassed, many of the Millennium Development Goals (MDGs) (WB, 2013).

Numerous studies have examined the contribution of various factors to household welfare in Vietnam. In general, these studies often examine the role of distinguishing household characteristics or assets (land, migration, access to credit, nonfarm participation) (Nguyen & Daniel, 2012; Nguyen & Marrit, 2014; Nguyen & Tran, 2013; Pfau & Giang, 2009; Ravallion & Van de Walle, 2008) and community characteristics (infrastructure, natural and geographic conditions) (Bui, Dungey, Nguyen, & Pham, 2014; Tran, Nguyen, Van, & Nguyen, 2015) in improving household welfare. Public governance can have a significant influence on the living standard of local people (Attride, 2002; Sáez, 2013) and in Vietnam, ensuring good governance is considered a prerequisite for reducing poverty and improving household welfare (Jairo, Nguyen, Tran, & Phung, 2015). To date, however, little is known about the role of local government in improving household welfare in Vietnam.

Since provinces are largely autonomous in their implementation of policy reforms in Vietnam (Malesky, 2004; Tran, Huong, Doan, & Tran, 2016), there are large gaps between formal institutions established in law and the enforcement and compliance performance of the local authorities. The data show that the quality of governance and institutions across provinces has been uneven. While many provinces have made significant improvements in economic governance and business investment, others have lagged behind (Malesky, 2007; VCCI & USAID, 2016). The lack of empirical evidence on the role of local government in improving household welfare, combined with substantial differences in public governance across provinces, have motivated us to consider *how and to what extent the quality of provincial governance affects household welfare*. To the best of our knowledge, our study is the first

attempt to apply micro-econometrics to investigate the role of provincial governance in the growth of household income in Vietnam.

Our study has several strong points. *First*, using a balanced panel data set with fixed effect regression models allows us to control for unobservable household and province-specific effects which are invariant over time and can affect a household's income. *Second*, existing studies often investigate only the effect of public governance or institutions on household welfare at the mean using a mean regression approach (e.g., ordinary least squares or fixed/random effects estimators). This approach, however, may not capture heterogeneous effects, possibly because these may differ across points on the outcome distribution of households.

To address this issue, our study applied a fixed-effect quantile regression model to consider the role of provincial governance at various points in the conditional distribution of household welfare. Whereas we found no evidence for the influence of provincial governance when a linear fixed-effect regression estimator was used, the results from a fixed-effect quantile regression estimator reveal that provincial governance has a positive effect on some quantiles considered but the effect seems to be greater for better-off households. The findings suggest that a mean regression approach that does not consider differences in the distribution of household welfare, may miss some heterogeneity of interest to policy makers.

2. Theoretical and Empirical Evidence

The present use of the concept of governance may be traced to a study on Africa by Mundial (1989), who defined governance as “the exercise of political power to manage a nation’s affairs.” The World Bank (1992) understood governance as “the manner in which power is exercised in the management of a country’s economic and social resources for development.” In similar vein, the Organization for Economic Co-operation and Development (OECD) defined governance as “the exercise of authority in government and the political arena.” According to their understanding, “good public governance helps to strengthen democracy and human rights, promote economic prosperity and social cohesion, reduce poverty, enhance environmental protection and the sustainable use of natural resources, and deepen confidence in government and public administration” (Tarschys, 2001, p. 28). Huther and Shah (2005) linked governance to the notion of institutions, defining governance as a “multifaceted concept encompassing all aspects of the exercise of authority through formal and informal institutions in the management of the resource endowment of a state” (Huther & Shah, 2005, p. 40).

Institutionalists Krueger (1974) and North (1994, 1995) pointed out that good governance reduces transaction costs for economic activities. Stiglitz (2002) and other New-Keynesians indicated that transparent legal frameworks and clear tax policies enable the market to function effectively. According to Eric, Chetwynd, and Spector (2003), two theoretical models emerge from the research literature and explain the role of good public governance in improving income and poverty reduction.

The “economic model” postulates that good public governance increases economic investment, reduces market distortions, promotes competition, and improves efficiencies by reducing the cost of doing business. In turn, these encourage economic growth and poverty reduction.

The “governance model,” on the other hand, asserts that good public governance improves the institutional capacity of government to deliver quality public services, increase public investment in major public demands, enhance compliance with safety and health regulations, and reduce budgetary pressures on government. Good public governance, in turn, increases social capital and public trust in governmental institutions, and expands public resources available to implement effective economic development programs, enhancing the capability of government to help its citizens, particularly the poor. Thus, improving governance, at both national and international levels, is important for the development of poor countries (Brinkerhoff, 2008). There is also increasing consensus that good governance is vital for human development (UNDP, 2011a).

