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Hoang Dat Vu

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Trade liberalization, labor allocation and income dynamics
in Vietnam

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Trade liberalization, labor allocation and income dynamics in Vietnam

THESE

Pour l'obtention du titre de Docteur en Sciences Économiques
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General Introduction

Context and research needs

In 1986, Vietnam launched Doi Moi (renovation) to transition from a centrally planned to a socialist-oriented market economy. Initial reforms included maintaining macroeconomic stability by reducing inflationary pressures, allowing foreign investment with the enactment of the first Foreign Investment Law in 1987, and de-collectivizing agricultural production with Resolution No. 10 in 1988. For facilitating doing business in the domestic sector, the Law on Private Enterprises and Companies Law were introduced in 1990. Another version of the Law on Private Enterprises was passed in 1999 which significantly liberalized conditions for doing business in Vietnam.

In terms of international trade, before 1989, almost all international trade decisions were centrally determined by the government. However, with the introduction of customs tariffs in 1989, a modern trade regime began to formally take shape. In 1991, private enterprises were allowed to engage in international trade and since 1998 have been able to participate in export and import activities without a license. The first modern trade agreement with the EU was signed in 1992. In 1995, the country joined ASEAN and its trade agreement – CEPT/AFTA (Common Effective Preferential Tariff/ ASEAN Free Trade Area). Other milestones include the Vietnam-US Bilateral Trade Agreement in 2000 and accession to the World Trade Organization in 2007.

These main reforms and other supplementary reforms and policies have helped Vietnam liberalize its resources and boost economic development. GDP growth has hovered at over 6% since Doi Moi. GDP (at Purchasing Power Parity) per capita has increased more than six fold, from \$970 in 1990 to \$6,023 in 2015 (Sarma, Saumik and Guanghua, 2017). The country graduated from low-income status to lower-middle-income status in 2010. Sustained high economic growth has lifted about 40 million people out of poverty, ranking the country second best in poverty reduction after China.

Consistent with stylized facts and predictions in the literature on structural transformation, economic growth in Vietnam has led to radical structural change. The agricultural sector has collapsed along with the expansion of manufacturing and services. Agriculture's share of GDP nearly halved from 32% in 1990 to 17% in 2009, with a concomitant rise in manufacturing's share of GDP from 25% to 42% (Tran and Doan, 2010).

In parallel, the employment shares of the economic sectors have also changed. Employment in agriculture, which had accounted for more than 70% of total employment since the early

1990s, declined to less than 50% of the total by the end of the 2000s. Employment in manufacturing and services expanded sharply to absorb declining labor use in agriculture. Employment in agriculture declined in both relative and absolute terms. McCaig and Pavnick (2017) presume that increased agricultural productivity meant that outputs were sufficient to meet the demand of the increasing population even as the number of agricultural workers decreased.

In terms of the distribution of benefits, Vietnam's economic growth and structural transformation have been relatively inclusive. The Gini coefficient has barely changed over the decades, according to Yamada (2017). Furthermore, he finds that all population deciles benefitted from economic growth in 1993-2014. The bottom deciles (10 and 20) benefitted slightly less than the others, but the disadvantage is not large.

As a developing country, Vietnam has a large number of economic entities based on households or household businesses engaged in non-farm activities (HHBs)¹. The first survey of this type of economic entity – household business and informal sector (HB&IS) – was conducted in Hanoi and Ho Chi Minh City (HCMC) in 2007 by the General Statistics Office (GSO) and DIAL-IRD². A second survey was executed in 2009. In addition, the “new” Labor Force Survey in 2007, conducted by GSO with technical supports from DIAL-IRD, provides fruitful information for positioning HHBs in the labor market as a whole. Results of the surveys and other research studies conducted by DIAL researchers have provided insights into the characteristics of HHBs in Hanoi and HCMC. It is not overstated to say that the work of DIAL researchers has brought the sector to the public's attention for the first time, built a firm foundation to learn more about the sector in Vietnam. In 2014, the Centre for Analysis and Forecasting (CAF), Vietnam Academy of Social Sciences (VASS) and DIAL-IRD conducted a nationally representative survey of HHBs, the first of its kind in Vietnam. The survey provides very rich information about the different dimensions of HHBs in Vietnam.

Studies conducted by the DIAL group have provided useful information about Vietnam's HHB sector. The roles of HHBs in both non-farm and total employment steadily increased during the transformation process. The sector accounted for 18.3% of total employment in 1993, 34% in 2010 and then 31% in 2016. In 2014, there were about 9 million non-farm HHBs in Vietnam. If we assume that one household owns one HHB, one in three households in Vietnam has a HHB. The sector provides about 15.7 million jobs (Pham and Pasquier-Doumer, 2017). This type of

¹ Household Business (HHBs) only cover non-farm ones.

² Développement, institutions et mondialisation - (DIAL), Institut de Recherche pour le Réveloppement (IRD).

employment will remain the largest provider of non-farm employment in years to come (Oudin et al., 2013). Employment created by HHBs has been critical as the working-age population of Vietnam increased at a pace of more than one million annually in the period leading up to 2010. The expansion of formal enterprises, that is, state-owned and private and FDI ones, could not absorb all the increase in the labor force. Meanwhile, employment in the agricultural sector has declined. Therefore, it is safe to say that HHBs have played an important role in delivering and distributing the benefits of inclusive growth and structural transformation.

HHBs have played a vital role not only in terms of employment creation but also in other aspects of the Vietnamese economy. In 2014, HHBs accounted for 23% of GDP or 28% of non-farm GDP. They contributed a majority of value added in the trade sector, at 63% (Oudin, 2017).

In terms of spatiality, HHBs in Vietnam has not only been an urban phenomenon. Indeed, non-farm HHBs in rural areas account for two-thirds of total employment in the sector (Cling, Razafindrakoto and Roubaud, 2017). This partly reflects limitations of the definition of “urban” in Vietnam but also reflects the fact that non-farm economic activities have been prevalent in rural areas. The development of non-farm activities meets increased demands for non-farm goods and services when agricultural productivity and rural household incomes increase.

There are spatial differences in the composition and dynamics of labor markets in different areas of Vietnam, however. The peripheries of Hanoi and HCMC, the two economic hubs of the country, experienced extraordinary change. Meanwhile, HHBs are shrinking in the inner areas of the two cities but are expanding in the periphery areas as well as other urban areas (Cling et al., 2012).

A certain level of segmentation of HHBs is found in Vietnam. Nguyen, Nordman and Roubaud (2013) report that wage workers in HHBs receive about 14% less than their counterparts in the formal sector. However, they also find that the earnings of male workers or the self-employers are comparable with that of their counterparts in the formal sector. The authors conclude that the exclusion hypothesis of HHBs is not clear in Vietnam.

On the supply side, the demographic trend in Vietnam has been quite interesting. Before 2010, the country faced the challenge of finding jobs for about one million new labor market entrants every year. Rapid population growth is predicted to affect labor market transformation (Porta and Shleifer, 2014; Cling, Razafindrakoto and Roubaud, 2017) because the formal sector cannot absorb all of the expanding labor force. However, there has been a sharp drop in the net

incremental of the labor force since 2010, to less than 500, 000 per year³. This reduction has partially relieved pressure on job creation in Vietnam's labor market.

Vietnam has experienced a slowing down of economic growth since 2008. Although the growth rate has not dipped below 5%, growth has been lower and more volatile than in previous periods. The economy seems to face a 10-year business cycle with a low point at the end-of-decade years, i.e. 1998-1998, 2008-2009. The slowdown since 2009 has indeed affected the structural transformation of the economy, as pointed out in Oudin et al. (2013). Initial empirical evidence of Oudin et al. (2013) suggests adjustments in the labor market with the slowing down of structural change. This raises an important question for Vietnam's economic transformation – whether this slowdown is a short-term or a long-term phenomenon.

One important finding of Oudin et al. (2013) is that the share of HHBs in non-farm employment started to decline in 2009. This is somewhat different from the traditional view of HHB expansion during a slowdown. Actually, there is another argument that the relationship between sector size, especially the number of self-employers, and macroeconomic conditions is not homogenous, with both pro-and counter-cyclicality against economic growth, even within an economy (Fiess, Fugazza and Maloney, 2010).

Oudin et al. (2013) is the first ex-post study that links macroeconomic conditions and labor market adjustments with a significant focus on the informal sector employment in 2007-2012. Their findings are meaningful in that employment in agriculture stopped declining but employment in HHBs started to decline at almost the same time. However, the study does not explain the links between these changes with macroeconomic conditions and changes in demographic trends.

Previous studies have provided a good picture of structural transformation and the roles of HHBs in Vietnam. However, a number of questions concerning structural change in Vietnam's labor market remain unanswered thoroughly. These questions can be grouped into three main topics: (1) correlations between structural change in economic sectors and HHBs with macroeconomic conditions and demographic trends; (2) income dynamics of laborers in HHBs and in the formal sector and the underlying reasons for the low level of exclusion of HHBs in Vietnam; and (3) the dynamics of spatial dimensions of the labor market.

In other aspects, the dynamics of HHBs are not only determined by the prevailing macroeconomic conditions and demographic trends, but are also affected by other economic

³ Author's self-estimation from Labor Force Surveys

circumstances as well as regulations such as trade liberalization or minimum wage. Therefore, economic circumstances and regulations, especially those relating to employment, are clearly expected to have impacts on HHBs.

A number of studies on Vietnam provide meaningful insights into the impacts of these factors on the informal sector in Vietnam. The empirical results of McCaig and Pavcnik (2018) show that the effectiveness of the Vietnam-US trade agreement had positive impacts on labor movements from HHBs to formal enterprises. Meanwhile, Carpio et al. (2013) report that increases in the minimum wage reduces both total employment and employment in the formal sector. However, these studies focus on specific periods and the results should not be generalized.

McCaig and Pavcnik (2018) investigate the effects of Vietnam-US bilateral trade in 2000. They find that increase in access to the US market reduced employment in HHBs in general and self-employment in particular. Their study focuses on the effects of increase in market access to a foreign market. Whether the result holds true with effects of the opposite side of trade liberalization i.e. opening the domestic market as well as following further trade liberalization in subsequent periods is not clear. In addition, the effect of trade liberalization on income differentials between different types of employment was not investigated.

Impact and evaluation studies on increases in the minimum wage in Vietnam investigate the simultaneous effects, but have not evaluated the possibility of lagged effects (Meer and West, 2016). Therefore, the lagged effects should be carefully captured in the empirical models. Furthermore, the study of Hansen, Jann and Torm (2015) on the effects of the minimum wage on income distribution, the first such study on Vietnam, should be revisited using a more rigorous estimation procedure.

Objectives of the thesis

Given several aspects of the Vietnam's labor market has not been thoroughly investigated, including the above listed questions of structural change in general and the effects of specific economic circumstances and regulations as discussed above, the general objective of this thesis is to investigate structural change of the labor market and income dynamics of different types of employment in Vietnam as well as the effects of economic circumstances and regulations represented by trade liberalization and minimum wage on the dimensions.

To elaborate, the thesis first draws a synthesized picture of labor allocation and income dynamics or labor market transformation in Vietnam in the period 1993-2016. Labor market transformation is explored in terms of economic sectors, institutional sectors and geographic

areas with different levels of urbanization. We also investigate labor market changes against the backdrop of macroeconomic and demographic trends to identify associations, if any, between these factors and the transformation process. Furthermore, we analyze dynamics of income and its co-movements with productivity in different economic and institutional sectors to learn how workers have benefited from the economic growth and transformation. One important element which previous studies have often neglected is productivity. Indeed, productivity growth is a crucial determinant of structural transformation. Investigating productivity allows us to link different dimensions of structural change.

After drawing the general picture, the thesis investigates in detail effects of economic circumstances and regulations on labor allocation and income dynamics. The two elements are represented by trade liberalization and minimum wage respectively.

The minimum wage in Vietnam has increased significantly since 2008, especially in the domestic business sector. Some early studies found that increases in the minimum wage negatively affect both total employment and employment in formal enterprises. Studies often investigate the whole labor market or specific groups in general. Furthermore, all existing studies on Vietnam consider only simultaneous effects of a rise in the minimum wage, though Meer and West (2016) argue that potential lagged effects have been ignored. Consequently, it is necessary to revisit the effects of the minimum wage on employment and labor allocation in Vietnam, taking into account the possibility of lagged effects as well as possibility of different effects on age or gender sub-groups. Furthermore, the effects of an increase in the minimum wage on wage distribution should be carefully investigated with explicit validations of some of the assumptions, which are not addressed in Hansen, Jann and Torm (2015), the first such study on Vietnam.

Vietnam has drastically liberalized its international trade, as mentioned in an earlier section. Trade liberalization has radically affected the economy. McCaig and Pavcnik (2018) provide empirical evidence for the effects of increased export opportunities on labor allocation. However, the effects of opening the domestic market have not been explored or documented, it is also the case for the effects on income gaps between different types of employment.

Concepts and categorizations of employment

In Vietnam, we can distinguish two distinct types of business units based on their status as defined by law, formal enterprises and household businesses (McCaig and Pavcnik, 2018). In this thesis, we refer to these as institutional sectors. Indeed, different sectors have different levels of associations with the state. At the higher level are formal enterprises, which are

registered and operate under the Enterprise Law. At the lower level are household businesses, both farm and non-farm ones. Farm household businesses are exempt from registration and non-farm household businesses can be registered or non-registered. Accordingly, formal enterprises cover all economic entities that are registered and operate under Enterprise Law. Farm households cover all households or individuals working in the agricultural sector. Meanwhile, non-farm household businesses (HHBs) refer to households or self-employed individuals engaged in non-farm activities with or without registration.

There are two common approaches for defining informality by sectors. The first considers differences in characteristics and incomes or working conditions in different sectors (Field, 2007; Cling, Razafindrakoto and Roubaud, 2017). The second looks at links between economic entities and the state (Maloney and Chanduvi, 2007). The first approach is based on the nature of labor market segmentation and the second is an operational approach which helps us readily define or measure informality. In practice, the two approaches overlap. The former also uses the level of exposing to regulation to define the sectors; for example, economic entities that are not registered with a state agency are often categorized as belonging to the informal sector. The latter directly uses these associations to define informality. The second is therefore can be considered as the practical approach of the first.

It is clear that the formal sector covers formal enterprises. Registered HHBs can be also considered to belong to the formal sector. However, incomes and working conditions in the registered HHBs are more similar to those in the unregistered HHBs than in the formal enterprises. Furthermore, we cannot distinguish the two types of HHBs from the workers' side in the data. We therefore consider the registered HHBs as belonging to the informal sector.

An alternative approach uses the formality of laborers, which is often defined depending on whether or not laborers receive the compulsory benefits stipulated in labor regulations. The main benefit used for such classification is social insurance. Therefore, we have cases of laborers working in the formal sector but who do not have social insurance, they are classed as informal workers in the formal sector. It is also possible that formal workers who are covered by the social insurance work in the informal sector.

In Vietnam, previous studies point out that very few laborers in the informal sector have social insurance, and lack of social insurance for laborers in the formal sector is also somewhat prevalent, especially in domestic private enterprises.

In the current thesis, we categorize laborers based on their economic and institutional sectors as well as their status in HHBs. Consequently, except definitions in specific contexts, we

generally have four types of (1) self-employers and wage workers in the agricultural sector, (2) wage workers in the non-farm formal enterprises (formal enterprises), (3) wage workers, and (4) self-employers in non-farm HHBs. The first category covers all employment in the agricultural sector. The second one constitutes the formal sector; meanwhile the third and the fourth categories are regarded as the informal sector. Therefore, in analyses, the formal enterprises are interchangeable with the formal sector and HHBs are alternatively used for the informal sector. It should be noted that although HHBs is a general name, it does not cover agricultural households in our categorization. Indeed, the categorization is consistent with definition of the informal sector in the literature that agricultural activity is often excluded from the sector.

Our focus is employment. Thus, the employment approach should be used. However, information about social insurance for laborers is not available in VLSS and VHLSS, the main source of data, for a number of years. In addition, the income of wage workers without social insurance in the formal sector is still higher than that of their HHB counterparts. If we group informal workers in the formal sector with their counterparts in HHBs, we may end up with incorrect information about the income of informal workers in HHBs. The focus on employment is also a reason for grouping the registered HHBs in the informal sector, as previous studies show that the characteristics of laborers in the registered HHBs are closer to those of their counterparts in the non-registered HHBs than in the formal sector. Nonetheless, we cannot create a separate category for the registered HHBs because the VLSS and VHLSS do not collect information about registration from the laborers' side.

We have a couple of names for working people, such as laborers, workers or self-employers. To make it consistently, "worker" is used for whom works for wage or salary, "self-employer" are those run his/her own HHBs or family workers without receiving wage or salary, and "laborer" for both of them in general. Indeed, we also have owners of private enterprises but they accounted for a tiny share of total laborers and they are excluded from our analysis.

To investigate effects of the minimum wage on employment, one of our questions is the effects on employment rates. This indicator is defined as ratio of number of full time employment to the corresponding population of specific groups, i.e. female age 15-65 or young population age 15-29.

Opening the domestic market is understood as phenomenon that Vietnam opens its domestic market for imported goods and services. Meanwhile, measures of this context are indicators which quantify the levels of opening of Vietnam's domestic market. They can be levels of tariffs imposing on imported goods and services or import penetration.

Data

HB&IS surveys in 2007 for Hanoi and HCMC and in 2014 and 2015 for the whole country provide excellent data for investigating HHBs in Vietnam. However, as the thesis aims at a longer period as well as other institutional and economic sectors, we use data from three national survey series: Vietnam Living Standards Survey (VLSS) 1993 and 1998 and Vietnam Household Living Standards Survey (VHLSS) 2002 to 2016; Labor Force Survey 2011 to 2014; and Enterprises Census 2004 to 2016.

Vietnam Living Standard Survey and Vietnam Household Living Standards Survey

Vietnam's first Living Standards Survey (VLSS) was conducted in 1993. It was administered by the GSO with technical support from the World Bank. The second survey was conducted in 1998⁴. The sample sizes of the two surveys are about 4000 and 6000 households, respectively. This means that the surveys are nationally representative at both the urban and rural level. Observations in VLSS 1993 are self-weighted; observations in VHLSS 1998 were selected with different probabilities and weights are used to correct for representativeness.

The survey was resumed in 2002 and has been conducted every two years since then. It was renamed the Vietnam Household Living Standards Survey (VHLSS)⁵. Except for VHLSS 2002, it provides observations on about 9000 households. The survey is representative for urban and rural areas of regions across country.

Both VLSS and VHLSS follow the standardized contents of the Living Standards Measurement Study (LSMS) of the World Bank. They therefore provide rich demographic information on households, education and employment of each individual aged 6 and above for the 12 months before survey. The employment sections cover employment status, industry, ownership, occupation and income. The household business and self-employment section provides information on business operations including expenses and revenues. The survey information allows us to investigate changes in different dimensions such as sector of employment or employment status. Furthermore, we can estimate income from all kinds of employment, including self-employment with certain assumptions.

⁴ See World Bank (2000, 2001) for basic information of Vietnam Living Standard Survey 1993 and 1998.

⁵ See Phung and Nguyen (2007) for basic information of VHLSS 2002 and 2004.

Vietnam Labor Force Survey

Starting in 2007, the Labor Force Survey (LFS) has been conducted by GSO with technical support from DIAL-IRD. The LFS has been conducted monthly since 2010. The sampling frame is drawn from the 2009 population census. Large samples of more than 500,000 observations per year allow the LFS to be representative at the provincial level. Information on education, schooling and demographics of both individuals and households is collected.

Relating to employment, the LFS collects a wide range of information, including on affiliated industries, occupation, employment status, institutional sector, and income. It does not collect data on the income of the self-employed and family workers, however. The survey information is consistent over years, allowing us to carry out a time series analysis.

As the surveys since 2009 have used the same master sampling frame, the consistency of the collected data is assured. Even so, this approach raises the problem of data representativeness, especially for years far from 2009.

Vietnam Enterprise Census

We use data from the Enterprise Census to estimate labor productivity in formal sector firms. This is the annual census of firms operating under the Enterprise Law in Vietnam, starting in 2001. All firms with more than 10 employees across all industries and a sample of firms with fewer than 10 employees are surveyed. The survey comprises two components: basic and extension. The basic component, which has been maintained over years, includes information on industries (varying from 4 to 6 digits between years), ownership, labor, wage payments, capital, and business results. The survey collects information on intermediate costs for selected years only, which mean we cannot estimate value added using the deduction method. However, value added can be estimated by using data on the incomes of different stakeholders including, the state, laborers and business owners. The extension component varies from year to year and covers different topics such as technology, business and investment, environmental treatment. With value added and number of employees, we can estimate productivity per worker over years for any sub-groups of firms by industry and location.

Structure of the thesis

Chapter 1 draws an overall picture of structural change in Vietnam's labor market since 1993, focusing on labor allocation between different economic and institutional sectors and income dynamics of laborers. The general picture of structural changes in employment across the country in both economic and institutional sectors is firstly estimated. Its co-movements with

macroeconomic and demographic trends are also analyzed. Secondly, structural changes in four areas with different levels of urbanization are investigated; this type of analysis should reveal co-movements of patterns of structural change with varying levels of urbanization across the country. Thirdly, dynamics of laborers' income and its movements with productivity is discussed. This estimation should shed light on changes in income gaps by geographical location and institutional sectors and analysis of productivity provides insight into the causes of change.

Chapter 2 investigates the effects of the minimum wage on employment rates, labor allocation across employment types, and wage distribution for the whole population and sub-groups by age and gender. In the past, Vietnam maintained different minimum wage systems for the domestic business and FDI sectors. Since 2008, the minimum wage has increased rapidly in both sectors, with a higher minimum wage growth in the former sector shrinking the gap in the minimum wage between the two. This led to the gradual unification of the minimum wage, culminating in domestic and foreign firms having the same minimum wage levels from October 2011. Further increases in the minimum wage have since been kept at 15% per year in nominal terms. This specific period provides an appropriate context for investigating the impacts of the minimum wage on total employment and labor allocation between sectors and wage distribution.

Chapter 3 focuses on investigating the association between allocation as well as income gaps between different types of employment and trade liberalization for the period 2002-2010. Trade liberalization is a major driver of economic transformation. As briefly discussed in the beginning, Vietnam has considerably liberalized its international trade by eliminating quotas and non-tariff barriers and cutting tariffs. This has resulted in a drastic increase in international trade and is expected to affect other aspects of the economy such as structure and productivity, including the areas of our interest – labor allocation and income dynamics.

Main empirical results

The results confirm the radical structural change in Vietnam which follows the predictions of conventional structural transformation and labor market models in developing countries with declining in agricultural employment and increasing in wage works in general and in the formal sector in particular. The pattern of change varies depending on the levels of urbanization. However, the pattern has changed since 2010 as short-term macroeconomic conditions have played a more important role in determining structural change. Pro- and counter-cyclical behaviors among non-farm self-employers which relate to the exit hypothesis of the informal

sector have been found in Hanoi and HCMC, the two economic hubs with the highest level of urbanization. However, this behavior is not found in either urban or rural areas in other areas.

There is a certain level of segmentation among HHBs and formal enterprises, but it is not as serious as that reported in the literature. This result is consistent with the findings of Nguyen, Nordman and Roubaud (2013). Also evidence since 2002 is a small convergence in income of wage workers in HHBs and their counterparts in formal enterprises. The low productivity of domestic private enterprises and relatively high productivity growth of HHBs since 2004 are possible reasons for the unserious segmentation and non-negative changes in segmentation, respectively.

The results imply that the minimum wage do not have significant impacts on the employment rates of the whole working age population or young cohort and male sub-groups in the period 2011-2014, both in terms of simultaneous and lagged effects. The minimum wage does, however, increase the employment rate of the female sub-group as lagged effects. Meanwhile, the result for adult cohort also implies no association between the minimum wage and the employment rate. However, the result is not consistent across specifications. Yet, there are no effects on movements across types of employment at all. Similarly to the work of Hansen, Jann and Torm (2015), the empirical results indicate that the minimum wage positively affects wage distribution in the formal sector. However, using a more rigorous estimation procedure, we find that the effects do not stop at the median as Hansen, Jann and Torm assume, but also spill over into higher percentiles. In terms of difference between sub-groups, the effects are stronger for young workers than for their adult counterparts. Meanwhile, the model does not work well for male workers or for wage workers in the informal sector.

Regarding the impact of trade liberalization, opening up the domestic market is found to reduce share of wage workers in HHBs, comparing with that in the formal sector of manufacturing industries but the results are inconsistent across approaches for the case of self-employment. Meanwhile, opening up the domestic market does not have significant impacts on income gaps between three types of employments of self-employment, wage employment in HHBs and wage employment in formal manufacturing enterprises. This result is consistent with the result presented in a previous paragraph, that the income gap between wage employment in HHBs and the formal sector has been stable since 2002.

In summary, the thesis contributes to the literature of the topic in several aspects. Firstly, it provides an updated and comprehensive picture of structural change with different responses of the labor market in different macro-economic conditions as well as different locations in Vietnam. A new “episode” of structural change since 2010 which has not closely followed the

conventional models, especially for urban Hanoi and HCMC, is found and documented. In addition, an estimation of productivity of all stakeholders in the economy for a more than decade provides explanations for several dynamics in the labor market. Secondly, the thesis investigates both simultaneous and lagged effects of the minimum wage on employment with explicit consideration of potential existence of location trends for the first time in Vietnam. A different result to the literature of the topic is a positive lagged effect of the minimum wage on the employment rate of the female sub-group. Thirdly, the thesis investigates effects of the opening the domestic market on employment allocation with simultaneous separation of employment within non-farm household businesses and income gap between different types of employments. The latter effect which is found to be insignificant is also investigated for the first time in Vietnam.

However, the thesis also has a number of limitations. Firstly, capital investment and its productivity which are believed to play an important role in structural change in Vietnam are not investigated. Furthermore, estimation of labor productivity is rather simple which does not take into account differences in labors' productive characteristics such as education or skills. On another aspect, underlying factors inducing structural change as well as behaviors of actors in the labor market are not analyzed that somewhat restrain understandings of structure change in Vietnam. Secondly, the current model employed for studying the impacts of the minimum wage on the wage distribution does not effectively work for the informal sector. Given the importance of the sector, alternative models should be searched for. Furthermore, explanations for the positive association between the minimum wage and the employment rate for the female laborers should be more rigorously validated. Thirdly, both sides of trade liberalization should be studied simultaneously for its impacts on labor allocation and income gaps. In addition, the service sector which accounts for a main share of HHBs is not investigated as we cannot access to measures of opening the domestic market of the sector.

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Chapter 1 Structure Changes in Vietnam's Labor Market since Doi Moi

Abstract

Vietnam has experienced drastic changes in the labor market after three decades of relatively high economic growth. The current chapter looks at structural change in the Vietnam's labor market with focus on allocation between different economic and institutional sectors and dynamics income of employments in each sector. It firstly provides an updated analysis of changes in conventional angles of economic and institutional sectors whose evolution has been induced by economic growth and demographic trend and disaggregates for different areas that witness varying levels of urbanization. Income dynamics of different types of employment in these areas are then investigated. Productivity of different institutional sectors is also estimated as it is believed to be an important underlying factor for income dynamics. Before 2010, structural change in Vietnam closely followed predictions by conventionally structural transformation and labor market models under economic growth in long-term of developing countries. However, short-term macroeconomic conditions have played a more important role in determining structural change since then. Areas with different levels of urbanization postulate different structural changes and behaviors of their labor markets. In the two economic hubs with the highest level of urbanization namely, Hanoi and Ho Chi Minh City, pro- and counter- cyclical behaviors of non-farm self-employers are found. There is a certain level of segmentation of non-farm household businesses and the formal enterprises but it is not as serious as that reported in the literature and there is also a little convergence in incomes of the two types of employment in the study period. Meanwhile, the spatial segmentation in Vietnam's labor market was not serious and it was also a convergence process in income of laborers across areas. Low productivity of the domestic private enterprises and relatively good productivity growth of non-farm household businesses are reasons for the unserious segmentation and non-negative changes in the segmentation respectively.

Key words: structural change, non-farm household business, formal enterprise, urbanization, income, productivity, Vietnam.

Introduction

After 30 years of Doi moi (renovation) since 1986, Vietnam has gained significant achievements in different aspects. With an average growth rate of about 6% over three decades, the PPP-GDP per capita has increased by more than six times, from \$970 in 1990 to \$6,023 in 2015 (Sarma, Saumik and Guanghua, 2017). The structure of the economy has also radically changed. Role of the agricultural sector has steadily declined; its contribution to GDP has decreased from 34% in 1986 to 17% in 2009. The shares of the manufacturing and service sectors have increased as substitutions.

However, the growth has not been smooth. A drastic growth was observed in the 1990s. In the 2000s, the growth rate was up and down but still relatively high. Meanwhile, a slowdown by the end of 2000s has not been fully recovered in recent years. Furthermore, some scholars have mentioned the 10-year business cycle of Vietnam economy which claims that the economy often experiences the slowing down in the economic growth in the end-of-decade years such as 1998-1999 or 2008-2009.

Along with changes in the economic structure, the labor market also has critical changes. The process has been documented in a number of papers (Cling et al., 2012; McCraig and Pacvnick, 2017). In general, trends included labor movements from agriculture to manufacturing and service sectors as well as between institutional sectors⁶ with increase in workers in the formal sector. This process has resulted in an increase the overall productivity (McCraig and Pacvnick, 2017).

Other features of structural change have been also investigated. For example, structural change has not been the same across locations (Cling et al., 2012). Young, male, better educated laborers and those belonging to the middle class are more likely to involve in structural change (McCraig and Pacvnick, 2017).

On another aspect, studies often investigate the whole labor market to learn its trends. Initial evidence of Cling et al. (2012) and Sarma, Saumik and Guanghua (2017) indicates that there are multi-stages in Vietnam's labor market. Consequently, it is necessary to separate the whole market into different sub-groups in terms of levels of development to document structural change accurately.

⁶ Institutional sectors mean sectors with different levels of association with the state. Normally, we use this for whether economic entities operate as enterprises or not. We distinguish two overall components of the formal and informal sectors as discussed in the introduction.

However, there are a number of questions that have not been properly answered. For example, whether the slowing down in the economic growth in the end-of-decade years has negatively affected the structural transformation of the labor market. In addition, effects of strong demographic trend of the economy have not been investigated.

The current chapter aims at filling these gaps. Our overall objective is to document structural change in the Vietnam's labor market since 1993 with focus on allocation between economic⁷ and institutional sectors, and on changes in income of specific laborer groups. Firstly, we update structural change in Vietnam with recent data as well as provide a more complete picture of labor market in Vietnam since Doi Moi. Secondly, we examine these changes in different locations with varying levels of urbanization; this is an extension and updated work of Cling et al. (2012). Thirdly, we discuss structural change in context of an macro-economic perspective and the demographic trend to see relative roles of these factors. Fourthly, we investigate the outcomes or income of laborers and corresponding productivities of different economic and institutional sectors.

With these objectives, the chapter is organized as follows. Section 2 presents briefly theoretical models for both structural change in economic sectors and the labor market. Section 3 reviews currently existing findings of structural change and characteristics of the informal sector in Vietnam. Data and specifications are discussed in Section 4. Section 5 is devoted for discussions of calculations results. The Chapter ends with the conclusion.

1. A theoretical background

In the process of economic development, from a low income to a higher income one, economies experienced changes in their structures. Therefore, underlying reasons and directions of changes are concerns of development economists. In this section, we shall briefly present underlying reasons and a typical trend of changes during the development process. As our main concern is the labor market, models of different segments of the labor market and their dynamics in developing countries are then reviewed.

1.1. Underlying reasons and directions of structure change

During the process of economic growth in developing economies, shares of different economic sectors change⁸. It is common that the share of the agricultural sector declines regarding both

⁷ As latter define, industries here is referred as broad sectors of agriculture, manufacturing, and services. However, the sector is also used for the institutional classification. Therefore, we differentiate by economic and institutional sectors.

⁸ See Syrquin (1988) and Herrendorf, Rogerson, Valentinyi (2013) for reviews of patterns of structural changes.

output and employment although changes in the shares may be different in alternative dimensions (Herrendorf, Rogerson and Valentinyi, 2014). The manufacturing sector including the construction and other non-agricultural productions witnesses increases in its share. However, there is often a specific highest point its share in an economy. Meanwhile, the share of the service sector is expected to increase continuously over time (Syquin, 1988). These stylized facts have been found in development experiences of a number of countries. However, there is absent of a general theory to explain the process (Kruger, 2008).

Indeed, studies of structural change often use a conventional three-sector classification of primary, secondary and tertiary ones. Definitions of the three sectors are not identical across studies (Kruger, 2008). Meanwhile, multi-sector models of the labor market discussed in the next sub-section often distinguish between agricultural and non-agricultural sectors. Therefore, in the current chapter, we define the primary, secondary and tertiary sectors as the agricultural, manufacturing and construction, and service ones respectively.

Differences in productivity growths across sectors and differences in income elasticity of demand for final goods and services are often cited as underlying reasons for structural change. In the supply side, capital accumulation and technological progress both induce the increase in the productivity which, in turn, results in income increase. In the demand side, as income elasticity of demand is different across products, their demands change accordingly when income increases. Consequently, the interaction of the two sides leads to changes in structure of production and consumption of economies.

We summarize here a typical model of Fourastie (1949) which is discussed in detail in Kruger (2008)⁹ - for prediction of structural change. Under this model, the two forces, the technological progress and income elasticity of demand for products of different sectors, interact with each other to determine the pattern of structure change. The former induces structural change via its effects on productivity and income. Meanwhile, the later determines the direction of changes.

The Fourastie model predicts that, at the initial stage, the agricultural employment dominates that of the manufacturing and service sectors. In the growing period, employment and output of the manufacturing sector increase rapidly. However, its demand should be matured in a certain point. Therefore, its employment also reaches the highest proportion at a specific point and then declines given a further increase in the sector's productivity. The continuous increase in productivity in the agricultural sector helps it be able to meet the demand of a growing

⁹ Unfortunately, the original writing of the model is not available in English. Therefore, we cannot approach it.

population given the decline in its employment. Meanwhile, the demand for products of the service sector enlarges along with the increase in the income without any limitations. In addition, its income elasticity is rationally expected to be higher than one. Therefore, the demand increases disproportionately faster than the increase in income. Meanwhile, the productivity of the sector cannot improve as fast as in the manufacturing one and its employment also disproportionately increases as a consequence.

As noted by stylized facts discussed above, empirical evidence strongly supports the conjecture of the model (See Syrquin, 1988; Herrendorf, Rogerson, Valentinyi, 2013) that the shares of employment and output in the agricultural sector collapse. These dimensions of the manufacturing sector increase disproportionately in the initial stage of development process but its employment share also declines in developed countries. Meanwhile, employment in the service sector increase continuously.

On another aspect, Swiecki (2017) find that deterministic roles of different forces vary across economies with different level of development. Differences in productivity across sectors play a more important role in developed countries. Meanwhile, income elasticity is more deterministic in developing countries.

1.2. Models of the informal sector and formal-informal dynamics

Above models of structural change document a relatively clear picture of labor allocation as well as productivity across economic sectors to some extent during the development process. However, they do not provide implications for different segments of the labor market as well as their laborers in terms of income. Therefore, we discuss here models of the labor market in developing countries and their dynamics during the process. These models provide us with implications for different stages of the labor market and the relative positions of laborers in terms of income in different segments.

Since pioneering works of Lewis (1954) and Kuznets (1955), it is regarded as a proposition that the labor market in developing countries includes sub-sectors with different characteristics. Indeed, we have two objects here as discussed in the introduction, the sectors, and the laborers. In terms of laborers, wage and working conditions are two critical criteria for distinguishing sub-sectors (Fields, 2007; Cling, Razafindrakoto and Roubaud, 2017). Meanwhile, the level of associations with the state is often a criterion for differentiating the sectors. Indeed, there is a possibility of more than two sub-sectors in the labor market of a developing country. However, modelers often characterize them into two distinct sub-sectors. This characterization

is useful to understand the labor market in developing countries, while it is not too complicated to be modeled.

Typically, there is one advantageous sector with better wage and working conditions, and another is opposite. The two sectors have been called with different names (Fields, 2004b, 2007). In the current chapter, we use the terms “formal” and “informal” for them.

