ADBI Working Paper Series

STRUCTURAL TRANSFORMATION, GROWTH, AND INEQUALITY: EVIDENCE FROM VIET NAM

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No. 681
March 2017

Asian Development Bank Institute

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Suggested citation:

Sarma, V., S. Paul, and G. Wan. 2017. Structural Transformation, Growth, and Inequality: Evidence from Viet Nam. ADBI Working Paper 681. Tokyo: Asian Development Bank Institute. Available: https://www.adb.org/publications/structural-transformation-growth-and-inequality-evidence-viet-nam

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Abstract

We examine whether structural transformation leads to growth and income inequality in Viet Nam. Using three rounds of the Vietnam Household Living Standards Survey (2002, 2006, and 2010), we estimate re–centered influence functions to construct a decomposition analysis. Our results indicate that Viet Nam continues to experience sustained structural transformation and growth, but this growth is heterogeneous across regions. The growth exhibits pro–rich gains, with returns to agriculture and manufacturing increasing only for the top 10 to 20th percentiles. We also find that such growth increases income inequality in Viet Nam, and change in income inequality is heterogeneous across regions. Differences in growth and income inequality are driven by differences in the rate of industrialisation across regions and by structural effects such as access to seaports. For a more inclusive growth, access to non-farm activities may need to be increased for households that are not in areas with high levels of structural transformation.

JEL Classification: O15, P46, O12, O53

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1. INTRODUCTION

Economic development and growth entail large-scale structural transformation of economies (Hnatkovska and Lahiri 2014). Many Asian and African economies are now undergoing such large scale structural transformation—typically from agriculture to manufacturing and service sectors. Such structural transformation inevitably entails reallocation of workers from the primary sector to the manufacturing and service sectors. One of the important questions arising from such structural transformation led growth is, whether such growth helps the poor. On the one hand, growth may lift people out of poverty and therefore improve living standards for everyone. On the other hand, growth may increase income inequality by benefitting the rich more than the poor. There is no consensus in the literature on whether structural transformation led growth achieves the twin goals of improving welfare for the poor and decreasing income inequality.

Viet Nam, one such developing economy, introduced a series of economic reforms in 1986—termed *Doi Moi*. These reforms enabled private lease of agricultural land (which enabled lease holders to trade land and seek rent on land), deregulated the domestic market significantly and also introduced trade liberalization measures. In particular, agricultural products were allowed to be exported, and foreign ownership of manufacturing firms was allowed. Price of agricultural goods increased as a result of trade liberalization, but it was the manufacturing sector that experienced rapid expansion over the last 3 decades. Workers have also therefore increasingly moved from agriculture to manufacturing (and to a smaller extent to services).

Structural transformation has led to sustained economic growth in Viet Nam but at the expense of increasing income inequality. Economic growth in Viet Nam averaged 5%–6% over the last 3 decades. In particular, the 2000s saw average growth rates of about 6.4%. Gross domestic product (GDP) per capita at purchasing power parity (PPP) increased from $970 in 1990 to $6,023 in 2015. The proportion of the population living on under $3.10 a day (at 2011 PPP) decreased from 34.7% to 3.5%. However, in the same period the World Bank GINI index increased from 35.7 in 1992 to 38.7 in 2012.[1] There is also evidence that the reduction in poverty and dividends from growth were spread unevenly across Viet Nam, increasing income inequality between regions and to some extent within regions (World Bank 2013).

In this chapter, we examine how structural transformation through growth contributes to income inequality. In particular, we address the following research questions:

- Does economic growth affect income inequality?
- Is change in income inequality explained by sectoral participation within the income distribution?

We use three rounds of repeated cross-sectional Vietnamese data to analyze structural change and income inequality over an 8-year period. We use the 2002, 2006, and 2010 rounds of the Vietnam Household Living Standards Survey (VHLSS) conducted by the General Statistics Office (GSO) in Viet Nam. The VHLSS data show significant structural transformation in Viet Nam over the 8-year period. Descriptive evidence also indicates a significant increase in household income over the period emulating the increase in national GDP. Further, similar to the World Bank GINI index, our data indicate a widening income disparity in Viet Nam over the years. There is also evidence

[1] These statistics are downloaded from the World Bank's World Development Indicators (WDI) database.

to suggest the existence of significant regional disparity in structural transformation, income growth, and income inequality.

Using growth incidence curves (GICs) and re-centered influence functions (RIFs) we identify how structural transformation maps onto the income distribution over the time periods. The data suggests that the labor mobility between the agriculture and manufacturing sectors was more prominent for the 30th to 65th percentile population. Regression outcomes also indicate that participation in agriculture and manufacturing yielded lower income compared to participation in the service sector, indicating negative returns to both working in agriculture and the manufacturing sectors. However, unconditional quantile RIF regression coefficients indicate that returns to agriculture and manufacturing are only negative for the poor—the returns are in fact positive for the top 20 percentile in agriculture and the top 10 percentile in manufacturing. While the returns to both agriculture and manufacturing are improving across the income distribution, there is evidence that, currently, the disparity in sectoral returns across the income distribution contribute to widening the income inequality. We then apply an Oxaca–Blinder style decomposition to our RIF estimates to identify the composition and structural effects of change. About 90% of the variation in growth across the income distribution is explained by structural effects across both periods: 2002–2006 and 2006–2010. We do not find that structural transformation explains these structural effects. For those in the bottom half of the income distribution, we find that household characteristics contribute significantly in explaining structural effects.

Overall, our results indicate the need for the state to work towards improving the distribution of growth dividends across the income distribution. There is also some evidence that the poor may be concentrated in interior Viet Nam, away from the coastal regions and industrial zones—engaging in smallholder farming. Government policies may be required to ensure access to non-farm activities for such workers. Without adequate measures to address the widening income inequality, sustained growth may accelerate income inequality along geographical, and perhaps ethnic lines.

We make two key contributions to the literature. First, we add to the work of McCaig, Benjamin, and Brandt (2015) by applying RIF estimates to decompose growth effects and map those onto the income distribution. Second, we also identify how sectoral returns on participation affect individuals and households along the income distribution, thus analyzing how growth dividends are shared along the income distribution and how this contributes to income (in)equality.

This chapter proceeds as follows. In section 2, we briefly discuss the literature on structural transformation and inequality with a special focus on Viet Nam. In section 3, we discuss the data. Section 4, outlines the estimation strategy and the results. Section 5 concludes.

2. STRUCTURAL TRANSFORMATION AND INCOME INEQUALITY: THE CASE OF VIET NAM

As Hnatkovska and Lahiri (2014) discuss, structural transformation has led to sustained economic growth in developing countries in Africa, Latin America, and especially, Asia. Such structural transformation typically entails a shift in economic activity from agriculture to manufacturing and services. This is characterised in dual economy models as that of Lewis (1954), where agriculture—the traditional sector has lower productivity while the modern sectors—manufacturing and services have higher

productivity. [2] Globalization and transfer of technology have helped developing countries to accelerate structural transformation (Aizenman, Lee, and Park 2012). As resources, especially labor, move from the less productive agricultural sector to the more productive manufacturing and service sectors, the economy grows and people's income grows (McMillian and Rodrik 2011; Rodrik 2013). Whether such growth benefits everyone in an economy is contentious.

Kuznets (1955) hypothesized an inverted U-shaped relationship between economic growth and income inequality. Kuznets argued that as economies grow, income inequality will initially worsen. This is because much of the growth is likely to reward skills and those with access to capital—exhibiting pro-rich growth. Gradually over time, as low-skilled workers move to higher productivity and income sectors, the growth is likely to be more pro-poor. The empirical literature on this topic has boomed since the publication of the Deininger and Squire (1996) inequality dataset. Many of the cross-country studies (such as Datt and Ravallion 1998; Dollar and Kraay 2002; Ravallion 2012) and country case studies (such as Ravaliio and Datt 1996; Ravallion and Chen 2007) show that economic growth in fact reduces poverty. However, as Gunatilaka and Chotikapanich (2009) and Rubin and Segal (2015) show, growth is likely to increase income inequality and be pro-rich through two channels: (1) the rich receive larger shares of their income through wealth, which is more sensitive to growth than wage income; and (2) access to better education, infrastructure, and mobility yield better returns for the rich. There is also some evidence that the causal relationship flows both ways, and in fact high levels of inequality can hamper growth, and vice versa (UNRISD 2010)[3].

Viet Nam has experienced significant sustained economic growth since the economic reforms of 1986, termed *Doi Moi* (meaning: *renovation)*. Since 1986, the Vietnamese economy has grown at average growth rates of between 5% and 6% (with exceptions during the Asian financial crisis in 1999 and the global economic crisis in 2009) [see Figure 1].