The relationship between governance, public administration and development progress has been a main concern in the research on developing countries (Jairo et al., 2015). In consequence of the presence of comparable units of analysis, most large-scale studies that utilize econometric and statistical methods use national-level data to examine the effect of key governance variables on development progress. On the macro level, any study of governance as a unit of analysis initially focuses narrowly on the association between governance and economic growth (Sáez, 2013). Seminal work by Barro (1991) employed a cross-national study to regress economic growth on a number of country characteristics (e.g., government consumption expenditure, public investment in education, and political instability). The main finding from this study was that political instability and a high ratio of government consumption expenditure to GDP had a negative effect on income growth.

Campos and Nugent (1999) evaluated the extent to which governance affects some indicators of development progress, namely per capita income, infant mortality rate and the

illiteracy rate. Governance is measured by a set of institutional factors: (i) accountability; (ii) a strong civil society; (iii) bureaucratic quality; (iv) rule of law. In their study, ordinary least squares regression (OLS) models were used with the data from a sample of 21 Latin American countries (LACs) and 8 Southeast and East Asian countries (SEACs).¹ The regression results show that the last three indicators are positively associated with the real per capita income for the whole sample. However, looking at each region, only the strong civil society factor has a positive relationship with income per capita in the SEACs, while only bureaucratic quality and the rule of law have a positive linkage with per capita income in LACs. Similar findings were also observed for the case of infant mortality and illiteracy rates. The results suggest that the relationship between governance and development progress might be different across regions and countries.

Hasan, Mitra, and Ulubasoglu (2007) re-examined the association between poverty and institutions to test if governance, political freedom, and the ease of doing business, among other indicators of institutions, affect cross-country poverty rates. Their main finding was that good governance, as measured by a strong commitment to the rule of law, among other measures, matters for poverty reduction, mainly through its influence on economic growth. Though not a panacea, less cumbersome regulations governing private sector operations, especially those pertaining to starting a business, can directly affect economic growth as well as poverty reduction. In addition, their study finds that political freedom is not linked with either higher growth or lower poverty. Combined, the findings imply that good governance and regulations supporting the establishment of new firms are more relevant for growth and poverty reduction than the nature of the political system.

Haq, Zia, and Arif (2006) examined whether there was an association between good governance and pro-poor growth in Pakistan from 1996 to 2005. The authors employed three broad indicators of governance: (i) political governance (i.e., voice and accountability, political instability and violence); (ii) economic governance (i.e., government effectiveness and regulatory quality); and (iii) institutional dimensions of governance (i.e., rule of law, control of corruption). Haq et al. (2006) investigated the relationship between governance and poverty (as well as governance and income inequality) using simple ordinary least squares (OLS) regressions. Their main finding is that voice, accountability, and political stability are negatively and significantly associated with poverty. By combining macro data (states) and

¹ Socialist and transitioning nations, such as China, Cuba, Lao People's Democratic Republic and Viet Nam, were excluded from the sample.

micro data (child poverty) with multilevel regression models, Daoud (2015) investigated the association between the quality of local governance and absolute child poverty across states in India. His study found that controlling for all other factors, households living in a state with better local governance were more likely to escape child poverty, while those living in a state with more corruption were more likely to suffer from child poverty.

Substantial gaps in the quality of governance and institutions and in economic development across provinces have inspired few studies using provincial data levels in Vietnam to test if the quality of governance is associated with the living standard of the population. For instance, there is a positive association between the Human Development Index (HDI) and the Public Administration Performance Index (PAPI) (UNDP, 2011b). Ha and Hanh (2013) also found that provincial governance (PCI and PAPI) can have a positive effect on GDP per capita at the provincial level. It should be noted, however, that using aggregate data, cross-province studies are likely to provide biased estimates because of their failure to control for the heterogeneity of household characteristics (Blundell & Stoker, 2005). As these writers have noted (Blundell & Stoker, p. 3), “for any application, a model must be specified which captures all important economic effects, allows for relevant individual heterogeneity, and bridges the gap between individual and aggregate, facilitating analysis at both levels.” In the current study, we applied a micro-econometric approach with a balanced panel data set to examine the role of provincial governance in improving household welfare, accounting for heterogeneity in household characteristics.

3. Data and Method

3.1. Data

In this study, household data were taken from the Vietnam Household Living Standard Surveys (VHLSS) of 2012 and 2014. The VHLSSs were conducted by the General Statistics Office of Vietnam (GSO) with technical assistance from the World Bank. Each VHLSS covers around 9,400 households. The VHLSSs are representative at the national and regional levels (Vietnam is divided into six geographic and eight economic regions). Data on households and individuals include basic demography, employment and labour force participation, education, health, income, expenditure, housing, fixed assets and durable goods, and participation of households in poverty alleviation programs. It may be added that the 2012 and 2014 VHLSSs set up a balanced panel of around 4,200 households.