There are a number of reasons documented in the literature for the existence of multi-sectors in developing countries (see La Porta and Shleifer, 2014; Maloney and Chanduvi, 2007; Fields, 2004a, 2007 for summaries). The traditional view of Lewis (1954) and Harris and Todaro (1970) and their followers implies that the informal sector is a result of segmentation in labor markets. Put differently, it is a natural phenomenon of existing multi-sectors in developing countries given their low level of development. As productivity is low, the sector can only cover a low labor cost. Workers in the informal sector are often paid less as well as excluded from non-wage benefits. Therefore, the lower labor cost is the main reason for the existence of the informal sector. The difference in the labor cost raises a question of competition between the two sectors that the informal sector would have an advantage and dominate the formal one in long-term (La Porta and Shleifer, 2014). Meanwhile, the development trajectory depicts the opposite. Indeed, the two sectors serve different markets (La Porta and Shleifer, 2014). The informal sector mainly provides goods and services for people with income from the sector and *vice versa*.

Meanwhile, De Soto (1989) (cited in Maloney and Chanduvi, 2007) argues that over-regulations restrict small firms from registration or joining the formal sector. Business entities in the two sectors have comparable characteristics. However, a proportion of business entities are absent from registration as they view that regulations and costs imposed by the state are higher than benefits of registration. A recently emerging view is that the informal sector is a selective one that income and benefits of laborers from working in the informal sector are as good as what they would receive if they work in the formal sector but they would like to work in the former (Maloney and Chanduvi, 2007).

Under the view of workers, it is conventionally accepted that a majority of workers commonly prefers employments in the formal sector. However, the limitation of employments in the sector restricts workers from being recruited. Meanwhile, unemployment is expensive in the developing countries, they cannot sustain for a long period without working. Consequently, they shall take all available jobs which are not as good as those in the formal sector and that constitute the informal sector (Fields, 2007). Meanwhile, the selective view of the informal

sector is often applied for self-employers who can indeed work as wage workers in the formal sector.

1.2.1. Models of the informal sector

As discussed in previous paragraphs, it is widely believed that in developing countries the informal sector is the disadvantageous one. It is easy to enter with a low cost, and it acts as the last choice for laborers. However, there is a parallel view that the informal sector is the preferable one which provides benefits as comparable as the formal one does. Consequently, it is a cost and benefit exercise of economic entities to be formalized or not (Maloney and Chanduvi, 2007). As a result, a combination view is that the informal sector has its own multi-subsectors. This classification is heavily borrowed from Fields (2004a, 2007).

Traditional models

Under these views, it is easy to enter the informal sector with a very low cost or skill requirements. Anyone needs a job; he or she can find it, either as a self-employer or as a wage worker. For self-employment, an only small investment is required to produce goods or services to sell. However, the job is often unsecured and provides low income. This model of the informal sector is prevalent among early models of the informal sector such as Lewis and its extensions of Harris and Todaro (1970). One supplement reason for the existence of the sector is that unemployment is expensive in developing countries (Fields, 2007).

This model of the informal sector is quite intuitive as we can observe in daily life. However, one critical question is that how the income is set in this class of models. Based on assumptions of the marginal productivity of labor in the sector, there are three views of how income is determined.

The first view is that the size of the market, and its total income, is fixed. That means a new entrant entering the informal sector in the given community would decrease the income of the existing laborers. For example, the demand for moto taxi is fixed; a new driver entering the market would share the demand with the existing ones. Under this view, the marginal product of labor is zero or very small that the laborers in the sector share the fixed total income. This is a typical feature of the Lewis model. As a consequence, the wage in the model is set by income-sharing mechanism that the total income is shared among laborers in the sector, regardless of the number of laborers.

The second view is the constant marginal productivity of labor. A typical model with this assumption is the Harris-Todaro model. For example, every farmer who wants to cultivate can find a plot of land and his/her marginal product is the same as other laborers who already do.

The assumption of this approach is too specific for some contexts where supplemental resources, land in this instance, are proportionately higher than the labor supply to the informal sector.

The third view is the mixed between the two above discussed ones. The marginal productivity of labor is not zero but diminishing. Let assume that demand for fruits from street vendors depends on the convenience of buying, if more laborers work as street vendors selling fruits, the demand would increase. However, the association between an increase in availability and demand is not one to one. The demand increase is lower than the increase in the number of street vendors. Therefore, the marginal productivity of the newly entering laborer does not equal the average productivity, or it is diminishing. Under this view, the income of laborers still follows the sharing mechanism. A newly entering laborer in the informal sector shall reduce the average income of existing ones.

Given three views, the supply of labor and demand for products from the informal sector as well as availability of other resources determine the marginal productivity of labor and income of laborers in the informal sector. Consequently, conditions can change over time. Therefore, the wage in the informal sector may fall into one of these alternative views at different points in time.

There is somewhat inconsistency between the zero marginal productivity-income sharing and constant wage in the informal sector as stated in Lewis's class of models. The income-sharing mechanism implies that when some workers move from the informal sector to the formal sector, the remaining ones would have a higher income given there is no unemployment. Put differently, the wage is not constant. This is indeed a reason for the end of the unlimited supply of labor to the formal sector or the turning point under the Lewis model.

The informal sector as a selective one

There is an opposing view that the informal sector is a selective one. In this case, people select to work in the informal sector given that they can find jobs in the formal one. This view has a long history (Fields, 2007) and recently more formalized by Perry et al. (2007).

Under this view, benefits are equal in the two sectors. However, as the model is featured by choice of laborers, it may work only for those who are able to have a job in the formal sector if they want to. This is actually limited to only a sub-group of laborers. Besides, the benefits of working in the informal sector include the flexibility of time and independence. These benefits are only available for self-employers, not wage workers. Therefore, this view may be only applicable to self-employers including owners of small businesses. One extreme case as we

discuss later is that if the two sectors are fully integrated, the selective model can be applied for the whole labor market.

A combination view

The third view is that the informal sector has its own multi-subsectors. Under this approach, the informal sector has two poles, one is selective, and another is not which are often mentioned as “upper” and “lower” tiers (Maloney and Chanduvi, 2007). This view is more shared recently by scholars in modeling the informal sector. However, there have not been any clear criteria for distinguishing the two components in the sector. A majority of wage workers belonging to the “lower” tier is a plausible assumption. Meanwhile, it may not be strongly reasonable to assume that all self-employers can be regarded as the upper tier.

Regarding empirical evidence, a study of La Porta and Shleifer (2014) depicts that informality in countries around the world mainly follows the classical models of Lewis (1954) and Harris and Todaro (1970) instead of one of De Soto (1989). Unfortunately, La Porta and Shleifer did not consider the combination view of the informal sector. The study of La Porta and Shleifer is based on a large sample of countries. Therefore, the results are correct for the general case. Meanwhile, Maloney and Chanduvi (2007) report evidence of the selective model among self-employers in a number of Latin American economies.

1.2.2. Interlinks between the sectors and their dynamics

We now turn to links between the two sectors. The links between the two sectors allow us to learn about the dynamics in the labor market under the economic development process. There are a number of stylized models for associations between the two sectors with different assumptions. One again, we distinguish the models by following Fields (2004a, 2007). We only discuss the two typical ones.

Multi-sector Models with Wage Differentials and no Unemployment

This class of models includes a number of specific models with different assumptions and specifications, but they share common features of wage differentials between the two sectors and no unemployment. The wage is assumed to be higher in the formal sector. Another assumption is that laborers who cannot find jobs in the formal sector shall take their employment in the informal one. Consequently, there is no unemployment in the class of models.

Lewis model is a flagship one of this class of models. Under the model, workers are assumed to prefer to work in the formal sector that means it has the labor supply of the whole labor force.

Initially, the sector only absorbs a proportion of the labor supply. Therefore, it can recruit more workers without an increase in the wage or has “an effectively unlimited supply of labor” (Fields, 2004b).

When capital accumulation and economic growth occur, the formal sector expands and can recruit more workers without an increase in the wage. However, the supply of labor to the sector is not unlimited. It shall reach a milestone named “turning point” that the sector has to increase wage if it wants to recruit more. The wage in the informal sector also rises as well.

Models with Wage Differentials and Unemployment: The Harris-Todaro model

Under this model, there are two statuses of having employment and unemployment. Therefore, laborers fall into one of three types of employment/status: formal and informal employment in the urban and rural areas respectively, and unemployment.

Another assumption of the model is that there is location segregation. The formal sector exists only in the urban area, and the informal sector only locates in the rural area. Therefore, if a worker looks for a job in the formal sector, he or she has to stay in the urban area. However, he or she exposes to a risk of unemployment. Meanwhile, workers in the rural area only have the opportunity of working in the informal sector with free entry.

As shown in Fields (2004a, 2007), the wage in the formal sector, W_F , is set at the point that equals the marginal productivity of labor as the case of the competitive labor market. The wage in the informal sector, W_I , is depended on the labor supply and demand in the sector but below that in the formal sector.

Under equilibrium, the expected wages in the two sectors are equal, as $\overline{W}_F \frac{E_F}{L_F} = \overline{W}_I$

Where E_F and L_F are employment and labor supply in the formal sector respectively. As the wage in the formal sector is higher than that in the informal sector, $E_F < L_F$ or unemployment exists. It should be noted that unemployment only exists in the urban area.

2. Existing evidence of structural change in Vietnam’s labor market

We now turn to review empirical findings of structural change in Vietnam with two angles of economic and institutional sectors as well as selective features depicted by theoretical models. We also discuss findings of underlying factors as causes of structural change and who are more likely involvements in movements.

Given the transition context of Vietnam’s economy as well as its labor market as briefly discussed in the introduction. There has been a number of studies documented the

transformation process as well as its related aspects including who are more likely to involve in transitions and outcomes. In this section, we shall highlight structural change in the labor market from existing studies. Let recall that we use the terms non-farm household businesses (HHBs) and the informal sector are used interchangeably; it is also the case for formal enterprises and the formal sector.

Agricultural employment decline

Decline in agricultural employment has been well documented in various papers (Cling, et al. 2012; McCraig and Pacvnick, 2017). In 8 years, from 1998 to 2006, the share of employment in the agricultural sector declined by 17 percentage points, from 65% to 48% (Cling et al., 2012). Meanwhile, the proportion of employment in the manufacturing sector increased from 8% in 1990 to 14% in 2008 (McCraig and Pacvnick, 2017). These figures imply that Vietnam have experienced a period of remarkable changes in employment structure across economic sectors. However, the changes were slowing down in the period 2007-2012. Oudin et al. (2013) use data from the LFS in 2007-2012 to estimate allocation of labor across sectors and find that the shares of employment in different sectors only slightly changed in the period.

More employment in the formal sector

In terms of institutions, the share of employment¹⁰ in household businesses (HHBs) also decreased, from 86% in 2002 to 81% in 2008 (McCraig and Pacvnick, 2015)¹¹. For the period of 1998-2006, employment in the formal sector excluding the public sector has been more than doubled from 1.5 million in 1998 to 3.6 million in 2006 (Cling et al, 2012). However, declines in the shares of employment in HHBs are uneven across economic sectors. The most decrease is observed in the manufacturing sector. A significant decrease in the share of HHBs is also found in transport, or communication (McCraig and Pacvnick, 2017). Meanwhile, the share of employment in HHBs in agriculture, business services does not change. The change is further observed in the period 2007-2012 with the share of employment in FDI and domestic private enterprises as well formal household business increased from 15% in 2007 to 21% in 2012 (Oudin et al, 2013).

In general, changes of employment in HHBs are induced by two channels, movement of laborers between institutions within economic sectors or industries and movements of laborers across economic sectors or industries with different share of employment in household

¹⁰ As presented in the introduction, we use the terms of household businesses and the informal sector alternatively as we define the informal sector covers all non-farm household businesses.

¹¹ Household businesses in this study include agricultural ones.

businesses. With decomposition exercise, McCaig and Pavcnik (2015) finds that a half decline in the share of employment in HHBs is attributed to the decline of the share within industries and another half is accounted by movements of laborers between industries caused by the different shares of HHBs across industries in the first half of 2000s in Vietnam. However, with the situation of a little change across industries and economic sectors since 2007 as noted above, the decline in employment in HHBs has been mainly driven by movement within economic sectors.

However, the patterns have not the same across locations with different levels of urbanization. Therefore, Cling et al. (2012) classify different locations across the country into 4 groups, namely Urban Hanoi and Ho Chi Minh City (HCMC), Other urban areas, Rural Hanoi and HCMC and other rural areas. This classification reveals differences in patterns of structural change across locations as their various levels of urbanization.

Moving out of agriculture is confirmed in all four areas, but the destinations of moving are different across areas. The unique highest receiving destination is formal enterprises; this is observed for all areas. Meanwhile, the increase in employment in non-farm HHBs varied across areas. It is observed that employment of household business has shrank in the inner areas of the large cities of Hanoi and HCMC and its share seems to be stable in the other urban areas. Meanwhile, its share is impressively increased in the rural area of the large cities. The increase is also observed in the other rural areas but with a slower pace. In generally, the weight of non-farm HHBs reduces at the whole economy level.

One interesting finding of Cling et al. (2012) is that the increase of non-farm HHBs follows an inverted U-shape. The number of this type of jobs has been slightly declined in urban Hanoi and HCMC. Whereas, it has increased in all other areas with different paces. Shape increases were observed for the rural areas of both Hanoi and HCMC and other areas but the increase rate was much lower for the other urban areas.

On another aspect, Sarma, Saumik and Guanghua (2017) report differences in labors' income across regions in Vietnam in the period of 2002-2010. They find that the difference is attributed heterogeneities in levels of industrialization and accessibility to sea-ports.

These initial findings indicate that there are multi-stages of Vietnam's labor market. Urban Hanoi and HCMC has been relatively advance with a gradual decline of the informal sector. Meanwhile, the rural areas have been still in another side of the U-Sharpe with prediction of increases of the informal sector in the near future. This feature should be captured more precisely with more updated data.

Existence of dualism in the informal sector

Evidence reveals that the informal sector in Vietnam has its own dualism. However, it is not clear as circumstances in other developing economies. Nguyen, Nordman and Roubaud (2013), carefully estimate income gaps between two types of employments in the informal sector and wage employment in the formal sector. Their conclusion is that the exclusion hypothesis of the informal sector in Vietnam is not clear. Put differently, there is the case that male wage workers can earn higher in the informal sector than their counterparts in the formal sector. Meanwhile, a better income of self-employer may be consistent with the exit hypothesis. These results imply that integration of Vietnam labor market is higher than its level of development or segmentation of the two sectors is weak (Nguyen, Nordman and Roubaud, 2013).

However, indirect evidence of a more recent period indicates that the raw income gaps, of which productive characteristics are not controlled for, between formal and informal sector were widened in the period 2009-2012. Increases in wages of wage workers in both formal and informal HHBs have been below the GDP growth rate (Oudin et al, 2013). This result may indicate that more segregation has been emerged in Vietnam's labor market and the models of dualism may be more effective in reflecting the market in the recent period.

Lewis turning point have not been reached

In another aspect, Yamada (2017) compare the marginal productivity of labor and the wage to investigate whether Vietnam have reached the Lewis turing's point. As the wage is still lower than the marginal productivity of labor, he concludes that Vietnam has not reached the turning point. However, we may have to links with the argument of multi-stages across areas of Vietnam's labor market, there is a possibility that some locations have reached the turning point and other has not. This stage also implies that increase of income of labor in the informal sector would be lower than that of their counterparts in the formal sector.

What are reasons under these changes?

It is clear that reforms under Doi Moi have been main reasons for structural change in Vietnam. McCraig and Pavcnik (2017) discussed selected reforms in agriculture, enterprise and international integration. Reforms in agriculture increased productivity in the sector. The authors also note that there is no paper formally investigate role of increase on productivity in agriculture as "push" side of movements of laborers out of agriculture. However, there is a possibility that the increase in the productivity in the sector already resulted in agricultural

output surpassed the subsistence level of food security that has allowed laborers to move out of the sector without effects on the main objective of production of the sector.

On another aspect, reforms in the enterprise sector play as “pull” side of movement of laborers out of agriculture sector. The reform in the enterprise sector has had two aspects that have facilitated the “push” side of labor movement out of the agricultural sector. Firstly, it has increased the productivity gap between the agriculture and the enterprise sector. Secondly, the expansion of the enterprise sector has increased its demand for labor.

Meanwhile, the international integration can also positively affect the movements of laborer out of the agriculture sector as the composition of trade has changed. The agricultural products have loosened its importance in the export of Vietnam. Meanwhile, exports of labor-intensive manufactured products such as textile and garment, footwear have increased considerably overtime.

Looking at production side of the economy, Dang et al. (2016) also finds a similar picture of structural change in the manufacturing sector. The expansion of the manufacturing has been led by labor intensive industries of textile, garment, leather and footwear.

Using the Social Accounting Matrix in Dang et al. (2016) allows the authors to track the sources of structural change which are changes in the final demand. The changes in the final demand itself is caused by the integration in the international economy and changes in the domestic demand. Demand of food is reduced with increase in demand for higher value goods. In the change in the domestic demand, the urbanization process also plays a role. Meanwhile, the role of technology change is minor. This is evidence of role of changes in demand for structure change as discussed in the theoretical section.

Indeed, the result of Cling et al. (2012) also indicates a strong association between the urbanization process and changes in employment composition. Urbanization plays an important role in growth of the informal sector. If urbanization at the high level such as urban Hanoi and HCMC, the informal sector has declined. Rapid urbanization of rural Hanoi and HCMC also resulted in a tremendous decrease in share of employment in agricultural sector, compared with that in the other rural areas.

Labor’s outcome of structural change

One question is that who is benefited from the structure changes and how they benefit. Yamada (2017) finds that all population has been benefitted from the economic growth in the period 1993--2014. The bottom deciles (10 and 20) have been a little bit less benefitted but the disadvantage is not large. However, the trend has not been unique over time.

Hoang, Pham, and Ulubasoglu (2014) report that involvements in non-farm activities have positive impacts on poverty reduction in 2002-2008. However, the role of non-farm employment has reduced over time. This result may be explained by the fact that when there are fewer poor households, common factors such as employment or education reduce their roles. Reasons of poverty status of the remaining households are heterogeneous and out of employment dimension such as shocks or no employment resource at all.

Comparing welfare of households of diversified versus non-diversified to non-farm activities, Kinghan and Newman (2017) find that the former is better off than the latter in terms of expenditure per capita. In addition, if the household have an own business, the level of better off is higher than the average of diversified households. Transition from agriculture to non-farm self-employment activities results in 13% increase in welfare. Expenditure per capital of households with transition to wage employment increase by 15%. Meanwhile, transition both to non-farm self-employment and wage employment increase the welfare of households by 23%.

The evidence implies that benefits of structural change in Vietnam have been inclusive and involvements in non-farm activities and wage employment have been resulted in better off, compared with only participation in agricultural production. Indeed, a result of a decomposition exercise depicted by Figure 1 in Packard and Nguyen (2014) indicates that income from wage is the main component of income source for poverty reduction in Vietnam in the period of 2004-2010¹².

Who are more likely to involve in structural change

One important question is characteristics of laborers and their household related to moving out of agriculture, Kinghan and Newman (2017) find that initial income and income shocks are strongly related to the transition process. Households with lower income in the initial as well as experiences of income shocks are found to have higher probability of moving out of specialized in agriculture. Wealth of households, meanwhile, does not relate to the probability of transition. Demographic characteristics of household head does not relate to transition but the ethnicity. However, the problem of such kinds of regression is that the initial employment including who are already specialized in non-farm and wage businesses are already determined by other characteristics of households¹³.

¹² A small share of non-farm activity in poverty reduction in their result is explained by already-low poverty rate of households having non-farm activities as well as low rate of movement to non-farm activities.

¹³ The dependent take one if a household move from pure agriculture production to different types of combination and 0 otherwise.

McCaig and Pavcnik (2015) documents characteristics of laborers who are more likely to work in the formal sector as well as who have higher probability of moving from the informal sector to the formal one. They find that age play important roles in determining both stages of working as well as moving to the formal sector. Younger workers have higher probabilities in both phenomenon. Meanwhile, education, male and living in urban areas are positively associated with probabilities of moving to the formal sector.

The demographic change in Vietnam may play a role in the structure changes in the labor market. The replacement of young workers with higher share of working in the manufacturing and service sectors to the old workers who mainly work in the agriculture sector shall result in the structure change in terms of industries. However, the result of McCraig and Pavcnik (2017) exhibits that the structure change within cohorts accounts for 80% of the total change in the period of 1999-2009. Therefore, the demographic changes only play a small role in the change.

As implied by model of Banerjee and Newman (1993), lack of capital may restrict households in selecting the best type of employment for them. Results of Sarma, Saumik and Guanghai (2017) indicate that the movement from agriculture to manufacturing sectors is most prevalence for the middle income group. Consistently, Hoang, Pham, and Ulubasoglu (2014) find that engagement in non-farm activities required a certain amount of endowments and the poorest households are hard to access this type of employment.

Existing literature have documented a number of features of structural change in Vietnam. A significant movement of laborers out of agricultural sector and a parallel process of formalization have been observed. These processes have not only induced by young laborers who have newly entered the labor market but also by ones in older cohorts. Inclusion of older laborers could be also a reason for the inclusiveness of benefit incidence of the growing process of Vietnam. McCraig and Pavcnik (2017) discussed a number of reforms as underling forces for structural change. Meanwhile, Dang et al. (2016) quantified sources of structural change in demand side. Findings of current existing papers also imply that the process is ongoing and Vietnam has not reached the critical Lewis turning point.

However, a number of aspects of structural change and dynamic features of non-farm Household Businesses in comparison with the agricultural sector and the formal sector in Vietnam, especially since 2010 have not been investigated. In detail, the chapter aims at addressing: (1) how about the changes since 2010 as the current study main used data before 2010; (2) links with marco-economic growth and demographic changes; (3) spatial differences in terms of structural change (4) detail outcomes of laborers in different economic and institutional sectors during structural change process (5) productivity of corresponding sectors.

3. Data and specifications

To answer questions as noted in the end of Section 2, the paper mainly employs data from Vietnam Living Standards Surveys (VLSS) in 1993 and 1998 and Vietnam Household Living Standard Surveys (VHLSS) 2002-2016. In addition, population data from GSO and other secondary data are used.

We use the whole country and provincial population data from GSO occasionally to correct for a number of estimations. Specifically, incremental of population aged 15-65 over year and labor distribution across areas are corrected with data from provincial population data.

Data of VHLSS and VHLSS is detailed in the introduction, in this section we discuss our specifications of types of employment and different areas of the country that we would like to disaggregate. Representativeness and comparability of VLSS and VHLSS overtime is then investigated.

Employment classification

Besides the sector classification as noted in Section 1.1, we also specify employments into 7 different types. This classification take into account both institutional sector and employment status and allows us to learn in detail about structural change of not only economic and institutional sectors but also employment status within sectors.

1- Self-employment in agriculture: laborers work for their own households in the agricultural sector.

2- Non-farm self-employment: laborers work on their own HHBs including formal enterprises¹⁴ without receiving wages in non-farm activities.

3- Wage employment in agriculture: including both for other households and formal enterprises.

4- Wage employment in non-farm activities for other households.

5- Wage employment in non-farm activities for the formal sector (the enterprise sector excluding SOEs).

6- Wage employment in non-farm activities for SOEs.

7- Wage employment for the administrative system, communist party and social organizations.

¹⁴ Indeed, self-employment for formal enterprises accounts for a very small proportion of this type. Therefore, this category mainly covers self-employers for household businesses.

The formal sector includes domestic private enterprises which operate under the enterprise law and FDI ones, in some case including the State owned Enterprises (SOE), the two names of the formal sector or formal enterprises are alternatively used. Meanwhile, non-farm self-employment and wage employment in non-farm activities for other households constitute HHBs or the informal sector under our categorizations.

Area classification

As our focus is to investigate structural change in Vietnam under urbanization process, a proper measure of level of urbanization for different locations of the country is needed. However, we do not have such measure. Therefore, we groups locations into 4 categories of urban Hanoi and HCMC, rural Hanoi and HCMC, other urban areas and other rural areas. This classification roughly captures different stages of urbanization across locations. We use official administrative classification of urban and rural areas which is available in surveys of GSO in the classification. The official classification may not well truly reflect the reality (Cling et al, 2012), but the official classification is only available information for our study.

Another problem is changes in the urban status of locations overtime. Vietnam has experienced a rapid urbanization process. Therefore, the grouping of areas into four areas basing on rural-urban classification at the times of surveys cannot secure the same location within a group overtimes. For example, a commune of a province rather than Hanoi or HCMC were belong to rural areas in 1993 but were classified as an urban area in 1998. Therefore, it was belonged to the other rural areas in 1993 but classified as the other urban areas in 1998.

Ideally, initial groups of locations should be secured over the whole period of 1993-2016, that means some areas which were initially regarded as rural areas in 1993 should be still kept their rural status for the whole period. For example, Quarter 7 of HCMC (was initially belonged to Nha Be Rural District, but separated to be the urban Quarter 7 in 1997) or Cau Giay Quarter of Hanoi (was initially belonged to Tu Liem Rural District, and separated to be the urban Cau Giay Quarter in 1997) should be still regarded as Rural of Hanoi and Ho Chi Minh during the period. However, accessible information of the survey does not allow us to do that. Therefore, we have to use the rural-urban classification at the times of surveys for grouping.

Representativeness and Comparability of different rounds of VLSS and VHLSS

In principal, both VLSS and VHLSS represent the population of Vietnam at the times of collecting data. Households (VLSS 1998 and VHLSSs) are randomly selected in the surveys with unequal probabilities. Consequently, weights are used to make surveys are nationally representative. In each round, weights (for VLSS 1998 and VHLSSs) are updated to ensure that the data of the

survey are representative in principal. However, procedure of updating the weights has not secured the representativeness of the data for the whole population.

Procedures of selection of households included in surveys are different between VLSS and VHLSS. Households were directly selected in VLSS. Meanwhile, VHLSS follows stratified sampling procedures. Furthermore, sample of VHLSS is not selected directly from the population censuses but from a frame named the master sampling frame which in turn is based on the nearest population censuses. This is fixed for whole periods between the two population censuses.

In each round of VHLSS, population of enumeration areas is updated and weights of each household are calculated from the updated population of enumeration areas only (Phung and Nguyen, 2007). That means VHLSS representing the master sampling frame itself rather than the whole population. Given this fact, rounds of VHLSS between the two population censuses are comparable. However, there a potentiality of incomparability across rounds with changes in the master sampling frame. Therefore, there is the potentiality of incomparability between VLSS 1998 and VHLSS 2002 or VHLSS 2008 and VHLSS 2010.

In 2008, Ha Tay province was merged with Hanoi. Therefore, since VHLSS 2010, the sample of Hanoi includes both old Hanoi and Ha Tay. To ensure the comparability of the areas as much as possible, we still separate Ha Tay from Hanoi for the period of 2010-2016. Consequently, the urban/rural areas of Hanoi only cover the old one consistently.

4. Structural change in Vietnam's labor market since 1993

In this section, we briefly analyze population and economic growth of Vietnam since Doi Moi as the backdrop for the labor market. Then, employing data from VLSS 1993, 1998 and VHLSS 2002-2016, we aim at drawing a synthesized picture of structural change in the labor market since 1993 under the marco-economic condition and urbanization perspectives. Different dimensions of the labor market such as types of employment, income dynamics are investigated.

4.1. Population and Economic Growth of Vietnam since Doi moi

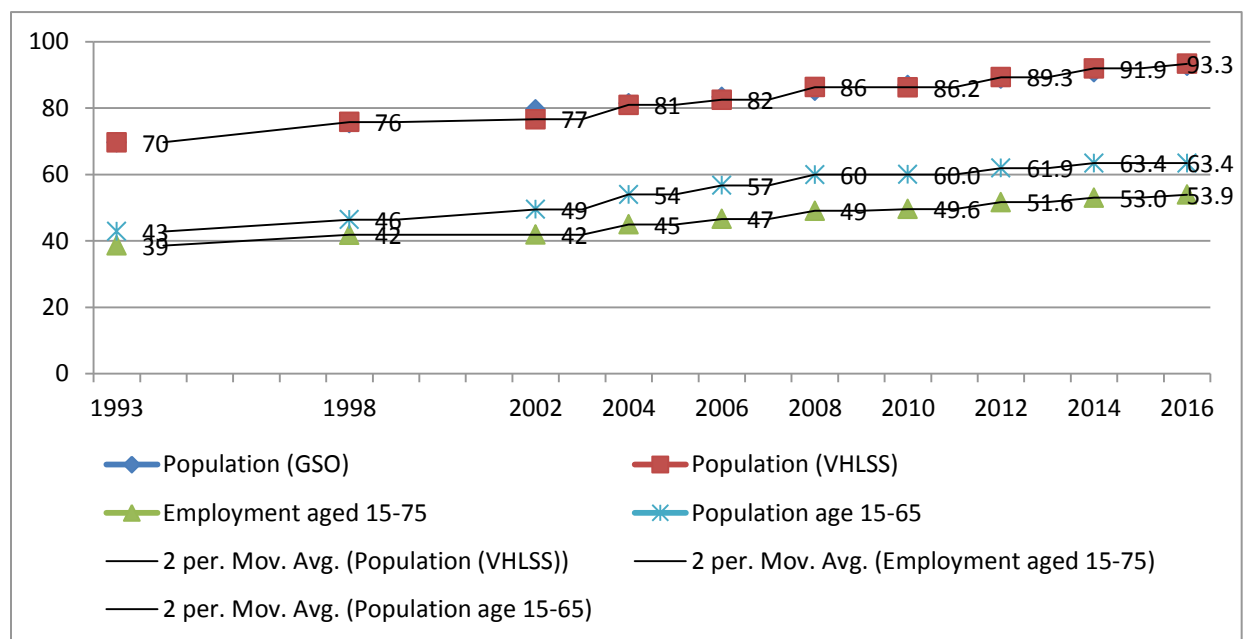
As discussed in Section 3, there are a number of micro-forces inducing structural change. Furthermore, these determinants are mainly investigated in a long-term perspective. However, there are also macro-circumstances which potentially influence the structural change process. In this sub-section, we discuss two factors of the demographic trend and the economic growth

of Vietnam since 1993 to facilitate analyzing their possible associations with structural change in the labor market.

4.1.1. Incremental of population and employment in Vietnam

Vietnam entered Doi Moi with a significantly increasing trend in the population. On average, the population increased by about 1 million per year in the period of 1993-2016. The increase in the population put a strong pressure of job creation on the economy. Indeed, the population growth rate has declined over time, from nearly 2% per year in early 1990s to almost 1% since 2010. However, as the population already increased, the absolute increase has not been as small as the relative term indicates.

Figure 1-1: Population and employment growth of Vietnam 1993-2016 (million)



Source: Author’s estimation from VLSS 1993, 1998; VHLSS 2002-2016 and GSO.

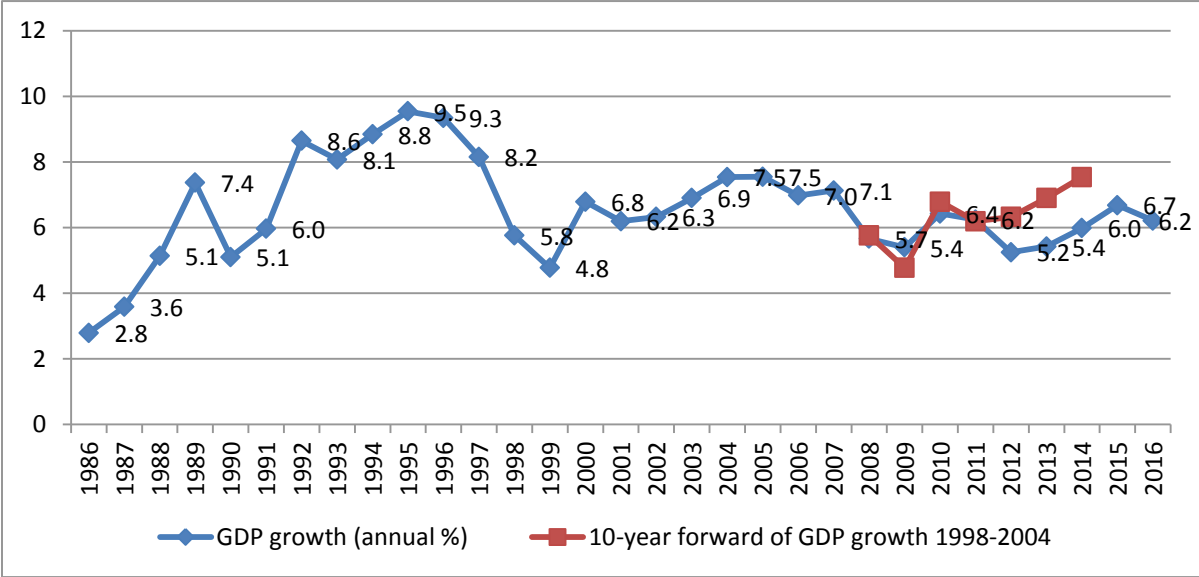
Increases in the whole population and selectively aged groups are presented in Figure 1-1. All figures are estimated from VLSS (1998) and VHLSSs adjusted with official population data from GSO. Figures for 1993 are estimated with an assumption that age structure of the population of this year is the same as that in 1998. In general, differences between the population estimated from VLSS and VHLSSs and population data of GSO ranges from 0.35 to 1.2 million, except the year 2002. In 2002, the population estimated from VHLSS is about 3 million lower than that from GSO. Therefore, except the year 2002, figures estimated from VLSS and VHLSSs for the whole population as well as selectively aged groups and total employment are acceptable.

Indeed, the direct pressure on the labor market has come from the increase in the working age population, normally 15-65, and the labor force participation rate in some extent. Since 1993, the increase of population aged 15-65 has been also 1 million on average. However, the increase has not smoothed over time. In the period 1993-1998, the increase was about 0.7 million per year. Starting with an increase of 1.3 million per year in 1998-2002, the increase of the working age population accelerated and reached the peak of 1.5 million per year in the 2004-2006 period and then has been slowing down. The average increase in the period 2006-2008 was about 1 million per year. Especially, there was almost no increase of the working age group between 2014 and 2016.

Given this pattern of increase in the working age population, Vietnam’s economy has faced with the two processes at the same time, creating new employment and structural change. However, pressure of the former has considerably reduced since 2010.

4.1.2. Economic growth

Figure 1-2: GDP growth rate of Vietnam 1986-2016 (%)



Source: World Bank indicators.

Since Doi Moi in 1986, Vietnam has achieved a significant economic growth with an average of 6.5% for the period of 1986-2016. However, the growth has not been smooth as depicted in Figure 1-2. It seems that Vietnam has faced a 10-year cycle of growth. Put differently, growth has been lower for the end-of-decade years. Indeed, the slowing down in growth in 1998-1999 and 2008-2009 was significantly affected by international crises. Another feature is that the recovery in the growth of following decades has not been as good as the previous ones. The

average growth rates for 1990-1999, 2000-2009 and 2010-2016 were 7.5%, 6.6% and 6.0% respectively. In a more difficult circumstance, the latest slowing down since 2008 has not been fully recovered although there has been no year with the growth rate of less than 5%. Given this context, it is predicted that changes in the labor market of Vietnam have been also not smooth over the study period.

It is noticeable that the population and the economy in Vietnam have similar paces of change over time. In the period before 2010, we have both a considerable increase in the working age population and the relatively good economic growth. Meanwhile, they have both declined since 2010. We shall demonstrate these favorable circumstances for analyzing co-movements between structural change and the two forces in following sections.

4.2. Structural change in Vietnam labor market

4.2.1. Economic and institutional sectors

We now turn to changes in employment structure of the economy, starting with the conventional division of three economic sectors of agriculture, manufacturing and construction (hereafter referred to as manufacturing for short) and services. Besides, we separate two additional sectors of mining, and water supply and garbage collection activities. However, the two sectors accounted for only less than 1% of total employment at all times. Therefore, we concentrate on the three main economic sectors only.