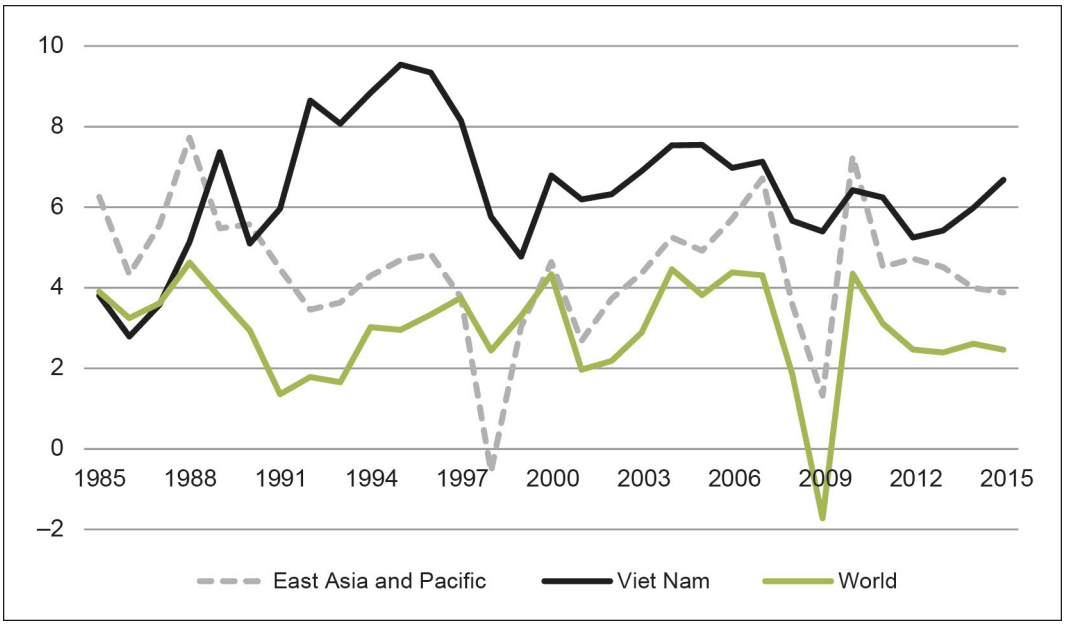
The economic reforms introduced private lease of agricultural land (previously all agricultural land was state owned), enabling trade and rental of such land. The reforms also introduced trade liberalization policies encouraging agricultural and manufacturing exports. The government also allowed for foreign ownership of manufacturing firms, at one point up to 100%. Prior to the reforms, almost the entire manufacturing sector was led by state owned enterprises (SOEs). Between 1989 and 2010, however, the number of SOEs declined by as much as 75% and the labor force in SOEs shrunk by about 40% (World Bank 2011). Since the economic reforms, productivity and wages in manufacturing have increased, causing a pull factor for workers to move from agriculture to manufacturing (see Appendix A for change in labor force participation across sectors and Appendix B for change in sectoral productivity). It should however be noted that, opening up of the agricultural sector for exports, increased prices of agricultural products and also improved rice yield from 3.33 tons per hectare in 1992 to 4.90 in 2006 (Benjamin et al. 2009). McCaig and Pavcnik (2013) however point out that

[2] McMillan and Rodrik (2011) posit that the productivity gap between the traditional and modern sectors exhibit a U-shaped relationship. Initially, the productivity gap widens as productivity in the modern sectors grow with technology and reforms. As economies experience a shift in resources, especially labor, from agriculture to the modern sectors, productivity gap between agriculture and the modern sectors is likely to decrease.

[3] Similar evidence is presented in 12 studies summarized in Benabou (2000). However, Banerjee and Duflo (2003) show that the causal relationship between income inequality and economic growth is likely to be non-linear, and any changes to income inequality (in any direction) are likely to reduce future growth.

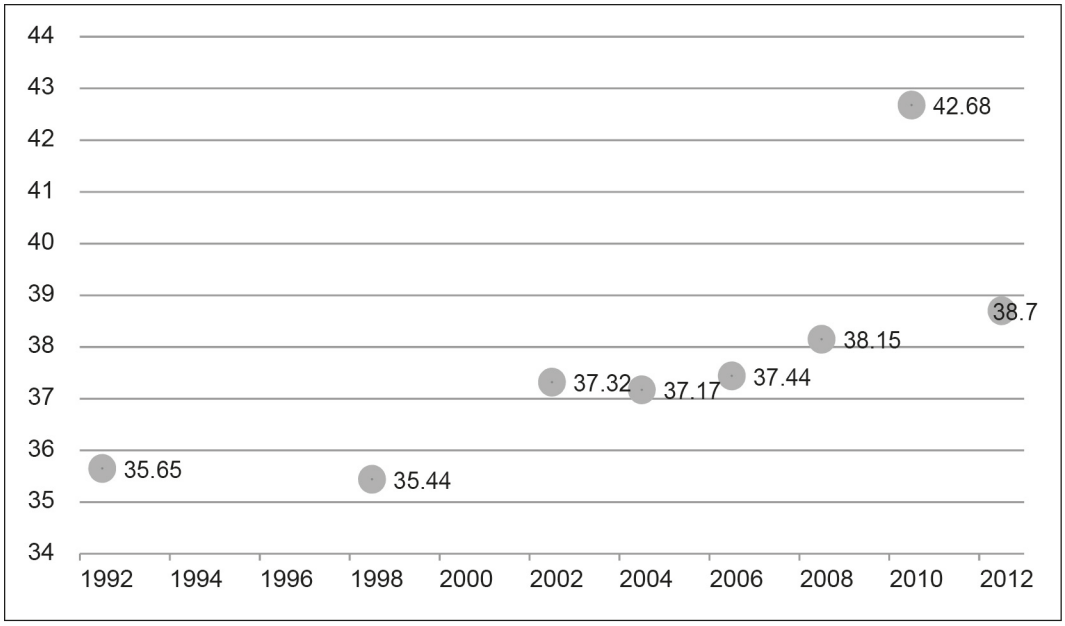
this increase was still not sufficient to incentivize agricultural workers to remain in the sector. Labour productivity in Viet Nam increased by 5.1% between 1990 and 2005, and 38% of this can be attributed to structural change (McCaig and Pavcnik 2013). McCaig and Pavcnik also argue that the flexible labor force ensured that structural unemployment remained very low and only for brief periods. Rapid and sustained economic growth in Viet Nam however was accompanied by an increase in income inequality [Figure 2].

Figure 1: Annual GDP Growth



Source: World Development Indicators.

Figure 2: GINI Index



Source: World Development Indicators.

Table 1: Effect of Per Capita Income on Gini—Provincial Analysis

Dep Var: Gini	(1)	(2)	(3)	(4)	(5)	(6)
Log PCHHE	0.023***	0.048***	0.057***	0.034*	0.041	0.054
	(0.004)	(0.012)	(0.015)	(0.017)	(0.033)	(0.032)
Net migration				–0.012*	–0.013	–0.013
				(0.005)	(0.009)	(0.009)
Log domestic remittance						–0.019
						(0.013)
Log foreign remittance						
Skilled agricultural worker						
Skilled manufacturing worker						
Professional						
Unskilled worker						
Year dummies	√	√	√	√	√	√
Region dummies		√	√	√	√	√
Individual and HH controls						
Constant	0.108**	–0.085	–0.131	0.041	0.033	0.055
	(0.038)	(0.120)	(0.142)	(0.168)	(0.304)	(0.307)
Number of observations	192	192	128	128	64	64
B2	0.138	0.43	0.48	0.508	0.431	0.444
Dep Var: Gini	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Log PCHHE	0.057***	0.063***	0.064***	0.068***	0.064***	0.076***
	(0.013)	(0.012)	(0.011)	(0.016)	(0.016)	(0.020)
Net migration						
						–0.003
Log domestic remittance	–0.016	0.000				–0.02
	(0.008)	(0.008)				
Log foreign remittance		–0.009***	–0.009***	–0.006**		
		(0.002)	(0.002)	(0.002)		
Skilled agricultural worker				39.158*	34.862	49.721*
				(18.983)	(19.588)	(23.156)
Skilled manufacturing worker				38.983*	34.676	49.399*
				(18.988)	(19.596)	(23.153)
Professional				39.377*	35.073	49.911*
				(18.988)	(19.606)	(23.176)
Unskilled worker				39.203*	34.898	49.737*
				(18.989)	(19.593)	(23.168)
Year dummies	√	√	√	√	√	√
Region dummies	√	√	√	√	√	√
Individual and HH controls				√	√	√
Constant	–0.057	–0.234*	–0.194	–0.238	–0.290	–0.499**
	(0.121)	(0.111)	(0.108)	(0.157)	(0.161)	(0.186)
Number of observations	192	192	192	192	192	128
B2	0.442	0.536	0.536	0.633	0.6	0.702

Note: *** p<0.001, ** p<0.01, * p<0.05. Robust standard errors in parentheses.

Viet Nam's structural transformation led growth exhibits increasing income inequality—especially with regional heterogeneity. As seen in Figure 2, the GINI index for Viet Nam increased from 35.7 to 38.7 in the 20-year period from 1992 to 2012. Given the increase in income inequality, Akram–Lodhi (2005) argued that Vietnam's economic reforms were not pro-poor and in fact created a peasant class differentiation. Evidence from Table 1 also indicates that rising income (at the provincial level) has contributed to rising income inequality (increasing the provincial GINI). The table shows that increases in per capita household expenditure (used as a proxy for per capita income) increase the provincial Gini, and this effect is robust to alternate specifications after controlling for regional and time fixed effects. Results from Table 1 also indicate that domestic migration has no statistically significant effect on income inequality—but foreign remittances reduce income inequality.