Table 1

Ten Composite Sub-Indices of the Provincial Competitiveness Index (PCI)

<ol style="list-style-type: none">1. Market entry costs for business start-up;2. Access to land and security of business premises;3. Transparent business environment and equitable business information;4. Informal charges;5. Time requirements for bureaucratic procedures and inspections;6. Restrictions marginalising private activity due to policy biases toward state-owned and foreign-owned businesses;²7. Proactive, creative provincial leadership in problem solving for businesses;8. Business support services;9. Labour training policies and regulations;10. Fair and effective legal procedures for dispute resolution.
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Source: (VCCI & USAID, 2016).

In this study, the quality of provincial governance is measured by the Provincial Competitiveness Index (PCI), an aggregate performance indicator that evaluates and ranks the quality of economic governance by provincial authorities in creating a favourable business environment for the development of the private sector (Table 1). The PCI has been collected annually by the Vietnam Chamber of Commerce and Industry (VCCI) since 2007 with support from USAID.³ The survey covers all 63 provinces in Vietnam. Briefly, the PCI methodology was conducted in a three-step sequence: (i) gather data from business surveys and published documents, (ii) compute ten sub-indices and standardize to a 10-point scale, and (iii) adjust the composite PCI as the weighted mean of nine sub-indices with a maximum score of 100 points (VCCI & USAID, 2016). The combination of the VHLSSs and PCI surveys offers a unique household-provincial level panel dataset. This balanced panel dataset enables us to measure the impact of provincial governance on the growth of household income, accounting for household characteristics at the household level.

3.2. Model specifications

Since household income is considered to be one of the standard measures of household economic welfare (Deaton, 1997), household welfare is measured by household per capita income in the current study. We assume household welfare is a reduced function of provincial governance and of household characteristics, as follows:

² This sub-index was even mentioned in the PCI's official documentation but there is no data available on their website to download, so in this study we use the overall PCI.

³ For the sampling and methodology of the survey, see http://eng.pcivietnam.org/uploads/96646-PCI%20USER%20GUIDE_Final_Website.pdf

$$y_{ijt} = \beta_0 + X_{ijt}\beta_1 + PCI_{jt}\beta_2 + Year_t\beta_3 + u_{ij} + \varepsilon_{ijt} \quad (1)$$

where y_{ijt} is the annual per capita income of household i in province j in the year t ; X_{ijt} is a vector of household distinguishing characteristics, such as demographic variables and assets; PCI_{jt} is the measurement of the quality of public governance at province j ; $Year_t$ is the dummy variable of the year 2014. In equation (1), unobserved variables are decomposed into time invariant component u_{ij} ⁴, and time-variant component ε_{ijt} . Equation (1) was estimated using a fixed-effect estimator with a balanced panel dataset of households and the PCI in 2012 and 2014. This approach allows the researcher to remove the influence of time-invariant unobservable regional, household and individual characteristics that can affect household welfare (Cameron & Trivedi, 2005). According to Wooldridge (2013), with the assumption of strict exogeneity for the explanatory variables, using a fixed effect estimator in equation (1) yields unbiased estimates. Broadly speaking, the idiosyncratic error ε_{ijt} should be uncorrelated with each explanatory variable across all time periods.

A mean approach using standard linear regression techniques (e.g., ordinary least squares or fixed/random effects estimators) provides a methodology commonly used for considering the influence of public governance or institution on household welfare or development indicators (e.g., Azfar & Gurgur, 2008; Barro, 1991; Campos & Nugent, 1999; Hasan et al., 2007; Sáez, 2013). The mean approach looks at the average relationship between governance and household welfare based on the conditional mean of the outcome distribution. This gives us only a partial view of the relationship. However, quantile regression enables us to examine the relationship at different points in the conditional distribution of household welfare (Buchinsky, 1994).

Several studies (e.g., Dollar & Kraay, 2002; Li, Squire, & Zou, 1998) found a public governance heterogeneous effect across levels of development. Thus, we employed a fixed effects quantile regression estimator to test whether the effect of provincial governance quality differs for households with varying levels of household per capita income. The quantile estimator also provides a richer characterization of the data, allowing us to study the effect of

⁴ The variable u_{ij} captures all unobserved, time-constant factors that affect household welfare (the fact that u_{ij} has no t subscript shows that it does not vary over time). Generically, u_{ij} is called an unobserved effect and it is also common in applied research to find u_{ij} referred to as a fixed effect. In application, we might also see u_{ij} referred to as unobserved heterogeneity (or individual/household heterogeneity) (Wooldridge, 2013).

the quality of public governance on the entire distribution of household welfare, not merely its conditional mean (Koenker & Hallock, 2001). In addition, a quantile regression estimator is more robust to non-normal errors and outliers, while a linear regression estimator can suffer from inefficiency if the errors are highly abnormal (Koenker, 2005; Ha & Tran, 2017).