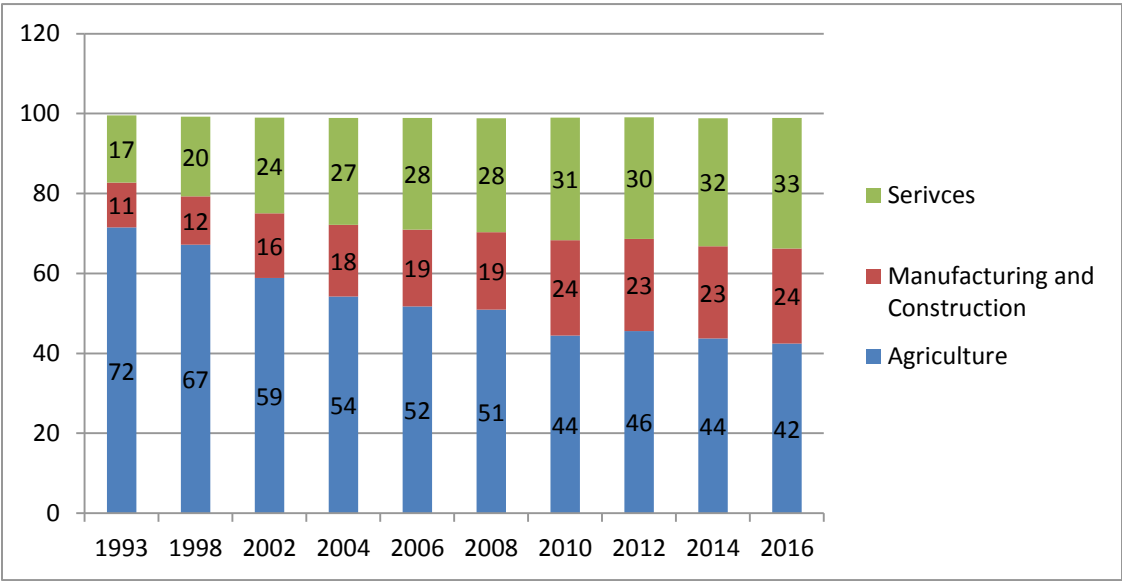
A significant reduction in agricultural employment in favor of both manufacturing and services

Employment shares of the three sectors overtime are given in Figure 1-3. There was a significant decline of 29 percentage points in the share of the agricultural sector after 23 years. The decline is not only observed in the relative term but also in the absolute term. Compared with 1993¹⁵, employment in the agricultural sector declined by 4.7 million in 2016, given that number of laborers in the economy increased by 15.3 million in the period. However, the decrease was mainly witnessed for the period before 2010. There was a struggle in 2010-2012 when the share of the agricultural employment increased. A modest decline in the agricultural employment was observed again in 2012-2016.

¹⁵ We do not have information of total employment in 1993 indeed. Employment in 1993 is estimated with an assumption that proportion of employment to the total population is unchanged between 1993 and 1998. Employment in 1993 equal population in 1993 multiplies by the proportion of employment to the total population in 1998. Furthermore, employment of specific sectors equals their proportions in the total employment.

Employment of the service and manufacturing sectors has expanded to compensate for the decline of the agricultural employment. The employment shares of the two sectors were both doubled in the 1993-2016 period. However, the patterns of change of the two sectors were not the same. Although both sectors' employment shares significantly increased before 2010, the main increase in the share of the manufacturing sector is observed in periods of changes in the master sampling frames of VLSS and VHLSSs, between 1998-2002 and 2008-2010. Meanwhile, the increase in the employment share of the service sector has been smoother. Furthermore, since 2010, the service sector has kept a modest increase but the share of manufacturing has been stable or even declined in several years.

Figure 1-3. Employment share of sectors in Vietnam 1993-2016 (%)



Source: Author's calculation with data from VLSS 1993, 1998 and VHLSS 2002-2016.

We turn to investigating potential co-movements between increase in the working age population, the macro-economic condition and structural change. In general, the macro-economic conditions is more important in terms of determining structural change. This result is consistent with findings of Lee and Wolpin (2006) that the labor supply only plays a minor role in structural change.

The relative importance of the macro-economic condition exhibits via correlations between three dimensions in different sub-periods. Given that the working age population increased significantly and the economic growth was relatively good before 2010, Vietnam also performed well in terms of structural change. Meanwhile, both increase in population and economic growth have been slow down since 2010 and structural change has been also less

impressive. A slower increase in the working age population was indeed favorable for structural change as the labor supply was limited. As predicted by the argument of structural change induced by gaps in productivities across economic sectors, there would be relative expansions of higher productivity sectors of manufacturing and services. However, we do not observe this fact since 2010. Meanwhile, the economic growth has been less impressive since then and its association with slowing in structural change is clearer.

Furthermore, one interesting point is that it seems that the macro-economic condition of ending years, comparing with those of beginning years of specific periods determine structural change in the periods. For example, in the period of 2010-2012, the condition in 2012 was worse than that of 2010 and an increase of the share of agricultural employment was found. This fact reveals that structure change in Vietnam was relatively fragile and significantly depended on short term conditions. This argument is supported for evidence from the period of 2012-2016, when the economic growth has been improved; we witnessed improvements in employment structure with a lower share of agricultural employment.

The role of the population trend seems to be minor to the economic growth. In addition, the long term momentum of structural change was not strong and structural change was quite sensitive to growth performance, especially after 2010. Put differently, structural change in Vietnam has been fragile and short term economic performance has played an important role in determining it.

An increase in wage employment in HHBs

Turning to the employment classification as noted in Section 3, we first look at the share of different types of employment over the period 1993-2016 for the whole economy (Figure 1-4). Actually, we cannot distinguish between wage works in HHBs and those in the formal sector in 1993. We estimate figures for 1993 with an assumption that the proportions of wage employment in the two sectors are the same between 1993 and 1998.

Indeed, our classification includes 7 categories as an effort to see nuances in structural change. However, we focus on two processes: transition between self-employment and wage employment and formalization.

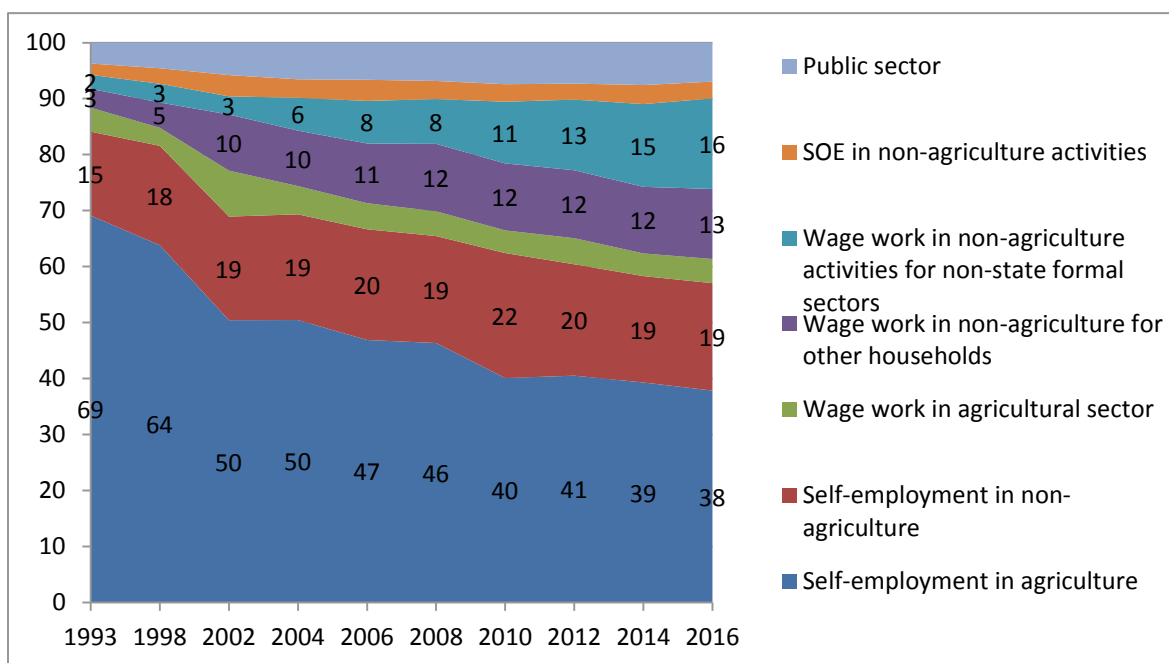
The decline in agricultural employment as revealed in the previous section was mainly compensated by wage employment in non-farm activities. In 18 years, the number of wage employment in non-farm activities increased from 6.4 million in 1998 to 20.8 million in 2016. This increase offset 86.6% of total decline of agricultural employment, the remaining was filled up by increase in the non-farm self-employment. In addition, the increase in wage employment

has been quite steady over the whole study period with an only break in the period of 1998-2002.

Formalization is steady

Besides the expansion of employment in the public sector, the share of non-farm employment in the formal sector of private domestic and FDI enterprises has also steadily increased over the study period. Starting with a small share of 2.4% in 1993, this type of employment accounted for 16.2% in 2016 and became the third largest employment provider. Furthermore, the process has been stable overtime that fluctuations in the macro-economic condition have only slightly affected the expansion of this type of employment.

Figure 1-4. Shares of different types of employments in Vietnam’s labor market 1998-2016 (%)



Source: Author’s calculation with data from VLSS 1993, 1998 and VHLSS 2002-2016.

Changes in composition of expansion of wage employment after 2010

Within non-farm wage employment, contributors change over time. Before 2010, all three types of wage employment, in non-farm HHBs, in formal enterprises and in administration system contributed to the increase in this type of employment. Whereas, formal enterprises have been only the main contributor for the expansion since 2010. This trend is a good indicator for modernization of the labor market. However, the speed of expansion of the sector is still somewhat not higher than that of the previous period.

Meanwhile, almost no expansion of wage employment in HHBs as well as a decline in non-farm self-employment since 2010 possibly implies that employment in non-farm HHBs already reached its highest share and was likely to start reducing. However, this also could be the case of counter-cyclicality as pointed out by Fiess, Fugazza and Maloney (2010). Under this circumstance, the number of self-employers declines in economic slowdown periods when opportunities of micro non-farm activities collapse. Indeed, an increase in the share of non-farm self-employer in Hanoi and HCMC in the period of 2014-16 as analyzed later seems to support the second phenomenon.

Before 2010, the process of structural change closely followed stylized facts found in other developing countries as well as predictions by theoretical models. We can observe the decline in agricultural employment and the expansion of non-farm employment in both formal and informal sectors. Whereas, the share of employment in the informal sector, especially self-employment, has reduced since 2010. This could be the case of counter-cyclicality as discussed above. In addition, the pro-cyclicality behavior can be also the reason for the slowdown in decline of agricultural employment since 2010. In an economic slowing down period, opportunities in micro non-farm activities collapse, laborers continue in or come back to agricultural production. In 2014-2016, when the economy boosted again, they transformed or came back to non-farm activities. This proposition is supported by the fact that employment in the agricultural sector declined again in the period of 2014-2016.

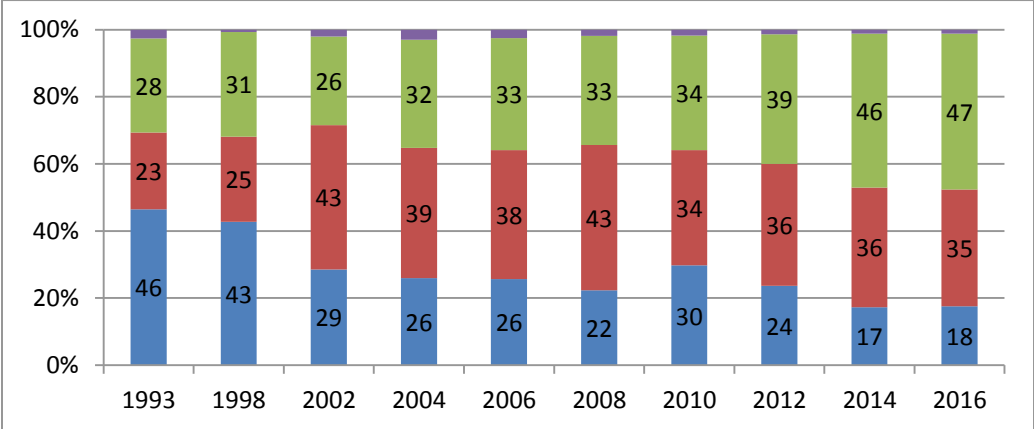
The fluctuations in shares of employment in the agricultural sector and HHBs since 2010 imply that the long-term momentums of employment changes in these sectors have reduced and the short-term effect of macro-economic conditions has increased its role.

A cross cutting between economic sectors and employment types

As noted in the previous section, the increases in wage employment as well as formalization are steady in Vietnam' labor market. These processes are induced by two parallel changes, movements across as well as changes within economic sectors. In the first section, we investigate employment structural change across the three economic sectors. We now investigate changes within the sectors in terms of employment types. Indeed, employment types in the agriculture sector have not changed much over time with domination of self-employment which has consistently accounted for about 90% of total employment. Therefore, we focus on two sectors of manufacturing and services of which distribution of employment types are given in Figure 1-5 and Figure 1-6 respectively.

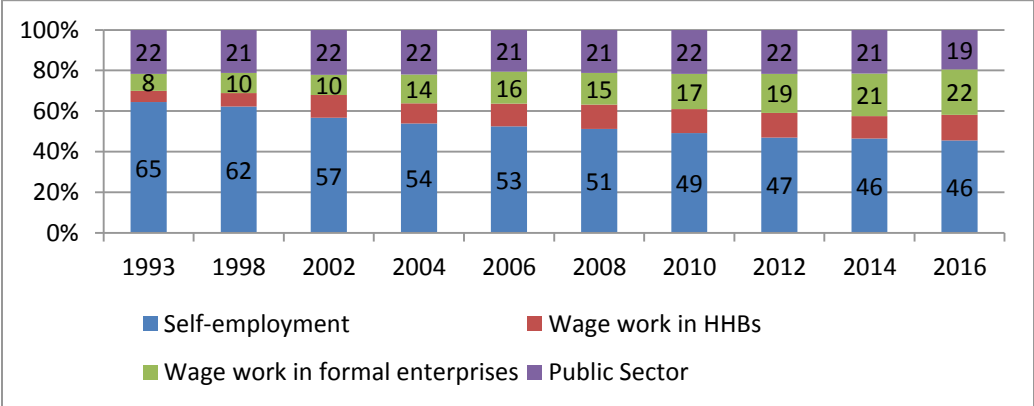
The two economic sectors exhibit different employment compositions. Self-employment is prevalent in the service sector and wage employment in HHBs accounts for a small fraction. Meanwhile, self-employment has only accounted for a less than one-third in the manufacturing sector since 2002 and wage employment in HHBs has accounted for a significant proportion. This fact implies that size of HHBs in the manufacturing sector has been larger than that in the service one. Furthermore, wage employment in formal enterprises also accounted for a much higher proportion in the former sector.

Figure 1-5. Distribution of employment types- manufacturing sector (%)



Source: Authors’ calculation with data from VLSS 1998 and VHLSS 2002-2016

Figure 1-6. Distribution of employment types- service sector (%)



Source: Author’s calculation with data from VLSS 1998 and VHLSS 2002-2016.

In terms of dynamics, there were common patterns of changes in employment statuses of the two sectors, with reductions in self-employment and increases in wage employment in formal enterprises. However, there were also differences between the two sectors. The share of wage employment in HHBs of the manufacturing sector has fluctuated over time with a decreasing trend. Meanwhile, the share of this kind of employment has been stable in the service sector.

Furthermore, the speed of formalization in the former sector has been much than that of the latter.

The faster formalization process of the manufacturing sector is explained by its characteristics that technology and capital play relative important roles in the sector. Higher productivity in formal enterprises outpaces domination of HHBs and this type of business entities collapses. In addition, the relatively standardized production in the manufacturing sector, compared with that in the service sector, makes it easier to replace labor by capital. This characteristic enhances the higher productivity of formal enterprises as they have advantage in capital.

The slowing formalization process in the service sector is caused by the fact that the sector comprises of large trading sub-sectors with low-technology of which individuals as service providers in the form of self-employer dominate. In addition, it is more difficult to replace labor by capital in the sector and this fact reduces a relative advantage of formal enterprises in terms of capital.

Aggregating all sectors in terms of formalization, it was not as impressive as structure change across economic sectors as discussed above. The share of employment in formal enterprises in the agricultural sector has been unchanged. Meanwhile, the modest share of the manufacturing sector as well as its unchanged since 2010 have resulted in limitation of formalization caused by sectoral compositions. Furthermore, the formalization of the service sector has not been as fast as expected.

As analyzed above, increase in share of employment in formal enterprises are induced by both changes in the compositions of economic sectors and changes in the shares of employment in formal enterprises within sectors. We conduct a decomposition exercise to evaluate contribution of each process to formalization of the Vietnam's labor market. The objective indicator is the share of employment working in formal enterprises and the state sector. Sectors include the three main ones and the two of mining and water supply. It should be recalled that the two additional sectors account for less than 1% of total employment. Therefore, their role is very minor.

The decomposition exercise is given as follow:

Let denote S_{it} as employment share of sector i at time t and F_{it} as share of employment in the formal sector of the sector.

$$\text{We have: } F_t = \sum_{i=1}^5 S_{it} F_{it} \quad (1)$$

Therefore, change in share of employment in formal sector between time 1 and 0 can be decomposed into three components of:

$$F_1 - F_0 = \sum_{i=1}^5 S_{0i}(F_{1i} - F_{0i}) + \sum_{i=1}^5 F_{0i}(S_{1i} - S_{0i}) + \sum_{i=1}^5 (F_{1i} - F_{0i})(S_{1i} - S_{0i}) \quad (2)$$

The first component is the change in the share of employment in formal enterprises within sectors given employment the shares of economic sectors unchanged or changes within sectors. The second component is the change caused by changes in the shares of employment of economic sectors given their shares of employment in formal enterprises unchanged or changes in composition of economic sectors. The third component is caused by interaction between changes in both processes.

For the whole period of 1998-2016 (Table 1-1), structure change of employment across economic sectors mainly contributed to the increase in employment in formal enterprises and the state sector. This fact is understandable that Vietnam the manufacturing sector which has the highest share of employment in formal enterprises accounted for a humble share in total employment at the beginning of the period. However, the contribution of formalization within sectors is also not neglectable. Nearly 30% of the increase in the share of employment in formal enterprises and the state sector was attributed for this process.

Table 1-1. Decomposition of increase in employment in the formal sector

Periods	Share at the beginning (%)	Share at the end (%)	Changes in shares (%)	Contribution of changing within sectors (%)	Contribution of changing in sector composition (%)	Interaction (%)
1998-2002	11.3	13.6	2.3	-0.2	2.6	-0.2
2002-2008	13.6	18.5	5.0	2.1	2.5	0.4
2008-2010	18.5	21.7	3.2	0.9	2.1	0.1
2010-2016	21.7	26.4	4.7	3.8	0.8	0.0
1998-2016	11.3	26.4	15.1	4.3	7.9	2.9

Source: Author's calculation with data from VLSS 1998 and VHLSS 2002, 2008, 2010, 2016 and GSO.

However, the relative contributions of two processes have not been the same in all sub-periods. Indeed, for the sub-period of 2002-2008 with the same master sampling frame, contribution of the formalization within sectors was comparable with the change in composition of economic sectors. Furthermore, the former process absolutely dominated the latter process in 2010-2016. Good performance of formalization within sectors helped the overall formalization in this sub-period as comparable as other sub-periods given the change in the sectoral composition was slowing down. However, the question is how sustainable of the process. Looking at the relatively low proportions of employment in formal enterprises and the

state sector of the manufacturing and services, it is reasonable to expect that the formalization process in the two sectors does not stop or even slowing down in the near future, especially in the service sector. However, if employment in the agricultural sector still accounts for a large share, the process is harder in the future as well as there is be a boundary of employment in formal enterprises as the share of this type of employment in the agricultural sector has been almost no change.

4.2.2. Urbanization process

We have looked at employment allocation across sectors as well as changes within sectors, we now move to on a different aspect of structural change, the urbanization process.

Table 1-2 provides employment shares of different areas overtime. Indeed, original figures calculated from VHLSS and VLSS depicts inconsistencies, especially between 1998 and 2002. Therefore, figures for these years are corrected by population of each area from GSO. Figures of employment in each area are estimated as population from GSO multiplied by proportions of employment to population estimated from VLSS 1998 and VHLSS 2002.

Table 1-2. Employment shares of different areas (%)

Areas	1993	1998	2002	2008	2010	2016
Urban HN and HCMC	5.5	7.0	7.2	7.7	8.1	8.6
Rural HN and HCMC	2.7	2.8	2.9	2.5	2.6	2.8
Other Urban	13.7	14.8	16.3	17.7	19.3	21.1
Other Rural	78.0	75.4	73.5	72.1	70.0	67.6

Source: Author's calculation with data from VLSS 1993, 1998 and VHLSS 2002, 2008, 2010, 2016 and GSO.

In parallel with structural change within each area, there has witnessed a process of urbanization of the country. After 23 years, from 1993 to 2016, the absolute share of employment in urban areas increased about 10.5 percentage points. However, as the share of urban areas was quite low in 1993, two-third of laborers in Vietnam still resided in rural areas in 2016. Therefore, Vietnam has not graduated from an agrarian economy (Packard and Nguyen, 2014)¹⁶. In addition, the process has been relatively smooth overtime that means there was no break in the process. As a result, it is rationale to predict that the process continues in the

¹⁶ The report of Packard and Nguyen (2014) introduce a threshold of less than 60% of population living in the rural area as a criterion for an economy to pass the agrarian status.

future but it takes time for Vietnam to reach a mile stone of less than 60% of people living in the rural area to pass the agrarian status¹⁷.

Looking at contribution of each urban area, it is understandable that the other urban areas accounted for a majority of increase in proportion of the urban area in the absolute term. However, the proportion of Hanoi and HCMC in the total urban employment in Vietnam has been still kept stable, at about 29%. This fact implies that Vietnam has not solved the problem of concentration in the two cities and the other urban areas have not got rid of their roles as administrative capitals of provinces or districts.

A decomposition of contributors to structural change

It is the same as the case of formalization that the overall structural change in employment is attributed to two processes, structural change within each area and changes in employment composition across areas as depicted in Table 1-2. Therefore, one question is contribution of each process to the overall change in structure. This question can be answered by a simple decomposition exercise which is similar to (2). We conduct the exercise for the share of employment in the agricultural sector.

Let denote S_{it} as share of employment of area i at time t and A_{it} as share of agricultural employment in total employment of the area.

Change in the agricultural share between time 1 and 0 can be decomposed into three components of:

$$A_1 - A_0 = \sum_{i=1}^4 S_{0i}(A_{1i} - A_{0i}) + \sum_{i=1}^4 A_{0i}(S_{1i} - S_{0i}) + \sum_{i=1}^4 (A_{1i} - A_{0i})(S_{1i} - S_{0i}) \quad (3)$$

The first component is the change in shares of agricultural employment within areas given their shares in the total employment unchanged, the second component is the change caused by change in shares in the total employment of different areas given their shares of agricultural employment unchanged and the third is caused by interaction between two changes. The result of the exercise is given in Table 1-3.

Generally, the main contributor of decline in the share of agricultural employment was the change in the shares within areas. For the whole period of 1993-2016, changes within areas contributed 84.8% of the total decline or 79% if we exclude interaction effects. However, the story is the same for all sub-periods. In the period of 2010-2016, the contribution of the change

¹⁷ Of course, the employment share may be different from the population share because of the employment rates are potentially different between the urban and rural areas. It is assumed that the two shares are the same. With speed of change between 2010-2016, it takes Vietnam 28 years since 2016 to reach the threshold of 60% population living in the rural area.

in employment shares of different areas surpassed the contribution of changes within areas. As the urbanization process has been relatively steady over the whole period, the contribution of the process has been stable over time. Therefore, the contribution of changes within areas determines both the level of structural change and the relative contribution of two factors. Among three sub-periods under investigation in Table 1-3, the change within areas was poor in the period 2010-2016. This fact resulted in the lowest decline in overall agricultural employment and also the relatively higher contribution of the change between areas in the period.

Table 1-3. Contribution of different factors to changes in the agricultural employment

Periods	Share at the beginning (%)	Share at the end (%)	Changes in shares (%)	Contribution of changing within areas (%)	Contribution of changing in area composition (%)	Contribution of Interaction (%)
1993-1998	71.4	67.0	-4.4	69.1	33.7	-2.8
2002-2008	59.0	50.8	-8.2	78.8	23.1	-1.9
2010-2016	44.1	42.2	-2.0	48.0	52.7	-0.7
1993-2016	71.4	42.2	-29.2	84.6	22.3	-6.9

Source: Author's calculation with data from VLSS 1993, 1998 and VHLSS 2002, 2008, 2010, 2016

4.3. Structural change within areas

We are now moving to specific structural change of each area. Shares of different types of employment over years of each area are provided in Appendix 1-1.

4.3.1. Urban Hanoi and Ho Chi Minh

For urban Hanoi and HCMC, the main process was formalization. In 1998, HHBs accounted for 56% of total employment in the area; meanwhile its share was 40% in 2016. Expansion of wage employment in the non-state formal sector, including both FDI and domestic private enterprises filled the reduction of employment in non-farm HHBs.

However, the reduction of employment in HHBs has not been smooth and irreversible overtime. There were two breaks with huge reductions, between 2002-2004 and 2008-2010. In these periods, the share of this type of employment reduced by 7.0% and 8.6% respectively. The breaking decrease of this type of employment in 2002-2004 period may be caused by the came into force of the enterprise law in 2000, which good HHBs changed their status to enterprises. Whereas, the drop in the 2008-2010 period is harder to be explained as macro-economic conditions were unfavorable in the period. Indeed, counter- cyclicity behavior is a candidate causing that large drop in the share. However, there was also a change in the master

sampling frames of VHLSS in the period which is also a potential reason for the breaking reduction of this type of employment.

Meanwhile, it was witnessed of an increase in the share of employment in HHBs in the period 2004-2008 as well as resurgence in 2016. Looking at macro-economic conditions, we may find a coincidence. Macro-economic conditions of both periods were relatively good although the GDP growth rate in 2016 was a little low but the recovery trend in GDP growth of the economy has started since 2015. These are evidence of existence of pro-and counter-cyclicity behaviors of self-employers (Fiess, Fugazza and Maloney, 2010).

4.3.2. Rural Hanoi and Ho Chi Minh

The structure of employment of the area exhibited a radical change. The share of agricultural employment significantly dropped, from 61.3% in 1993 to 17.3% in 2016. This is a clear consequence of the urbanization process. Agricultural land has been transformed to be residential or non-farm production land. Meanwhile, employment availability in non-farm activities increased. Both of these processes have facilitated the transformation from agricultural employment to non-farm employment.

The more interesting phenomenon is the share of employment in HHBs and that in formal enterprises. The general trend for employment in HHBs is that its share reached a peak sometime around 2006-2010 and the decreasing trend has been observed for following years although it might be up or down in specific years. The trend after 2010 was somewhat coincidence with that of the urban area in terms of directions of variances.

Furthermore, since 2006, the decrease of agricultural employment has been slow and the continuity of expansion of the formal sector was mainly at expense of employment in non-farm HHBs. Therefore, starting with a small number of 5.6% in 1998, the proportion of employment in the formal sector reached 40.3% in 2014 which surpassed those in HHBs of 32.1%. However, the situation changed in 2016 that the proportion of the latter took back its domination to the former. The small sample of the area raises a question of reliability of the results but it seems that the behavior of self-employers in the sector also follows the model of pro- and counter-cyclicity.

Starting with an outdated structure in 1993, compared with that of the other urban areas, the rapid structure change in the area has led to its outperformance- indicated by proportion of employment in the formal sector- to the other urban areas since 2002. The radical change in the rural Hanoi and HCMC was caused by its links to the urban Hanoi and HCMC. One factor

was that firms in urban Hanoi and HCMC have moved its production factories to peripheral areas as well as firms in other locations might also re-located closely to urban Hanoi and HCMC.

4.3.3. Other urban areas

This area exhibited the least structural change among four areas. The change in share of non-farm self-employers was modest. There were a significant drop between 1998 and 2002 and then a period of modest decline of this kind of employment in the area. The modest decline overtime of this kind of employment would have been explained by the less availability of employment in domestic private and FDI enterprises in the area. It is the fact that a majority of the other urban areas is capital of provinces or districts and their main function is to serve as administrative capitals as well as distributional hubs for provinces or districts but not production hubs. This fact would have been also a potential explanation for slow reduction in agricultural employment in the area, there was only 6% declined in the agricultural employment in the area in the period of 1998-2016.

One restriction for increase in income of self-employers in the other urban areas would have been structure of labor's market in the area. The opportunity of employment in the formal sector in the area was limited, in compared with those in urban and rural Hanoi and HCMC. In addition, lands for agricultural production were also scale in the area. Therefore, self-employment as well as wage employment in HHBs accounted for a significant proportion and were stable over years. Meanwhile, the market would have been restrictive by the locations. Consequently, competition of this type of employment would have been quite high in the area, in compared with those in rural Hanoi and HCMC.

There has been no clear link between macro-economic conditions and the share of non-farm self-employers in the area. It seems that the share of non-farm self-employers in total employment has followed prediction in conventional models that the share decline over time when the economy grows. The fluctuations in macro-economic conditions have not affected the decline. However, the share of employment in HHBs including wage employment fluctuated with a clear drop in the period 2010-2014. The difference implies that macro-economic conditions would have affected size of HHBs instead of their number.

The role as administrative capitals of the other urban area would has been also a reason for the only modest proportion of employment in the formal sector of the area. Since 2002, the proportion of this type of employment to total employment in rural Hanoi and HCMC has been higher than that in the area. The proportion in the former area was double to that in the latter area since 2012. Although, the story in 2016 was somewhat reverse for rural Hanoi and HCMC

area but its outperformance in terms of expansion of employment in the formal sector to the other urban areas is undeniable.

Another difference between the area and urban Hanoi and HCMC was the role of employment in the administrative system. The decline in employments in HHBs in urban Hanoi and HCMC was compensated by the expansion of employment in the formal enterprises but the increase in employment in the administrative system was the main type for compensation of the decrease in employment in HHBs and agricultural employment in the area in some extent.

Indeed, the difference in structural change in the other urban areas, compared with the whole economy was the decline in self-employment in non-farm activities instead of self-employment in the agricultural sector. The pattern of expansion of wage employment was also the same as the whole economy. In the period before 2010, three types of wage employment in non-farm HHBs, formal sector and administrative system all expanded. Meanwhile, only wage employment in the formal sector has continued to expand after 2010.

4.3.4. Other rural areas

As the area accounts the largest share of population, structural change of the area has significantly affected the trend of the whole economy. Therefore, patterns of structural change of the area were somewhat the same as that of the whole economy. There was a break in structural change in 2010 in the area. A majority of reduction in agricultural employment was observed for the period before 2010. Meanwhile, there has been only about 1% decline in the share of this type of employment in 6 years since 2010. Another feature of reduction in this type of employment in the area was that the reduction mainly happened in the periods of changing master sampling frame. After 17 years (1993-2010), the share of employment in the agricultural sector declined by 27.8 percentage points. Whereas, about 61.2% of the decline happened in 6 years of changes in the master sampling frames, 1998-2002 and 2008-2010.

To offset decline in agricultural employment in the area, HHBs played a critical role. Among 25.4% of decline in the share of agricultural employment in the period 1998-2010, the expansion of HHBs including both self-employment and wage employment compensated 16.2%. However, the role of these types of employment has decreased since 2010.

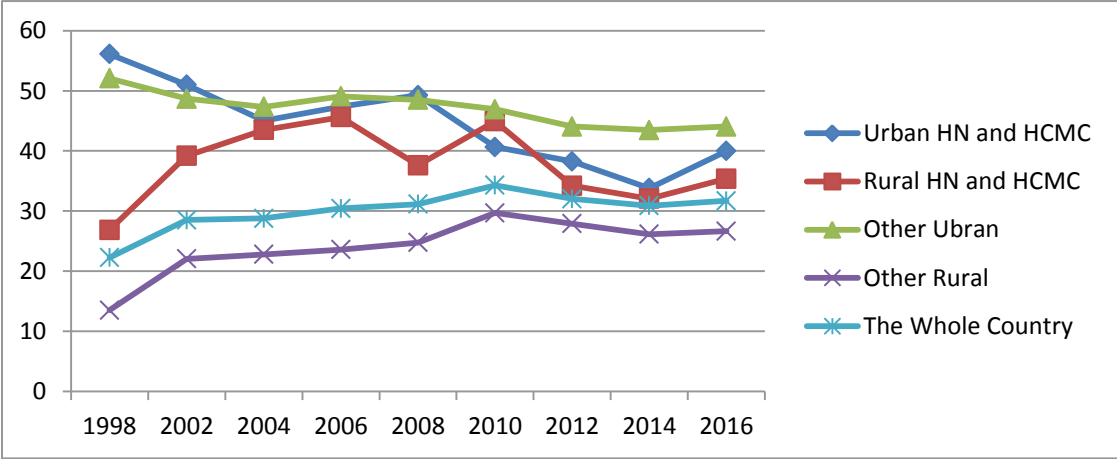
Evidence of pro- and counter-cyclical behaviors of self-employer in the area is not clear. Before 2008, employment in HHBs expanded but the self-employer declined. This could have partially been caused by replacement of family workers by hired workers when family workers could find better wage jobs. Therefore, the decline in non-farm self-employer does not support the pro- cyclical behavior hypothesis. Meanwhile, a clear decline in share of non-farm self-

employer as well as total employment in HHBs in the period of 2010-2014 supports the counter- cyclicity behavior hypothesis. However, the share of employment in the formal sector has been steadily increased in the area. Possibly, the increase in share of employment in the formal sector has been a long term trend of the area and the effects of short-term macro-economic conditions would have been on moving between agricultural employment and non-farm employment in HHBs. In addition, structural change between these two types of employment has followed the conventional model that the share of non-farm employment would have increased if macro-economic conditions were favorable.

4.4. Employment in household businesses

As analyzed in each area, changes in the share of employment in HHBs in general and number of non-farm self-employers in particular are different between Hanoi and HCMC and other areas. Employment in HHBs in the former area had stopped following the conventional models and changed to pro- and counter- cyclicity behaviors. Meanwhile, other areas including both urban and rural ones have still followed the conventional models. We additionally discusses related feature of HHBs. The employment shares of HHBs of different areas as well as the whole economy since 1998 is given in Figure 1-7¹⁸.

Figure 1-7. Employment shares of non-farm household businesses (%)



Source: Author’s calculation with data from VLSS 1998 and VHLSS 2002-2016. Numbers for the figure are provided in Appendix 1-2.

There has been a convergence in the share of employment in HHBs across areas. The share has been declined in Hanoi and HCMC as well in the other urban areas in some extent. But it increased in the other rural areas. The gap was smallest in 2014. However, there as a large

¹⁸ In 1993, salaried employment cannot be distinguished between formal and HHBs.

increase in HHBs in Hanoi and HCMC in 2016. It is explained by the pro-cyclicality behavior of HHBs in 2016. Whereas, the share was almost no change in the other rural areas in 2016.

The question for the other rural areas is that the peak of share of employment in HHBs was relatively low. In the area, the peak reached in 2010 at around 29%. Meanwhile, urban areas including both Hanoi and HCMC and the other urban areas the share reached 50% or higher and rural of Hanoi and HCMC also reached about 45%. The low proportion of employment in HHBs in the other rural areas is more questionable when the agricultural employment of the area was still more than 50% in 2010 and only slightly declined in the following years.

Indeed, it is difficult in evaluating whether the decline in employment in HHBs since 2010 was a long term trend. As noted, the economy has experienced unfavorable macro-conditions since 2008. This slowing down has lasted for a number of years with fluctuations in the GDP growth. This phenomenon can be a reason for the decline which is a short-term circumstance. This argument is supported by stopping of decline of this type of employment in the other urban and rural areas as well as a further decrease of the agricultural employment in 2016. Put differently, the decline trend of employment in HHBs stopped in 2016 when the macro-economic condition was better. Tentatively, it is concluded that the decline in employment in HHBs was a short term fluctuation but it takes time to increase the share of employment in HHBs again.

In sum, before 2010, the different stages in the labor market development across areas well exhibited. The share of employment in HHBs declined in urban areas. The share of this type of employment significantly increased and then fluctuated for rural Hanoi and HCMC. Meanwhile, share of this type of employment continuously increased for the other rural areas. In parallel, agricultural employment has declined in all areas.

Only slight changes in the agricultural employment in the other urban and rural areas since 2010 caused the patterns of changes across types of employment have been somewhat similar across areas, with different magnitudes of variances. Slowing down in agricultural employment reduction and only modest changed across remaining types of employment in the other urban and other rural areas raise concerns about stopping of structural change in Vietnam's labor market. However, it is evident that it is a short term phenomenon.

Results of the decomposition exercise show that structural change of the whole economy was mainly caused by structural change within each area. However, change caused by composition of areas with increase in the share of urban areas has surpassed change within areas since 2010.