Benjamin and Brandt (2004) identify that if agricultural incomes increase (as is this case in Viet Nam) it would help reduce the inequality arising from rapidly increasing income from other sources. However, they also note that Viet Nam's ability to grow with equity depends on access to non-agricultural opportunities. Perhaps, this explains the regional heterogeneity, well documented in World Bank (2013) (see Figure 2, p.6 of the report). The World Bank report shows that coastal regions in Viet Nam experienced almost universal declines in the poverty rate. (In fact, nationally, the proportion of the population living on under $3.10 a day (at 2011 PPP) decreased from 34.7% to 3.5%). However interior regions, the mountainous North–West, and Central Coasts, experienced lower rates of reduction in poverty. The World Bank (2013) report and McCaig, Benjamin, and Brandt (2015) highlight that such regional variation is also a product of ethnic factors in Viet Nam. Almost half of those in poverty in Viet Nam are ethnic minorities, despite making up only 15% of the population (World Bank 2013). Another factor that helps explain this regional variation is the availability of non-farm activities.

In the North, Hanoi dominates manufacturing, while in the South, the South East region—home to Ho Chi Minh—dominates. As seen in Appendix C, this causes net migration to be positive for Ho Chi Minh and Binh Duong in the South and Hanoi in the North, but almost all other regions experience negative net migration (more people leave these provinces compared to the number of people who come in). There is also a significant shift away from agriculture in the regions in the South, more so than in the North (see Appendix D). The increased concentration of manufacturing firms and modern sectors in the Red River Delta, South East and the Mekong River Delta has caused the productivity of these regions and therefore incomes in these regions to be much higher than in the rest of Viet Nam (see Appendix E).

Given the non-inclusive growth that Viet Nam continues to experience across ethnic and regional lines, we identify how structural change may explain growth differences across the income distribution. In the next section we discuss the data that we use and provide some descriptive statistics.

3. DATA

We use three rounds of repeated cross-sectional data (the 2002, 2006, and 2010 rounds) from the Vietnamese Household Living Standards Survey (VHLSS). The surveys are conducted biennially and are based on the World Bank's Living Standard Measurement Surveys (LSMS). The VHLSSs are nationally representative (at the provincial level) and are stratified geographically. The smallest unit of geographical analysis are the communes. The communes are drawn from the 1999 census (for 2002

and 2006 VHLSS) and 2009 census (for the 2010 VHLSS). Communes make up districts, districts make up provinces. Provinces are the largest geographical unit available in the surveys. However, we could use provincial data to create regions—the highest level of geographical demarcation. Viet Nam is divided into eight regions composed of 58 provinces and 5 municipalities (which are considered to be on par with provinces).[4] The VHLSS contains information on household expenditures, employment, household and individual characteristics, among others. Our unit of analysis is the household. Household membership is defined by physical presence: individuals must eat and live with other members for at least 6 out of the past 12 months, and contribute to collective income and expenses. Therefore, people, living, working, or studying outside of the household would not be part of the household unit in the data and in our analysis. For the purpose of our analysis we use consumption expenditure as a proxy for income, because consumption expenditure is likely to be more accurate in measuring welfare of households in developing countries (for a discussion on this topic, see Deaton and Zaidi [2002])[5]. Appendix E provides descriptive statistics from the three rounds of the VHLSS.

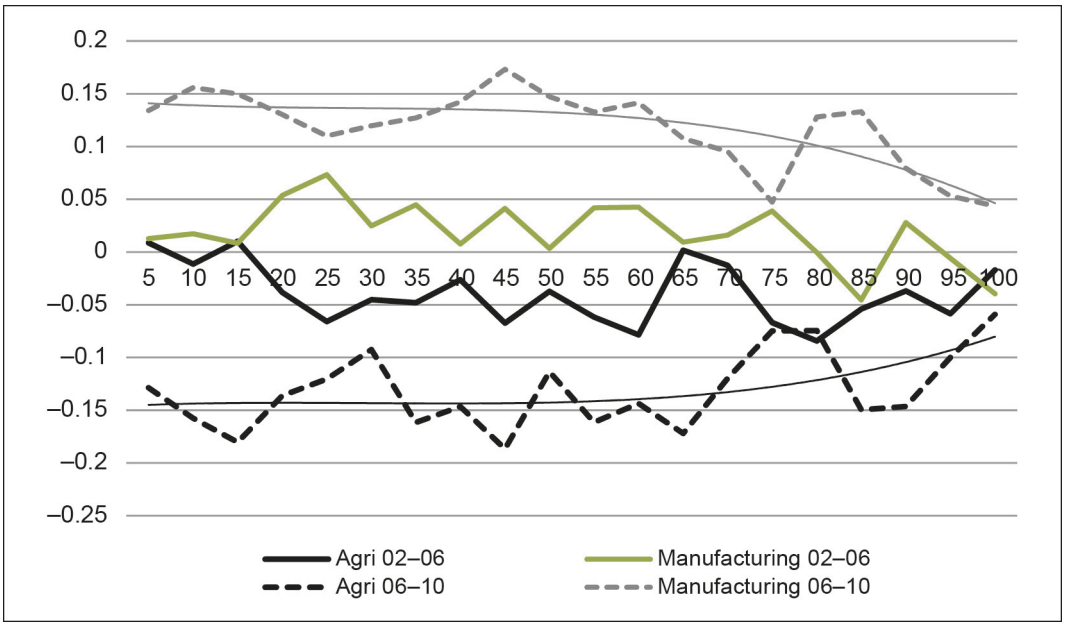
The descriptive statistics indicate little changes across households and individual characteristics but demonstrate large changes in sectoral participation and skills. Households are getting smaller, the share of ethnic minorities is increasing, land holding is decreasing; but, most importantly, household income is increasing (proxied by household consumption). There is a large shift in the proportion of workers engaged in agriculture and manufacturing and a small increase in those engaged in the service sector. The proportion of workers engaged in agriculture dropped 17 percentage points and that of manufacturing increased by 14 percentage points. There is also some descriptive evidence to suggest that the proportion of skilled workers in the agriculture and non-agricultural sectors has dramatically increased over the 8-year period—they have nearly doubled. The share of the population in the economically active regions—the Red River Delta, the South East, and the Mekong River Delta—marginally decrease in our data over the years; however, in comparable Vietnamese GSO data, we in fact find small marginal increases in the population in these regions.

The descriptive statistics indicate a large shift across the income distribution from agriculture to manufacturing as depicted in Figure 3. The non-linear trend lines for participation in agriculture and manufacturing across the two time periods indicate that the shift in participation from agriculture to manufacturing is prominent for those in the 30th to 65th percentile of the income distribution. As Phan and Coxhead (2010) point out, mobility constraints for the poorest may prevent them from making use of non-farm based opportunities and exasperate the income divide. Similarly, the richest whose income may be derived from returns from investments in agriculture or performance related wage income, may in fact experience increased income as agricultural productivity increases. This may dis-incentivize those at the higher quantiles of the income distribution to move towards the modern sectors (Rubin and Segal 2015). We also find that structural transformation affects regional income inequality.

[4] During the 8-year period that we refer to in our data, several provinces experienced splits or annexation, which we discuss here. The province Ha Tay was annexed into Hanoi in 2008. The province Dien Bien was carved out of Lai Chau in 2003. The province Dak Nong was carved out of Dak Lak in 2003. The province Hau Giang was carved out of Can Tho in 2003.

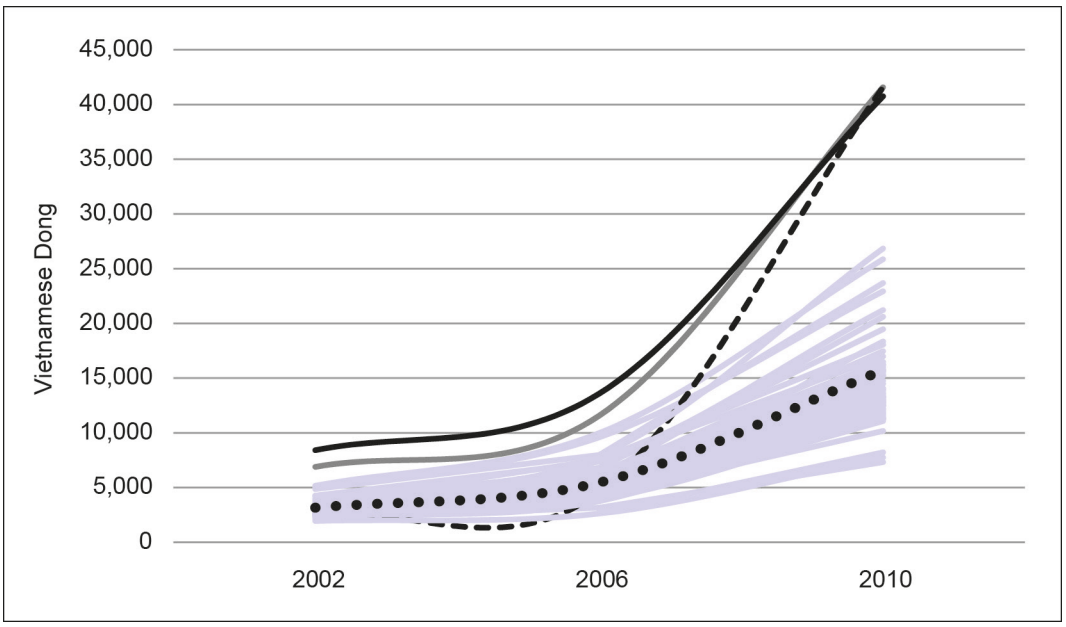
[5] McCaing, Benjamin, and Brandt (2015), however, using a similar dataset (with additional rounds of the VHLSS) use information on income to compute the income inequality measures rather than consumption expenditure.