In the current study, we applied Canay's method (2011) to estimate a fixed-effect quantile regression model. First, the conditional mean of \hat{u}_{ij} is estimated from equation (1) using a fixed effects estimator. Second, a new dependent variable is computed as the difference between the original dependent variable and \hat{u}_{ij} : $\widehat{y}_{ijt} = y_{ijt} - \hat{u}_{ij}$. Finally, a fixed-effects quantile regression estimator was estimated for equation (2), where θ denotes the corresponding quantiles of dependent variables. Standard errors are estimated using bootstrap techniques with 1,000 replications. Under certain assumptions discussed in Canay (2011), this estimator is asymptotically consistent.

$$\text{Quantile}\left(y_{ijt}\right)_{\theta} = \alpha_{\theta} + X_{ijt}\beta_{\theta} + PCI_{jt}\delta_{\theta} + Year_t\lambda_{\theta} \quad (2)$$

4. Results and Discussion

4.1. Background information on household characteristics and provincial governance

This section provides some basic information about key variables used in the estimation. On average, there is an overall improvement in PCI with scores from 58 to 59.3 over the study period (Table 2). Table 3 indicates the top 10 provinces with the highest achievement in improving the PCI over the period 2012-2014. It also lists the 10 provinces that showed the lowest improvement in the PCI over the same period. Tuyen Quang province's PCI increased by about 15.5% (7.4) while that of An Giang province declined by 8.4% (-5.3). The PCI data show that some provinces have high PCI scores while others are skewed to the left of the score distribution (Figure 1). Some provinces improved their scores even though their score was still relatively lower than that of others.

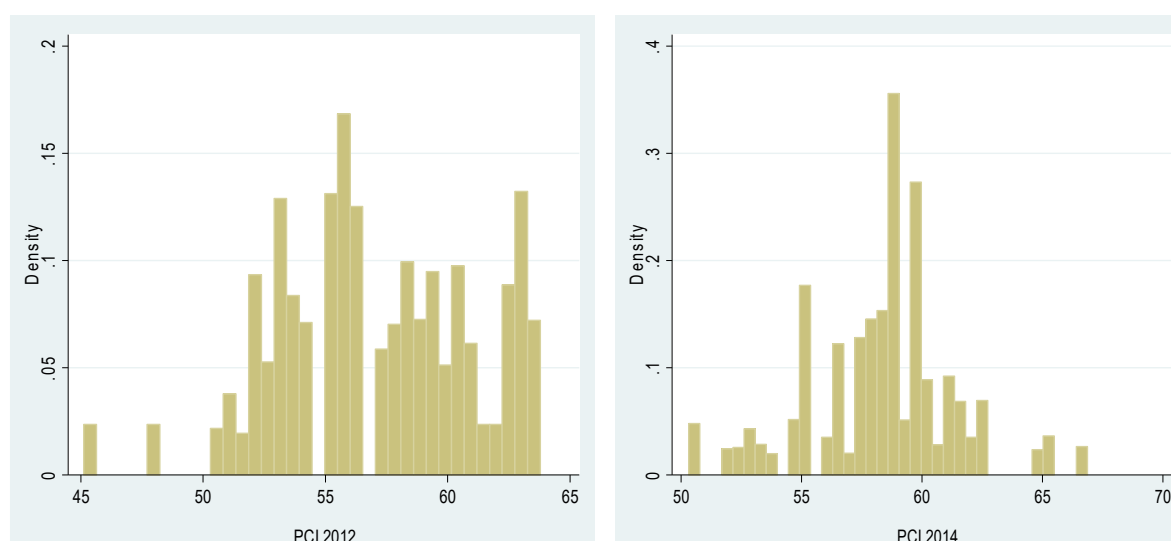
Table 2

Weighted Mean of PCI Sub-Indices for Wage Earning Sample

Year	Entry cost	Land access	Trans- parency	Time cost	Informal charge	Bias	Proac tive	Business support	Labour training	Legal	PCI
2012	8.66	6.34	5.87	5.82	6.55	NA	4.65	4.26	5.22	3.65	57.9
2014	8.10	5.64	6.21	6.46	5.10	5.02	4.39	5.93	6.24	5.62	59.3

Source: PCI 2012, 2014. NA: not available. Estimates from 63 provinces.

Figure 1: Distribution of PCI between 2012-2014.



Source: Authors' calculation from PCI 2012, 2014.