Patterns of the shares of employment in HHBs also raise a concern about the future of structural change in the rural area of Vietnam. Inverted U shape of the share of employment in HHBs is already observed for all areas. However, the peak in the rural area was relatively low, at about two-third of that of other areas. The low peak of the share of employment in HHBs is a main constraint for the further reduction in the agricultural employment given the fact that there was no break in expansion of employment in the formal sector in the area.

Employment in agriculture declined significantly in favor of that in both manufacturing and service sectors. However, the process was striking before 2010 only. The share of the manufacturing sector has been almost stable since 2010 and there has been only a modest movement between the agricultural and the service sector.

Expansion of wage employment both in HHBs and formal enterprises were seen before 2010. After 2010, only increase in the latter has been observed with expenses of non-farm self-employment. In addition, the contribution of formalization since 2010 was mainly attributed to formalization within sectors as the decomposition exercise shows.

4.5. Income dynamics

4.5.1. Income dynamics of different types of employment

We now turn to income of different types of employment. We focus on 3 types of employments: self-employment in non-farm activities and two types of wage work in HHBs and formal enterprises.

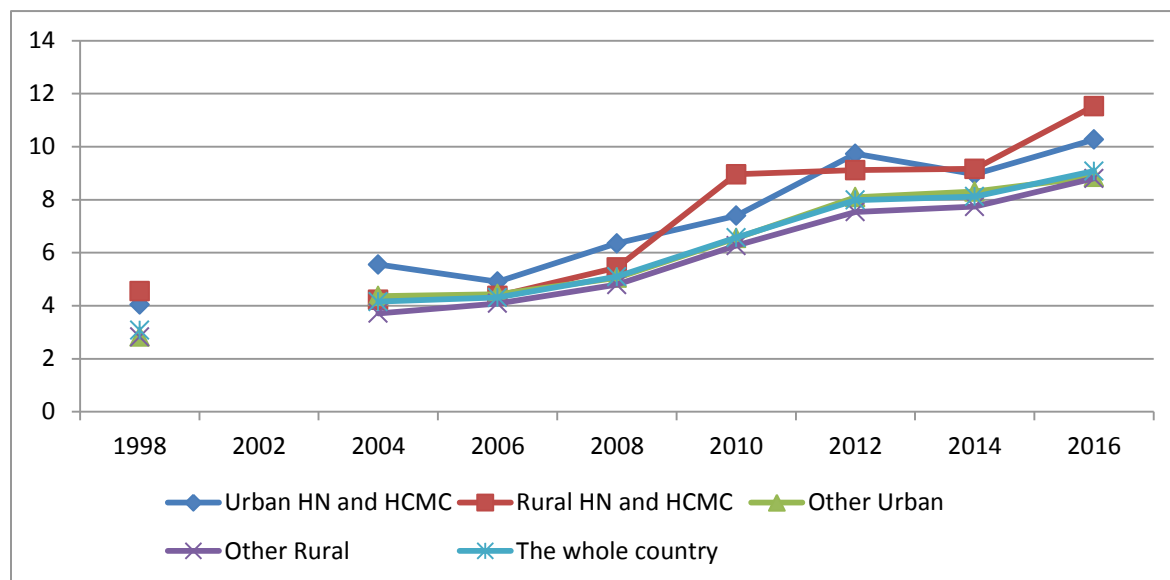
Income of nonfarm self-employers

The increase trends in income of nonfarm self-employers were observed for all areas (Figure 1-8). The increase was relatively smooth, except the period of 2012-2014 with a slowing down. Furthermore, the growth of income of self-employers in the other urban and rural areas was coincident and these areas determined the trend of the whole country. Meanwhile, the growth of income of their counterparts in Hanoi and HCMC, both urban and rural areas exhibited greater variances over years.

The gap – difference in hourly income- between self-employers in the other urban and rural areas and their counterparts in urban Hanoi and HCMC seemed to decrease over time. This implies a convergence across areas in income of laborers of this type of employment. Meanwhile, hourly income of self-employers in rural Hanoi and HCMC has passed their counterparts in the urban area for a couple of years. The decrease in the gaps in income between the self-employers in the other rural and urban areas to their counterparts in urban

Hanoi and HCMC would have possibly caused by the two processes. In Hanoi and HCMC, when the area was modernized; some segments of markets for HHBs would have been competed by the formal sector. Therefore, the market for micro-activities of self-employers collapsed. Meanwhile, in the other rural and urban areas, increase in income of population would have raised demand for non-farm goods and services of micro-activities and it in turn increased the income of self-employers.

Figure 1-8. Hourly income of nonfarm self-employers, (000 VND, January 1998 price)



Source: Author's calculation with data from VLSS 1998 and VHLSS 2004-2016. Numbers for the figure are provided in Appendix 1-2.

However, the increase of hourly income of self-employers in rural Hanoi and HCMC is somewhat hard to be explained. It suddenly increased in 2010 and remained as high as that in urban Hanoi and HCMC. This share of employment in HHBs also extraordinarily increased in 2008-2010. Therefore, we cannot conclude whether these changes happened in reality or caused by changes in the master sampling frame of VHLSS.

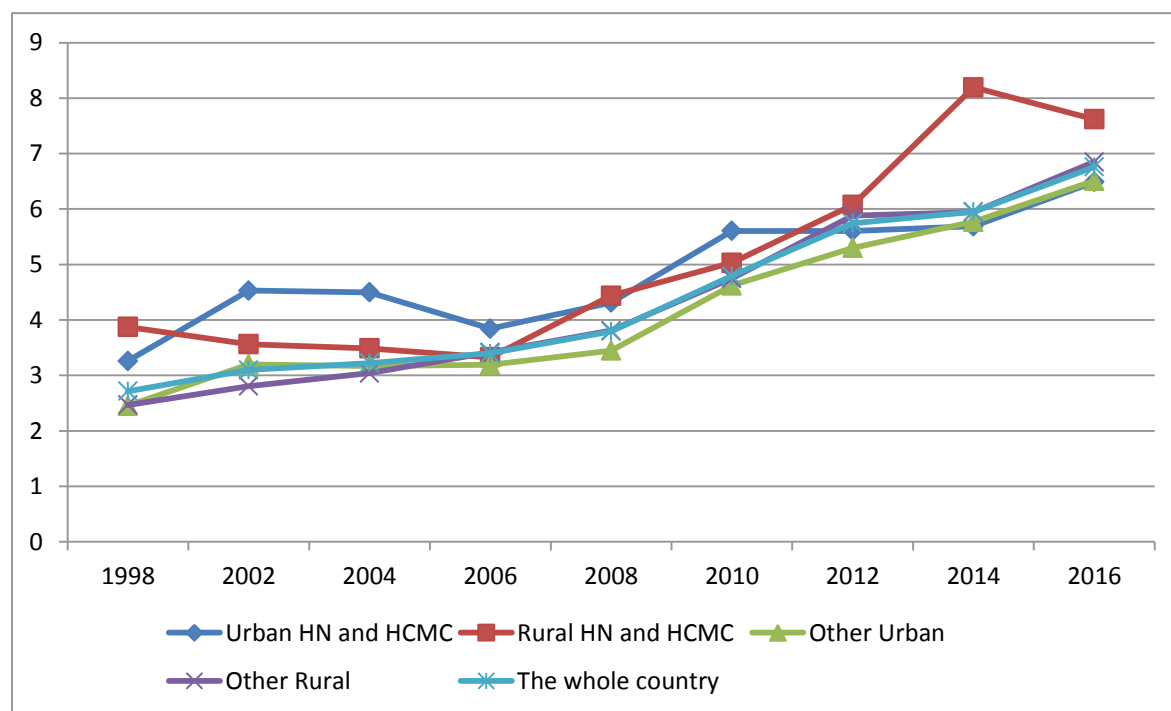
One may argue that the income of self-employers depends on level of urbanization that the income of self-employers in rural Hanoi and HCMC should be lower to that of their counterparts in the other urban areas. Indeed, this fact was observed for the period before 2006. The excess of income of self-employers in rural Hanoi and HCMC to that of their counterpart in the other urban areas since 2008 is an indicator for the higher level of urbanization of rural Hanoi and HCMC than the other urban areas.

Income of wage workers in non-farm household businesses

Income of wage workers in HHBs also depicted a consistent increase trend (Figure 1-9) and again, except rural Hanoi and HCMC, there was a convergence trend across areas. The income gap between the other rural and urban areas was cancelled out in 2006. Meanwhile, income of this type of employment in urban Hanoi and HCMC reduced its gaps to other areas. Since 2012, the income of this type of employment in this area indeed has been slightly lower to those in the other rural areas.

Compared with the case of self-employment in non-farm activities, the convergence of income for wage workers in HHBs was stronger. This fact is understandable that self-employers require specific knowledge as well as capital to set up and survival in the specific markets. Meanwhile, the low skill requirements of this type of employment allow workers were easy to move across areas to cancel out the income gaps.

Figure 1-9. Hourly income of wage workers in nonfarm household businesses, (000 VND, January 1998 price)



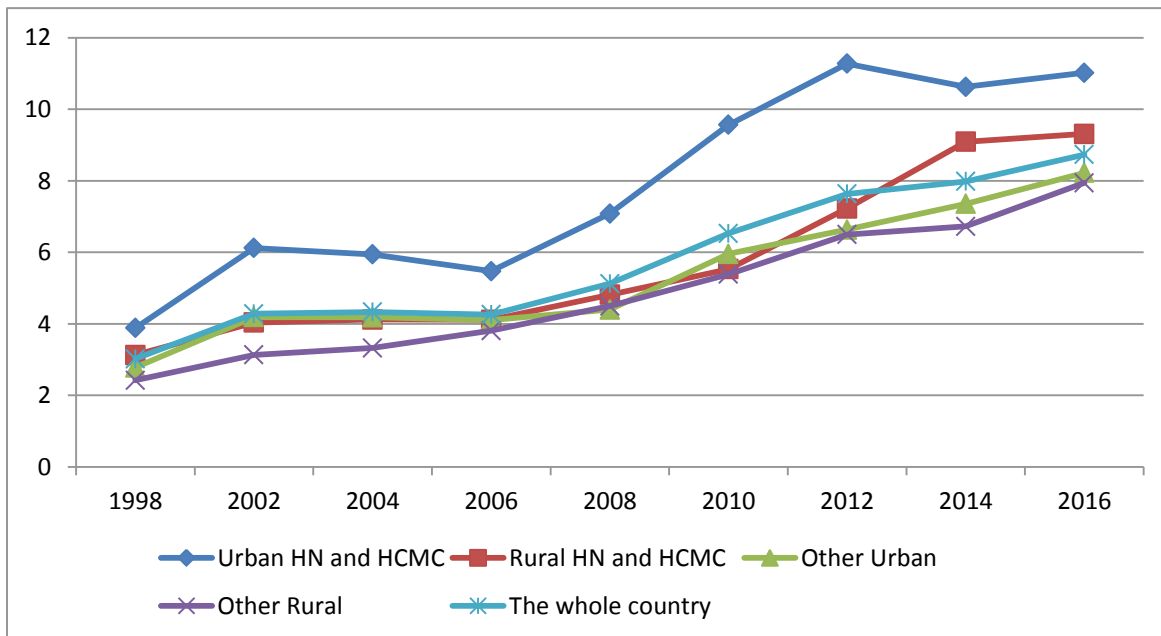
Source: Author's calculation with data from VLSS 1998 and VHLSS 2002-2016. Numbers for the figure are provided in Appendix 1-2.

Income of wage workers in the formal sector

As depicted in Figure 1-10, the gradual increase in the income of wage workers in the formal sector in all areas was also observed. Indeed, there was a stagnation of increase for three areas

of urban and rural Hanoi and HCMC as well as the other urban areas in the period of 2002-2006. This result is hard to be explained given a relatively good economic growth of the economy in the period. Possibly, it is evidence for the prediction by Lewis model that the excessive labor supply to the sector kept wage in the sector stable given increase in the demand. However, an increase in the wage of the sector in the other rural areas did not support this argument as the excessive labor supply should be highest in the area. The reason can be the wage gaps between the formal and informal sectors in different areas. For urban Hanoi and HCMC and the other urban areas, wage workers in HHBs got only about 70-78% of income of their counterparts in the formal sector. But, their counterparts in the other rural areas earned about 90% of that of wage workers in the formal sector. In other words, income of workers in the formal sector in the other rural areas was quite low and no clear distinction with that in the informal sector. Therefore, the former sector had to raise its wage when its labor demand increased.

Figure 1-10. Hourly income of wage workers in the formal sector, (000 VND, January 1998 price)



Source: Author's calculation with data from VLSS 1998 and VHLSS 2002-2016. Numbers for the figure are provided in Appendix 1-2.

Different to the case of employment in HHBs, including both self-employment and wage employment, the gap of income between urban Hanoi and HCMC and other areas were quite large in the formal sector. In addition, there was a divergence between 2006 and 2012. The larger income gap between wage workers in the formal sector in Hanoi and HCMC and their

counterparts in other areas, compared with the cases of employment in non-farm HHBs, are possibly attributed to differences in occupation as well as skills.

One again, there is an emergence of income of this type of employment in the rural area of Hanoi and HCMC. The income of this type of employment in the area has not yet as high as their counterparts in the urban area as the case of employment in HHBs. However, the income gap of workers in the area to their counterparts in the other urban and rural areas has been established since 2012, the same time with the emergence of income for employment in HHBs of the area.

The income gaps between urban Hanoi and HCMC and other areas have been positive in all kinds of employment up to 2012. At 2016, two kinds of non-farm self-employment and wage employment in the formal sector still keep its advantages to their counterparts in other areas. However, the gaps have been narrowed down over time. Indeed, the process of narrowing down is only consistent for the former type of employment. Meanwhile, it only happened for the latter one since 2012. Put differently, there was opposite trends in the income gaps of two types of employments before 2012.

Loosing advantage of non-farm self-employment in HHBs in urban Hanoi and HCMC could be attributed to both modernization of the market in the area as well as migrations or increase in demand of good and services of micro non-farm activities in other areas. Meanwhile, the increase in the income gap of wage workers in the formal sector before 2012 could be attributed to the specialization of the labor market in Hanoi and HCMC. As predicted in the theoretical section, employment in the service sector in Hanoi and HCMC has been expanded. Furthermore, the service sector in the area significantly comprises of high end sub-sectors such as banking and finances or business services, which require highly educated workers. Therefore, the difference in income of wage workers in the formal sector between the urban Hanoi and HCMC to their counterparts in other areas was not only attributed to the location premium but also differences in their skills. Since 2012, it has seemed that workers in urban Hanoi and HCMC relatively lost their domination of skills, compared with the previous period.

There was a small gap in income of laborers between the other urban and rural areas, in all kinds of employment. And the dynamics of gaps are different across types of employments. The income gap of self-employment and wage employment in the formal sector was somewhat persistent and narrow down slowly across the two areas. Meanwhile, the income gap in wage employment in HHBs was quickly filled and even that in the other rural areas surpassed the other urban areas. The higher income in the other rural areas can be attributed to availability of works in the agricultural sector. Laborers have an additional option of working for their own

agricultural activities. This result implies that spatial segmentation in Vietnam labor market has been small and seems to be mitigated over time.

The emergence of rural Hanoi and HCMC is quite interesting. Income of all three types of employment under investigation of the area relatively increased comparing with other areas. Starting with gaps to their counterparts in the urban Hanoi and HCMC, two types of employment in HHBs have successfully caught up since 2010. It is clear that the urbanization process has played the key role.

In short, there have been increases in income of all types of employment under investigation in all areas. The increased were relatively smooth over the whole period. This fact reveals that laborers in Vietnam have been benefitted from the growth process.

Small gaps existed between income of laborers in all types of employments between the other urban and rural areas. Furthermore, the gaps have been narrowed down over time. Even income of wage employment in HHBs in the latter area has surpassed that in the former area.

Convergences in income of laborers across areas were consistently observed for different types of employments but the speed of convergence was not the same. The gaps in income of self-employment and wage employment in the formal sector were persistent and narrow down slowing. Meanwhile, the gap of wage employment in HHBs was filled quickly. The convergences in income of laborers across areas implies that the growth and urbanization process have not resulted in an increase in inequality across different areas of Vietnam.

The case of rural Hanoi and HCMC is quite interesting. All three types of employments under investigation enjoyed significant increases in income. Since 2006, incomes of laborers in the area have been higher than their counterparts in the other urban areas, for all types of employment. This fact implies that the level of urbanization of the rural Hanoi and HCMC has been higher than that of the other urban areas.

4.5.2. Income gaps across types of employment

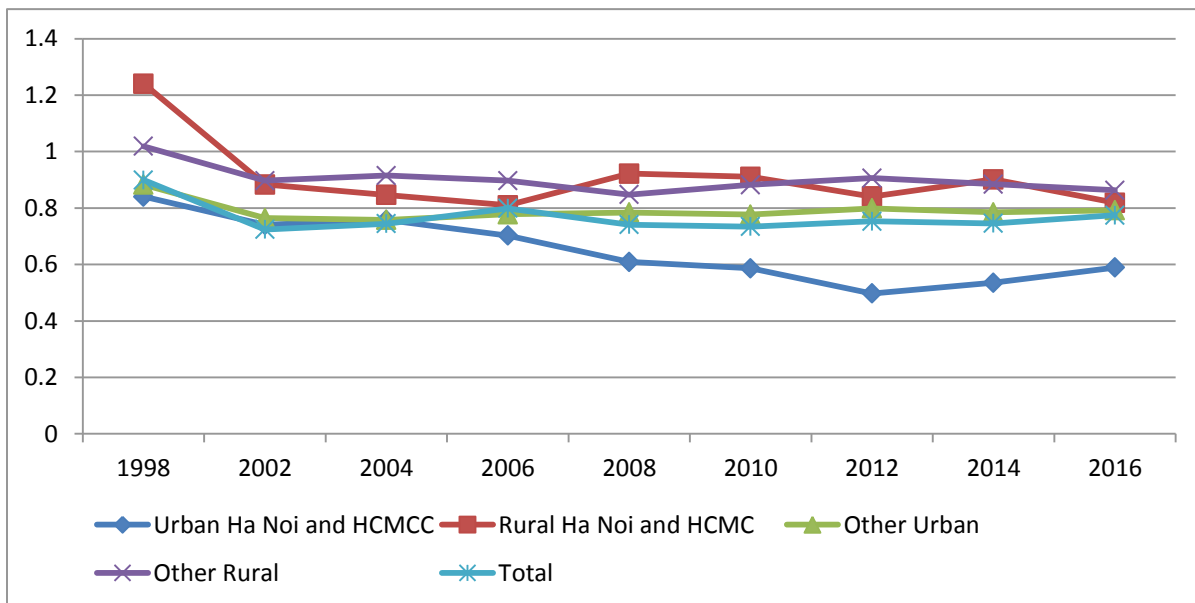
Now we turn to income gaps between different types of employment to see whether predict of theoretical models that the income across types of employment change over time as impacts of productivity change.

Income gap between wage workers in non-farm household businesses and in the formal sector

As shown in Figure 1-11, the gap of income between the two types of employment significantly decreased between 1998 and 2002 or wage workers in HHBs significantly earned less to their

counterparts in the formal sector and then kept stable for the whole country. On average, wage workers in HHBs have earned about 75% to 80% to that of their counterparts in the formal sector since 2002. Furthermore, it reaches 90% in the other rural areas. This gap is much lower than that found in other countries. La Porta and Shleifer (2014) report that wage workers in the informal sector only receive a haft or one-third of that of their counterparts in formal enterprises. Indeed, the informal sector in La Porta and Shleifer cover the agricultural sector as well. However, if we consider only wage workers in the agricultural sector, the workers still earn about 70% of their counterparts in the non-farm formal sector. This result confirms the unclear of exclusion hypothesis in Vietnam labor market argued by Nguyen, Nordman and Roubaud (2013). The stability in gaps overtime is explained by the relative low productivity in the formal sector as well as the productivity gap between the two sectors have not been wider as analyzed latter.

Figure 1-11. Relative hourly income between wage workers in non-farm household businesses and the formal sector



Source: Author’s calculation with data from VLSS 1998 and VHLSS 2002-2016. Numbers for the figure are provided in Appendix 1-2.

Indeed, the change in the gap between 1998 and 2002 can be possibly attributed to the came into force of the enterprise law in 2000 when a number of HHBs changed their status into enterprise one. Therefore, in 1998, employment in HHBs included both good and bad performance ones. After 2000, good performance HHBs changed their status into enterprises and HHBs in 2002 mainly comprised of relatively bad ones. Put differently, performance of the two types of business entities were more apparently separated in 2002 that resulted in more

distinguished in income of their workers. However, the change in the master sampling frame of VHLSS causes difficulties in evaluating the real situation. The consistence in income gap between wage employment in the formal sector and HHBs indicates existence of the segmentations across types of employments within areas and it persists overtime.

The gap was lower in the other rural areas and it was consistent over the study period. This fact is indeed possibly caused by two factors, the levels of development as well as occupations of employments in the two sectors in different areas. About the levels of development, productivity gaps between the formal sector and HHBs are often higher in the urban areas. In addition, the formal sector in the area often comprise of a higher proportion of employment in the service sector with more skilled workers. Therefore, the difference in industry compositions in urban and rural areas also creates a higher income gap.

Different areas exposed different patterns of changes in the gaps over time. For urban Hanoi and HCMC, the gap was wider. In 2012, when the gap was widest, wage worker in HHBs just earn a haft compared with that of their counterparts in the formal sector. Oppositely, the gap was slightly narrowed down in the other urban areas. Meanwhile, it fluctuated without trends in rural area of Hanoi and HCMC as well as the other rural areas.

A recovery in the gap in the 2012-2016 period in urban Hanoi and HCMC was difficult to be explained. However, we may link this fact to three factors: (1) population trend; (2) growth in other areas; and (3) the macro economic conditions. Since 2010, the net increase in the total labor force has been slow down. Therefore, the availability of workers, especially unskilled ones, has decreased. Meanwhile, other areas also developed that resulted in increases in labor demand and they competed with urban Hanoi and HCMC for workers. The third factor was again attributed to pro-cyclicality behaviors of self-employers as discussed above. Increase in self-employers results in increase in demand of wage workers in HHBs in the area.

Why the gap between the two types of employment has significantly increased in urban Hanoi and HCMC but it kept stable for the whole economy. Firstly, we observed a modest narrowing down in the other urban areas that contribute to offset the increase in the gap in urban Hanoi and HCMC. Secondly, changes in relative compositions between the two types of employments across areas also affected the overall gap as it was smaller in the rural areas. In our case, wage employment in HHBs kept its ration to the overall employment but wage employment in the formal sector relatively increased in the rural areas in the study period. So, the rural area accounted for a larger weight and it neutralized the increase in the gap in urban Hanoi and HCMC. Indeed, it is expected that the higher level of urbanization, the higher income gap

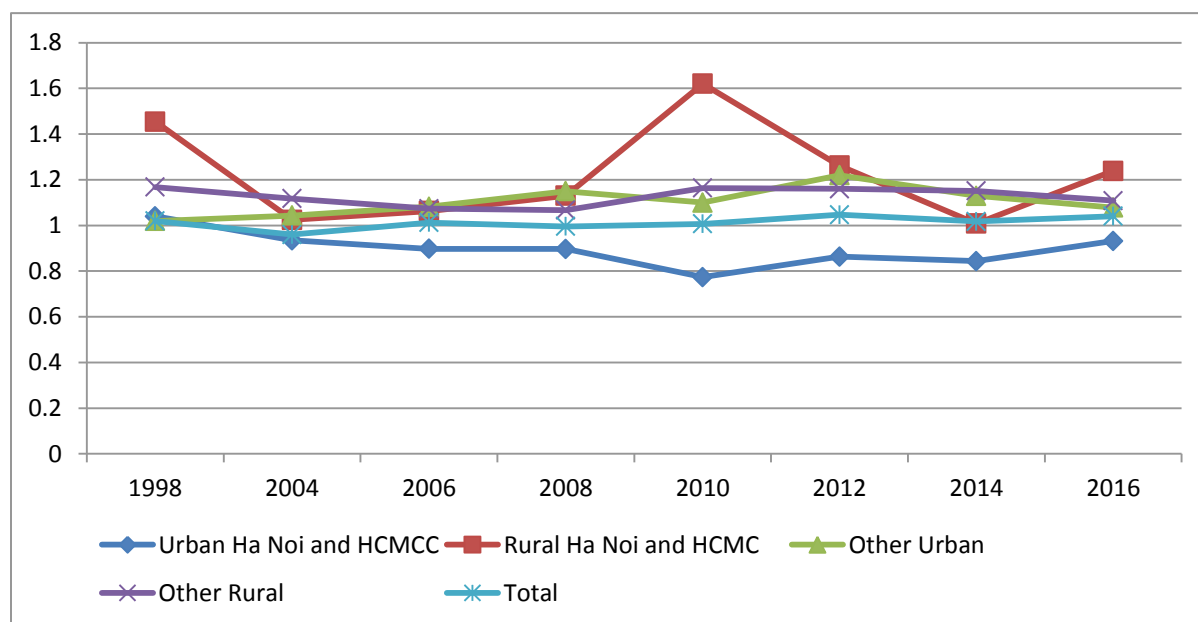
between the two types of employment. However, the patterns in the other urban areas exhibited a narrowing over time. This fact need to be exploited further.

Income gap between non-farm self-employers and wage workers in the formal sector

We now turn to income gap between non-farm self-employment and wage employment in the formal sector.

Overall, the income of self-employment was slightly higher than that of wage employment in the formal sector (Figure 1-12). In addition, the relative income of the former type of employment seemed to increase over time. However, the difference in incomes of the two types of employment did not exceed 5% for the whole study period. This result may imply the easy-to-move between the two types of employment as well as demand for goods and services of self-employers have been stable or it supports the combination view of the informal sector.

Figure 1-12. Relative hourly income between nonfarm self-employers and wage workers in the formal sector



Source: Author’s calculation with data from VLSS 1998 and VHLSS 2002-2016. Numbers for the figure are provided in Appendix 1-2.

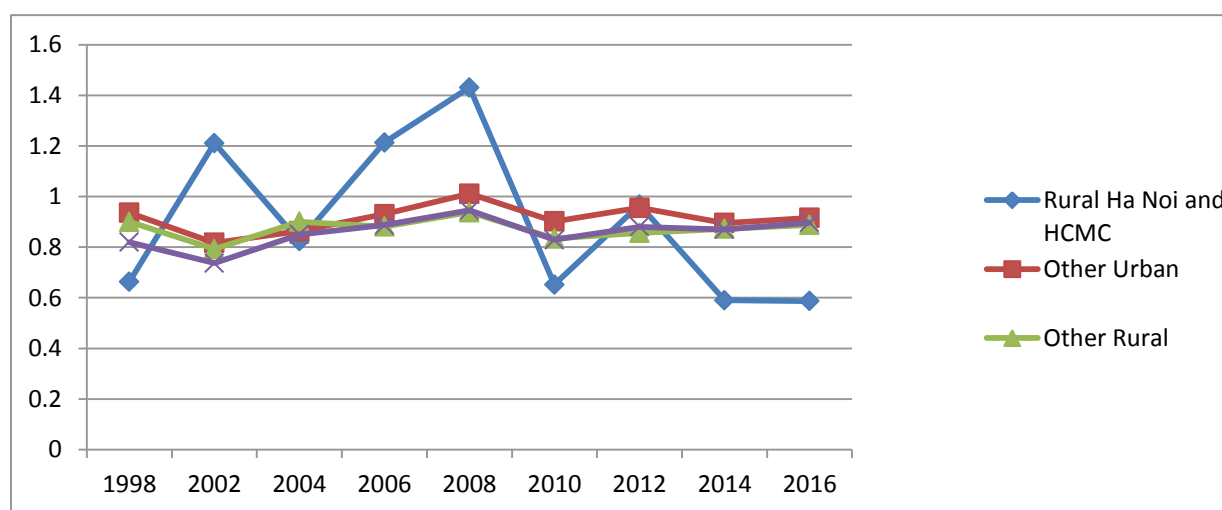
The patterns of difference as well as their dynamics are different across areas. Again, the non-farm self-employers in the rural areas were somewhat more advantageous to their counterparts in the urban areas in terms of relative income to wage workers in the formal sector, both in Hanoi and HCMC and other areas. In terms of dynamics over time, the patterns in both rural areas fluctuated without clear trends, especially in the rural Hanoi and HCMC. Meanwhile, the patterns in the urban areas exposed opposite trends. The non-farm self-

employers in Hanoi and HCMC suffered a decline in the relative income which was already smaller than one in ten years since 2004 with a recovery in 2016. Oppositely, their counterparts in the other urban areas enjoyed an increase in their relative income.

Income gap between wage workers in agriculture and non-farm household businesses

The ratio between incomes of wage workers in agricultural households to that of their counterpart in HHBs fluctuated around 0.9 with a slight increase trend or the gap in income between the two types of employment narrowed down over time (Figure 1-13). The problem with wage employment in the agricultural sector is working time that wage workers can only have jobs in certain months in a year indeed. Indeed, this ratio is only meaningful for the other urban and rural areas and a little bit relevant for rural Hanoi and HCMC in some extend. The ratio was higher for the other urban areas and it was consistent in the study period. This may implies that the process of urbanization would close the gap in incomes between the two types of employment. However, the change in the ratio of rural Hanoi and HCMC exhibits the opposite evidence. Indeed, result for the area may not be reliable for the small number of observations as well as change in employment compositions in the two types of employment in the area. The rapid urbanization process in the area would withdraw productive laborers, i.e. adult laborers from agriculture to non-farm activities. Therefore, laborers in agriculture in the area remain very young or old ones whose productivities are lower. We only calculate raw hourly income without taking into account productive characteristics. Therefore, we may partially result in misleading results in this case.

Figure 1-13. Relative hourly income between wage workers in agricultural households and in household businesses



Source: Author’s calculation with data from VLSS 1998 and VHLSS 2002-2016. Numbers for the figure are provided in Appendix 1-2.

In short, for the whole economy, employment in HHBs indeed still kept its relative income over time. Self-employment even enjoyed a slightly relative increase to wage employment in the formal sector. Meanwhile, these types of employment faced increasing disadvantages to employment in the formal sector in urban Hanoi and HCMC.

The income gaps between two types of employment in HHBs and that of employment in the formal sector were lower in the rural area. This result was consistent over time. This result indicates that the urbanization process will increase the gaps between the types of employment. This process was observed for the urban Hanoi and HCMC. However, the increases in the relative incomes between two types of employments in HHBs and that of wage employment in the formal sector in the other urban areas were difficult to be explained.

Meanwhile, the story for the income gap between wage workers in HHBs and their counterparts in the agricultural HHs were quite consistent. Wage workers in the agricultural HHBs in the urban area were advantageous to their counterparts in the rural areas and the gap between the two types of employment for the whole economy has been narrowed down over years.

Therefore, the employment structure in Vietnam is still mainly determined by the demand of the formal sector as predicted in Lewis model. It also recalled the result of Yamada (2017) that Vietnam has not reached the Lewis turning point. However, the difference between predictions of the Lewis model and the practice in Vietnam is that the relative income between the two types of employment keeps stables rather than the incomes themselves.

The gap in income between wage employment in HHBs and the formal sector kept stable since 2002. However, it exhibited different patterns across areas. One interesting pattern was the increase in the gap for urban Hanoi and HCMC which was already quite high to the average as well as those in other areas. Given the differences across areas, it is predicted that the gap would increase over time as effects of the urbanization process. However, a contradict trend is observed for the other urban areas.

4.6. Labor productivity

The above analyses show a certain level of segmentations in Vietnam's labor market in terms of institutional sectors as well as the agricultural sector. However, the gaps have not been large, especially in the other rural areas and they have only slightly changed over time. Put differently, laborers in all sectors are benefited from economic growth with somewhat the same level. This fact implies that adjustments in Vietnam's labor market have worked effectively to accommodate changes or shocks in specific sectors. Meanwhile, sectors encountered different

productivity rates. Therefore, we estimate productivity in household production of agriculture and non-farm HHBs, in comparisons with productivity in the formal sector to see how sustainable of income in the former sectors as well as explain above findings about structural and income change.

Productivity of agricultural households and other institutional sectors in the period of 2004-2016 are given in Figure 1-14. It should be noted that outliers detected by Hadi (1992) method are excluded. Productivity of agricultural households and HHBs is estimated from agricultural production and non-farm business section of VHLSSs and that of formal enterprises is estimated from the Enterprise Censuses. We restrict to the period of 2004-2016 because we can only estimate productivity of all three sectors of our interest: agricultural households, HHBs and formal enterprises in the period. Productivity of formal enterprises has been available since 2000. However, we cannot estimate productivity of households in both agricultural and non-farm activities for 2002. Furthermore, productivity for laborers in agricultural and non-farm activities is estimated with an assumption of 2000 working hours per year. This is average of working hour of self-employers and family workers in HHBs over time. The working hour of self-employers and family workers in agricultural households are much lower, about 1100 hours per years. However, to have an idea of increase in productivity over time, we still use average working hour of laborers in HHBs for those in agricultural households.

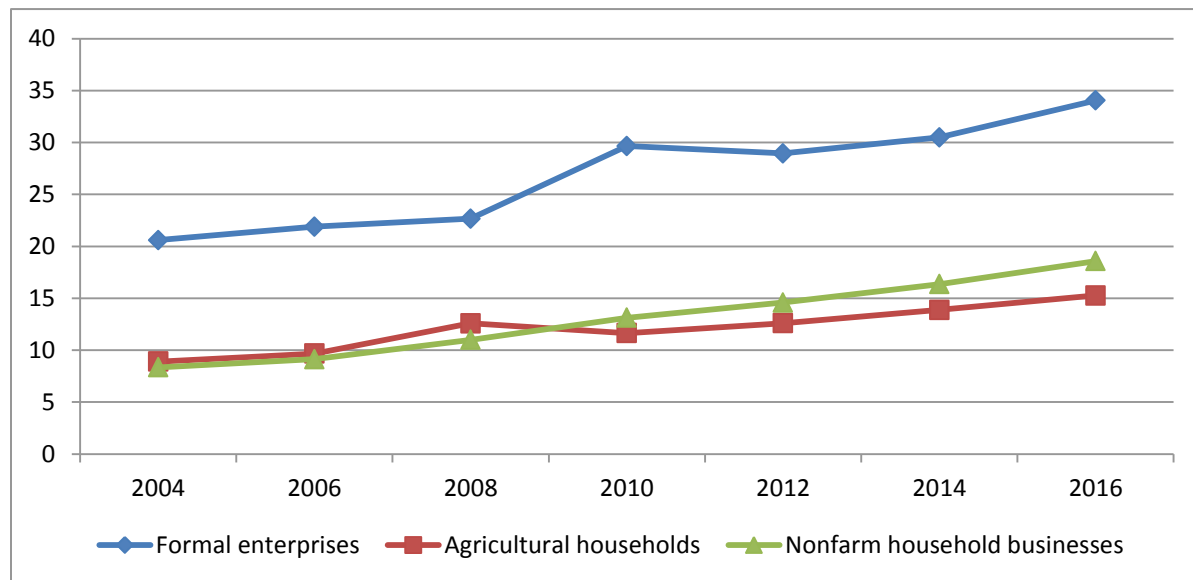
For agricultural production at households, the productivity increased gradually, except an extraordinary increase in the period of 2006-2008 and a decrease between the year 2008 and 2010. On average, the productivity increased about 4.6% per year for the period of 2004-2016. Indeed, the productivity here included both changes in outputs' prices and quantities. Indirectly, the absolute employment in the agricultural sector has decrease but the export of agricultural products of Vietnam has steadily increased over time. These processes imply that the productivity in the agricultural sector increases significantly over time.

The productivity per working hour in the agricultural production was as comparable as that in HHBs, even we could observe a higher productivity of the former before 2008. However, the agricultural sector faced two difficulties. Firstly, the working hour in the sector was low and has a tendency of declining in recent years. On average, self-employers in agricultural households only working about 1100 per year, compared with 2000 hour for the self-employers in non-farm HHBs. Secondly, increase in productivity of the sector was not as good as that of HHBs in recent years. The productivity of the former is about 88% and 82% of that of the latter in 2010 and 2016 respectively. The lower increase in productivity of the agricultural sector raises a concern of sustainability in paying the wage in the sector. The hourly income of wage workers in the

agricultural sector was about 80% of their hourly productivity in 2016, a huge increase from 62% in 2004.