Figure 3: Sectoral Participation by Income Quantile



Source: Authors' calculations based on VHLSS 2002, 2006, and 2010.

Figure 4: Per Capita Gross Regional Product
(local prices)



Note: The black line represents HCM, the grey line Ha Noi, the dashed line Ha Tay and the large dotted line Viet Nam.
Source: Authors' calculations based on VHLSS 2002, 2006, and 2010.

Structural transformation, however, increases income inequality and this effect is heterogeneous across regions. As we show in Appendix D, the rate of change from agriculture to manufacturing varies by region. The differences in structural transformation between regions affects the income inequality between the regions. As we see in Figure 4, the provincial GDP has widened across the provinces in the 8-year period we study. This may partly be explained by migration flows into these provinces.

It may also be a function of the differences in returns to participation across sectors. From 2006–2010 we find regions and provinces with traditionally very high levels of agriculture—the north central coast and the central highlands—also experienced an increase in Gini. This may partly be explained by the migration of some households within the center of the income distribution to manufacturing intensive regions. Such moves widen the Gini for the remaining population in a region.

Using this descriptive evidence, we build on our research questions to identify how structural transformation may help understand the differences in growth across the income distribution. For this purpose, we use a RIF-based decomposition analysis. We explain this empirical strategy in the next section.

4. EMPIRICAL STRATEGY AND RESULTS

Our estimation strategy relies on mapping structural transformation and growth to the income distribution. Since the seminal work of Kuznets (1955), a large body of empirical work has attempted to understand whether the inverted U-shaped relationship between growth and income inequality exists. Gallup (2012) show that there is no consensus in the empirical literature. While several empirical studies have tried to fit the data to an inverted-U shape proposed by Kuznets (Kanbur 2000), very little is known about why an economy would fit or not fit such an inverted U-shaped curve. One channel through which an economy may be mapped onto the Kuznets curve is through population movements across time along the income distribution—which may cause pro-rich and pro-poor growth periods (Anand and Kanbur 1993). Using a dual economy framework proposed in Paul (2016) we link structural transformation to growth across time and along the income distribution.

4.1 Mapping Changes in Income Inequality

Similar to Paul (2016), we use Growth Incidence Curves (GICs) to measure mean growth rate in each income quantile. These GICs show gains from growth and are distributed across the income distribution (Ravallion and Chen 2003). Formally, we can denote this as:

$$g(p) = \frac{\Delta y(p)}{y_0(p)} = \frac{y_1(p)}{y_0(p)} - 1$$

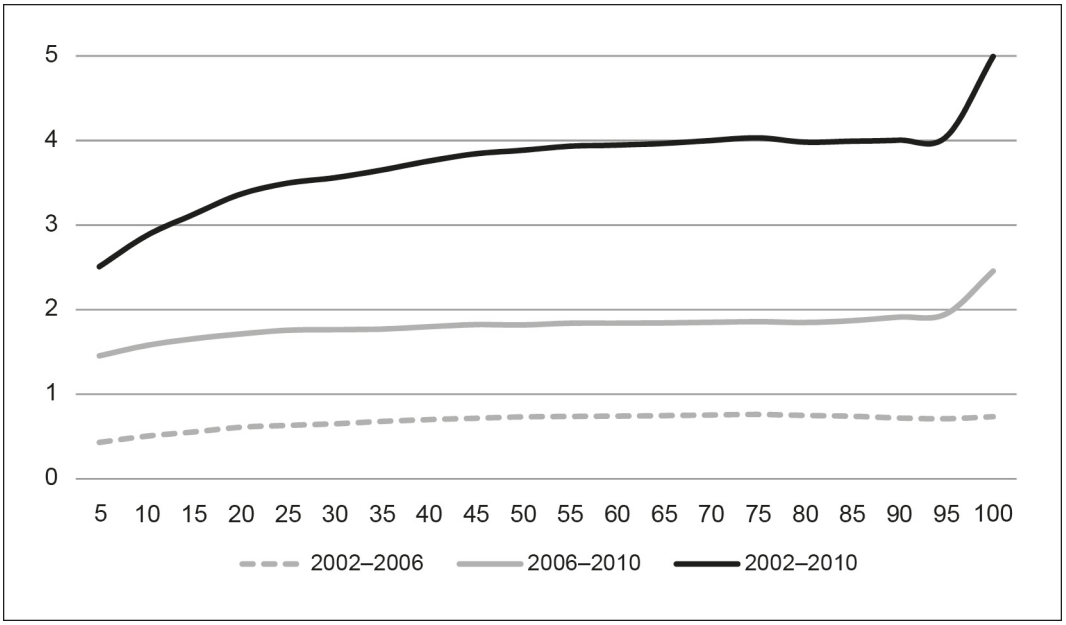
Where, $g(p)$ is the growth rate in income for quantile *p*; *y* represents income.

Pro-rich growth spells will exhibit upward sloping GICs while pro-poor spells will exhibit downward sloping GICs. If the GICs are relatively flat—i.e., exhibit similar levels of growth across the income distribution, then inequality does not change much. If across two time periods GICs exhibit a pro-rich growth spell followed by a pro-poor growth spell, this is then similar to the Kuznets motion—income inequality initially widens but then narrows (Paul 2016).[6]

[6] For a detailed discussion on the assumptions and specifications of the framework we apply here, see Paul (2016).

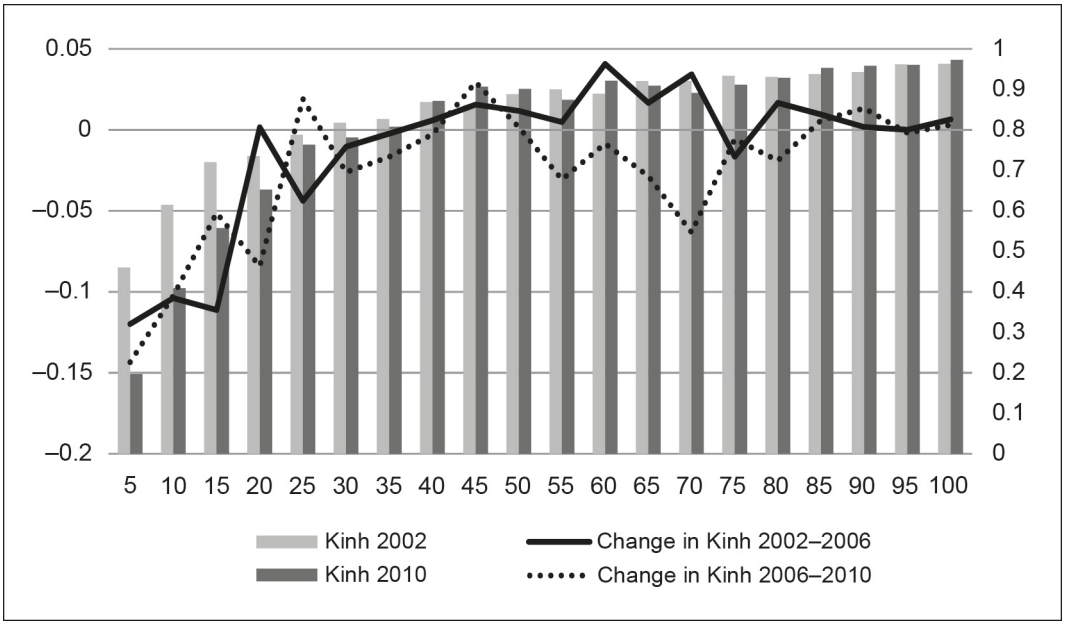
Over the 8-year period, the GICs demonstrate pro-rich growth. The GIC for the 2002 to 2006 period exhibits a fairly flat curve, indicating that growth rates across income quantiles were positive and fairly homogenous. In the 2006 to 2010 period however, the GIC depicts pro-rich growth. While there was positive growth across all income quantiles, growth income accelerated much more for the top 5th percentile and was slower for the bottom 20th percentile—widening income inequality.

Figure 5: Growth Incidence Curves (GICs)



Source: Authors' calculations based on VHLSS 2002, 2006, and 2010.