Table 3

Provinces Showing Greatest and Smallest Improvement in PCI Between 2012-2014

Province 2014	PCI 2014	Rank 2014	Change in score	% change
Top 10 provinces with the greatest improvement in PCI between 2012-2014				
An Giang	58.1	37	-5.32	-8.40%
Dong Nai	57.26	42	-5.03	-8.10%
Tra Vinh	58.58	32	-4.17	-6.60%
Son La	55.28	49	-3.71	-6.30%
Vinh Long	59.54	21	-3.43	-5.40%
Bac Lieu	59.5	22	-3.35	-5.30%
Binh Phuoc	59.72	17	-3.34	-5.30%
Hau Giang	58.91	25	-3.1	-5.00%
Ung Yen	55.14	51	-2.87	-4.90%
Ninh Thuan	56.88	43	-2.88	-4.80%
Top 10 provinces with the least improvement in PCI between 2012-2014				
Ha Nam	56.57	45	4.65	8.90%
Binh Thuan	59.16	23	5.08	9.40%
Thanh Hoa	60.33	12	5.22	9.50%
Ha Noi	58.89	26	5.49	10.30%
Lam Dong	58.79	29	5.95	11.20%
Dien Bien	50.32	63	5.20	11.50%
Nam Dinh	58.52	33	6.29	12.00%
Vinh Phuc	61.81	6	6.66	12.20%
Tay Ninh	59.62	19	7.67	14.80%
Tuyen Quang	55.2	50	7.39	15.50%

Source: PCI 2012, 2014.

Table 4*Statistical Summary of Key Variables Used in the Estimation*

Year	2012		2014	
	Mean	Std. Dev.	Mean	Std. Dev.
Variables				
<i>Quality of provincial governance</i>				
Provincial competitiveness index (score)	57.07	3.99	58.33	3.00
<i>Household welfare</i>				
Annual household per capita income (in thousands of VND)	24,420	25,156	30,168	33,680
Poverty incidence (1=yes; 0 otherwise)	0.09	0.29	0.08	0.27
Poverty gap (percentage of income shortfall relative to the poverty line)	0.02	0.08	0.02	0.08
<i>Household characteristics</i>				
Gender of household head (1=male; 0=female)	0.76	0.43	0.75	0.43
Age of household head (years)	49.87	14.03	51.36	13.85
Ethnicity of household head (1=major; 0=minor)	0.83	0.38	0.83	0.37
Marital status of household head (1=married; 0=unmarried)	0.98	0.15	0.98	0.15
Household head, years of schooling (years)	8.18	4.04	8.20	4.02
Household size (number of household members)	3.93	1.53	3.84	1.59
Dependency ratio (number of dependents in the household) ^a	0.35	0.29	0.36	0.30
Wage employment (1 if the household has wage income; 0=no wage income)	0.67	0.47	0.67	0.47
Nonfarm self-employment (1 if the household has nonfarm-self-employment income; 0=not)	0.33	0.47	0.33	0.47
<i>Land holding per household</i>				
Cropland, annual (m ²)	2,887	6,108	2,895	6,776
Cropland, perennial (m ²)	1,054	4,319	1,128	5,157
Forestry land (m ²)	1,544	10,442	1,558	13,117
<i>Regions (% of households in each region)</i>				
Urban (1=urban; 0=rural)	0.29		0.30	
Red River Delta (1=yes; 0 otherwise)	0.20		0.20	
East Northern Mountains (1=yes; 0 otherwise)	0.13		0.13	
West Northern Mountains (1=yes; 0 otherwise)	0.07		0.07	
North Central Coast (1=yes; 0 otherwise)	0.11		0.11	
South Central Coast (1=yes; 0 otherwise)	0.09		0.09	
Central Highlands (1=yes; 0 otherwise)	0.07		0.07	
Southeast (1=yes; 0 otherwise)	0.14		0.14	
Mekong Delta (1=yes; 0 otherwise)	0.20		0.20	
<i>Observations</i>	4169		4152	

Note ^a: Dependents include young dependents (under 15) and old dependents (women over 59 and men over 64). Average exchange rate (USD/VND) was 20,919 in 2012 and 21,259 in 2014.

Source: Authors' calculation from VHLSS 2012-2014 and PCI 2012-2014. The poverty rate was estimated using the official poverty line 2012-2014 (GSO, 2015).

The statistical summary of variables is given in Table 4. It should be noted that the PCI mean in Table 4 is calculated on the basis of household samples, while in Table 2 this is

estimated with observations from 63 provinces. The data indicate that on average, each household member earned about 2,035 thousand Vietnamese dong (VND) per month in 2012 and 2,514 thousand VND per month in 2014. The poverty head count index (poverty rate) also decreased from about 9% in 2012 to around 8% in 2012, while the poverty gap remained almost unchanged. The sample data reveal that about 30% of households live in urban areas while 70% live in rural areas. Most households lived in the Red River Delta and the Southeast region, accounting for about 40% of the total sample.

The poorest region is located in the West Northern Mountains, with monthly per capita income being estimated at about 1,134 thousand VND in 2012 and 1,660 thousand VND in 2014. Households living in the Southeast region are the richest, with per capita income at about 2,650 thousand VND per month and around 3,400 thousand VND in 2012 and 2014, respectively. On average, each household member in urban areas earned about 2,094 thousand VND in 2012 and 3,500 thousand VND in 2014, whereas each household member in rural areas earned only about 1,660 thousand VND and 2,080 thousand VND for the same period.