Turing to HHBs, there is only productivity estimation for HHBs at the national level in 2014 by Oudin (2017). Comparing with his results, we have a higher productivity for non-registered HHBs but a lower one for registered HHBs. Of course, data from Household Business and Informal Survey 2014/15 used in Oudin (2017) is better for productivity estimation as the survey is designated for HHBs. However, the more important implication of our consistent estimation of the series was the changes of productivity overtime.

Figure 1-14. Labor productivity in 2004-2016 (million per year, Jan 1998 price)



Source: Author's estimation with data from VHLSSs and Enterprise Censuses, 2004-2016. Numbers for the figure are provided in Appendix 1-2.

The productivity increase of HHBs has been relatively good with about 6.9% per year in the period of 2004-2016. The increase has been also smoother compared with the case of the agricultural sector. This trend is somewhat different from stylized fact listed in Porta and Shleifer (2014) of stagnation in productivity of the informal sector during development process. On another aspect, the convergence process was observed that the productivities of areas converge to each other. In 2016, the productivity of HHBs in the other rural areas was almost the same as that in the other urban areas and 89% of that in the urban Hanoi and HCMC. This process could be a reason for convergence in income of both wage workers and self-employers of HHBs as investigated above. The good increase in productivity of HHBs has resulted in a better ratio of hourly income of wage worker and hourly productivity. This ratio reduced from

77% in 2004 to 72% in 2016. The reduction was not large but it exhibited sustainability of the sector in paying compensation of its wage workers.

One again, our productivity estimation is different from Oudin (2017) for FDI and State-Owned Enterprises in 2014. However, our yearly estimated productivity of domestic private enterprises of 93 million per worker (2014 current price) is almost the same as that of Oudin (2017), about 90 million per worker. One important implication from the consistent results for the domestic private enterprises is a low productivity of this type of business. As the lowest productivity business type in the formal sector, wage in this type of business determines the wage in the formal sector. This low productivity is an explanation for unclear exclusion hypothesis of HHBs in Vietnam.

As expected, the increase in productivity of the formal sector was observed. However, it is somewhat difficult to be explained, the productivity only slightly increased in the period of 2004-2008 and a breaking increase in the period of 2008-2010. Furthermore, the increase in the productivity of the formal sector was lower than those of HHBs and the agricultural sector. Of course, we exclude outstanding firms under the procedure of outlier detection. However, the remaining firms can be considered as average firms and the low productivity increase of the formal sector was still difficult to be explained. The lower increase in productivity of former enterprises can be a reason for no increase or even narrowing down in the gaps of income of wage workers in HHBs and formal enterprises.

Similar to the case of HHBs, there is also a tendency of convergence between Hanoi and HCMC and other provinces in productivity of formal enterprises. However, the convergence has not been as smooth as the case of HHBs. The gap between the two areas was largest in 2010 and then smaller in following years. To go to a lower level in terms of industries, the productivity gap was larger in the service sector support the argument of different service sub-sectors in Hanoi and HCMC to those in other provinces.

We now turn to evaluate links between productivity increases and structural change. Initially, there is evidence of a correlation between the productivity and structural change. In the period of 2010-2012 when the productivity decreased, we observe a period of the negative structural change with the increase in the share of agricultural employment and the decrease in the share of employment in the manufacturing sector. Meanwhile, in the period of 2014-2016 when the productivity increased relatively well, structural change was also considerably positive. However, it should be note that the study period is relatively short and productivity was also affected by the macro economic conditions. Therefore, it is possible that macro-economic conditions have affected both factors.

Conclusion

The chapter aims at investigating structural change, employment allocation and income dynamics in different economic and institutional sectors with focus on non-farm household businesses in comparison with those in the agricultural sector and the formal sector in Vietnam. Initially, we analyze changes in employment in three conventional sectors of agriculture, manufacturing and services and allocations between formal enterprises and HHBs. Secondly, possible correlations between the two processes and the increase in the population as well as macro-economic conditions are investigated. Thirdly, we explore the dynamics under the urbanization process. Fourthly, income dynamics of different types of employment, both in absolute and relative terms, are studied. Fifthly, productivity of different institutional sectors is estimated. The whole economy is classified into 4 areas based on their levels of urbanization to capture the differences in structural change across areas with different levels of urbanization.

Vietnam has experienced a period of good performance in terms of structural change as well as formalization. Economic growth has played a deterministic role in the process, compared with that of the population trend. However, the processes have not been smooth over time and they have been affected by short-term economic performance, especially structural change. Since 2010, the influence of short-term economic conditions has surpassed the long-term trend and we observe the pro-and-counter-cyclicity behaviors of non-farm self-employers. Indeed, these behaviors of non-farm self-employers were only observed in Hanoi and HCMC. The higher income as well as level of urbanization in Hanoi and HCMC is a reason for differences of behaviors of non-farm self-employers, compared with their counterparts in other areas.

Before 2010, structural change in different areas relatively well followed pictures postulated by conventionally theoretical models. Advance areas of urban Hanoi and HCMC as well as the other urban areas exhibited decline in the share of employment in HHBs in favor of the formal sector or the administrative sector. Meanwhile, share of this type of employment continued to increase for the other rural areas. In parallel, agricultural employment has declined in all areas.

Changes in economic sectors have resulted in increasing share of wage employment in general and in the formal sector in particular. Our decomposition exercise shows that changes in employment share across economic sectors was the main source for formalization in the period of 1998-2016.

However, the picture has changed since 2010. Agricultural employment in the other urban and rural areas only slightly declined. The continuity in expansion of the formal sector was at expense of employment in non-farm HHBs, especially self-employers. This transition was found

in all areas although magnitudes of the transition were different across areas. As structural change across economic sectors have been slowing down, formalization within sectors have become the main driver for the overall formalization of the economy. As noted above, it seems that the long term momentums of structural change in employments has been dominated by behaviors of stakeholders responding to short-term fluctuations in macro-economic conditions. This argument is initially demonstrated by self-employers in Hanoi and HCMC.

Vietnam has witnessed a steady process of urbanization, this process have contributed to structural change in the labor market. Although the other urban areas mainly contributed to the urbanization process in absolute term but the concentration in Hanoi and HCMC have been kept as the share of employment of the two cities to all urban employment has been stable over time. In addition, it still takes times for Vietnam to pass the threshold of an agrarian economy as the low urbanization level in 1993.

Given the slowing change in structure since 2010, structural change of the whole economy has been significantly determined by changes in compositions across areas. This has been different to the previous period when structural change within areas dominated the changes induced by changes in compositions of areas.

There is convergence in share of employment in HHBs across areas. The share of this type of employment has declined in urban areas, especially in urban Hanoi and HCMC. Meanwhile, it has increased in the other rural areas. However, the concern is that whether the share of this type of employment has reached its peak in the other rural areas as the decreasing share has been observed. The decreasing share of this type of employment has mainly resulted in almost no decrease in agricultural employment in the area since 2010.

All types of employment enjoyed increases in income. The increased were relatively smooth over the whole study period except that of wage workers in the formal sector in the period of 2002-2006. The slow increase in income in the formal sector in 2002-2006 period is possibly explained by prediction of the Lewis model with excessive labor supply to the sector at that time.

Convergences in income of laborers across areas were consistently observed for different types of employments but the speed of convergence was not the same. The gap in income of self-employment and wage employment in the formal sector were persistent and narrowed down slowly. Meanwhile, the gap of wage employment in HHBs was filled quickly. The convergences in income of laborers across areas implies that the growth and urbanization process have not resulted in an increase in inequality across areas of Vietnam. This result in

conjunction with small gaps in income of employment in HHBs and wage employment in the agricultural sector implies that there has been only a small spatial segmentation in Vietnam's labor market.

There are differences in income of laborers in different sectors and types of employments. However, the gaps between wage workers in the formal and informal sectors are not pronounced as those reported in the literature, especially for the other rural areas. This result confirms the argument of Nguyen (2013) that the exclusion hypothesis of the informal sector in Vietnam is not strong. This result is supported by the fact that firms in the formal sector still mainly engages in low productivity activities of assembling in manufacturing or low-end services which is postulated by the low estimated productivity for the domestic private enterprises.

For the relative income of different types of employment, only self-employers and wage workers in HHBs in urban Hanoi and HCMC face increasing disadvantages to their counterparts in the formal sector. Laborers in HHBs as well as wage workers in the agricultural sectors in other areas, including both rural and urban, did not lose their relative income to their counterparts in the formal sector even they gained a relative increase in income. This is indeed backed up by increase in the productivity in the agricultural sector as well as HHBs. Productivity of these sectors still kept up with that of the formal sector and increase in productivity of HHBs was even higher than that of the formal sector. However, the persistence in the relative income implies the certain level of segmentations across types of employment have been only slowly mitigated overtime.

The case of rural Hanoi and HCMC depicted an extraordinary picture of structural change. Starting with an out-date phenomenon in 1998, compared with the other urban areas, the area quickly changed to be similar to the urban Hanoi and HCMC in some dimensions. However, there is still a clear income gap between wage workers in the formal sector in the two areas which implies different industry compositions as well as occupations of wage workers in the formal sector of the two areas.

Given above results, the current chapter points out a new "episode" of structural change since 2010 in Vietnam. In addition, analysis of productivity along with income of different economic and institutional sectors provides an explanation for the unseriousness of the income gap between employment in HHBs and wage workers in the formal sector for in the economy.

However, the chapter faces a number of limitations. Firstly, roles of investment and capital productivity in structural change in Vietnam are not investigated. Secondly, estimation of

income and productivity does not take into account productive characteristics of laborers in different sectors that make the analysis of segmentation not completed. Thirdly, the chapter does not discuss underlying factors for structural change which somewhat restrains full understandings of structure change in Vietnam. Fourthly, migration dimension of laborers is not investigated. This is important in the case of Vietnam given its heterogeneity in development across regions as pointed out in analysis.

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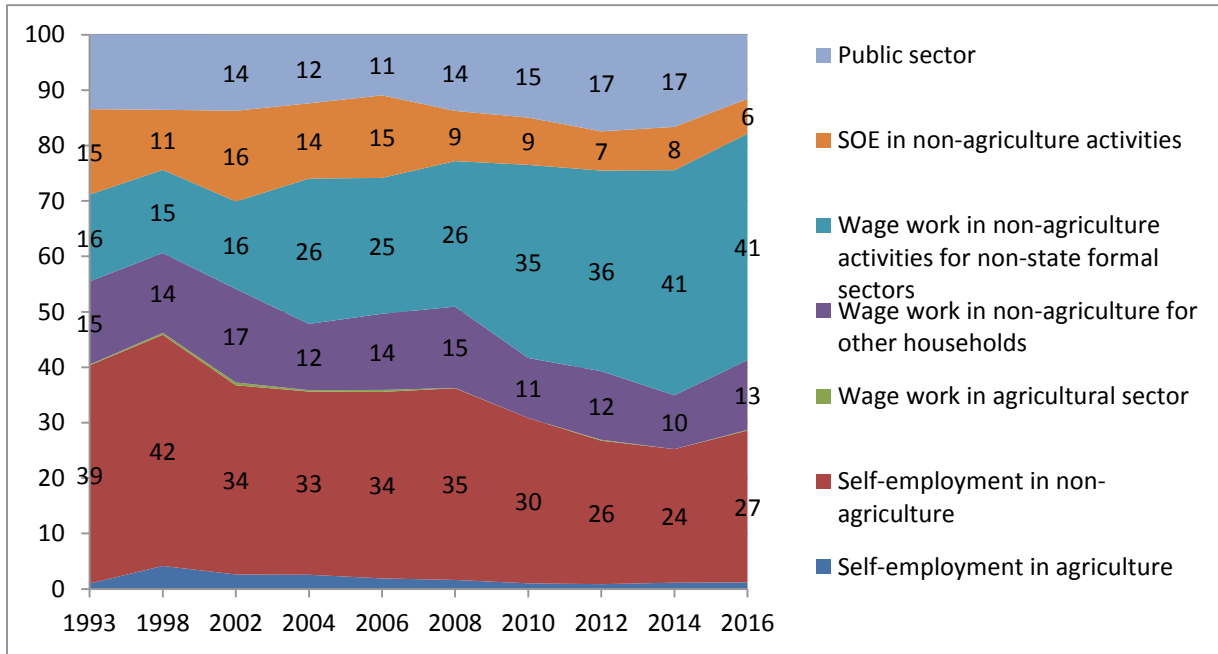
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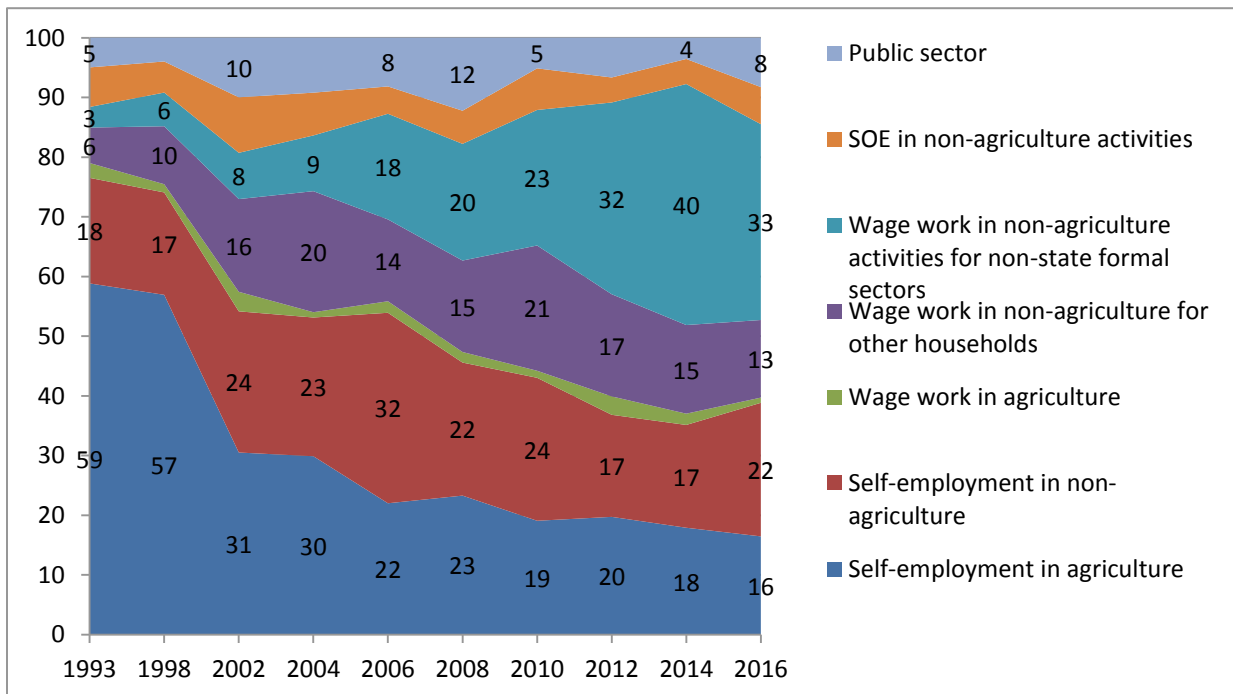
Appendix 1-1. Shares of different types of employments in Vietnam’s labor market 1993-2016 in each area (%)

Urban Hanoi and HCMC



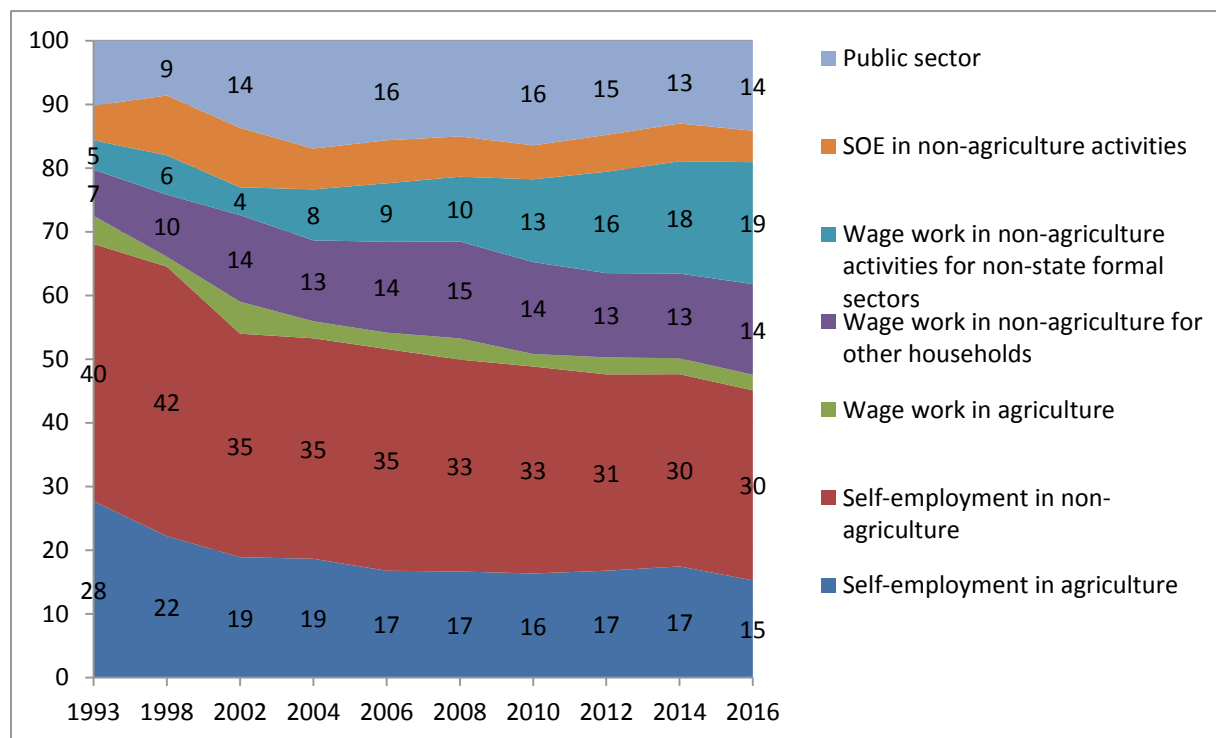
Source: Authors’ calculation with data from VLSS 1993, 1998 and VHLSS 2002-2016

Rural Hanoi and HCMC



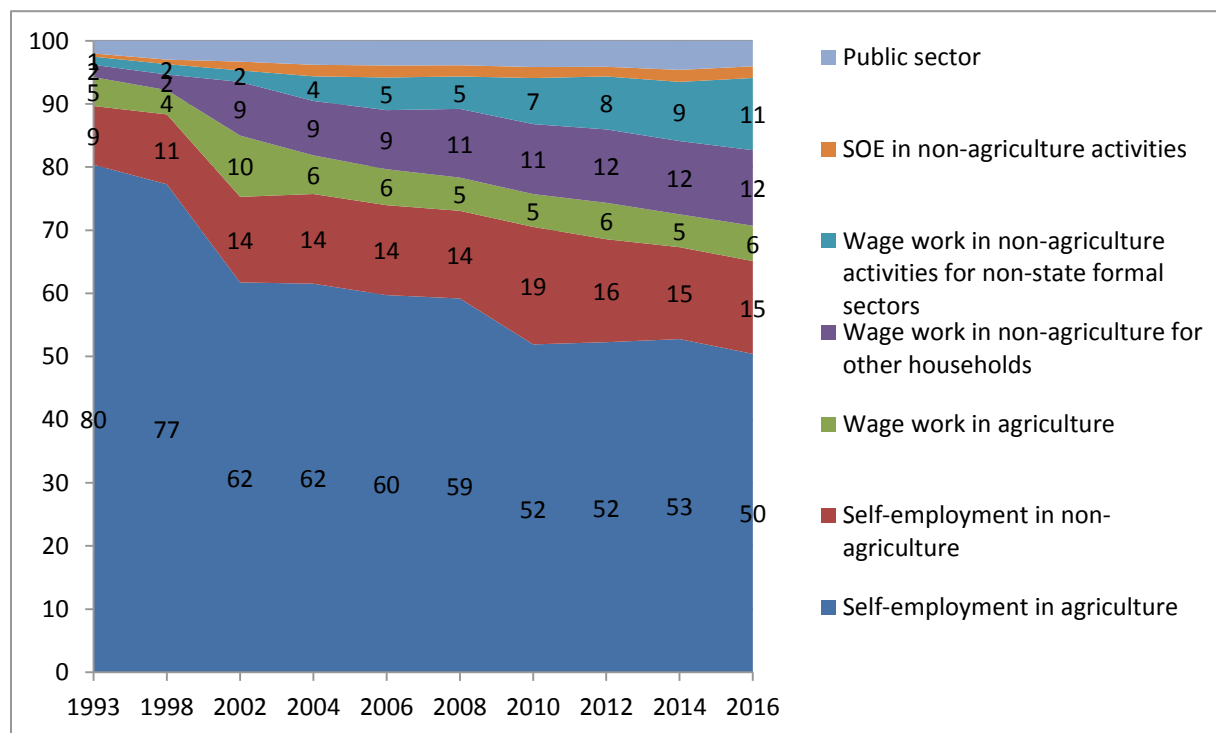
Source: Author’s calculation with data from VLSS 1993, 1998 and VHLSS 2002-2016

Other urban areas



Source: Author's calculation with data from VLSS 1993, 1998 and VHLSS 2002-2016

Other rural areas



Source: Author's calculation with data from VLSS 1993, 1998 and VHLSS 2002-2016

Appendix 1-2. Numbers in corresponding figures

Figure 1-7. Employment shares of non-farm household businesses (%)

Year	1998	2002	2004	2006	2008	2010	2012	2014	2016
Urban HN and HCMC	56.10	51.01	45.00	47.39	49.26	40.66	38.26	33.82	39.99
Rural HN and HCMC	26.86	39.19	43.51	45.62	37.61	44.93	34.22	32.07	35.38
Other urban area	52.06	48.69	47.32	49.09	48.49	46.93	44.05	43.48	44.06
Other rural area	13.53	22.05	22.81	23.60	24.76	29.68	27.92	26.15	26.66
The whole country	22.28	28.53	28.79	30.45	31.16	34.30	32.04	30.90	31.71

Source: Author's calculation with data from VLSS 1998 and VHLSS 2002-2016.

Figure 1-8. Hourly income of self-nonfarm employers, (000 VND, January 1998 price)

Year	1998	2002	2004	2006	2008	2010	2012	2014	2016
Urban HN and HCMC	4.04		5.55	4.91	6.35	7.40	9.73	8.96	10.27
Rural HN and HCMC	4.54		4.22	4.37	5.44	8.96	9.11	9.17	11.53
Other urban area	2.83		4.36	4.44	5.05	6.55	8.09	8.30	8.86
Other rural area	2.83		3.71	4.09	4.79	6.26	7.54	7.74	8.8
The whole country	3.08		4.15	4.31	5.10	6.57	7.99	8.12	9.08

Source: Author's calculation with data from VLSS 1998 and VHLSS 2004-2016.

Figure 1-9. Hourly income of wage workers in nonfarm household businesses, (000 VND, January 1998 price)

Year	1998	2002	2004	2006	2008	2010	2012	2014	2016
Urban HN and HCMC	3.26	4.53	4.50	3.84	4.31	5.61	5.61	5.69	6.49
Rural HN and HCMC	3.88	3.56	3.49	3.33	4.44	5.03	6.07	8.19	7.62
Other urban area	2.45	3.20	3.17	3.19	3.45	4.62	5.30	5.77	6.51
Other rural area	2.47	2.81	3.04	3.42	3.81	4.75	5.88	5.94	6.85
The whole country	2.72	3.10	3.22	3.40	3.79	4.79	5.74	5.95	6.76

Source: Author's calculation with data from VLSS 1998 and VHLSS 2002-2016.

Figure 1-10. Hourly income of wage workers in the formal sector, (000 VND, January 1998 price)

Year	1998	2002	2004	2006	2008	2010	2012	2014	2016
Urban HN and HCMC	3.88	6.12	5.94	5.47	7.08	9.56	11.27	10.62	11.02
Rural HN and HCMC	3.12	4.03	4.12	4.11	4.81	5.53	7.22	9.09	9.31
Other urban area	2.78	4.19	4.18	4.10	4.40	5.95	6.64	7.35	8.22
Other rural area	2.42	3.13	3.32	3.81	4.49	5.38	6.49	6.72	7.94
The whole country	3.02	4.28	4.33	4.26	5.12	6.53	7.63	7.98	8.73

Source: Author's calculation with data from VLSS 1998 and VHLSS 2004-2016.

Figure 1-11. Relative hourly income between wage workers in household businesses and the formal sector

Year	1998	2002	2004	2006	2008	2010	2012	2014	2016
Urban HN and HCMC	0.84	0.74	0.76	0.7	0.61	0.59	0.5	0.54	0.589
Rural HN and HCMC	1.24	0.88	0.85	0.81	0.92	0.91	0.84	0.9	0.818

Other urban area	0.88	0.76	0.76	0.78	0.78	0.78	0.8	0.78	0.792
Other rural area	1.02	0.9	0.92	0.9	0.85	0.88	0.91	0.88	0.863
The whole country	0.9	0.72	0.74	0.8	0.74	0.73	0.75	0.75	0.774

Source: Author's calculation with data from VLSS 1998 and VHLSS 2002-2016.

Figure 1-12. Relative hourly income between nonfarm self-employers and wage workers in the formal sector

Year	1998	2004	2006	2008	2010	2012	2014	2016
Urban HN and HCMC	1.04	0.93	0.9	0.9	0.77	0.86	0.84	0.93
Rural HN and HCMC	1.45	1.02	1.06	1.13	1.62	1.26	1.01	1.24
Other urban area	1.02	1.04	1.08	1.15	1.1	1.22	1.13	1.08
Other rural area	1.17	1.12	1.07	1.07	1.16	1.16	1.15	1.11
The whole country	1.02	0.96	1.01	1	1.01	1.05	1.02	1.04

Source: Author's calculation with data from VLSS 1998 and VHLSS 2004-2016.

Figure 1-13. Relative hourly income between wage workers in agricultural households and in nonfarm household businesses

	1998	2002	2004	2006	2008	2010	2012	2014	2016
Urban HN and HCMC	NA	0.89	0.57	0.8	NA	NA	1.07	NA	0.935
Rural HN and HCMC	0.66	1.21	0.82	1.21	1.43	0.65	0.97	0.59	0.587
Other urban area	0.94	0.82	0.86	0.93	1.01	0.9	0.96	0.9	0.916
Other rural area	0.9	0.79	0.9	0.88	0.94	0.83	0.86	0.87	0.888
The whole country	0.82	0.74	0.85	0.89	0.95	0.83	0.88	0.87	0.896

Source: Author's calculation with data from VLSS 1998 and VHLSS 2002-2016.

Figure 1-14. Labor productivity in 2004-2016 (million per year, Jan 1998 price)

Year	2004	2006	2008	2010	2012	2014	2016
Formal enterprises	20.6	21.9	22.7	29.7	28.9	30.5	34.1
Farming HHBs	8.9	9.7	12.6	11.6	12.6	13.9	15.3
Non-farming HHBs	8.3	9.1	11.0	13.1	14.6	16.4	18.6

Source: Author's calculation with data from VHLSS 2004-2016 and Enterprise Censuses 2004-2016.

Chapter 2 Impacts of Minimum Wage on Employment and Wage Distribution in Vietnam¹⁹

Abstract

Rates of minimum wage in Vietnam have increased drastically since 2009. This growth has been higher than productivity growth of the economy. Employing data of Vietnam Labor Force Surveys and Household Living Standard Surveys from 2010 to 2014, the current chapter investigates impacts of the minimum wage on two aspects: (1) employment statuses of the whole population and the different gender and age sub-groups; and (2) wages distribution in general and within these sub-groups. The results imply that the minimum wage does not have significant impacts on employment rates of the whole working age population as well as young and male sub-groups. No effect is also found for the adult cohort but the result is inconsistent across estimation approaches. Meanwhile, it even increases the employment rate of the female sub-group as lagged effects. This effect is consistently found in difference specifications. However, there are no effects on movements across types of employment for the whole working age populations and sub-groups. Similar to the work of Hansen, Rand, and Torm (2015), the results indicates that the minimum wage positively affects wage distribution in the formal sector. However, we find that the effects do not stop at the median as the result of Hansen, Rand, and Torm but also on higher percentiles. In terms of difference between sub-groups, the effect is stronger for the young cohort, compared with their adult counterparts. Meanwhile, the model does not work well for the male sub-group or wage workers in the informal sector.

Key words: minimum wage, employment, wage distribution, gender, age, Vietnam

¹⁹ This chapter is a revision and extension of the paper: Vu, Pham and La (2018) "Impact of Minimum Wages on Employment and Wage Distribution in Vietnam: Gender and Age Perspectives" under the Greater Mekong Sub-region Research Network (GMSNet) a research network managed by Cambodia Development Resource Institute (CDRI) with financial support from the International Development Research Centre (IDRC), Canada. I am grateful to my supervisors, Dr. Jean-Pierre Cling and Dr. François Roubaud for their valuable guidances and comments on different versions of the chapter. I also would like to thank Prof. Gordon Betcherman (University of Ottawa), Dr. Edgard Rodriguez (IDRC) and Mr. Roth Vathana (CDRI) for their comments and suggestions. Comments from participants at GMSNet internal networking meetings, the 10th Vietnam Economist Annual Meeting in Ho Chi Minh City, Vietnam (2017), and the 52th Canadian Economics Association Annual Conference in Montreal, Canada (2018) are duly acknowledged. I am also thankful to Vu Van Ngoc, Nguyen Kim Thai for their inputs under the GMS Net study, especially their works on the qualitative survey.

Introduction

As a part of economic reforms since Doi Moi (1986), a minimum wage was introduced in Vietnam in early 1990s. According to the 2012 Vietnam Labor Code, the minimum wage is “the lowest rate paid to workers for performing the simplest work in normal working conditions, and that has to secure their and their families’ the minimal living needs”.

Before 2008, the minimum wage have not received much attention as the rate had been kept stable for years and the rate for non-state domestic sectors were quite low. Aftermath, the minimum wage issues in Vietnam have received much attention given changes in the scheme. The minimum wage for the domestic non-state sectors has been separated from the “basic” salary for the public sector and the rate has been adjusted annually with an increase of more than 15% per year. This increase has been higher than other economies as well labor productivity of the economy (Carpio and Pabon, 2014). As a result, the ratio of the minimum wage to the median of wage in Vietnam has been higher than those in a majority of other countries (WB, 2015).

In addition, expansion of employment in the formal sector of foreign direct Investment (FDI), state-owned and domestic enterprises as a modernization processes of the Vietnam’s labor market have been slow down since 2010 (Oudin et al., 2013). Employment in the FDI and domestic private enterprises in the period of 2010-2012 increased at 0.25% and 0.91% respectively. Meanwhile, the figure for in the 2007-2009 period is 1.46% for each type.

Early works on the topic for Vietnam (Nguyen 2010; Carpio and Pabon 2014; Nguyen 2014; Hansen, Rand and Torm 2015) indicate a small but negative effect of the minimum wage on employment and a positive impact on wage distribution. However, these studies investigate only the whole labour market or a very specific group of workers receiving less than the minimum wage in FDI, state-owned and domestic private enterprises (Nguyen 2010). Meanwhile, the impact on different gender and age groups has not been investigated. Furthermore, all studies only investigate simultaneous and discrete impacts on employment, but Meer and West (2016) argue that the minimum wage also has a potential lagged impact on employment. This feature should be properly studied for the long-term effects.

Meanwhile, the study of Hansen, Jann and Torm (2015) on the impact of the minimum wage on wage distribution with the method proposed by Lee (1999), the first such study on Vietnam, does not addressed a number of important assumptions. Therefore, it is necessary to re-estimate the effects with an explicit validation of the assumptions of the model.

To fill the above understanding gaps, this chapter aims to investigate the effects of the minimum wage on employment of the whole working age population and different gender and age sub-groups and then goes to the impacts on different aspects of the formal and informal sectors, including: (1) movements of laborers across the two sectors; (2) wage distributions within the two sectors. For explore the impacts on employment, we carefully include the potentiality of the lagged effects as well as location trend in the empirical models. Alternative specifications are estimated to have robust results. In parallel, assumptions of model of Lee (1999) on impacts of the minimum wage on wage distribution are explicitly validated to achieve more reliable results.

As the mentioned above, we split the whole population into sub-groups in terms of age and gender. With respect to age, a young cohort of aged 15-29 and an adult cohort of age 30-65 are separately investigated. This separation allows us to capture different impacts of the minimum wage on these sub-groups which has been overlooked in studies for Vietnam. In parallel, the two genders are also explored separately.

To acquire the objectives, the chapter is organized as follows: Section 2 presents both theoretical arguments of impact of the minimum wage on different sectors and empirical evidence from literature; the context of the minimum wage in Vietnam is discussed in Section 3; empirical models for investigation of impacts of the minimum wage are given in Section 4; Section 5 presents data and results of descriptive analyses; Section 6 is devoted for estimation results; and the chapter ends with conclusion.

1. Literature review

Although minimum wage is not a new labor policy-debate, the topic has continuously received interests of scholars (Meer and West, 2016). Before the end of the 1980s, empirical works were mainly available for the US. Since the second haft of 1990s, researches for developing countries, especially for Latin American countries, have been growing²⁰. In this section, we firstly discuss theoretical arguments for impacts of the minimum wage on both employment and income distribution. Empirical evidence is then reviewed.

²⁰ See Brown (1999); Neumark and Wascher (2007) and Betcherman (2015) for surveys of literature.

1.1. Theoretical predictions

1.1.1. *Minimum wage and employment*

Theoretical impacts of the minimum wage on employments vary across models of labor markets²¹. The basic competitive model with a unique labor market predicts a decline in employment if the minimum wage is higher than the market clearing level or the minimum wage is binding. When the minimum wage is binding, the demand for labor declines and supply of labor increases, compared with those at the clearance level. Firms only recruit employment at that their marginal productivity equals the minimum wage, which is smaller compared with the amount of employment at the clearance level of wage. As a result, unemployment increases.

However, under the monopsony model, employment possibly increases if the minimum wage is binding (Brown, 1999). Although the monopsony model is not popular in the labor market, Dickens, Machin and Manning (1999) argue it is not as scarce as we think.

When there are different segments of the labor market, the formal and informal sectors, the effects are predicted to be different across sectors. In the formal sector, either of the above arguments may work. However, the effect on the informal sector depends on its link with the formal one. If the formal sector follows the competitive model, labor supply to the informal one increase when the minimum wage increase or be imposed. Under this link, employment in the informal sector shall increase. However, the total effect on the labor market as a whole depends on capacity of the informal sector in term of absorbing the increase in the labor supply. If the labor market in the sector also follows the competitive model, employment increase is lower than the increase in the labor supply or we have a decline in total employment of the two sectors. However, the decline is smaller than that in the unique and competitive model given that the minimum wage is not imposed on the informal sector.

1.1.2. *Minimum wage and income*

For the formal sector, the increase in the minimum wage is likely to improve the equality of wage distribution as well as the average wage in the sector in several ways. At least, ones whose income lies between the new and the old minimum wages face with lower probability of being employed. An apparent implication is that the wage distribution seems to be more equal as the right end of the distribution is excluded. In addition, if these workers are employed, they

²¹See Brown (1999) for an overview of models for impacts of the minimum wage on employment.

are paid at the new minimum wage which is higher than their previous incomes. These two effects shall increase the average wage in the sector as well as improve wage distribution.

Another effect, spillover effect, can make workers who are already paid higher than the minimum wage better off when the minimum wage is imposed or increases. Under this effect, workers whose wages are already higher than the minimum wage also has increases in the wage. There are a number of reasons for this phenomenon. For example, the minimum wage can act as multipliers for wages, this effect is called as “numeraire” (Maloney and Menez, 2004), or indexation (Newmark et al., 2006) effects. Secondly, some rationale behaviors in the labor markets such as substitution between the relatively more skilled workers to the less skilled workers or firms’ keeping the relativeness of wages across categories of workers to remain their working incentives (Stewart, 2012). These effects both increase wages which are already higher than the minimum wage but their patterns of effects are different and empirical tests for their existences are also subsequently different.

Effects of the minimum wage on wage or income in the informal sector are ambiguous. Intuitively, wage in the informal sector decreases as labor supply in the sector increase. When the minimum is binding, employment in the formal sector decreases under the competitive labor market. People who cannot find jobs in the formal sector as effects of the minimum wage look for jobs in the informal sector. If the informal sector is also competitive, the wage which is set at the clearance level decreases. It should be noted that informal sector is assumed to be not subject to the minimum wage under this argument.