Figure 6: Change in Ethnic Composition across Income Quantiles



Source: Authors' calculations based on VHLSS 2002, 2006, and 2010.

Growth dividends are also ethnically polarised. As evident from Figure 6, the proportion of Kinh (ethnic majority) in the lowest income quantiles dropped dramatically from 2002 to 2010 and marginally increased in the highest income quantiles. More than half of those in the bottom 20th quantiles are ethnic minorities despite making up only about 15% of the population. Further, the proportion of ethnic minorities in the bottom 20th quantiles in fact increased over the 8-year period. Slower paced structural transformation among the ethnic minorities partially explains the widening income disparity across majority Kinhs and the ethnic minorities (see Appendix G).

4.2 Returns to Sectoral Participation across Income Quantiles

We use Recentered Influence Function (RIFs) regressions to connect unconditional marginal quantiles to observable covariates (including household, structural factors, and geographical factors) based on Paul (2016) and Fortin, Lemieux, and Firpo (2010). Collecting the leading terms of a Von Mises (1947) linear approximation of the associated functional, the rescaled influence function of the pth quantile of the distribution of *y* can be written as:

$$RIF(y;\ q_p) = q_p + IF(y;\ q_p) = q_p + \frac{[p - I(y \leq q_p)]}{f_y(q_p)}$$

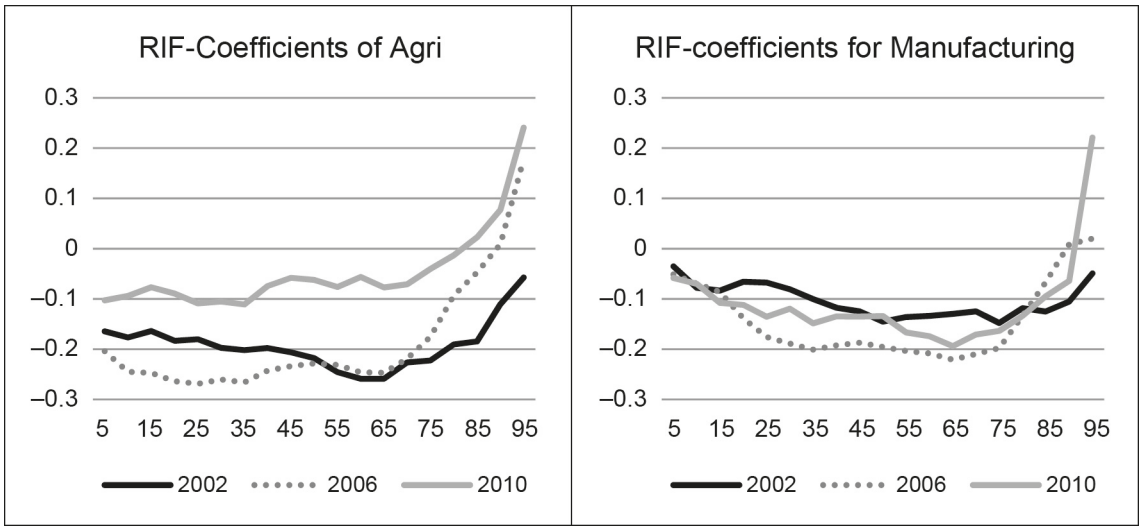
We consider movements from agriculture to manufacturing to be the main channel of structural transformation. The RIF regression for the pth quantile of the distribution of income (y) can therefore be written as:

$$RIF(y;\ q_p) = \beta_0 + \beta_1 Agri + \beta_2 MAN + X'\gamma + \varepsilon$$

where the unconditional or marginal quantile is $q_p = \int E[RIF(y;\ q_p,\ F_y)|X]dF(X)$. *Agri* is a dummy for participation in agriculture, *MAN* is a dummy for participation in manufacturing, γ is a set of covariates, and ε is the error term.

We produce ordinary least square estimations of the RIF (presented in Appendix H) and also plot the RIF coefficients in Figure 7 above. The RIF regressions indicate negative income gains associated with participation in both agriculture and manufacturing as opposed to participation in the service sector. However, skilled workers across all three sectors experienced positive income returns. There is also some evidence in the regression results to suggest that agricultural land holding size adversely affects income, but this result is likely to be driven by non-agricultural high-wage employment. There is also strong evidence to suggest households in the South East had higher per capita income than the rest of the regions, the magnitude is also statistically large. This highlights the concentration of modern sector economic activity in the Ho Chi Minh province and its neighbouring provinces. The RIF coefficients when plotted against the income distribution, however, illustrate an interesting narrative—returns to agriculture and manufacturing (and even services) is only positive for the rich. In 2002, returns to participation in agriculture and manufacturing are negative across the income distribution. But in 2010, returns to both agriculture and manufacturing improve for those in the top 20th percentile and top 10th percentile, respectively. These results again re-iterate a widening income disparity in Viet Nam alongside economic growth and rising incomes.

Figure 7: Unconditional Quantile Regression Coefficients



Source: Authors' calculations based on VHLSS 2002, 2006, and 2010.

4.3 Structural Change and Income Inequality: Decomposition

While the evidence thus far has demonstrated a link between economic growth and widening income inequality, it is important to analyze how much of this widening income inequality is explained by structural change. We use a generalised Oaxaca–Blinder decomposition analysis (discussed in Fortin, Lemieux, and Firpo (2010) and Paul (2016)) to estimate the relative contribution of sectoral transformation on income inequality. We can denote the decomposition function as:

$$\Delta^{\theta}_{Overall} = E(X|t=1)(\beta^{\theta}_1 - \beta^{\theta}_C) + E(X|t=1)\beta^{\theta}_C - E(X|t=0)\beta^{\theta}_0$$

Where, the linear RIF-regressions of the pth quantile of the distribution of y is estimated by replacing y with the estimated value of $\widehat{RIF}(y;\, q_p)$. The structure and composition effects can be decomposed as:

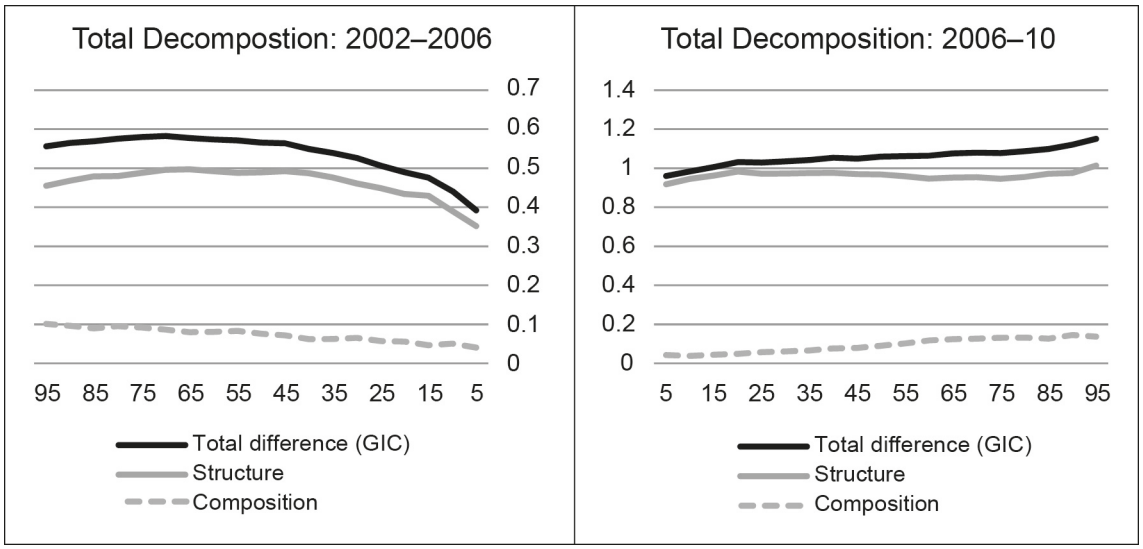
Structure Effect $= E(X|t=1)^T.\ (\hat{\gamma}_1^{q_p} - \hat{\gamma}_C^{q_p})$

Composition Effect $= E(X|t=1)^T.\hat{\gamma}_C^{q_p} - E(X|t=0)^T.\hat{\gamma}_0^{q_p}.$

The decomposed GICs in Figure 8 indicate that much of the variation in income growth is explained by structural effects. About 90% of the variation in growth across the income distribution is explained by structural effects across both periods: 2002–2006 and 2006–2010. The contribution of structural effects in explaining growth, however, declines for the rich, across both time periods. Composition effects have a marginally higher capacity to explain the income growth of the top 10th percentile, but yet, the contribution in explaining is very small. We then decompose the structural and composition effects by covariates, to identify which factors affect structural and composition effects. In particular, we are interested to know whether structural transformation—differences in participation rates in agriculture and manufacturing, explain the differences in growth across the income distribution. We present the decomposition of covariates' contribution to structural effects in Appendix I. We do not find that structural transformation explains the structural effects. Structural transformation contributes less than 1% in explaining structural effects, but contributes more significantly in explaining composition effects (not presented here for brevity).