3.2. Determinants of household welfare

Model 1 in Table 5 reports the results from the income model using a fixed-effect estimator. It shows that the size of the PCI coefficient is about 48 thousand Vietnamese Dong (VND), not statistically significant at the conventional level of 10% ($p\text{-value} = 0.71$). Thus, we can conclude that there is no evidence to support the hypothesis that the quality of provincial governance affects per capita income at the mean. A different picture emerged, however, when a fixed-effect quantile regression model was applied. As can be seen in Model 2 and Figure 2, local governance has a positive and statistically significant effect on household per capita income for all quantiles except the tenth.

The effect is heterogeneous across the quantiles considered, however, and tends to be larger for households with per capita income above the median. Specifically, holding all other factors constant, an increase of one point in the PCI would lead to an increase of 60 thousand VND in annual per capita income for those at the median. The corresponding figures for those at the 75th and 90th quantiles are about 81 thousand VND and 122 thousand VND, respectively. These results suggest that a mean regression approach has obscured the role of good governance in improving household welfare at different points of outcome distribution. Our results have thus moved toward reconciling the findings of previous studies reported in the literature.

Interestingly, our research finding reveals that the quality of local governance plays a larger role in the income growth of richer households. The greater impact of provincial governance on richer households may be explained by the fact that better-off households have more resources with which to seize economic opportunities provided by improvement in local economic governance, which in turn can lead to higher income growth.

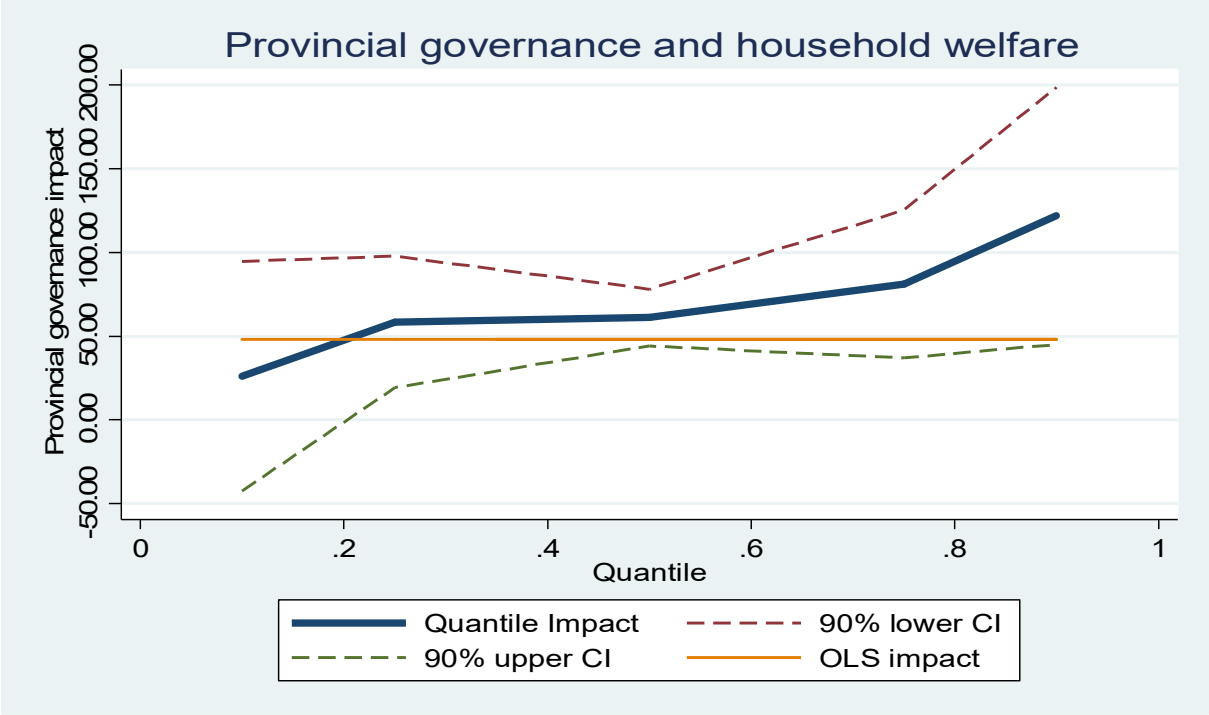


Figure 2: Slope and 90% coefficient intervals for quantile treatment regression.

Source: authors’ calculation from the VHLSSs and the PCI 2012-2014.

Note: Figure 2 reflects the varying effects of provincial governance on per capita income across different points in the distribution of income and also indicates that the effect is greater for better-off households.