However, there is an effect named as “lighthouse effect” (Manoney and Menez, 2004) implies that wage in the informal sector may increase as the minimum wage can work as a reference for wage in the economy. Even when the minimum wage is not mandatory in the informal sector, the minimum wage can still work as a “benchmark” for the wage in the sector. In addition, it can be the case that the wage in the formal sector is a reference for the wage in the informal one. The increase in the minimum wage induces the increase in the wage in the formal sector which, in turn, results in the increase in the wage in the informal sector.

1.2. Empirical evidence

1.2.1. Empirical evidence of impact of the minimum wage on employment

Empirical evidence of impacts of the minimum wage on employment in the US, the most intensively studied-economy, has not reached a consensus. A frequently cited paper of Card and Krueger (1994) reports no negative effects in terms of employment on the fast-food industry in New Jersey and Pennsylvania of the US. No dis-employment impact is also found by

Addison, Blackburn and Cotti (2009) for low-wage sub-sectors of the retail-trade sector of the U.S in the period of 1990-2005. However, Neumark and Wascher (2007) argue that results for specific industries may not be generalized for the economy. A recent revision of Neumark et al. (2014) finds a negative employment elasticity of 0.15 for teen laborers in the U.S.

Meanwhile, results of studies for the United Kingdom are somewhat more concentrative. Dickens, Machin and Manning (1999) study for the period of 1975 to 1992 and no negative impact on employment is found. The minimum wage in the UK was terminated in 1993 and re-introduced in 1999. Stewart (2002) investigates the impacts of the re-introduction and also finds no significant negative impacts. It should be noted that, the minimum wage in the UK scheme were different across groups in terms of age, occupation and regions (before 1986) or age (since 1999). Therefore, the binding feature of the minimum wage has been possibly mitigated.

Turning to developing countries, the results are also diverse across countries and even within a country in different points in time. Maloney and Mendez (2004) find significant dis-employment effects of the minimum wage with for the case of Colombia. Meanwhile, Lemos (2009), reports of no impact of the minimum wage on employment for the period of 1982 to 2004 in Brazil. However, the author's study for the period of 1982 to 2000 finds a negative employment effect (Lemos, 2006). By contrast, Montenegro and Pages (2004) report a positive impact of the minimum wage on employment in Chile.

With regard to formal and informal separation, Lemos (2006) finds that the minimum wage has no negative effect on employment both informal and formal sector in Brazil. Hohberg and Jay (2015) also find no negative effect on employment in the formal sector for Indonesia. Meanwhile, Alatas and Cameron (2003) find a negative effect for small domestic firms in textile and clothing, footwear and leather industries in Indonesia. However, the small domestic firms are not identical to the informal sector. These firms still follows the minimum wage regulation.

1.2.2. Empirical evidence of impact of the minimum wage on wage and income

Empirical evidence of impacts of the minimum wage on income general and income distribution in particular are somewhat more concentrative. Lee (1999) study the impacts of the minimum wage on wage distribution in the U.S for a decade, from 1979 to 1989 and finds that the increase in the inequality of the low end of the wage distribution can be attributed for the decrease of the minimum wage in the period, especially for the women. He also finds that the differences across groups in terms of gender, race or education are modestly affected by the changes in the real minimum wage in the period.

The positive association between the minimum wage and the wage is also found for Latin America countries. Maloney and Menez (2004) report that the increase in the minimum wage has a significant effect on the wage, in the case of Colombia, especially for whose income initially located around the minimum wage. Lemos (2006) documents compressions of wage distribution as affected by minimum wage in Brazil. The same result is also found in Argentina (Khamis, 2008). The same direction of impact but the minimum wage changes have attributed to the increase in inequality in Mexico for the period of 1989-2001 as the minimum wage had been decreased in the period (Bosch and Manacorda, 2010).

For Asian countries, Liu and Yun (2012) study impacts in the period of 2002-2009 for China, with the method in Lee (1999), and find that the increase of the minimum wage has a positive impact on the wage distribution—particularly reducing the income gap between the median and the bottom decile—over the period of analysis. Hohberg and Jay (2015) find the minimum wage have positive effects on wages in the formal sector in Indonesia. Meanwhile, wages in the informal sector is not affected.

The lighthouse effects have been found to be significant in Latin American countries, Maloney and Menez (2004) finds a significant increase in wage of the informal sector for Colombia when the minimum wage increases. The same results are found in Argentina (Khamis, 2008) and Costa Rica (Gindling and Terrell (2005). Indeed, Gindling and Terrell argue the lighthouse effects do not exist in Costa Rica as the minimum wage does not have significant effect on self-employers, the informal sector under their definition. However, they find a significant effect for wage workers in small enterprises, significant part of them work as informal workers. Therefore, the lighthouse effects still exist. By contrast, the effect is not found in Indonesia (Hohberg and Jann Lay, 2015) as the wages in the informal sector is unaffected by the minimum wage.

It is quite interesting that the minimum wage is found to have no effects on income of self-employers in Colombia (Maloney and Menez, 2004) and Costa Rica (Gindling and Terrell, 2005). Maloney and Menez presume that frequent and in-time adjustment of prices of goods and services from self-employers may mitigate the shocks of the minimum wage.

For the spillover effect, studies for the UK (Dickens et al, 1999, Stewart, 2014) report little no strong evidence of this kind of effect in the economy. Meanwhile, Maloney and Menez (2004) find a strong effect for Colombia and Neumark et al. (2006) also find a significant effect for Brazil.

1.2.3. Initial Evidence from Vietnam

Nguyen (2010) using data from Vietnam Household Living Standard Surveys 2004 and 2006 to study impacts of the minimum wage increase on employment, wage and expenditures of workers who worked in the formal sector but receiving payments below the minimum wage. Findings are that the increase in the minimum wage between the two years reduced this type of employments but it has no significant effects on wage and expenditure of the workers belonging to this type of employment. However, this specific worker group only accounted for a moderate proportion of wage workers in the formal sector, ranged from 3,7% in domestic private enterprises to 5,1% in the state sector in 2004. In addition, workers whose wages are paid from the state budget in Vietnam follows a different payment system and the minimum wage for other sectors is not applied to those employees. Consequently, the proportion of 5,1% as indicated may not be illegally paid. Therefore, the study has a limited implication for the whole labor market.

With data from the enterprise censuses of Vietnam in the period of 2008-2010, Nguyen (2017) investigates effects of minimum wage on enterprises' labor and fixed asset. He finds the increase in minimum wage would reduce employments, one percent increase in real minimum wage results in 0.1 percent decrease in firm's employment size. A counter-intuition result is that male workers and those without social insurance face higher probability of reduction although the decrease of male labor proportion in the total firm's employment is small at 0.06 percent if there is one percent increase in real minimum wage.

Del Carpio, et al. (2013) using data from enterprise censuses in the period of 2006-2010 to investigate the impacts of the minimum wage on employment and wages. They find that increases in the minimum wage have negative impacts on wage employment. Self-employment increases but only absorbs a part of reduction in wage employment. Therefore, the total employment reduces as the minimum wage increases. In addition, the average wages of wage workers who retained their employments are positively affected by the increases in the minimum wage.

Hansen, Rand, and Torm (2015) using data from Vietnam Labor Force Survey 2011-2013 to investigate association between the minimum wage and hourly wage in Vietnam. They find that the relationship is positive for the formal sector. Furthermore, the minimum wage has compressed wage distribution in Vietnam. It compressed wages at the low end of the distribution closer to the median. Specifically, 10% increase in the minimum wage would narrow the gap between the 10th quantile wages to the median wage by 5.1%. Another finding is that the minimum wage setting has not affected income distribution in the informal sector

although the authors indicate that more representative data is needed to have proper conclusion on this finding.

2. Minimum wage context of Vietnam

Starting with the FDI sector in 1992, the minimum wage schemes have been extended to other sectors of the economy. At the beginning, there were two levels of the minimum wage, applied for different regions in terms of levels of development. One year later, in 1993, the salary systems in the public sector was introduced with the so called “the minimum wage” but it has been not the minimum wage in the normal term. For civil servants and people who received salaries and benefits from the state budget, the minimum wage was indeed referred to “basic salary”. Their total compensations equal the basic salary multiplied by a system of numeraires which is depended on their positions, qualifications and seniorities.

The minimum wage for the domestic non-state sectors was introduced quite late. Initially, it was applied for domestic enterprises including both state-owned ones and enterprises operating under the Enterprise Law 1999, which was detailed in the Decree No. 10/2000/ND-CP dated 27th March 2000. The minimum wage rate was the same as “basic salary” for civil servants. Since October, 2004 the coverage has extended for all kinds of wage employment including those in the agricultural sector and HHBs (Decree No. 203/2004/ND-CP). It should be noted that there was only one minimum wage rate for the whole economy as well as all domestic sectors at that time.

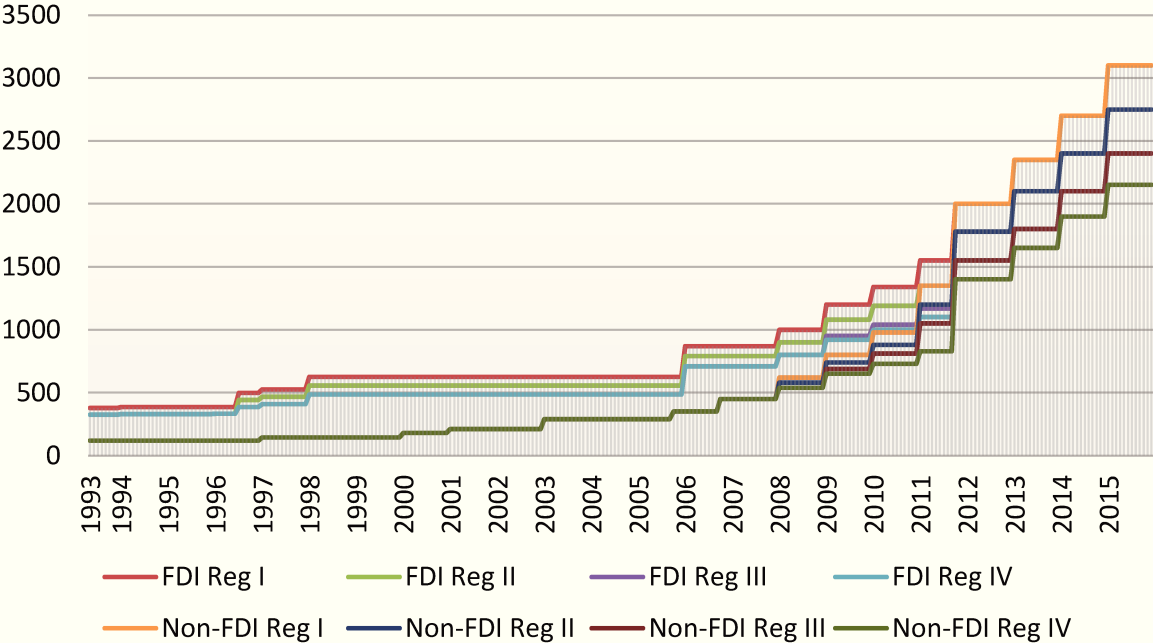
Before 2000 there were irregular adjustments of the minimum wage for the FDI sector and the basic salary for the public sector (see Figure 2-1 for details). Since 2000 the minimum wage for the domestic sectors had been increased more frequently, almost on a yearly basis but with modest adjustments. However, the minimum wage for the FDI sector was significantly higher than that of the domestic sectors. For example, in 2000 the lowest rate for the FDI sector was more than double than that of the domestic sectors. In 2005, the last year of application of the 1999 scheme for the FDI sector, the lowest rate for the FDI sector remained 20% higher than that of the domestic sectors.

The minimum wage scheme for the domestic sectors changed remarkably in 2008. The minimum wage applied for the domestic business sectors was separated from the “basic salary” of the public sector. Like the scheme applicable in the FDI sector, it was set higher than the “basic salary” and differed across locations in terms of levels of development which were similar to the scheme of the FDI sector. However, in a given location, the minimum wage rate for FDI firms was still significantly higher than that for the domestic business sectors.

To equalize minimum wages in both the domestic non-state and FDI sectors, in 2009-2012, the minimum wages applied for the domestic business sector had higher growth rates than those applied in the FDI one. As a result, the minimum wages of the two sectors were unified in October, 2011. This unification process was due to Vietnam’s commitments of non-discrimination between foreign and domestic sectors under the WTO accession in 2007.

Since the unification in 2011, the minimum wage for the enterprise sectors have increased by about 15% annually. In 2014, the monthly minimum wage ranged from VND 1,900 thousand (\$90 at January 2014 exchange rate) in the fourth region to VND 2,700 thousand (\$128) in the first region. It is cautious that the increase in the minimum wage has been significantly higher than labour productivity increase in recent years, leading to significant increase in the Kaitz index (WB, 2015).

Figure 2-1. Minimum wage scheme in Vietnam (000 VND per month)



Source: Authors’ calculation from the minimum wage stipulated in government’s legal documents.

The minimum wage rates in Vietnam are location-specific due to their differed levels of developments. The initial scheme for the FDI sector included two levels. It was then extended to three in 1996. The three levels of the minimum wage in the FDI sector remained until 2008, before splitting up further to four in 2009. Meanwhile, different levels of the minimum wage

for the domestic business sectors have been only applied since 2008. The lowest administrative level of applying a minimum wage rate is district that means there are more than one rates of minimum wage within a province.

Since 2012, classification of districts for applying different levels of the minimum wage has been stable. The highest level is applicable in inner districts of Hanoi, Ho Chi Minh, Hai Phong, and industrialized districts of Dong Nai , Binh Duong, and and Ba Ria-Vung Tau provinces. The second level is applicable in the remaining districts of Hanoi, Ho Chi Minh, Hai Phong, inner districts of other municipalities as well as districts of some provinces with a high level of industrialization. The third level covers capital town and districts which are relatively more developed than the other districts in a given province. The fourth level is applied for all remaining districts. In the following sections, we call a level of minimum wage as a minimum wage region that means a minimum wage region cover all districts over the countries applied the same minimum wage level.

As noted above, the public sector has a separate compensation system. In 2014, the “basic salary” was VND1,150 thousand. For example, a newly-recruited employee who has a university degree was paid with the numeraire of 2.34 to the “basic salary”. This wage amount was still lower than the highest level of minimum wage in the enterprise sector.

Table 2-1. Real minimum wage rates (000 VND)

Region	2011	2012	Change to previous year (%)	2013	Change to previous year (%)	2014	Change to previous year (%)	Change 2014 to 2011 (%)
1	1059	1513	42.82	1668	10.27	1941	16.32	83.29
2	1026	1461	42.34	1618	10.79	1794	10.86	74.85
3	926	1293	39.72	1411	9.08	1589	12.61	71.60
4	777	1203	54.85	1332	10.68	1467	10.13	88.80

Source: Authors’ calculation with the minimum wage stipulated in government’s legal documents, CPI of GSO and RCPI of VHLSSs

To know more about the minimum wage in Vietnam, we deflate the nominal minimum wage by the Consumer Price Index (CPI) and adjusted for spatial differences with a Regional Price Index (RCPI) sourced from Vietnam Household Living Standard Surveys (VHLSS)²². The figures are presented in Table 2-1. The increase trend was clear with an exceptional increase in 2012. However, the change patterns were not the same across regions since 2012. The increase in the minimum in Regions 1 and 3 were higher in 2014. In the meantime, Region 4, had a higher

²² We adjusted for the Regional Price Index as the nominal minimum wages are different across regions.

increase in 2012. Meanwhile, the increase in Region 2 was not different from other regions in any years. The different increase patterns are important to our analyses as our empirical models based on variances in the minimum wage changes across the minimum wage regions.

3. Estimation models

In this section, we discuss models for examining the impacts of the minimum wage on the total employment or the employment rate, movements across types of employments and wage distribution. Identification problems of the models as well as strategies for going over the problem are also discussed.

3.1. Impact of the minimum wage on total employment and employment status

Frequently, studies on impacts of the minimum wage on employment investigate employment opportunities of individuals. This approach is quite straightforward by estimation of a logit model with the dependent variable of working or not, explained by individual characteristics as well as other measurable community or macro variables and the minimum wage applied in their locations. However, this is not easy to separate the effects of the minimum wage from other factors of the labor markets indeed, especially when there are factors such as demographic trends that are known to be significant in the study period.

Given the context as discussed in Section 2, there are two dimensions of variances of the minimum wage schemes which are expected to have differentiated effects on the employment opportunity, variances over time and variance across regions. However, there are a number of factors which possibly coincide or mitigate the variances under the models of individuals. First, the working-age population increased at a lower rate in the study period. It helps increasing the working opportunities of all existing people given a momentum of the economy in terms of absorbing significantly higher net increases in the working-age population in previous years. Therefore, this trend mitigates the negative effects of the minimum wage increases over time, and it is difficult to separate the effects of the two factors when we investigate employment statuses of individuals. Second, locations with differently applied levels of the minimum wage are quite close to each other, just borders of districts. Therefore, laborers easily move from one to another district to seek for higher wages. This fact shall mitigate the effects of the minimum wage variances on the dimension of spatiality.

We have two alternatives in terms of levels of analyses, individual and aggregation. As discussed later, individual data can be sourced from Labor Force Surveys (LFSs) and Vietnam Household Living Standard Surveys (VHLSSs). Only individual cross-sectional data is available from LFSs. Panel data can be constructed from VHLSSs but we face the problem of attrition. The

problem is more serious in the case of total employment than the case of transitions across types of employment as people already having jobs are less likely to move, the main reason of attrition.

Therefore, we use aggregate data to examine the effects of the minimum wage increases on the number employment or the employment rate as an alternative, of a given location over time. Inclusions of both the total working-age population and proportion of migrant workers as explanatory variables shall partially capture the effects of demographic changes. As estimation with total employment face the problem of almost identity, in empirical analysis later, we use the employment rate- the ratio of full-time employment to the corresponding age population- as an alternative. Specifically, we calculate the employment rate of each group of districts with the same level of the minimum wage within provinces and regress this variable on the minimum wage applied for that group of districts and other employment characteristics of the group such as average education of people, ethnicity composition and proportion of immigrants.

Specifically, the employment rate, S_{djt} , of group of districts d of province j at time t are explained by the following function:

$$S_{djt} = \beta_0 + X_{djt}\beta_1 + MW_{djt}\beta_2 + \pi_{dj} + \tau + u_{idjt} \quad (1)$$

X_{djt} are characteristics of groups of district d in province j and time t ; MW_{djt} is the minimum wage applied for the group of districts at time t . π_{dj}, τ are fixed effects of groups of districts, and time fixed effects respectively.

With this aggregation, we have 141 units per year nationwide. Given the availability of LFS over years, we can calculate the data and construct panel data for the units over year. Consequently, fixed effect panel models can be employed.

To capture the possibilities of difference in time trends across groups, interaction between years and groups can be also included in the models.

$$S_{djt} = \beta_0 + X_{djt}\beta_1 + MW_{djt}\beta_2 + \pi_{dj} + \tau + \tau\pi_{dj} + u_{ijt} \quad (2)$$

The above two models capture only immediate effects of the minimum wage on the employment rate. However, there is a possibility of effect of the minimum wage on employment over time (Meer and West, 2016). Under this circumstance, the effect of the minimum wage lasts for a certain period rather than a unique simultaneous change. If it is the case, model (2) suffers from an inaccuracy in capturing the effect of the minimum wage on employment.

Therefore, both models have to be modified to capture the effects on the employment rate over time. Meer and West (2016) propose to include lagged minimum wage in the models under the circumstance. Given that, lagged variables are added to (2) to form:

$$S_{djt} = \beta_0 + X_{djt}\beta_1 + \sum_{l=0}^s MW_{djt-l}\beta_{2l} + \pi_{dj} + \tau + \tau\pi_{dj} + u_{ijt} \quad (3)$$

Sum of β_{2l} is the total effects of the minimum wage on the employment rate.

Model (3) may suffer from instability if the number of lagged variables is large. If the lagged variable is far from the time of evaluation, there are potential factors which disturb the effects of the minimum wage and make difficult to establish a reliable causal association between the minimum wage and the employment effects. Therefore, Meer and West (2016) suggest using the dynamic panel model with a small number of lagged variables. However, in the current study, the study period is short and the instability should not be a serious problem.

In addition, (3) can be estimated with the first difference:

$$\Delta S_{djt} = \Delta X_{djt}\beta_1 + \sum_{l=0}^s \Delta MW_{djt-l}\beta_{2l} + \Delta\tau_{dj} + \pi_{dj} + \Delta u_{idjt} \quad (4)$$

We also borrow names of (3) and (4) as the fixed effect and the first difference from Meer and West (2016). One emerged question is that which specification is better. Both (3) and (4) are typical specifications for panel data. However, there is no criterion for deciding which one is better. For our case, as discussed later, (4) is preferred because it can get rid of the location determination of variance in our interest, the effects on the employment rate.

The models (3) and (4) can be estimated with and without trends of location as difference between (1) and (2). However, we do not know which specifications are more accurate as inclusion of trend shall capture unobservable trend effects but it can also mitigate estimated effects of the minimum wage on employment over time and results in bias in estimated coefficients of the minimum wage variables (Meer and West, 2016). If the effects are immediate and β_2 capture the full effects, with and without trend does matter. However, if the effects employment change over time, inclusion of trend would cause bias in estimated coefficient of β_{2i} .

As an effort to investigate correlation of the minimum wage effects and trends, we firstly test whether leading variables of the minimum wage are statistically significant. If the leading variables are statistically significant, there is a possibility of pre-existing trends which correlate with the minimum wage changes. Therefore, trend of location should be included in the model.

Therefore, (3) and (4) are firstly estimated to see possibilities of effects of the minimum wage on employment. Leading variables are added to (3) and (4) as a test for the existence of trends.

If the test indicates that trends possibly exist, the models with trends of locations as well as leading variables are our preferences.

The second question deals with movements across types of employment for who have a job. Ideally, different types of employments based on institutional sectors such as enterprises or household businesses, statuses at work, i.e. owners or wage workers and economic sectors can be defined. For example, there is a classification of four types of employments of (1) wage employment in formal sector of FDI sector, domestic private enterprises and SOE; (2) self-employment in agriculture; (3) self-employment in non-agriculture; and (4) wage employment in HHBs is relatively good in capture the context of the economy. However, the short period of study and low frequencies of changes across types of employments cause difficulties in estimations, especially when we work in sub-groups in terms of age and gender²³. Therefore, we only investigate two alternative types of: (1) wage employment in the formal sector; and (2) other type of employments. This classification is meaningful in two aspects. First, it can answer a question of whether the minimum wage regulation have negative effects on the modernization process; namely, increases in the proportion of employment in formal sector, of Vietnam's labor market. Second, it captures impacts on various sectors in terms of levels of exposing to regulations. The formal sector is normally defined as the covered sector which is directly regulated by the minimum wage scheme. Indeed, wage employment in household businesses is also object of the minimum wage scheme. However, compliance of the regulation in HHBs is very weak, less than 5% of wage workers in the sector have written contracts. Therefore, exposing to regulation differs greatly between the formal sector and the household businesses.

The approach for the total employment discussed above can be also applied for question of the effects on movements across types of employment. For example, we can estimate numbers of workers working in the formal sector or the ratio of number of employment in the formal sector to the total number of employment with the same set of explanatory variables for the case of the employment rate. However, this approach shall hide an important component of the modernization process of Vietnam labor market.

There are two main sources for increase of wage workers in the formal sector in the context of Vietnam. First, an increasing number of young laborers who have higher probability of working in the formal sector. Given shares of other age cohorts, for example, more than 30 years old

²³ We have tried to estimate the individual fixed effect multinomial logit model with method of Chamberlain (1980). However, estimation results cannot be retrieved for a majority of specifications.

decrease over time, this process leads to a higher total share of wage workers working in the formal sector. Second, movements of older workers who initially entered the labor markets with other types of employment to the formal sector. The first source is relatively natural in the case of Vietnam but it takes time to replace all current age cohorts. In addition, the net increases of the working age population get smaller, so the second source is more important over time.

Consequently, there is a question of whether the increase in the minimum wage has effects on the movement process of old workers to the formal sector. This question is better answered with individual data as individual characteristics which should be taken into account in investigation effects of the minimum wage. Aggregate data from the LFS as the case of the employment rate does not provide this kind of information. Fortunately, the individual panel-data from VHLSS perfectly meets the requirement.

Specifically, employment status P_{ikdjt} on different types of employment of individual i of type k of group of district d within province j at time t are explained by the following function:

$$P_{ikdjt} = \beta_0 + X_{idjt}\beta_1 + MW_{djt}\beta_2 + \pi_{idj} + \tau + u_{idjt} \quad (5)$$

X_{idjt} is characteristics of person i in district d in province j and time t ; MW_{djt} is the minimum wage applied for group of district d in province j and time t . π_{idj} , τ are individual, and the time fixed effects respectively. Because we introduce the individual-fixed effects in the models, we cannot include any location fixed effects. u_{idjt} is unobservable time-variant variables.

To capture the possibilities of differences in time trends across locations, interaction between time and locations shall be included in the models.

$$P_{ikdjt} = \beta_0 + X_{idjt}\beta_{12} + MW_{djt}\beta_2 + \pi_{idj} + \tau + \theta_{ir}\tau + u_{ijt} \quad (6)$$

Where θ_{ir} is location of individual i . Under this model, P_{ikdjt} take 1 if the person working as wage worker in the formal sector and 0 for other types of employment. Consequently, a logit model is suitable for estimation. Given availability of panel data of individuals, the individual fixed effect model is applicable. It is standard to estimate the fixed effect logit model with the conditional logit model.

Some economic environmental variables are included in (2), (3) and (4) in a number of studies of the same topic. For example, Hohberg and Lay (2015) include provinces' GDP as a control for economic condition differences across locations or Gindling and Terrell (2007) add the value added at industry level to control changes in demand over time. However, our sample includes people, who initial did not work in a previous period, working environmental variables are

impossible. Meanwhile, population characteristics such as age structure, average education, gender distribution and proportion of ethnic minority of groups of districts are included in our empirical models.

3.2. Impact of the minimum wage on wage distribution

To answer the second research question, we employ the model of Lee (1999) and the explicit form is from Bosch and Manacorda (2010), Hansen, Rand, and Torm (2015) and Autor et al. (2016).

Intuitively, the functional form of (3) with a dependent variable as the wage of individuals can be applied to investigate impacts of the minimum wage on income distribution by estimating the impacts at different quintiles. However, the observed wages are already affected by the minimum wage. Therefore, the conditional quintiles (on the observed wages) do not reflect the true effects of the minimum wage on the wages at specific quintiles. Consequently, we need the counterfactual wages without effects of the minimum wage, but this is unobservable. Therefore, we face a challenge of missing counterfactual if we evaluate the impacts of the minimum wage on the wage distribution (Hansen, Rand and Torm, 2015). To solve this problem, Lee (1999) develops an approach to estimate the relative ratios across quantiles of the “latent” wage distribution, the distribution without effects of the minimum wage.

The underlying assumption of this approach is that the “latent” distributions of income or the counterfactual distribution do not varies in terms of shape across times, locations, and types of ownerships. The differences are only means and variances.

Let assume that w_{kdjt}^{*q} is the q-th percentile of the latent log wage distribution of sector k of group of districts d in province j and time t, the distribution without the effect of the minimum wage; w_{kdjt}^q is q-th percentile of the observed wage distribution of the same sector, group of districts in the province and time.

It is further assumed that there is existence of a sufficiently high percentile p that at that percentile and higher ones, the minimum wage does not affect the wage. If the minimum wage only has the censoring effects that wages under the minimum wage are increased exactly to the minimum wage. We have a censoring model as:

$$w_{kdjt}^q - w_{kdjt}^p = w_{kdjt}^{*q} - w_{kdjt}^{*p} \quad \text{if } w_{kdjt}^{*q} \geq MW_{kdjt}$$

$$w_{kdjt}^q - w_{kdjt}^p = MW_{kdjt} - w_{kdjt}^p \quad \text{if } w_{kdjt}^{*q} < MW_{kdjt}$$

MW_{djt} is the minimum wage of group of districts d in province j and time t.

Removing the censoring assumption, $w_{kdjt}^q - w_{kdjt}^p$ is affected the minimum wage and the “latent” income differential, $w_{kdjt}^{*q} - w_{kdjt}^{*p}$.

Let define $MW_{kdjt} - w_{kdjt}^p$ as the “effective minimum wage” and allowing for non-linear effects of the minimum wage. The quadratic term is included to capture dependences of marginal effects the level of the effective minimum wage as followed Lee (1999).

Effects of the minimum wage on the wage distribution can be estimated with:

$$w_{kdjt}^q - w_{kdjt}^p = \beta_{1,q} (MW_{sdjt} - w_{kdjt}^p) + \beta_{2,q} (MW_{sdjt} - w_{kdjt}^p)^2 + \gamma_{k,q} + \delta_{dj,q} + \tau_{t,q} + (\gamma\delta)_{k,j} + (\gamma\tau)_{k,t} + (\delta\tau)_{j,t} + \beta_{x,q} \overline{X}_{kdjt} + \epsilon_{jkt,p} \quad (7)$$

\overline{X}_{kdjt} are averages of the selected individual specific characteristics of sector k of group of district d in province j and time t. $\delta_{dj,q}$ and $\tau_{t,q}$ are groups of district and time factors respectively and terms in parentheses are interactions of these factors.

One of empirical issues is to set pth percentile. Studies of the US (Lee, 1999; Autor et al., 2016) use the median. Meanwhile, studies using the same approach for developing countries often set at higher percentiles, for example in a study of Leckcivilize (2015) for Thailand, the p is the 60th percentile and Bosch and Manacorda (2010) argue that the threshold should be set at the 70th percentile for the case of Mexico. Therefore, in the current study, we shall conduct some examinations for a valid threshold in the context of Vietnam.

3.3. Estimation strategies

As noted, the model of movements across types of employment shall include measures of trend. Initially, the trend of groups of districts which have the same level of the minimum wage within provinces is controlled for. However, this trend is possibly too heavy for the model given that we already employ individual-fixed effects. Therefore, the trend of districts with the same levels of the minimum wage within geographic regions²⁴ of the country is used when the trend of groups of districts within provinces is impossible.

The model of Lee (1999) discussed above may suffer from a problem of measurement errors, as the observed wages are used to estimate percentiles for both the dependent variable and the effective minimum wage as an independent one in (7). In addition, if there are shocks that affect both the pth percentile and differences between this percentile and specific percentiles, the OLS estimation of (7) would be biased (Autor et al., 2016). Therefore, the two-stage least square (2SLS) estimation with instrumental variables proposed by Autor et al. (2016) is

²⁴ We use 8 geographic regions as the previous classification.

employed to overcome this. Specifically, the real minimum wage is used as an instrumental variable for the effective minimum wage. The square term of the minimum wage and interaction between the minimum wage and average of the median of the wage are used as instruments for the square term of the effective minimum wage.

4. Data and Descriptive Analysis

4.1. Data sources and data construction

In this sub-section, we describe sources of primary data for empirical study, the procedures for calculation of aggregation figures of the model for the employment rate effects as well as estimate income percentiles for the model of effects on the wage distribution.

Data used in the current chapter is sourced from two survey series: (1) the Vietnam Labor Force Surveys (LFS) and Vietnam Household Living Standard Surveys. As panel data can be constructed from the latter survey, it is employed for investigating the transitions of types of employment. Meanwhile, the large sample sizes of the former survey allows us to aggregate employments for investigating the effects on the employment rate as well as estimate the wage percentiles for groups of districts within provinces for studying effects on the wage distribution.

In addition, we also conducted a qualitative survey in Hanoi and HCMC in 2016–2017 under the GMSNeT project to learn about the impacts and responses of firms to the increase in the minimum wage in practice. Different aspects such as firms' implementation of the minimum wage, its impacts on labor cost and firms' responses to the increase in the minimum wage were captured from interviews with 70 firms in different industries in the two cities.

For research questions answered with data from LFS, we restrict our sample to the 2011-2014 period as we cannot retrieve district identification for identifying grouping districts within provinces for years before 2011. The study of Hansen, Rand, and Torm (2015) restricts the study period from 2011 to 2013 to capture the “shock” increase in the year 2012. We extend one more year of 2014 to be able to include trends in the empirical models.

To estimate the effects on the employment rate, we need to calculate the total employment as well as total working-age population of each group of districts within provinces. Individual weights with the total of weights equals the population provided in LFSs allow us to calculate these figures.

One may concern about the representative of figures for each group of districts. The LFS surveys represent for rural and urban areas within province separately. The classifications of minimum wage levels within provinces are not identical to the urban and rural classification,

indeed. Therefore, figures for each group of districts is not fully secure its representativeness. However, the maximum number of levels of the minimum wage within a province is three, which is not too low level. Indeed, with 63 provinces, we have 126 representative areas. Meanwhile, we have 141 groups of districts which are modestly higher than the number of representative areas. Of course, the groups of districts are not identical to the urban and rural areas within provinces. As a result, a number of the groups secure the representativeness and other does not. However, the modest difference between the number of the groups and the number of representative areas implies that the under-representative of some groups of district is not a serious problem.

We restrict our sample to people aged 15 to 65. 15 is the youngest age of laborers defined in the Labor Code of Vietnam. Meanwhile, 55 and 60 are age for retirements for female and male laborers respectively. However, Oudin et al. (2013) estimate the median ages of stopping working of laborers in Vietnam in 2012 which are 64 and 67 for female and male laborers respectively. Therefore, we select 65 as the restriction for calculating the number of employments for both female and male laborers.

Another term should be defined is working status. By definition of Vietnam, any ones who work for more than 1 hour per week are considered as having employment. This definition apparently includes part-time jobs. However, our interest is laborers whose working is their main activity; namely, they do not go to school or house-work is not their main activity. To determine this, we base on working times. We only define who works for more than 20 hour per week as having a job and does not take into account who works for less than 20 hours per week. It is hard to define how many working hours should be applied. One may base on the maximum hours that one is allowed to work as part-time jobs, for example, maximum number of hour that one student can work. However, this regulation does not exist in Vietnam. Therefore, we borrow it from other economies, France and Australia in specific, of which the maximum hour that one can work on all part-time jobs is 20 hour per week.

Monthly wage and benefits are separately asked for each job. Unfortunately, incomes of self-employed or family workers are not available. Therefore, only compensation of wage workers is included in analysis.

To apply the estimation procedure for investigation of the effect of the minimum wage on the wage distribution as presented in Section 3, we need to select a level of aggregation to estimate wage percentiles. Location is the base for aggregation as means and variances of the latent wage distribution are allowed to be different across locations. Another criterion is that

minimum wage must vary across aggregations. Papers for the U.S often select states as the aggregation.

We also start with provinces as the level of aggregation. However, the applied minimum wage is not homogenous within a province. Therefore, we divide a province into groups of districts based on levels of the minimum wage which are applied for the groups of districts. Put differently, districts within a province which have the same applied minimum wage are grouped into one.

However, groups of districts within provinces for applying the same minimum wage have been only stable since 2012 and it was significantly different from that of the 2011. That, a number of districts classified as the second region of the minimum wage scheme in 2011 has been defined as the first one since 2012. For example, quarters and a number of districts of Hai Phong city were classified as the second minimum wage region in 2011 but they have been considered as the first one since 2012. Consequently, we use the group of districts since 2012 as the criterion for separation of districts within provinces. This classification secures groups of districts identically over time. One issue is that the minimum wage in 2011 was different across districts within some groups based on 2012 classification as they belonged to different minimum wage regions in the year. Therefore, the minimum wage in regressions for the groups of districts which had different minimum wage rates in 2011 is the average of minimum wage rates applied for observations within these groups in 2011.

Another problem is when we work at sectors within a group of districts in a given province (hereafter refers as sectors) as well as further separation of gender and age is small number of observations for percentile estimation. If we restrict to groups of districts with a certain number of observations; namely, over 100 observations, bias problem potentially emerges as excluded sectors is mainly in low development regions which have low proportion of wage workers and low population density. However, if we include all samples, wage percentiles of sectors of groups of districts with small numbers of observations may be imprecisely estimated. Consequently, we select a sample with 50 observations or more. The reason for dropping the sectors with small number of observations is that outliers of estimated percentiles are easy to be arisen when number of observations is small. Indeed, both number of observations and total wage-workers of excluded sectors of groups of districts account for less than 1% of total observations or total wage-workers²⁵.