Much of the structural effects are unexplained and can be attributed to unobservable factors. For those in the lowest half of the income distribution, we find that household characteristics (including ethnicity) contribute significantly in explaining structural effects. But the lack of significant contributions by sectoral covariates in the Oaxaca–Blinder decomposition indicate that while structural transformation led growth has increased income inequality, structural transformation by itself may not sufficiently explain changes in the income inequality.

Figure 8: Decomposition Analysis



Source: Authors' calculations based on VHLSS 2002, 2006, and 2010.

5. CONCLUSION

Viet Nam has experienced sustained and rapid economic growth since the *Doi Moi* economic reforms of 1986. Viet Nam's growth levels have surpassed the average growth for the East Asia and Pacific regions and the economy continues to grow at an annual average 6%. With economic growth, Viet Nam has also experienced a marginal albeit significant increase in income inequality.

Growth in Viet Nam, however, has not been entirely inclusive. The data indicate that structural transformation occurred across all income quantiles, but the shift from agriculture to manufacturing was more prominent for those at the center of the income distribution. The data also indicate that returns to agriculture and manufacturing were only positive for the top 10th to 20th percentile, exacerbating the income divide. Growth incidence curves indicate that Viet Nam's growth, especially from 2002 to 2010, has been pro-rich. Further, growth has been heterogeneous across ethnic groups and regions. In Viet Nam, ethnic concentration of regions also varies. The regions experiencing high levels of growth and modern sector activity are predominantly occupied by the Kinh ethnic group—the major ethnic group in Viet Nam. Such geographical and hence ethnic concentration of structural transformation have widened income inequality between regions and between ethnic groups. In decomposition analyses, however, we find that structural transformation does not sufficiently explain variations in income growth across the income distribution. The decomposition analysis indicates that household characteristics (including ethnicity) and unobservables explain much of the variations in growth across the income distribution.

Given the widening income inequality, government policies need to address more inclusive growth strategies. We propose three strategies to improve income equality in Viet Nam. First, improve skills acquisition for those at the lowest percentiles of the income distribution. There is strong evidence that skilled workers across the income distribution earn positive returns on their skills. Distinctions between those with and without skills—especially in the agricultural sector—widen overall income inequality. Second, as Phan and Coxhead (2010) point out, it is important to improve access to non-farm activities for the poor. Given that sectoral productivity and incomes are higher in the modern sectors, the poor, who are unable to move to regions with higher modern sector concentration may be left out from reaping growth dividends. Government policies aimed at increasing access to non-farm activities in regions with very high agricultural activity and poverty may help improve income equality. Third, reduce ethnic disparities in income growth. Geographical concentration of modern sector activity in the Red River Delta, the South East, and the Mekong River Delta have contributed to widening income disparities among Kinh and the ethnic minorities, as ethnic composition in Viet Nam is highly localized across different regions. While ethnic minorities have also experienced rising income over the years, their rate of increase in income has been significantly lower than that for Kinhs. Without targeted policies aimed at reducing inter-ethnic income inequality, Viet Nam may experience widening income inequality between ethnicities, regions, and economic activities.

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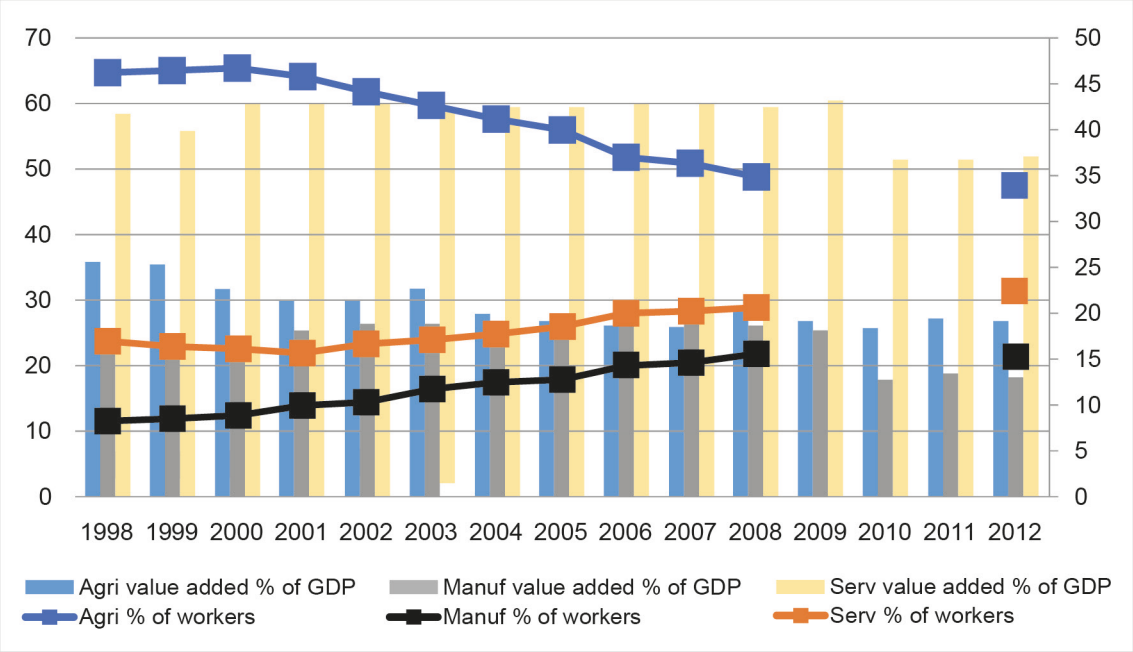
APPENDIX A

Sectoral Contribution to GDP and Share of Labor Force
(%)

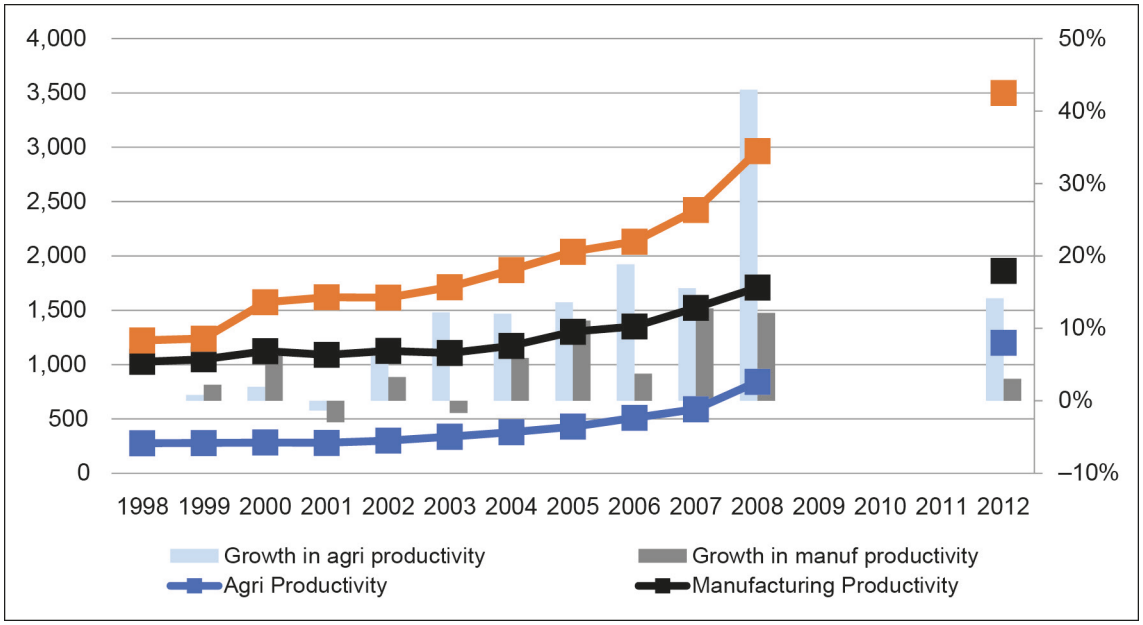


GDP = gross domestic product.

Source: World Development Indicators and McCaig and Pavcnick (2013).