Household size had a negative effect on per capita income in both models in Table 5. This finding is in line with several studies in rural Honduras (Jansen, Pender, Damon, Wielemaker, & Schipper, 2006) and peri-urban Vietnam (Tran, Lim, Cameron, & Van, 2014), which show that having more dependent members, and more family members in general, seems to reduce per capita income. Keeping all other variables constant, Model 1 shows that an additional family member results in a decrease in annual per capita income of about 2,643 thousand VND. The positive sign of the age of the household head and the negative sign of its squared term suggest that the age of the household head has a diminishing impact on per capita income.

Table 5*Determinants of Household per Capita Income*

Explanatory Variables	Model 1 Linear Fixed- Effect Estimator	Model 2 Fixed-Effects Simultaneous Quantile Regression Estimator				
		10 th Quantile	25 th Quantile	50 th Quantile	75 th Quantile	90 th Quantile
PCI	48.249 (128.300)	26.194 (40.094)	58.514** (24.294)	61.106*** (13.994)	81.111*** (24.460)	121.820*** (41.014)
Urban	4,202.931 (3,574.678)	2,737.856*** (449.239)	3,878.804*** (248.470)	4,348.978*** (134.843)	4,398.399*** (245.638)	5,503.781*** (405.393)
Gender	-7,036.009* (4,138.810)	-6,569.327*** (380.888)	-6,751.569*** (216.697)	-6,733.623*** (133.048)	-6,688.751*** (231.312)	-6,905.624*** (368.105)
Age	732.177** (351.487)	591.770*** (73.489)	647.517*** (37.464)	720.490*** (22.739)	785.619*** (39.569)	867.571*** (59.325)
Age squared	-5.795* (3.036)	-4.570*** (0.697)	-5.032*** (0.358)	-5.675*** (0.210)	-6.185*** (0.378)	-6.879*** (0.571)
Ethnicity	913.615 (2,318.397)	-523.931 (387.781)	318.778 (208.557)	855.971*** (144.929)	1,298.753*** (207.429)	2,132.063*** (312.234)
Marital status	-26.453 (3,247.906)	1,830.094 (1,408.867)	1,001.600** (421.214)	-28.699 (315.986)	-770.281* (444.221)	-1,200.851 (1,286.601)
Schooling years	502.918** (225.707)	292.871*** (45.665)	389.333*** (22.790)	492.905*** (13.483)	593.324*** (22.663)	751.418*** (39.556)
Household size	-2,642.740*** (397.604)	-2,244.935*** (106.574)	-2,449.322*** (51.328)	-2,599.172*** (35.644)	-2,747.446*** (65.630)	-2,916.468*** (98.940)
Dependency ratio	-3,242.060 (2,028.065)	-144.128 (747.621)	-2,035.245*** (330.154)	-3,312.393*** (236.796)	-4,701.621*** (355.788)	-6,808.457*** (658.540)
Wage employment	2,504.514*** (863.973)	3,619.445*** (325.368)	3,053.386*** (193.980)	2,448.163*** (122.746)	1,989.234*** (221.032)	592.289 (370.342)
Nonfarm self-employment	3,128.546*** (998.445)	1,642.368*** (402.773)	2,622.016*** (204.129)	3,093.737*** (125.109)	3,469.594*** (207.732)	4,462.368*** (392.233)
Annual land (log)	159.670 (161.834)	221.619*** (45.987)	192.770*** (25.491)	171.516*** (16.398)	132.025*** (26.984)	111.179*** (40.613)
Perennial land (log)	321.152*** (124.234)	162.532*** (53.237)	245.649*** (29.974)	307.471*** (20.724)	363.612*** (29.024)	442.688*** (52.618)
Forestry land (log)	435.628** (198.956)	470.305*** (38.310)	414.836*** (25.792)	390.018*** (16.471)	408.728*** (30.032)	404.544*** (41.927)
Year dummy 2014	5,125.969*** (484.900)	4,301.487*** (331.348)	3,714.260*** (165.421)	4,258.306*** (122.505)	3,599.444*** (161.184)	4,042.201*** (268.294)
Constant	8,080.828 (13,477.485)	6,333.994** (2,962.199)	7,272.941*** (1,650.650)	7,800.167*** (1,029.361)	8,129.843*** (1,640.945)	7,410.027*** (2,845.714)
R-squared	0.09					
Pseudo R2		0.200	0.300	0.37	0.36	0.31
Observations	7,812	7,812	7,812	7,812	7,812	7,812
Number of id	4,257			4,257		

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses in Model 1 and bootstrapped standard errors in parentheses in Model 2. Log stands for natural logarithm.

Surprisingly, the results from the fixed-effect estimator reveal that on average, male-led households have lower per capita income than female-led households, even after controlling for all other factors. This finding is also found in Vietnam (Ghai, 2000) and several African countries (Djurfeldt, Djurfeldt, & Lodin, 2013; Appleton, 1996) but contradicts the common

conclusion of many studies from other parts of the world that indicate that female-led households are poorer than male-led households (Oginni, Ahonsi, & Ukwuije, 2013).