²⁵ The number of wage workers is estimated with weights provided in the LFSs.

Since 2011, LFS is conducted on a monthly basis and rotation strategy. A sample of a quarter represents the national wide. Each household is in the two consecutive quarters and then excluded from the sample. Therefore, each individual is theoretically surveyed twice within a year. However, a number of observations of which identifiers indicate that they belong to the same people but some information such as age or gender are inconsistent between two survey times. In addition, we only keep one observation per year for individuals surveyed two times. Therefore, we have to clean the data before analysis. The procedure for data cleaning as well as keeping one observation for those surveyed twice is presented in Appendix 2-1.

VHLSS has been also designed as a rotation survey. Theoretically, we can construct two-wave panels of a half of observations and a three-wave panel of one quarter of observations for 2010-2012-2014. Attrition rates of VHLSSs are moderate at about 10% as we estimated from previous rounds surveys. Therefore, data of the survey is suitable for the empirical model of transition across types of employment both in terms of data availability and number of observations. As its rotation mechanism, one-fourth of VHLSS 2010 is theoretically resurveyed in 2014. Consequently, there are two panels that we can construct from VHLSS 2010-2012-2014.

The three-wave-balance panel is the balance panel of 2010-2012-2014, the acquired sample size is 6,328 individuals (3×18984 observations). With 37,012 of individuals of VHLSS 2010, the theoretical sample size of three-wave-balance panel is about 9,250 individuals (as the VHLSS is rotated with a half of re-surveying in the following round, the theoretical three-wave-balance panel is one fourth of the sample in 2010). So, the attrition rate is about 31.6%.

The three-wave-unbalance panel data is constructed as the combination of two-wave panels of 2010-2012 and 2012-2014, the panel includes 6,328 individuals of three-wave-balance panel and observations of individuals of two-wave panels of 2010-2012 and 2012-2014. The sample includes 6,328 individuals of three-wave balance panel and 17,041 individual of two-wave-panels, the total number of observations is 53,066. With our rough calculation, the theoretical number of observations for this three-wave-unbalance panel is about 64,417 observations in total and the attrition rate is 17.7%.

We prefer the three-wave-unbalance panel as it is a hybrid of the three-wave-balance panel and the pooled cross-sectional sample, and have advantages over the two remaining samples. Compared to the latter, the former has a number of advantages: (i) it is significantly larger; (ii) the attrition rate is considerably lower; and (iii) the sample is better in reflecting the whole labor market as the lower attrition rate as well as less restrictive groups of individuals. Meanwhile, fixed effect models are still applicable.

Consequently, the total number of individual-year observations are 53,066; of which, 18,984 are three-wave-panels and 34,082 are two-wave panels. However, the panel needs to be cleaned as there are potential errors in the panel over years. The identification information may not identify the same persons over time. Our cleaning procedure is relatively simple, persons with inconsistent information of birth years and genders are dropped from the sample. This procedure excludes 2,697 observations and we have 50,369 individual-year observations. With restricted ages of 15-65, our final sample comes up with 38,360 individual-year observations.

4.2. Descriptive analysis

4.2.1. Minimum wage and incomes

Table 2-2 presents proportions of wage workers earning below the minimum wage (the binding ratio) across groups in the study period. In general, the binding ratio tremendously increased in the study period. The binding ratio for the whole non-farm wage workers increased by more than 3 times after 5 years, from 3.8% to 13%. This ratio increased annually but at different rates. It was double in 2012, which was consistent with changes in the real minimum wage.

Table 2-2. Proportion of workers receiving wage below the minimum wage (%)

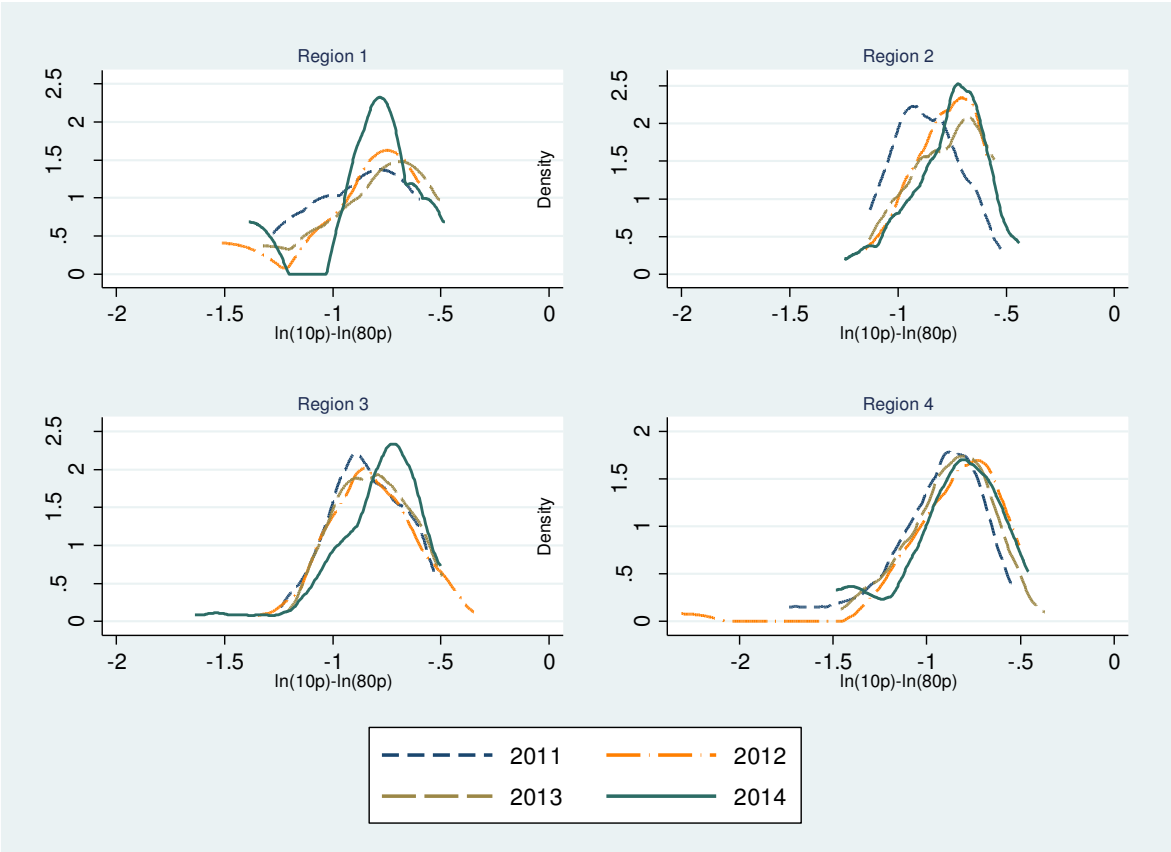
	2011			2012		
	All non-farm wage	Non-farm formal	Non-farm informal	All non-farm wage	Non-farm formal	Non-farm informal
All sample	3.78	1.36	6.94	7.87	3.13	14.15
Gender						
Female	6.82	1.82	17.56	12.52	3.75	31.36
Male	1.94	0.99	2.88	4.97	2.60	7.35
Age						
Adult (30-65)	3.92	1.33	6.75	8.04	3.09	13.61
Young (15-29)	3.62	1.40	7.23	7.62	3.17	15.08
	2013			2014		
	All non-farm wage	Non-farm formal	Non-farm informal	All non-farm wage	Non-farm formal	Non-farm informal
All sample	10.55	4.24	18.61	11.60	5.06	20.55
Gender						
Female	16.60	5.14	40.94	16.89	5.83	42.14
Male	6.69	3.43	9.75	8.10	4.35	11.83
Age						
Adult (30-65)	10.61	3.86	18.05	11.71	4.76	19.82
Young (15-29)	10.46	4.71	19.62	11.44	5.45	21.97

Source: Authors' calculation with data from LFS 2011, 2012, 2013, and 2014.

The binding ratio was higher for female wage workers, compared with their male counterparts. The difference across genders was widened in the absolute term but narrowed down in the relative term, i.e. the ratio between the binding ratios of the two genders. This result could be partially explained by an extremely low binding ratio of the male wage workers in 2011 that only a small gap between the two genders in the absolute term resulted in a large difference in the relative term. It is interesting that a gap in the binding ratio by gender was mainly due to differences in the informal sector. The difference in the formal sector between the two genders were consistently less than 2% in all years but the gap was 29% in the informal sector in 2014.

The gap between young and adult wage workers was only slightly different and the patterns of different were somewhat the same in formal and informal sectors. Possibly, higher levels education of new entrants in the labor market compensated their lack of experiences.

Figure 2-2. Distribution of $\log(10p)-\log(80p)$



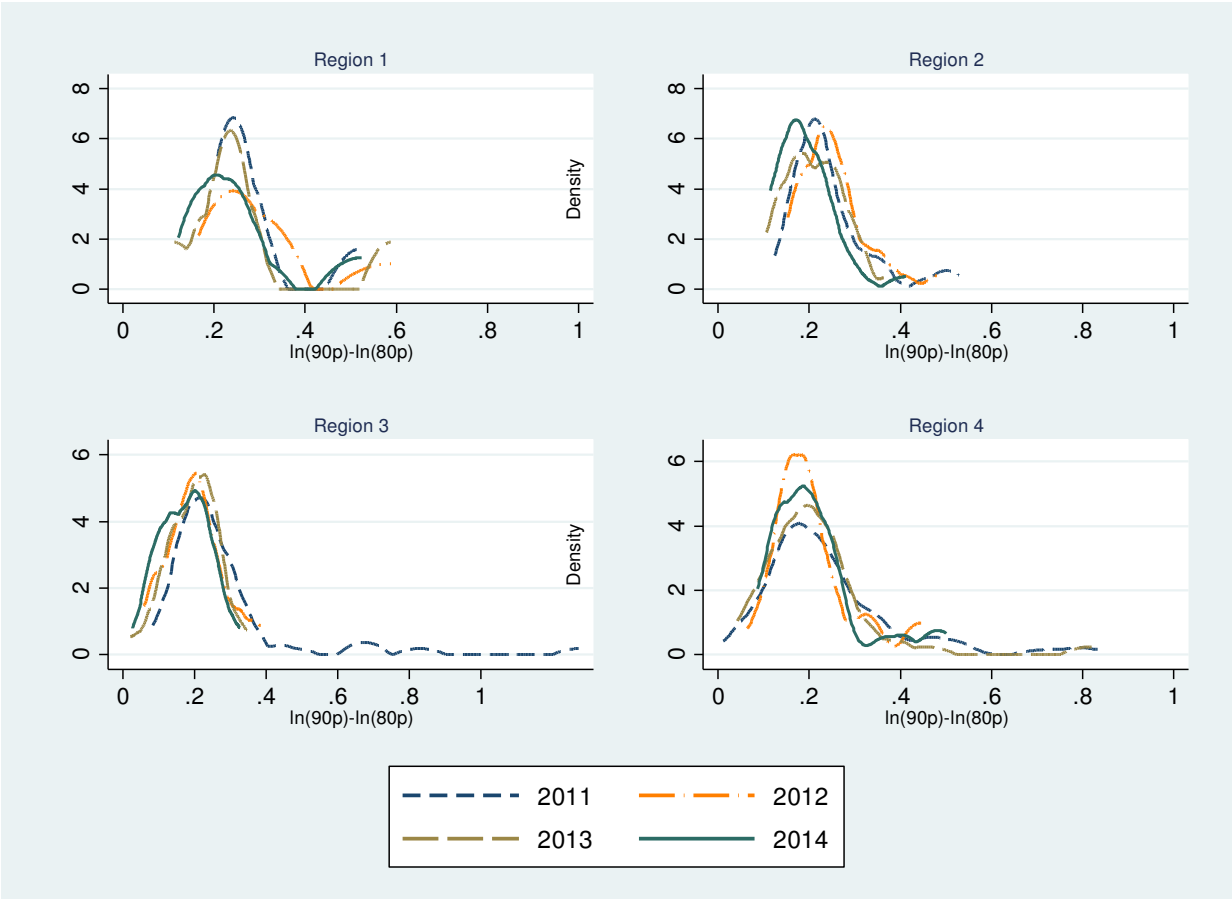
Source: Authors’ estimation with data from LFS 2011-2014.

We now turn directly to the gaps between different percentiles. As detailed later, the percentile at which the minimum wage does not affect the “latent” wage is the 80th one. Therefore, we

investigate the gaps between different percentiles and this percentile. Beside the changes in the relative percentiles, we also pay attention to the differences across regions (variances in independent variables).

Figure 2-2 depicts distributions of $\log(p_{10})-\log(p_{80})$ over the study period. As we estimate the distribution for each group of districts with the same minimum wage level within provinces, the number of observations varies across the minimum wage regions. In 2011, the number of observations for the minimum wage regions within provinces are, in turn, 6, 27, 54, and 47 for the first, second, third and fourth regions. Meanwhile, the corresponding numbers of observations in 2014 are 6, 26, 55 and 46 respectively. The number varies over years as well as was lower than the number of groups of districts because groups of districts with less than 50 observations are excluded.

Figure 2-3. Distribution of $\log(90p)-\log(80p)$



Source: Authors' estimation with data from LFS 2011-2014.

There were two common patterns of changes in $\ln(10p)-\ln(80p)$. But it should be noted that the number of observations in the first region is small and its distribution is just for reference. Moving to the right of the distribution indicating a narrowing gap between the two percentiles was observed for the fourth region in 2012, comparing with 2011 but then the gap moved back a little bit for 2013 and 2014. Moving to the right of the distribution in 2012 was also observed for the second region but then the gap did not moved back to the 2011 situation. On the contrary, the distribution of gap was relative stable in the period of 2011-2013 and then moved to the right in 2014 for the third region. During 2011 and 2014, there were apparent improvements in the distribution of the gap for the second and third regions. Meanwhile, the improvement for the fourth region was also observed but it was not as clear as other regions.

Opposite to patterns of the gap between $\log(10p)-\ln(80p)$ across groups of districts, more changes in the gap between $\log(90p)-\ln(80p)$ (Figure 2-3) was observed for the fourth region and fewer changes were observed for the second and the third regions. Indeed, increase in the gap demonstrated by movement of the distribution to the right was only observed for the fourth region. Meanwhile modest reductions in the gap were found for the second and the third regions. This indicates a compression in the wage distribution. Therefore, distributions of the gap indicate compressions in the wage distribution for the second and the third regions. Meanwhile, the compression was less clear for the fourth region.

4.2.2. Employment rates

Table 2-3 presents the employment rates of the whole population and different groups in 2011 - 2014. In this period, the rate was nationwide declined by more than 2%. Furthermore, the decline was gradual over years with the biggest drop in the 2011-2012 period. This pattern coincides with increases in the minimum wage in the same period. This decline trend was also observed for all minimum wage regions except the first one, of which the rates increases in 2012 and 2013 and the figure of 2014 was only slightly lower than that of 2011. With these patterns of changes, it is quite ambiguous about the effects of the increases in the minimum wage on the employment rates. Whether the changes in the minimum wage have played a role or the changes have been determined by trends.

By gender, there was no clear difference in variances over years in the rates between the genders, the proportions declined at almost the same rates, about more than 2%, in the study period, for both genders. However, the patterns of variances were different between genders in the minimum wage regions. The patterns of changes were somewhat the same between the two genders in the second and the third regions. However, they were different in the first and the fourth regions. In the first region, the rate for the female sub-group slightly increased in

2014, compared with that of 2011. Meanwhile, a significant decline was observed for the male sub-group. The gradual decline trends were found for both genders in the fourth regions but the rates of decline was different. Compared with 2011, the rates for the female and male sub-groups in the region decreased by 3.7% and 2% by 2014, respectively. This difference in the changes of the rates might indicate differed effects of the minimum wage across sub-groups. However, the associations with the pattern of change in the minimum wage and the changes in the employment rates are not clear, the same as the case of the overall employment rate.

Table 2-3. Employment rates of population aged 15-65 (%)

	All	Female	Male	Young (15-29)	Adult (30-65)
The whole economy					
2011	76.16	71.68	80.75	62.98	83.05
2012	75.13	70.89	79.46	61.16	81.72
2013	74.59	70.00	79.28	60.72	80.80
2014	74.03	69.54	78.61	60.39	79.85
Region 1					
	All	Female	Male	Young (15-29)	Adult (30-65)
2011	69.94	63.92	76.41	57.38	76.89
2012	70.35	65.05	76.05	58.45	76.26
2013	70.16	64.88	75.89	57.17	76.13
2014	69.27	64.18	74.69	56.43	74.96
Region 2					
	All	Female	Male	Young (15-29)	Adult (30-65)
2011	74.10	69.47	78.96	57.81	82.45
2012	72.56	68.42	76.90	56.32	80.10
2013	73.46	69.46	77.70	56.75	81.00
2014	71.99	67.81	76.30	55.47	78.99
Region 3					
	All	Female	Male	Young (15-29)	Adult (30-65)
2011	75.33	70.59	80.12	60.19	82.75
2012	74.42	70.09	78.82	58.56	81.37
2013	73.44	68.73	78.24	57.36	80.22
2014	73.42	69.20	77.69	57.77	79.78
Region 4					
	All	Female	Male	Young (15-29)	Adult (30-65)
2011	79.73	76.19	83.29	67.95	85.96

2012	78.20	74.55	81.81	64.70	84.63
2013	77.33	73.07	81.55	64.74	83.05
2014	76.93	72.58	81.29	64.57	82.24

Source: Authors' calculation with data from LFS 2011, 2012, 2013 and 2014.

By age, the employment rates decreased for both young and adult cohorts. In 2011-2014, the rates fell by 2,6% and 3,2% for the young and adult cohorts, respectively. The patterns of changes were also relatively consistent between the two sub-groups across the regions except the first one. In 2012, the rate of the young cohort in the first region increased but it is decreased for the adult sub-groups. Given these differences, we may expect the effects of the increase in the minimum wage are stronger for the adult sub-group.

Turing to the proportion of formal wage worker in the total employment, a significant increase was observed nationwide from 15.9% in 2010 to 20.5% in 2014. In the modernization process, increases in the number of wage earners in the formal sector seem profound in the labor market. However, patterns of increase in sub-periods still support the argument that the increase in the minimum wage would negatively affect employment in the formal sector. In 2012, when the minimum wage increased drastically, the increase in the proportion of wage workers in the formal sector was lower than that of 2014 when the minimum wage increase was moderate. The significant increase in the proportion indicates trends play an important role in determining labor allocation in the study period that we have to control for.

However, the increase is uneven across regions. The lower the level of development was, the lower increase in the proportion of wage workers in the formal sector, that the absolute increase in the first region was more than triple to that of the fourth region. Indeed, the increases in the minimum wage after adjusted for regional price index were only modestly different in the two regions. Meanwhile, the second and the third regions which had the lowest increases in the real minimum wage also had considerable increases in the proportions. . Therefore, if we do not control for trends, there is a potentiality of a suspiciously positive association between the increases in the minimum wage and the increases in the proportions of wage employment in the formal sector.

One interesting result is that increases in the proportion of wage employment in the formal sector were higher for the female and young cohorts. The increases in these sub-groups are about double to those of their male and adult counterparts. The growth of the low technology-export industries in Vietnam which is favorable to the female workers can be a reason for the different increases between genders. Meanwhile, higher education and physical strength are also preferences of firms in these industries to employ young workers; this fact is a reason for

the higher increase in the proportion of the young sub-group. The opposite trends in sub-groups by age and gender are different from predictions of impacts of the minimum wages. Female or young workers are expected to be more hit by the minimum wage as these sub-groups often have lower income, compared with their male or adult counterparts. Therefore, this result, one again, emphasize importance of trends in determining proportion of wage worker in the formal sector.

Table 2-4. Proportion of wage employment in the formal sector in the total employment (%)

	All	Female	Male	Young (15-29)	Adult (30-65)
The whole economy					
2010	15.90	14.15	17.61	23.96	12.15
2012	17.55	16.40	18.66	27.76	13.31
2014	20.51	20.39	20.62	32.08	16.19
Region 1					
	All	Female	Male	Young (15-29)	Adult (30-65)
2010	41.39	39.51	43.22	57.75	33.33
2012	44.27	42.57	45.91	63.64	36.25
2014	49.09	49.05	49.12	69.79	41.30
Region 2					
	All	Female	Male	Young (15-29)	Adult (30-65)
2010	20.01	17.70	22.36	32.91	15.04
2012	23.06	22.28	23.86	43.36	15.42
2014	26.97	26.06	27.89	45.62	20.42
Region 3					
	All	Female	Male	Young (15-29)	Adult (30-65)
2010	15.04	13.56	16.46	26.12	10.43
2012	17.62	16.44	18.79	31.69	12.09
2014	19.67	19.60	19.73	36.95	13.90
Region 4					
	All	Female	Male	Young (15-29)	Adult (30-65)
2010	6.66	4.96	8.33	9.99	5.02
2012	7.29	6.20	8.33	11.28	5.55
2014	8.74	8.74	8.74	13.72	6.78

Source: Authors' calculation with data from VHLSS 2010, 2012, and 2014.

5. Estimation results

5.1. Employment effects

5.1.1. Employment rates

Normally, the dependent variable of (1), (2) (3) and (4) is total employment of working age population and various sub-groups under investigation. Under specifications of (1), (2), and (3) for total employment, population in corresponding age ranges, 15-65 in our study, as well as those of the sub-groups are added as an explanatory variable. Our initial results with these specifications for total employment are almost identical provided that the study period is short. Put differently, the R-square of estimation reach about 99%, especially when both location (groups of districts) fixed effect and their time trends are controlled for. Therefore, we estimate the effects of the minimum wage on the employment rate. Even those, the R-squares of the estimations are still very high, of more than 90% as exhibited in Appendix 2-2. This situation is attributed to a heavy dominance of the variance of the fixed employment rates across groups of districts over their time variance. Therefore, we prefer the first difference specification as it is free of the location fixed employment rate. However, we also refer to the results of fixed effect specification as a consistency comparison.

The number of lagged variables which should be included in estimation can be tested in an ideal phenomenon. However, the short study period restrict us to do so. Consequently, we include lagged variables of three years. The same years for leading variables are also applied when we investigate possibility of existence of trends.

We firstly investigate appropriate specification of models, with or without location- groups of district- trends, we name as the decisive specification. The selection criterion is whether the leading variables of the minimum wage are statistically significant. If the leading variables are all insignificant, the specification without location trends is preferential and *vice versa*. The main specification for our decision is one with all three lagged and leading variables of the minimum wage, of which the estimation results are presented in column (3) of Table 2-5.

One may concern about the overall significance of the first difference estimation. There are some cases that R-squares are less than 10% and a specification for the female sub-group which the overall significance is only marginally significant at 10%. However, all other cases, the overall significance is significant at 5% for the female sub-group and at 1% for all specifications for the whole population and other sub-groups. Therefore, our specifications are meaningful for evaluating the association between the changes in the minimum wage and the employment rates.

Table 2-5. Effects of change in the minimum wage on change in employment rates: the first difference

Variables	(1)	(2)	(3)	(4)	(5)	(6)
The whole population						
ln(MW)	-0.032 (0.035)	-0.011 (0.048)	-0.009 (0.048)	-0.019 (0.041)	0.043 (0.095)	0.008 (0.150)
First lag of ln(MW)		0.012 (0.029)	-0.001 (0.030)		0.055 (0.072)	0.023 (0.099)
Second lag of ln(MW)		0.030 (0.023)	0.036 (0.028)		0.074 (0.078)	0.059 (0.084)
Third lag of ln(MW)		0.016 (0.026)	0.026 (0.028)		0.066 (0.095)	0.054 (0.095)
First lead of ln(MW)			-0.125* (0.064)			-0.114 (0.152)
Second lead of ln(MW)			0.054 (0.048)			0.038 (0.138)
Third lead of ln(MW)			-0.001 (0.138)			-0.107 (0.154)
Trend	No	No	No	Yes	Yes	Yes
Observations	423	423	423	423	423	423
Prob > F	0.0017	0.0013	0.0007	0.0018	0.0037	0.0000
R-squared	0.080	0.086	0.099	0.251	0.256	0.266
Female						
ln(MW)	-0.032 (0.040)	0.016 (0.053)	0.019 (0.052)	-0.002 (0.046)	0.178* (0.102)	0.190 (0.171)
First lag of ln(MW)		0.037 (0.034)	0.025 (0.036)		0.170** (0.079)	0.159 (0.110)
Second lag of ln(MW)		0.055** (0.027)	0.069** (0.032)		0.202** (0.086)	0.194** (0.093)
Third lag of ln(MW)		0.038 (0.030)	0.055* (0.032)		0.201* (0.106)	0.191* (0.106)
First lead of ln(MW)			-0.165** (0.068)			-0.035 (0.169)
Second lead of ln(MW)			0.017 (0.060)			0.105 (0.156)
Third lead of ln(MW)			0.034 (0.170)			-0.016 (0.191)
Trend	No	No	No	Yes	Yes	Yes
Observations	423	423	423	423	423	423
Prob > F	0.0773	0.0311	0.0162	0.0000	0.0000	0.0000
R-squared	0.052	0.068	0.081	0.226	0.246	0.252
Male						
ln(MW)	-0.025 (0.038)	-0.028 (0.055)	-0.027 (0.054)	-0.029 (0.043)	-0.037 (0.101)	-0.120 (0.151)
First lag of ln(MW)		-0.011 (0.032)	-0.026 (0.033)		-0.024 (0.079)	-0.081 (0.102)
Second lag of ln(MW)		0.013	0.015		-0.004	-0.026

		(0.026)	(0.029)		(0.089)	(0.093)
Third lag of ln(MW)		-0.019	-0.012		-0.040	-0.051
		(0.028)	(0.031)		(0.113)	(0.113)
First lead of ln(MW)			-0.106			-0.193
			(0.069)			(0.160)
Second lead of ln(MW)			0.069			-0.026
			(0.052)			(0.142)
Third lead of ln(MW)			0.002			-0.112
			(0.128)			(0.158)
Trend	No	No	No	Yes	Yes	Yes
Observations	423	423	423	423	423	423
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.114	0.118	0.128	0.265	0.268	0.279
Young (15-29)						
ln(MW)	-0.074*	-0.021	-0.017	-0.051	0.102	0.128
	(0.039)	(0.055)	(0.053)	(0.052)	(0.113)	(0.164)
First lag of ln(MW)		0.065*	0.042		0.119	0.098
		(0.033)	(0.032)		(0.088)	(0.106)
Second lag of ln(MW)		-0.005	0.008		0.020	0.007
		(0.032)	(0.034)		(0.099)	(0.098)
Third lag of ln(MW)		0.005	0.022		-0.014	-0.029
		(0.031)	(0.032)		(0.133)	(0.126)
First lead of ln(MW)			-0.209**			-0.068
			(0.090)			(0.181)
Second lead of ln(MW)			0.067			0.191
			(0.064)			(0.171)
Third lead of ln(MW)			0.055			0.045
			(0.256)			(0.284)
Trend	No	No	No	Yes	Yes	Yes
Observations	423	423	423	423	423	423
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.426	0.433	0.447	0.538	0.549	0.560
Adults (30-65)						
ln(MW)	-0.000	0.011	0.012	0.006	0.054	0.036
	(0.041)	(0.054)	(0.054)	(0.047)	(0.098)	(0.160)
First lag of ln(MW)		-0.006	-0.015		0.054	0.041
		(0.030)	(0.032)		(0.074)	(0.103)
Second lag of ln(MW)		0.048*	0.048		0.133	0.128
		(0.025)	(0.030)		(0.081)	(0.090)
Third lag of ln(MW)		0.018	0.021		0.144	0.140
		(0.027)	(0.030)		(0.101)	(0.103)
First lead of ln(MW)			-0.057			-0.049
			(0.064)			(0.158)
Second lead of ln(MW)			0.044			0.001
			(0.060)			(0.139)
Third lead of ln(MW)			0.012			-0.046
			(0.126)			(0.173)

Trend	No	No	No	Yes	Yes	Yes
Observations	423	423	423	423	423	423
Prob > F	0.0003	0.0000	0.0001	0.0000	0.0000	0.0000
R-squared	0.135	0.147	0.150	0.263	0.277	0.279

The dependent variable: first difference of the employment rates.

Trend: groups of district with the same level of the minimum wage within provinces. In the first difference specification, trend turn into the fixed effects of group of district as the data unit.

Total population of corresponding sub-group is employed as probability weight in the estimation

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimation with data from LFS, 2011, 2012, 2013, and 2014.

Table 2-6. Summary of key results

Group	Decisive specification		Association between the minimum wage and the employment rates		Consistency in results of with and without trend	
	(1)	(2)	(3)	(4)	(5)	(6)
	The first difference	The fixed effect	The first difference	The fixed effect	The first difference	The fixed effect
The whole population	With trend	With trend	No	No	Yes	Yes
Female	With trend	With trend	Yes, positive for the second and third lags	Yes, positive for the second lag	Yes	Yes
Male	Without trend	With trend	No	No	Yes	Yes
Young Cohort	With trend	With trend	No	No	Yes	Yes
Adult cohort	Without trend	Without trend	No	Yes, positive for the second lag	Yes	No

Source: Authors with results of Table 2-5 and Appendix 2-2.

A summary of the decisive specification in Table 2-6 shows that a majority of our cases, the whole population, female and young cohort, needs trend in models for estimating the effects of the minimum wage on the employment rates. The first leading variable of these cases is statistically significant. Therefore, the estimation results of the specification with trend are used to evaluate associations between the changes in the minimum wage, its lagged values and in the employment rates. Meanwhile, other sub-groups of male and adult cohort, none of leading variables is statistically significant. Therefore, results of specification without trend are suitable for evaluating the association for these sub-groups.

The result with inclusion of the leading variables and location trends implies that the minimum wage does not affect the employment rates of the whole population and young cohort as shown in column (6) of Table 2-5. All first difference of intermediate and lagged variables of the minimum wage is insignificant although there are a couple of statistically significant variables in other specifications for the young cohort. A consistent result of no association between the minimum wage and the employment rates is also found for these groups across estimation specifications. Column (3) of Appendix 2-2 also indicates that the location trend should be added in the fixed effect model for these groups. Meanwhile, the result of the last column of the Appendix, when both leading variables and the location trend are included, depicts that none of the minimum wage variables are significant.

Results for the young cohort as well as results of the fixed effect specification for the whole population and the female sub-group with only the simultaneous variable of the minimum wage imply that the minimum wage would have negative impacts on the employment rates. When lagged variables are included in estimations, only the result for the young cohort under the fixed effect specification still indicates the negative impact. However, the result for the cohort with trend, which is demonstrated to be necessary, shows that the minimum wage does not have the negative impact on the cohort's employment rate. The difference in results of those specifications exhibit that both lagged variables as well as the trends should be explicitly considered when we evaluate the association.

A consistency of no association between the changes in the minimum wage and in the employment rate as well as between the minimum wage and the employment rate are also found for the male sub-group. Both results of Table 2-5 and Appendix 2-2 show that none of the current and lagged variables of the minimum wage are significant for the sub-group. The consistence in the result is further found in specifications with and without trends in both approaches.

However, there is an inconsistency between the results in the first difference specification and the fixed effect for the adult cohort. The former approach implies the change in the minimum wage does not associate with that of the employment rate for the sub-group. Meanwhile, the latter approach indicates a positive link of the second lagged variable of the minimum wage and the employment rate although the estimated coefficient is only marginally significant. Therefore, we cannot retrieve a reliable conclusion for this sub-group. Tentatively, the change in the minimum wage does not affect that of the employment rate of the cohort, both in terms of intermediate and lagged effects.

Meanwhile, positive and significant effects of the second and the third lags of the minimum wage on the employment rate are found for the female sub-group. Indeed, the magnitudes of the estimated effects are different between specifications of with and without trend. However, positive and significant effects of the lagged variables are consistent across different specifications of the fixed effect or the first difference, as well as with and without trend. This consistently positive effect is indeed quite counter-intuitive.

One possible mechanism for the positive effect is that the minimum wage increases the average wage and encourages more people entering the labor market. Hansen, Rand, and Torm (2015) find a strong and positive association between the minimum wage and the average wage for the period of 2011-2013 in Vietnam. Normally, the increase in labor supply faces the reduction of labor demand caused by the increase in the minimum wage and the employment rate still reduces with increase in the unemployment rate. However, self-employment in Vietnam is considerably popular and the laborers can create employment for themselves. If the increase in self-employment is higher than the reduction in employment caused by the increase in the minimum wage, the employment rate increases. This mechanism takes time as it needs time to increase the average income in the labor market first. For the female sub-group, the effect is after two years.

Beside the mechanism for the positively lagged effect on the employment rate as discussed in the previous paragraph, the context of Vietnam's labor market in the study period provides additionally underlying reasons for the result of insignificant effect or even the positive effect of the minimum wage in the employment rate as found for the whole population and its sub-groups. Firstly, the demographic trend makes the net incremental of the working-age population have significantly decreased in the period. Results of our calculations from LFSs are that the net increase of population aged 15-65 in 2011 was 942 thousand people, but the net increase reduced to 640 thousands, 312 thousands and 308 thousands in the year 2012, 2013, and 2014 respectively. This significant decline in the net incremental of the working age population in a short period would result in increase of working opportunities for all existing people as the economy have been used to operate with an average- increase of almost 1 million of the net increase in the working-age population per year. If there is a factor that negatively affects employments in the economy, the demographic trend would mitigate the impact. Furthermore, this enhances income-induced employment effects caused by the minimum wage increases as noted for the case of female sub-group.

Secondly, the compliance of labor regulations in Vietnam is weak. Our estimation from data of the 2014 enterprise census shows that there were about 40% of enterprises in Vietnam did not

contribute social insurance although it is compulsory for any labor contracts of more than three months. Therefore, it is suggested that the compliance of the minimum wage is not strong as well.

Indeed, a majority number of enterprises under our qualitative survey in Hanoi and HCMC reported that real compensations of their workers were higher than the minimum wage. The minimum wage was only used for calculating the compensation indicated in contracts which were the base for contributions of social, health and other wage related insurances. Under the current regulations in Vietnam, firms have to contribute about 22% of the compensations indicated in contracts for different types of insurances as listed above. Therefore, when the minimum wage increases, the majority number of firms directly faces only 22% of the increase.

Furthermore, firms also have the own schedules of increase in compensations which may coincide with the increases in the minimum wage. Therefore, about 60% of firms under the qualitative survey report of no effects of the changes in the minimum wage on their operation. The remaining of 40% said the minimum wage has affected but only a modest level. The second situation mitigates the impacts of the minimum wage in demand side. Meanwhile, the first situation neutralizes the negative impacts of the increases in the minimum wage, if any.

5.1.2. Movements across types of employment

For the movements of working people, we estimate the fixed effect conditional logit model with and without the trend. The estimation results for the whole working people and sub-groups are given in Table 2-7.

The Pseudo R2 of specifications with and without the trend is remarkably different for the movements across types of employment. The Pseudo R2 of the specification with the trends is almost more than double to that of the specification without trend for some cases. In addition, the inclusion of the trend alters the overall significance of the whole model for the case of sub-group of adult laborers. Without trends, the whole model is insignificant. This result confirms the importance of time trend in Vietnam's labor market as noted in Section 4.2.

For the whole working population, the estimated coefficients of the minimum wage and its square term are negative but statistically insignificant in the specification with the trend although they are statistically significant in one specification without the time trend. This result indicates that increases in the minimum wage do not affect the movements across types of employment.

Estimated coefficients for the sub-groups are negative in some cases that mean negative effects on probability of moving to the formal sector. However, they are also statistically insignificant.

Consequently, the minimum wage increases seem not affect labor movements across types of employments for these sub-groups. The weak compliance of regulation in Vietnam formal sector as discussed above is a potential reason for the insignificant result in the model of movements to the sector.