APPENDIX B

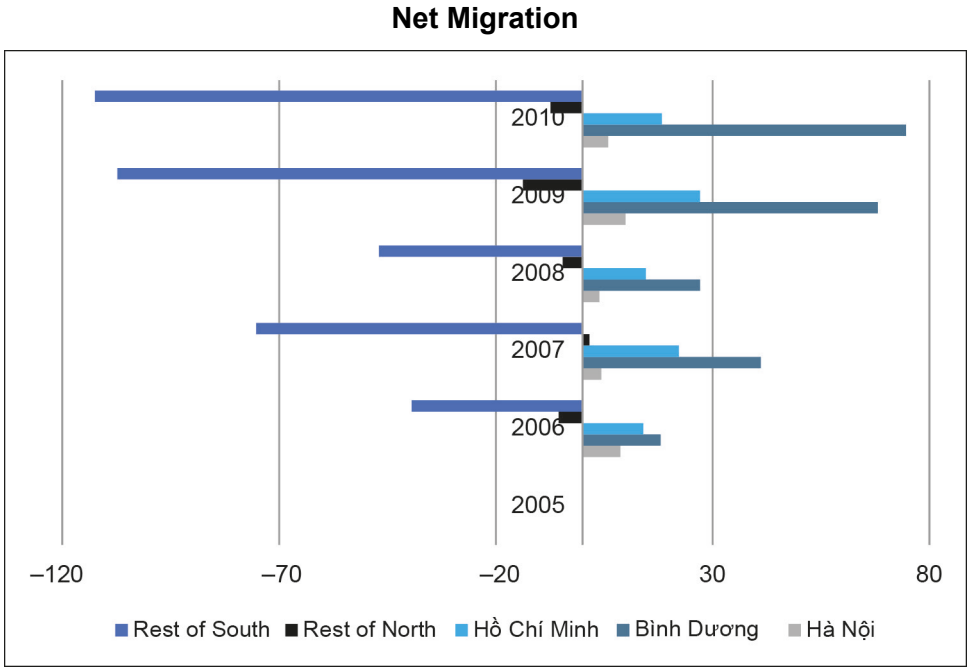
Sectoral Productivity (Share of GDP/Share of Employment, by Sector, US$, PPP)



GDP = gross domestic product; PPP = purchasing power parity.

Source: World Development Indicators and McCaig and Pavcnick (2013).

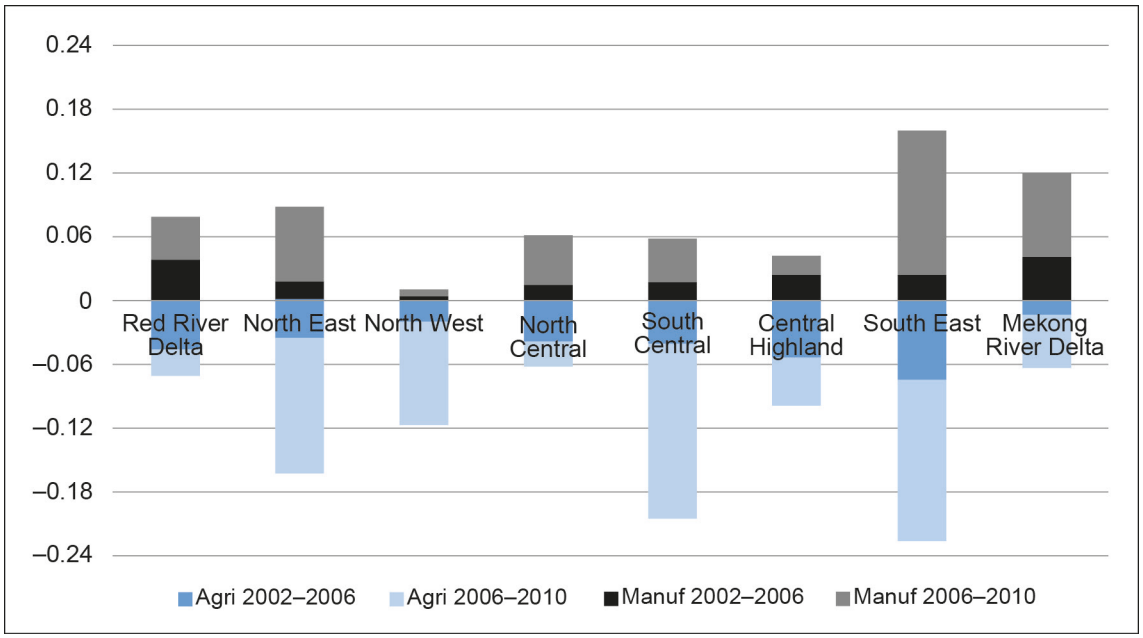
APPENDIX C



Source: General Statistics Office (GSO), Viet Nam.

APPENDIX D

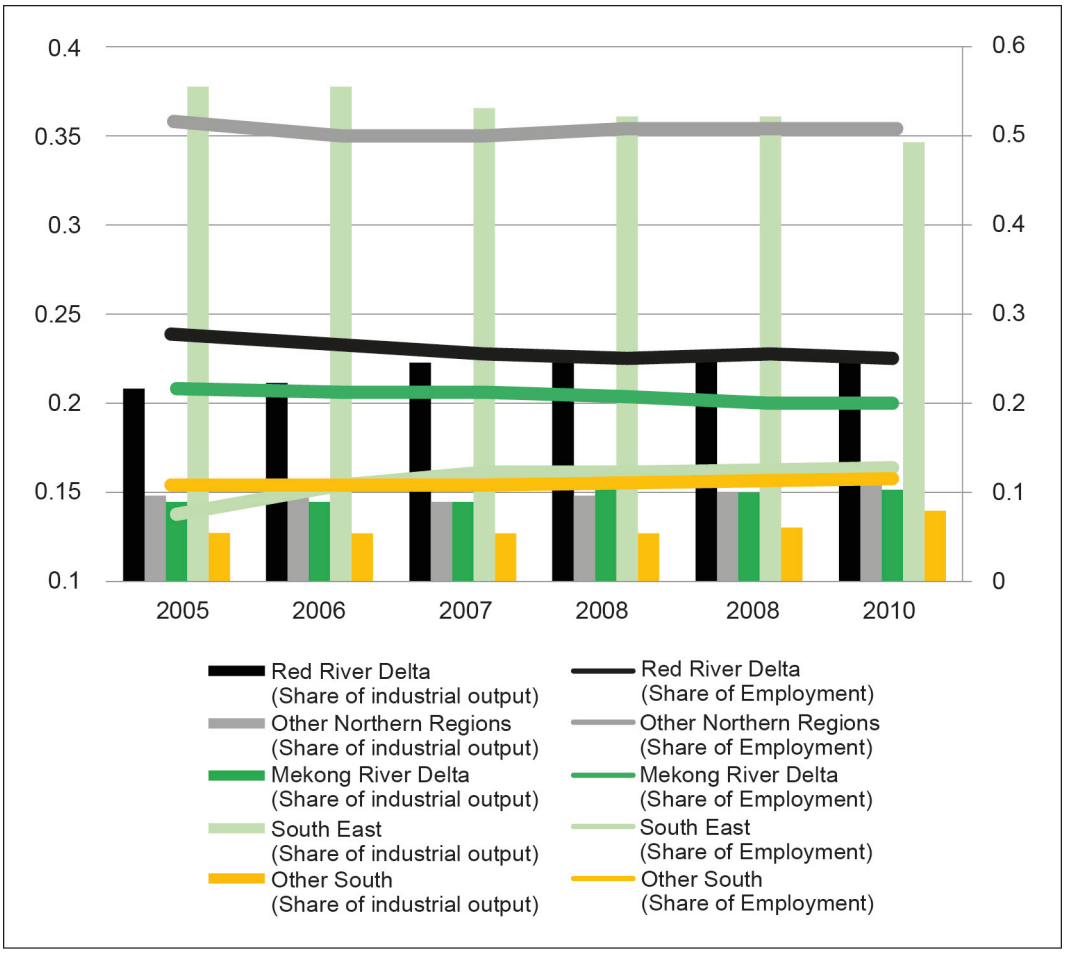
Change in Sectoral Participation by Region



Source: Authors' calculations based on VHLSS 2002, 2006 and 2010.

APPENDIX E

Regional Share of Industrial Output and Employment



Source: GSO Viet Nam.