In both models, we found that the education of the household head had an increasing effect on per capita income. Keeping all other factors constant, Model 1 shows that on average, an additional year of schooling would raise per capita income by about 500 thousand VND. This result accords with recent findings in Vietnam (Doan, Le, & Tran, 2016; Tran, 2015b; Tran et al., 2014). Nevertheless, the estimates in Model 2 show that the effect tends to be greater for higher quantiles, suggesting that the return on education is higher for better-off households.

The results from the fixed effect estimator indicate that nonfarm participation has a positive effect on household income. As shown in Model 1, Table 5, the coefficient of wage employment indicates that on average, keeping all other variables constant, households that took up wage employment would have a per capita income level 2,500 thousand VND higher than those without wage employment. The corresponding figures for those with nonfarm self-employment were 3,130 thousand VND. In general, this finding also accords with that of Pham, Anh Tuan, and Thanh (2010) and Tran (2015a) in Vietnam and other developing countries (Rigg, 2006). Interestingly, the results from the fixed effects quantile regression estimator suggest that the influence of nonfarm participation on household income differs across the percentiles. Specifically, the effect of wage employment tends to be greater for poorer households, while nonfarm self-employment seems to contribute more income for richer households. This heterogeneity effect, however, might not be found by using a mean regression approach.

Regarding the role of assets in household income, the study found that while annual land has no association with per capita income at the mean, it has a positive association with per capita income at all points of the income percentiles considered in Model 2. Having more perennial land is linked with the growth of per capita income at the mean in Model 1 as well as at all quantiles in Model 2. However, the effect of perennial land seems greater for those in higher quantiles. This suggests that land still plays an important role in Vietnam, where about two thirds of the population live in rural areas and about 45% of the labour force is found in agriculture (Tarp, Vinh and Tuan, 2017). Finally, the 2014-year dummy coefficient indicates that per capita income is much higher (5,126 thousand VND) in 2014 than in the base year, 2012.

4. Concluding Remarks

In this study, we examine the effect of the quality of provincial governance on household welfare, using a balanced panel data set from VHLSSs and the PCI in 2012 and 2014. The quality of provincial governance is measured by the Provincial Competitiveness Index, while household welfare is proxied by household per capita income. Both fixed effect and quantile fixed effect regression estimators were used to investigate the impact of provincial governance on household welfare. This approach allowed us to consider the role of local governance on the entire distribution of household welfare, not merely its conditional mean. Using fixed-effect regression estimators also enabled us to minimize endogeneity bias by controlling for unobserved and time-invariant factors that can affect household welfare.

We find no evidence for the impact of provincial governance on household welfare when a linear fixed-effect regression model is used. In contrast, we find a positive effect of provincial governance on household welfare at some points in the distribution of per capita income. Interestingly, the effect differs substantially across quantiles and is higher for quantiles above the median. Thus, the finding implies that good governance tends to provide greater benefits to richer households than to other groups. While we remain aware of the difficulties of definitively establishing causation between governance and household welfare, the strength of our findings is supportive of a link. The established literature discusses numerous channels through which good governance can affect household welfare. In our study, the greater effect on richer households may be explained by the fact that these households owned more resources, enabling them to seize economic opportunities afforded by improvement in local economic governance, which in turn can help them to achieve higher income growth. While the effect of good governance has a positive effect on income growth for several quantiles, this is not the case for the poorest (those in the 10th percentile). The reason may be that lack of resources prevents the poor from taking advantage of the improved business environment to enhance their economic welfare.

Using a quantile regression approach has allowed the current study to provide new insight into the role of household-related factors in household welfare. Whereas the positive effects of wage and nonfarm self-employment are reported in most studies in Vietnam, our study reveals that wage employment is much more important for the economic welfare of poorer households, and nonfarm self-employment tends to contribute more income for better-off households. In

addition, we find that the return on education is higher for richer households. We also find that having more land results in income growth for all groups, although the proportion of agriculture in total household income has declined significantly in Vietnam over the past decade (GSO, 2015).

We acknowledge that our study has some limitations. A problem in estimating the effect of the quality of provincial governance is encountered in the unobservable characteristics and potential endogeneity of provincial governance. In the current study, we used fixed-effect regressions to eliminate unobserved time-invariant variables that can cause endogeneity bias. The traditional method for dealing with endogeneity is the instrumental variables (IV) method. Practically speaking, it is not easy to find a good instrument which is not associated with household welfare but strongly affects the quality of provincial governance (Wooldridge, 2013). We believe that the endogeneity bias may well be negligible after removing unobserved time-invariant variables and controlling for observed variables. However, this issue suggests that future research should use the instrumental variables method to account for potentially endogenous regressors.

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