APPENDIX F

Descriptive Statistics

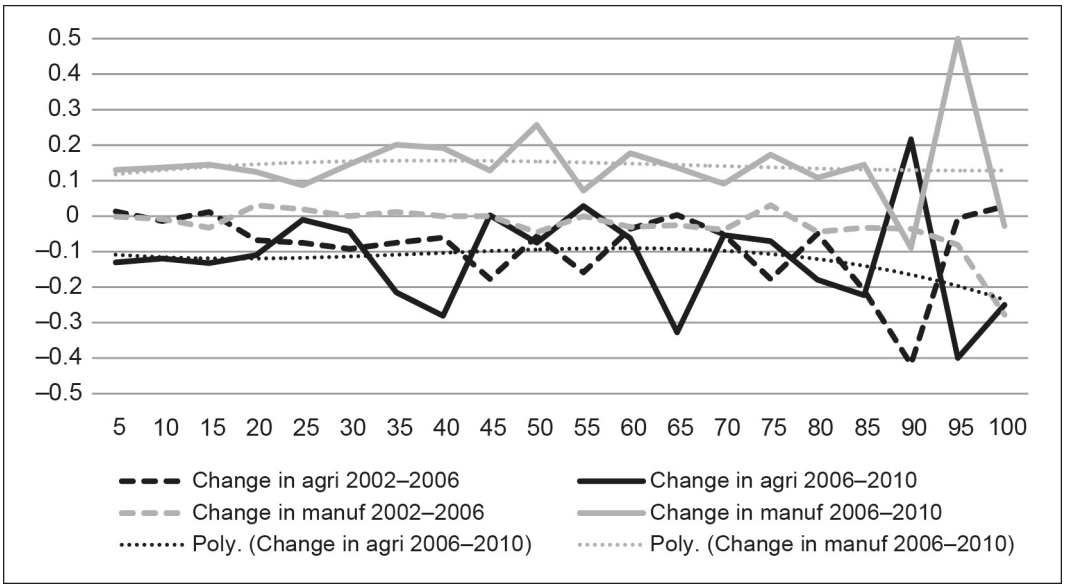
	2002	2006	2010
Observations	19,648	7,984	8,127
HHSize	4.506	4.294	3.975
	(1.729)	(1.631)	(1.520)
Log Land	6.174	6.304	5.864
	(3.884)	(3.741)	(3.945)
Ethnicity	2.036	2.22	2.371
	(3.724)	(4.270)	(4.343)
Age of Head	44.542	46.646	45.559
	(12.054)	(11.629)	(12.173)
Gender of Head (Male=1)	0.8	0.789	0.79
	(0.400)	(0.408)	(0.407)
Married (Yes=1)	0.863	0.859	0.86
	(0.344)	(0.348)	(0.347)
Secondary ed (Yes=1)	0.42	0.427	0.419
	(0.494)	(0.495)	(0.493)
Higher ed (Yes=1)	0.208	0.227	0.245
	(0.406)	(0.419)	(0.430)
Years of schooling of head	6.963	7.212	7.341
	(3.547)	(3.556)	(3.615)
No. of children	1.896	1.573	1.365
	(1.330)	(1.231)	(1.123)
Male adults	1.259	1.317	1.263
	(0.731)	(0.756)	(0.710)
Female adults	1.351	1.403	1.348
	(0.679)	(0.699)	(0.671)
lpchhexp	7.949	8.463	9.495
	(0.595)	(0.636)	(0.689)

Appendix F *table continued*

	2002	2006	2010
Observations	19,648	7,984	8,127
Agriculture	0.605	0.566	0.434
	(0.489)	(0.496)	(0.496)
Manufacturing	0.154	0.173	0.29
	(0.361)	(0.378)	(0.454)
Wholesale, Retail, Transport	0.151	0.157	0.162
	(0.358)	(0.364)	(0.368)
Other Services	0.089	0.105	0.114
	(0.285)	(0.306)	(0.318)
Leaders	0.021	0.03	0.022
	(0.144)	(0.170)	(0.146)
Professionals	0.084	0.097	0.194
	(0.277)	(0.297)	(0.395)
Skilled agri worker	0.05	0.042	0.107
	(0.217)	(0.201)	(0.309)
Unskilled agri worker	0.546	0.518	0.397
	(0.498)	(0.500)	(0.489)
Skilled manufacturing worker	0.112	0.126	0.184
	(0.315)	(0.332)	(0.388)
Unskilled other	0.184	0.183	0.096
	(0.387)	(0.387)	(0.295)
Region–Red River Delta	0.22	0.205	0.18
	(0.414)	(0.403)	(0.384)
Region–North East	0.158	0.151	0.167
	(0.365)	(0.358)	(0.373)
Region–North West	0.037	0.052	0.076
	(0.190)	(0.222)	(0.264)
Region–North Central Coast	0.115	0.112	0.109
	(0.319)	(0.315)	(0.312)
Region–Central Highlands	0.093	0.095	0.071
	(0.290)	(0.293)	(0.257)
Region–South Central	0.059	0.068	0.09
	(0.236)	(0.252)	(0.287)
Region–South East	0.115	0.121	0.109
	(0.319)	(0.326)	(0.311)
Region–Mekong River Delta	0.202	0.196	0.199
	(0.402)	(0.397)	(0.399)

APPENDIX G

Structural Change among Ethnic Minorities by Income Quantile



Source: Authors' calculations based on VHLSS 2002, 2006, and 2010.

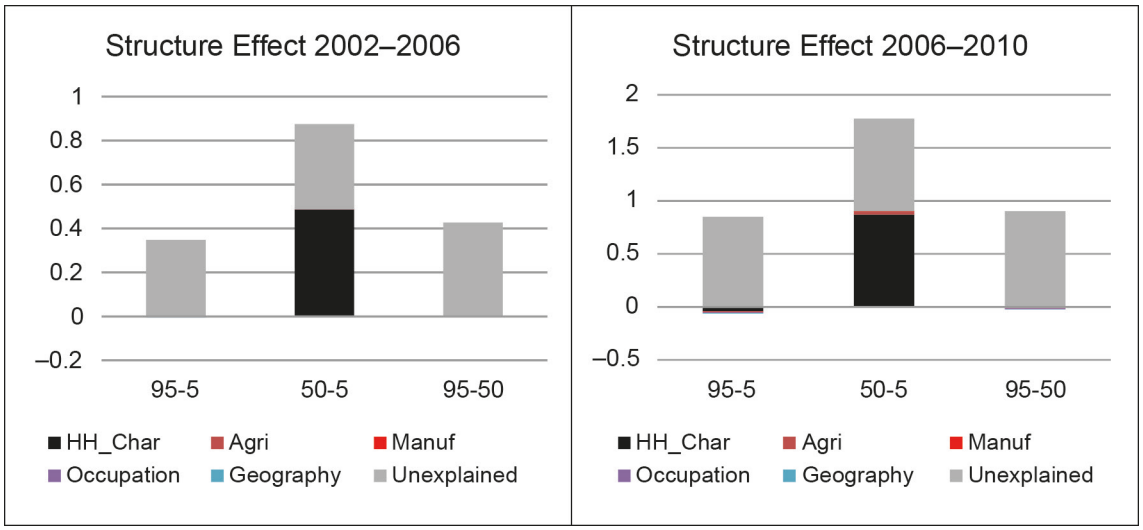
APPENDIX H

RIF Regression

Dep: lpchhexp	2002	2006	2010	Pooled
Sector–Agriculture	–0.187***	–0.175***	–0.039	–0.117***
	(0.014)	(0.018)	(0.021)	(0.011)
Sector–Manufacturing	–0.102***	–0.131***	–0.096***	–0.111***
	(0.017)	(0.021)	(0.023)	(0.013)
Skilled agriculture occupation	0.165***	0.240***	0.125***	0.134***
	(0.019)	(0.029)	(0.019)	(0.013)
Skilled manufacturing occupation	0.098***	0.082***	0.185***	0.127***
	(0.018)	(0.022)	(0.021)	(0.013)
Professional	0.234***	0.266***	0.391***	0.32***
	(0.02)	(0.023)	(0.024)	(0.014)
Log land size	–0.022***	–0.025***	–0.027***	–0.026***
	(0.001)	(0.002)	(0.002)	(0.001)
Household Size	0.017***	0.011	–0.012*	0.009**
	(0.004)	(0.006)	(0.006)	(0.003)
Married (Yes=1)	0.041*	0.034	0.048	0.035**
	(0.016)	(0.021)	(0.025)	(0.013)
Secondary ed. (Yes=1)	0.118***	0.197***	0.215***	0.177***
	(0.01)	(0.014)	(0.014)	(0.008)
Higher ed. (Yes=1)	0.315***	0.428***	0.433***	0.402***
	(0.014)	(0.018)	(0.019)	(0.011)
Ethnicity	0.201***	0.251***	0.455***	0.292***
	(0.014)	(0.02)	(0.019)	(0.01)
No. of children	–0.143***	–0.153***	–0.157***	–0.151***
	(0.005)	(0.007)	(0.008)	(0.004)
More than one adult male (Yes=1)	0.027	0.006	0.051	0.031
	(0.022)	(0.03)	(0.033)	(0.018)
More than one adult female (Yes=1)	–0.143***	–0.249***	–0.08	–0.146***
	(0.037)	(0.057)	(0.046)	(0.03)
Region–Red River Delta	–0.179***	–0.141***	0.302***	–0.030**
	(0.014)	(0.018)	(0.025)	(0.011)
Region–North East	–0.115***	–0.143***	0.053**	–0.051***
	(0.015)	(0.019)	(0.019)	(0.011)
Region–North West	–0.149***	–0.121***	–0.038	–0.100***
	(0.025)	(0.03)	(0.022)	(0.015)
Region–North Central Coast	–0.292***	–0.349***	–0.059**	–0.233***
	(0.015)	(0.02)	(0.02)	(0.011)
Region–Central Highlands	–0.157***	–0.116***	–0.052*	–0.104***
	(0.015)	(0.02)	(0.022)	(0.011)
Region–South Central	–0.096***	–0.010	0.190***	0.043**
	(0.019)	(0.025)	(0.023)	(0.014)
Region–South East	0.247***	0.300***	0.321***	0.291***
	(0.019)	(0.022)	(0.025)	(0.013)
Year 2006				0.456***
				(0.007)
Year 2010				1.408***
				(0.008)
Constant	8.261***	8.779***	9.167***	8.095***
	(0.045)	(0.068)	(0.056)	(0.035)
R–Squared	0.427	0.498	0.518	0.736
Observations	19,648	7,984	8,127	35,759

APPENDIX I

Decomposition of Structure Effect



Source: Authors' calculations based on VHLSS 2002, 2006, and 2010.