Table 2-7. The effects of the minimum wage on movements across types of employments

	(1)	(2)	(3)	(4)
The whole population				
Minimum Wage (log)	1.363 (1.014)	-27.748** (13.897)	-0.596 (1.487)	-34.072 (25.022)
Minimum Wage (log), square		2.012** (0.957)		2.428 (1.814)
2010	1.000 (0.780)	0.165 (0.876)	1.063 (1.110)	1.070 (1.105)
2012	0.261 (0.299)	0.167 (0.299)	0.527 (0.426)	0.729 (0.447)
2014			Base	
Trend	No	No	Yes	Yes
Prob > chi2	0.000	0.000	0.000	0.000
Pseudo R2	0.0436	0.0467	0.0698	0.0711
Observations	2055	2055	2055	2055
Minimum Wage (log) + 2* Minimum Wage (log), square*(mean of Minimum Wage (log))		0.369		-0.137
Wald test of the total effect equal zero		0.11		0.01
Female				
Minimum Wage (log)	0.853 (1.689)	-6.937 (24.972)	0.775 (2.812)	-1.096 (44.938)
Minimum Wage (log), square		0.537 (1.704)		0.135 (3.235)
2010	0.165 (1.476)	-0.073 (1.768)	1.813 (2.113)	1.810 (2.116)
2012	-0.117 (0.610)	-0.146 (0.626)	0.779 (0.816)	0.789 (0.853)
2014			Base	
Trend	No	No	Yes	Yes
Prob > chi2	0.000	0.000	0.000	0.000
Pseudo R2	0.1218	0.1220	0.1791	0.1791
Observations	747	747	747	747
Minimum Wage (log) + 2* Minimum Wage (log), square*(mean of Minimum Wage (log))		0.0570		0.795
Wald test of the total effect equal zero		0.08		0.08
Male				
Minimum Wage (log)	1.198 (1.323)	-42.020** (17.427)	-1.716 (1.951)	-47.616 (32.884)

Minimum Wage (log), square		2.985**		3.329
		(1.200)		(2.390)
2010	0.792	-0.578	-0.035	-0.059
	(1.105)	(1.275)	(1.542)	(1.569)
2012	0.237	0.031	0.167	0.425
	(0.435)	(0.464)	(0.604)	(0.642)
2014			Base	
Trend	No	No	Yes	Yes
Prob > chi2	0.0667	0.0198	0.0000	0.0000
Pseudo R2	0.0349	0.0413	0.0741	0.0763
Observations	1302	1302	1302	1302
Minimum Wage (log) + 2* Minimum Wage (log), square*(mean of Minimum Wage (log))		-0.302		-1.094
Wald test of the total effect equal zero		0.04		0.28
Young (15-29)				
Minimum Wage (log)	1.068	-47.405*	-2.550	-4.596
	(1.637)	(24.463)	(2.476)	(50.895)
Minimum Wage (log), square		3.351**		0.149
		(1.690)		(3.681)
2010	1.190	-0.256	1.888	1.896
	(1.438)	(1.596)	(2.332)	(2.330)
2012	0.461	0.273	1.301	1.318
	(0.592)	(0.582)	(0.996)	(1.067)
2014			Base	
Trend	No	No	Yes	Yes
Prob > chi2	0.0013	0.0012	0.0000	0.0000
Pseudo R2	0.1148	0.1231	0.2169	0.2170
Observations	701	701	701	701
Minimum Wage (log) + 2* Minimum Wage (log), square*(mean of Minimum Wage (log))		-0.574		-2.520
Wald test of the total effect equal zero		0.10		0.98
Adult (30-65)				
Minimum Wage (log)	2.691**	-22.769	1.223	-48.553
	(1.371)	(18.856)	(1.979)	(32.759)
Minimum Wage (log), square		1.763		3.615
		(1.303)		(2.383)
2010	1.962*	1.295	1.580	1.677
	(1.027)	(1.128)	(1.437)	(1.443)
2012	0.540	0.486	0.553	0.882
	(0.385)	(0.386)	(0.531)	(0.585)
2014			Base	
Trend	No	No	Yes	Yes
Prob > chi2	0.4298	0.4342	0.0000	0.0000
Pseudo R2	0.0281	0.0304	0.0602	0.0630
Observations	1193	1193	1193	1193

Minimum Wage (log) + 2* Minimum Wage (log), square*(mean of Minimum Wage (log))	1.872	1.968
Wald test of the total effect equal zero	1.56	0.91

The conditional logit model, the dependent variable is working in the formal sector versus other types of employment, it takes 1 if the person working in the formal sector and 0 otherwise.
Trend: groups of district with the same level of the minimum wage within geographic regions.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimation with data from VHLSS 2010, 2012, 2014.

5.2. Impacts on wage distribution

As the square-term of the effective minimum wage included in the estimation, we have to retrieve the total effect of the effective minimum wage by the formula that the total effect at mean is given by: coefficient of the first order of the effective minimum wage +2*(coefficient of the second order term)*(mean value of the effective minimum wage). Then, the total effect is tested for being different from zero. If the total estimated effect is positive, the increase in the minimum wage compresses the wage distribution to the threshold percentile and *vice versa*.

We separate sample into the formal sector of SOE, FDI and private domestic enterprises and non-farm HHBs as the informal sector²⁶. Unfortunately, tests for detecting the percentile for that the minimum wage does not affect it and higher percentiles are failed in the informal sector. Therefore, we cannot estimate the effects for the sector.

A key assumption of the model is the percentile from that the minimum wage does not affect the "latent" wage distribution; we name it as the threshold percentile. One implication of this assumption is that the effective minimum wage should not affect the gaps between that percentile and the higher ones. For the studies in US, the median is often used. Meanwhile, other studies for developing countries employ higher percentiles as discussed in Section 4.3. Therefore, we first evaluate which percentile is valid for the context of Vietnam.

To find the threshold percentile, we have to select a model. The model with trends is preferred as they can capture time-varying-location effects over time. In addition, the effective minimum wage is potentially endogenous. Therefore, it is tested against endogeneity to see whether OLS estimation is un-biased. If the effective minimum wage and its square term are endogenous, the estimation with instruments is employed to examine the validity of the threshold percentile.

²⁶ As noted in Chapter 1, the agricultural sector is not considered as the informal sector. Therefore, we also exclude the agricultural sector from the informal sector.

Starting with the 60th percentile as the threshold, of which the result is reported in Appendix 2-3 along with the result with the threshold of the 70th percentile given in Appendix 2-4. We examine whether the effective minimum wage affects the gaps between the threshold percentile and higher ones. For 70th and 80th percentiles, the endogenous test indicates that the effective minimum wage and its square term are exogenous. Therefore, the OLS results are un-biased and the insignificant effect implies that the condition is satisfied. For the 90th percentile, the test indicates the effective minimum wage and its square are endogenous. However, the test for validity of the instrumental variables implies that the instruments are invalid. Therefore, we do not have a proper estimation of the gap between the 60th and 90th percentiles and we cannot conclude whether the 60th percentile meet the condition of the model.

Moving to the 70th percentile, the effective minimum wage and its square are endogenous and the instruments are valid for estimation of both percentiles of 80th and 90th. The estimation results with the instruments imply that the effective minimum wage has significant effects on the gaps between percentiles of 80th and 90th and the 70th one. Therefore, the threshold of 70th percentile violates the condition.

However, the 80th percentile satisfies the condition. The effective minimum wage and its square term are endogenous and the instruments are valid. The estimation result indicates that effect of the effective minimum wage and its square term on gap between 80th and 90th percentiles is statistically insignificant or the condition is met. Therefore, the 80th is selected as the threshold.

The total effect of the effective minimum wage on the gaps between different percentiles, the 80th percentile, and statistics of relevant tests are present in Table 2-8. For the whole population, there are two percentiles of 20th and 30th of which the effective minimum wage and its square term are endogenous but the instruments are invalid. Meanwhile, remaining percentiles of the left to the 80th percentile are not suffered from the endogenous problem. The OLS estimation is thus un-biased for these percentiles.

All effect²⁷ is statistically significant at 1% level that indicates a strong association between the effective minimum wage and the wage distribution. The positive effects indicate a “compress” effect or the increase in the minimum wage shall narrow downs the gaps between the lower percentiles to the 80th percentile. Furthermore, the decreasing values of the effects for

²⁷ For the effects of the 20th and 30th percentile, the instruments are invalid but positive associations between the effective minimum wage and the gaps between these percentiles and the 80th percentile are depicted in both OLS and instrument estimations. Therefore, we can tentatively argue that the positive association is also found for these percentiles.

percentiles closing to the 80th percentile imply that the effects are stronger for percentiles which are far from the threshold. This result is similar to that reported in Hansen, Rand, and Torm (2015) that more “compress” effects are found for low percentiles. As the thresholds are different, the median in Hansen, Rand, and Torm (2015) and the 80th percentile in the current chapter, we cannot compare the magnitude of the effects. However, the trends of the effects are similar.

We now turn to effects of the minimum wage on the wage distribution of the sub-groups. The results with the threshold of 80th percentiles of the sub-groups with the trends are also reported in Table 2-8. The results of the same specifications without trends are provided in Appendix 2-5. We first evaluate whether the condition of no effects on higher percentiles is satisfied; namely, whether the effect of the effective minimum wage and its square term on the gaps between 80th and 90th percentile is significant. Again, depending on whether the effective minimum wage and its square term are endogenous, the OLS estimation or the estimation with the instruments is used for evaluation.

For sub-groups in terms of age, the OLS estimation is un-biased as the endogenous test implies there is no endogeneity. In addition, the effects on the gap between 80th and 90th percentiles are statistically insignificant. Therefore, 80th percentile satisfies the condition for these sub-groups. The effective minimum wage and its square term are endogenous in estimation of the gap between 80th and 90th percentiles for the female sub-group but the instruments are valid. Furthermore, the effect of the effective minimum wage on the gap in the result of the estimation with instrument is statistically insignificant. This result implies that the 80th percentile also meets the condition for the female sub-group. Meanwhile, the result of the endogenous test indicates that OLS estimation for the gap between 80th and 90th percentiles is unbiased in the male sub-group. However, the OLS estimation result shows that the effective minimum wage significantly associates with the gap. Consequently, the results for the male sub-group are not reliable and we cannot make comments on the result for the sub-group.

Table 2-8. Association between $\log(p) - \log(80p)$ and $\log(\text{minimum wage}) - \log(80p)$ at select percentiles of the wage distribution, specification trends.

	OLS	Instrument variable	Durbin test statistics	Wu–Hausman test statistics	Statistics of test of over-identification
The whole wage workers					
10p	0.7863***	0.4697	2.737	1.058	
20p	0.6749***	1.5027*	8.733**	2.909*	2.760*
30p	0.6875***	1.3397**	7.272**	2.522*	3.933**
40p	0.5812***	1.0312**	3.303	1.078	
50p	0.5294***	0.628**	0.247	0.087	

60p	0.4202***	0.5349**	0.327	0.101	
70p	0.2583***	-0.1418	4.361	1.375	
90p	-0.1054	1.6936	16.899***	4.956***	0.041
Female					
10p	0.8511***	0.8331***	2.084	0.620	
20p	0.6861***	0.6499***	2.231	0.611	
30p	0.6222***	0.6233***	0.018	0.005	
40p	0.6414***	0.5779***	2.397	1.046	
50p	0.5377***	0.5168***	0.961	0.349	
60p	0.4335***	0.3143***	8.163**	1.522	
70p	0.2345***	0.0953	15.036***	2.574*	0.132
90p	0.0082	0.2485	7.791**	2.110	
Male					
10p	0.6783***	-1.1392	5.200*	3.570**	0.172
20p	0.7246***	-0.0609	2.417	0.610	
30p	0.706***	-0.529	8.718**	2.580*	0.503
40p	0.6467***	-0.6743	12.718***	3.962**	0.354
50p	0.5562***	-1.1817	21.528***	7.255***	0.026
60p	0.4193***	-0.7653	12.613***	2.588*	0.001
70p	0.2208***	-0.4729	5.836*	0.872	
90p	-0.3766***	-1.4706	2.721	0.898	
Young (15-29)					
10p	0.8974***	0.4969**	2.832	0.658	
20p	0.6376***	0.6652***	0.284	0.074	
30p	0.5697***	0.6204***	4.068	0.818	
40p	0.5521***	0.6401***	7.577**	2.469*	15.195***
50p	0.4811***	0.5337***	2.689	0.695	
60p	0.4216***	0.4892***	2.298	0.658	
70p	0.3199***	0.5565***	5.360*	0.886	
90p	-0.073	0.2199	1.783	0.282	
Adult (30-65)					
10p	0.8162***	0.6882***	0.302	0.106	
20p	0.7588***	0.5089**	2.907	0.683	
30p	0.703***	0.3534	6.502**	1.608	
40p	0.6059***	0.1641	13.727***	5.089***	1.013
50p	0.5541***	-0.2082	33.715***	13.313***	0.268
60p	0.4684***	-0.011	16.372***	7.709***	0.047
70p	0.247***	0.1803	2.413	0.995	
90p	-0.0787	-0.3732	3.941	1.685	
Year fixed effect	Yes	Yes			
Group of district fixed effects	Yes	Yes			

Trends	Yes	Yes
*** p<0.01, ** p<0.05, * p<0.1		

Source: Authors' estimation with data from LFS 2011-2014.

For results of endogeneity test as well as validity of instruments for other percentiles for female, young and adult sub-groups, we have either no endogeneity or valid instruments for endogenous cases, except the 40th percentile for the young sub-group. Therefore, we have unbiased estimation results for almost percentiles of three sub-groups.

Comparing the results for the young and adult sub-groups, the effective minimum wage have stronger effects for the young cohort although the positive effects; namely, the “compress” effects are found in both cohorts. The effects are only significant for the gaps between the two lowest percentiles and the 80th percentile for the adult cohort. Meanwhile, the effects are statistically significant up to 70th percentile for the young one. In addition, the magnitudes of the effects are also larger. It is understandable that effects are stronger for the young cohort as their wage is lower compared with their adult counterparts. Therefore, their wage is more likely affected by the minimum wage.

Conclusion

The current chapter investigates impacts of the minimum wage in Vietnam in recent years on employment and wage distribution of the whole population and different sub-groups in terms of age and gender. Appropriate specifications of fixed or lagged effects and instrumental variables have been employed with the two different data sets of VHLSSs, in the three years 2010, 2012, 2014, and of LFSs from 2011 to 2014.

Models with lagged variables of the minimum wage are used for estimating the effects on the employment rates. Appropriate examinations are conducted to find reliable model specifications. The results indicate that the increase in the minimum wage has no effect on the employment rates as well as movements across types of employments for the whole population as well as its male and young sub-groups. No effect is also found for the adult cohort but the result is inconsistent across estimation specifications for the case of the employment rate. Meanwhile, a positively- lagged effect on the employment rate is consistently found for female sub-group in all specifications and estimation approaches. However, no effects on movements across types of employment is also found for this sub-group as the same as the whole population or other ones.

One possible explanation is that the minimum wage has positive impacts on the average wage in the labor market. The increase in wage and income in the labor market, in turn, encourages

more people entering the labor market. The decrease in the net incremental of working-age-population of the economy and the weak compliance of regulations in the labor market are also two factors which partially mitigate the negative impacts of the increases in the minimum wage on the employment rate as well as movements to the formal sector of laborers.

In terms of impacts on wage distribution, various tests of endogeneity as well as assumptions of the approach are conducted to secure reliability of results. The 80th percentile instead of lower ones as often used in other studies is the valid percentile which satisfies the key assumption of the used model. This percentile is also valid for female, young and adult sub-groups. However, it is not valid for the male sub-group. Therefore, we do not estimate the impact for the sub-group.

The results imply that the minimum wage has the effects on the whole sample of wage workers in the formal sector as well as its sub-groups. The increases in the minimum wage result in the more compression of wage distribution. Put differently, the increase in the minimum wage reduces the gaps between lower percentiles to the threshold percentile. Furthermore, the reductions in the gap decrease for percentiles which are closer to the threshold one. Broader effects are found for the young cohort, compared with the adult counterparts. The minimum wage has both impacts on higher percentiles, instead of only low percentile for the adult cohort, and the larger magnitudes in the young cohort.

The chapter faces a number of limitations. Firstly, the model for estimating the impacts of the minimum wages on wage distribution does not work well for the informal sector or the male worker sub-group in the formal sector. Therefore, other models should be employed to investigate the effect in these cases. It is important to investigate the effect in the informal sector, given its large size in Vietnam as well as the gap between the formal and informal sectors is an important indicator of inequality. Secondly, time-variance economic conditions of locations as proxies for the demand side in local labor markets should be controlled for in the estimation. Thirdly, discussed explanations for the positive association between the minimum wage and the employment rate for the female sub-group should have more supportive evidence.

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Appendix 2-1. Data cleaning

As only wage is available in LFS, only wage workers are kept. Then we follow the data cleaning procedure of Hansen, Rand, and Torm (2015) with some modification.

Consistencies in typical personal characteristics are firstly checked. Observations are surveyed twice (identifying via household and personal ID) of which differences in age or education across two times of surveys are larger than 1 are dropped. Duplication observations which are inconsistent in terms of birth year, gender and ethnicity are also dropped.

In the last step, duplication observations in terms of birth year, gender, ethnicity and working sectors (and age or education differences by only one as the maximum) are collapsed into one by means of the two observations.

Appendix 2-2. Effects of the minimum wage on employment rate, fixed effects

Variables	(1)	(2)	(3)	(4)	(5)	(6)
The whole population						
ln(MW)	-0.057*	-0.029	0.005	-0.029	0.014	-0.007
	(0.033)	(0.036)	(0.040)	(0.040)	(0.093)	(0.138)
First lag of ln(MW)		0.012	0.005		0.038	0.012
		(0.027)	(0.029)		(0.069)	(0.087)
Second lag of ln(MW)		0.032	0.046		0.059	0.049
		(0.025)	(0.029)		(0.074)	(0.078)
Third lag of ln(MW)		0.021	0.034		0.055	0.046
		(0.021)	(0.022)		(0.089)	(0.089)
First lead of ln(MW)			-0.145**			-0.124
			(0.064)			(0.148)
Second lead of ln(MW)			0.040			0.026
			(0.061)			(0.127)
Third lead of ln(MW)			0.091			-0.088
			(0.106)			(0.168)
Trend	No	No	No	Yes	Yes	Yes
Observations	564	564	564	564	564	564
R-squared	0.942	0.943	0.944	0.970	0.970	0.970
Female						
ln(MW)	-0.077*	-0.030	0.012	-0.014	0.138	0.158
	(0.041)	(0.041)	(0.044)	(0.044)	(0.102)	(0.159)
First lag of ln(MW)		0.026	0.022		0.142*	0.136
		(0.032)	(0.035)		(0.077)	(0.100)
Second lag of ln(MW)		0.049*	0.069**		0.170**	0.168*
		(0.029)	(0.033)		(0.082)	(0.088)
Third lag of ln(MW)		0.046*	0.062**		0.175*	0.168
		(0.024)	(0.025)		(0.103)	(0.103)
First lead of ln(MW)			-0.168**			-0.057
			(0.068)			(0.165)
Second lead of ln(MW)			0.025			0.089

			(0.077)			(0.150)
Third lead of ln(MW)			0.091			-0.038
			(0.117)			(0.216)
Trend	No	No	No	Yes	Yes	Yes
Observations	564	564	564	564	564	564
R-squared	0.955	0.957	0.957	0.977	0.977	0.977
Male						
ln(MW)	-0.034	-0.029	0.000	-0.034	-0.055	-0.124
	(0.033)	(0.038)	(0.042)	(0.042)	(0.100)	(0.139)
First lag of ln(MW)		-0.005	-0.012		-0.037	-0.088
		(0.029)	(0.030)		(0.073)	(0.090)
Second lag of ln(MW)		0.020	0.033		-0.011	-0.029
		(0.025)	(0.029)		(0.083)	(0.087)
Third lag of ln(MW)		-0.015	-0.003		-0.043	-0.052
		(0.023)	(0.024)		(0.102)	(0.103)
First lead of ln(MW)			-0.131*			-0.202
			(0.070)			(0.157)
Second lead of ln(MW)			0.037			-0.040
			(0.061)			(0.127)
Third lead of ln(MW)			0.088			-0.058
			(0.114)			(0.165)
Trend	No	No	No	Yes	Yes	Yes
Observations	564	564	564	564	564	564
R-squared	0.901	0.901	0.903	0.946	0.946	0.946
Young (15-29)						
ln(MW)	-0.103***	-0.081*	-0.039	-0.053	0.064	0.094
	(0.038)	(0.042)	(0.046)	(0.051)	(0.109)	(0.150)
First lag of ln(MW)		0.049	0.043		0.094	0.074
		(0.034)	(0.034)		(0.084)	(0.098)
Second lag of ln(MW)		-0.003	0.018		-0.004	-0.011
		(0.031)	(0.033)		(0.090)	(0.089)
Third lag of ln(MW)		0.017	0.034		-0.028	-0.039
		(0.027)	(0.027)		(0.122)	(0.117)
First lead of ln(MW)			-0.175**			-0.103
			(0.082)			(0.173)
Second lead of ln(MW)			0.029			0.151
			(0.081)			(0.150)
Third lead of ln(MW)			0.088			0.107
			(0.182)			(0.297)
Trend	No	No	No	Yes	Yes	Yes
Observations	564	564	564	564	564	564
R-squared	0.957	0.957	0.958	0.978	0.979	0.979
Adults (30-65)						
ln(MW)	-0.014	0.020	0.038	0.001	0.042	0.029
	(0.035)	(0.037)	(0.041)	(0.046)	(0.096)	(0.146)
First lag of ln(MW)		0.001	-0.009		0.041	0.031
		(0.028)	(0.031)		(0.071)	(0.092)

Second lag of ln(MW)		0.050*	0.054*		0.116	0.113
		(0.027)	(0.030)		(0.075)	(0.082)
Third lag of ln(MW)		0.020	0.026		0.126	0.123
		(0.021)	(0.023)		(0.094)	(0.097)
First lead of ln(MW)			-0.092			-0.042
			(0.066)			(0.157)
Second lead of ln(MW)			0.059			-0.005
			(0.063)			(0.127)
Third lead of ln(MW)			0.063			-0.026
			(0.093)			(0.182)
Trend	No	No	No	Yes	Yes	Yes
Observations	564	564	564	564	564	564
R-squared	0.939	0.940	0.941	0.964	0.965	0.965

The dependent variable: Employment rate.

Trend: groups of district with the same level of the minimum wage within provinces. Total population of corresponding sub-group is employed as probability weight in the estimation.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimation with data from LFS 2011, 2012, 2013 and 2014.

Appendix 2-3. Association between $\log(p) - \log(60p)$ and $\log(\text{minimum wage}) - \log(60p)$, specification with trends.

	OLS	Instrument variable	Durbin test statistics	Wu-Hausman test statistics	Statistics of test of overidentification
The whole wage workers					
10p	0.4661***	0.5794***	3.898	1.655	
20p	0.3802***	0.6615***	10.840***	5.549***	0.061
30p	0.3801***	0.5752***	9.175**	5.171***	0.498
40p	0.2298***	0.4097***	13.436***	7.966***	3.572*
50p	0.1889***	0.2772***	4.573	1.368	
70p	-0.0517	-0.0708	1.234	0.462	
80p	-0.0739	0.0642	2.466	0.929	
90p	-0.0414	0.4644**	11.554***	2.946*	4.859**

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimation with data from LFS 2011, 2012, 2013 and 2014.

Appendix 2-4. Association between $\log(p) - \log(70p)$ and $\log(\text{minimum wage}) - \log(70p)$, specification with trends.

	OLS	Instrument variable	Durbin test statistics	Wu-Hausman test statistics	Statistics of test of overidentification
The whole wage workers					
10p	0.5759***	0.6849***	3.254	1.417	
20p	0.5224***	1.0469***	14.481***	5.099***	1.371

30p	0.5185***	0.9184***	12.284***	4.759***	2.165
40p	0.392***	0.7616***	11.762***	4.226**	4.502**
50p	0.353***	0.572***	5.7556*	2.080	
60p	0.2119***	0.399***	6.386**	1.508	
80p	-0.0268	0.2739*	10.472***	4.033**	0.523
90p	-0.0458	1.016**	23.856***	7.418***	0.547

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimation with data from LFS 2011, 2012, 2013 and 2014.

Appendix 2-5. Association between log(p) – log(80p) and log(minimum wage) – log(80p) at select percentiles of the wage distribution, specification without trends.

	OLS	Instrument variable	Durbin test statistics	Wu–Hausman test statistics	Statistics of test of overidentification
The whole wage workers					
10p	0.5616***	0.2496	3.273	0.969	
20p	0.5748***	0.2988	3.044	0.829	
30p	0.5985***	0.3332*	3.336	1.643	
40p	0.5217***	0.213	4.954*	2.266	4.300**
50p	0.4837***	0.1243	9.931***	6.357***	2.614
60p	0.398***	0.2101	4.580	2.672*	7.499***
70p	0.2548***	0.0527	6.197**	3.924**	3.730*
90p	-0.0714	0.3895	7.924**	4.159**	0.000
Female					
10p	0.6236***	-0.1718	3.866	2.211	
20p	0.5154***	-0.2771	7.860**	4.580**	0.003
30p	0.4787***	-0.2801	8.779**	5.760***	0.014
40p	0.4946***	-0.1479	8.577**	4.866***	0.102
50p	0.4226***	-0.0863	6.408**	3.125**	0.223
60p	0.346***	-0.1487	7.472**	3.799**	0.212
70p	0.1731***	-0.1919	4.806*	2.418*	0.089
90p	0.0402	0.5784	2.289	0.796	
Male					
10p	0.7003***	0.7733***	0.844	0.322	
20p	0.7119***	0.8118***	1.772	0.771	
30p	0.6654***	0.6687***	1.858	1.848	
40p	0.5951***	0.4989***	2.914	3.000*	7.234***
50p	0.5467***	0.3712***	6.104**	6.929***	7.574***
60p	0.4142***	0.3254***	4.493	5.922***	4.681**
70p	0.2394***	0.2006***	2.775	1.525	
90p	-0.3344***	-0.2811*	0.270	0.118	
Young					
10p	0.5772***	0.3389	1.543	0.746	

20p	0.5165***	0.1275	4.955*	1.677	8.110***
30p	0.4725***	0.1501	4.864*	1.736	5.209**
40p	0.4521***	0.1967	4.529	2.274	
50p	0.3829***	0.1	6.982**	4.347**	4.482**
60p	0.3413***	0.0858	6.588**	4.622**	3.010*
70p	0.2589***	0.1757	1.035	0.753	
90p	-0.1613	0.1516	1.403	0.417	
Adult					
10p	0.6882***	0.7084***	0.231	0.152	
20p	0.6489***	0.5459***	1.356	0.489	
30p	0.6147***	0.4661***	3.274	1.239	
40p	0.5457***	0.3681***	4.528	3.059**	6.772***
50p	0.4948***	0.2647**	9.227***	5.058***	4.692**
60p	0.4102***	0.3217***	2.816	3.856**	10.565***
70p	0.239***	0.2449***	1.929	2.052	
90p	-0.1195**	-0.3276**	4.368	3.896**	0.138
Year fixed effect	Yes	Yes			
Group of district fixed effects	Yes	Yes			
Trends	No	No			
*** p<0.01, ** p<0.05, * p<0.1					

Source: Authors' estimation with data from LFS 2011, 2012, 2013 and 2014.

Chapter 3 Opening the domestic market, labor allocation and income dynamics in Vietnam²⁸

Abstract

This chapter seeks to answer two inter-related questions for Vietnam: (i) how opening the domestic market affects allocation of workers across self-employment, wage employment in household businesses and wage employment in the formal sector; and (ii) income differentials between these kinds of employment. Extensions and modifications of the two-step model in Goldberg and Pavcnik (2003) are used to answer the questions. Data is sourced from five Vietnam Household Living Standard Surveys from 2002 to 2010 and available measures of opening the domestic market in Vietnam. The results indicate that opening the domestic market does not have significant impacts on income differentials between different types of employments. But, increased exposure to international trade reduces share of wage employment in household businesses, compared with that in the formal sector. Meanwhile, the result is not robust for the case of self-employment.

Keywords: opening the domestic market, labor allocation, income differentials, informality, Vietnam.

²⁸This chapter is a revision and extension of the paper: Vu et al. (2014) "Trade liberalization and employment: the case of Vietnam" under the Mekong Economic Research Network (MERN) - a research network managed by the Centre for Analysis and Forecasting (CAF) of the Vietnam Academy of Social Sciences (VASS) with financial support from the International Development Research Centre (IDRC), Canada. I am grateful to my supervisors, Dr. Jean-Pierre Cling and Dr. François Roubaud for their valuable guidance and comments on different stages of the chapter. I also would like to thank Dr. Nguyen Thang (CAF/VASS), Dr. Brian McCaig (Wilfrid Laurier University), Dr. Sothea Oum (Economic Research Institute for ASEAN and East Asia (ERIA)), and participants at internal networking meetings, the Asia-Pacific Trade Economists' Conference celebrating the 10th anniversary of ARTNeT in Bangkok, Thailand (2014) for their helpful comments and suggestions.

Introduction

The first ten years of this century seems to be a busy decade for Vietnam in terms of international trade liberalization. It was started with implementation of the Bilateral Trade Agreement with the U.S in 2000. The WTO accession in 2007 was another key milestone. A number of trade related agreements were also signed during this period (Phan and Coxhead, 2011). As a result, the economy has become increasingly dependent on foreign trade. The ratio of total export value over GDP increased substantially, from 55 percent in 2000 to 87 percent in 2010²⁹. Importantly, the process of trade liberalization is expected to continue in the future as Vietnam is actively engaged in negotiations of a number of trade agreements³⁰.

In the meantime, household businesses (HHBs) have been critical non-farm employment providers in Vietnam as shown in Chapter 1. Given the important role of this employment type and aforementioned trade liberalization context, emerging questions are how the process has affected employment and income in HHBs relatively to those in the formal sector, i.e, private and foreign invested enterprises and the state sector including state owned enterprises.

Indeed, trade liberalization constitutes of two sides, liberalizing exports or access to foreign markets and opening the domestic market. The impacts caused by each of the two sides are expected to be different. Ideally, we should study impacts of the two sides simultaneously. However, it is difficult to measure access to different foreign markets in a long period.

Therefore, we focus on investigating the impacts of opening the domestic market on labor allocation between different types of employment in HHBs and wage employment in the formal sector as well as income differentials between those in the period of 2002-2010.

There is a study of McCraig and Pavcnik (2018) which investigates effects of the Vietnam-US bilateral trade agreement on labor allocation between HHBs and the formal enterprises in the period of 2002-2004 as an increase in the export opportunity of Vietnamese firms. However, the current chapter is different from their study in two aspects; (1) This chapter focuses on opening of the domestic market as the effects are potentially different from that of increase in the export opportunity (2) This chapter evaluates the effects on income differentials between different types of employment. It is important to know whether this phenomenon raises the inequality.

²⁹ Authors' calculation from GSO's data.

³⁰ For example, Viet Nam is a member of Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) (waiting for final approval), and the country and EU officially started to negotiate their Free Trade Agreement on 26th June 2012 (negotiation was finished, waiting for approval).

Given the objectives of the Chapter, apart from introduction and conclusion, the remaining of the chapter is organized as follows: Section 1 is devoted to briefly review the literature. Section 2 provides an overview of opening the domestic market of Vietnam in the study period. Section 3 presents empirical models while Section 4 discusses data and estimation results.

1. Literature review

Indeed, these two questions have been addressed in studies on impacts of trade liberalization on the labor market in a number of countries, especially in the Latin America. In general, empirical evidence is mixed. Since arguments may not clearly distinguish the two sides of trade liberalization when predicting its effects, we review in this section as trade liberalization in general with emphasis on opening the domestic market in particular when it is possible.

In terms of labor allocation, there are different views on changes in employment of HHBs under trade liberalization in general and opening the domestic market in particular. Firstly, there is a view that stemmed from the informal characteristic of this kind of employment, which predicts employment expansion in HHBs under trade liberalization. When a country opens its domestic market, its formal domestic firms face a fiercer competition. Consequently, they have to find ways to cut their labor costs, such as replacing contracted workers by un-contracted workers who do not receive non-wage benefits or sub-contracting to the informal sector, which largely comprises of household businesses. Following this view, Goldberg and Pavcnik (2003) develop a theoretical model and then test it with data of Brazil and Colombia. They find no association between trade liberalization and the degree of informality³¹ in Brazil, but a positive relationship between cuts in tariffs and the informal employment in a specific period in Colombia when rigidity of the labor market of the country was high. Meanwhile, employing the same empirical model, Aleman-Castilla (2006) finds a significant relationship between trade liberalization between the US and Mexico and the informality in tradable industries of Mexico. Specifically, informality of Mexico decreases when tariffs were cut.

In contrast, a view that originates from “models of trade with heterogeneous firms” (McCaig and Pavcnik, 2018) indicates increases in employment in the formal sector when the trade is liberalized. Under the fiercer competition as well as increasingly accessing to other countries markets, larger and better performing firms have higher probabilities of surviving and growing. Hence, this process results in rising labor demand by larger and better performing firms and declining the demand by smaller and less efficient firms. Thus, one would expect declines in

³¹ As noted in introduction, we use the term informal sector and HHBs are interchangeable in the thesis.

employment in household businesses, which are typically small and less productive than firms in the formal sector.

McCaig and Pavcnik (2018) also employ data from Vietnam Household Living Standard Surveys 2002 and 2004 to test their argument; it is found that there was a large labor movement from HHBs to formal firms after the US-Vietnam Bilateral Trade Agreement came into effect.

There is also an argument of decline in employment in HHBs when imports of intermediate inputs are liberalized. Tariff reduction of intermediate inputs has impacts on production of firms and potential effects on informality as a consequence. Reduction in the trade barrier in general and tariffs on imported intermediate inputs in particular result in cheaper prices as well as newly available inputs, which are expected to boost firms' productivity. Cheaper and newly available inputs offer firms with more options to optimize their productions that can increase their productivity given the current technology. Furthermore, higher quality as well as embodied technology of inputs is also expected to improve productivity of firms.

However, these effects are heterogeneous across firms. It is clear that better firms can capture the opportunities better than worse ones. Consequently, we can expect the same impacts on informality as the case of increase in accessing the export markets under the heterogeneous model. As discussed above, the model predicts a decline employment in household businesses.

Thus there is no consensus in terms of both theory and empirical evidence with regard to the direction of labor allocation between HHBs and the formal sector under trade liberalization in general and opening the domestic market in particular. Goldberg and Pavcnik (2003) conclude that specific labor market arrangements and regulations play an important role in determining the allocation process.

Regarding income differentials, there is also no consensus. Since workers in HHBs are often found to have lower level of educational attainment than their counterparts in the formal sector, investigation of impacts of trade liberalization on returns to education is a good starting point for predicting impacts of trade liberalization on income differentials between different types of employment.

The main theory behind the predicted changes in skill (normally measured by education) premiums under trade liberalization is the Stolper-Samuelson theorem under the Heckscher-Ohlin model of international trade. This theorem suggests that prices of relatively abundant factors would increase when trade is liberalized. In developing countries, like Vietnam, unskilled labor is such a factor; therefore, we would expect increases in income of unskilled workers relatively to the skilled ones. Given the common situation that unskilled workers are

predominantly employed by household businesses, it is logical to predict that income differentials between workers in HHBs and wage workers in the formal sector would decrease when trade is liberalized. However, empirical results do not appear to support this prediction³². It is argued conditions of the Stolper-Samuelson theorem are not met in a common practice. In addition, alternative theories have been proposed to explain the increase in the skills premium induced by trade liberalization³³.

Another prediction on changes in income differentials under trade liberalization comes from the first above mentioned argument on the impact on labor allocation. Since the informal employment increases because formal firms cut their labor costs and the minimum wage and other regulations tends to be better enforced under trade liberalization, income differentials across types of employment would increase.

Several papers estimated associations between trade liberalization and wage differentials between formal and informal sector. Aleman-Castilla (2006) reports increases in the wage differentials in Mexico due to cuts in Mexico-US tariffs while Goldberg and Pavcnik (2005) find insignificant relationship between the two. Again, differences in labor market arrangements and regulations may explain these diverse results.

For Vietnam, there have been a number of studies investigating changes in skill premium since Doi Moi. Phan and Coxhead (2011) find the skill premium increased for non-state enterprises in traded industries in the period of 2002-2008 but no increase in state enterprises in these industries. Oostendorp and Doan (2013) report decreases in return to education because of trade liberalization, mostly due to changes in employment allocation across industries. Moreover, the authors also report that largest decrease is found among workers with lowest level of educational attainment. Thus, this result may indirectly suggest rising income differentials between workers in the formal sector and those in HHBs due to trade liberalization, because of lower education levels of workers in household businesses. Meanwhile, Cling et al. (2009) employ the Computable General Equilibrium (CGE) model to ex ante assess impacts of the Vietnam's WTO accession in January 2007 on income distribution. Their simulations show that real wage of un-skilled workers would increase relatively to their skilled counterparts and subsequently indicates a decrease in income differentials.

³² See Goldberg and Pavcnik (2007) for a survey of impacts of trade liberalization on inequality in general and skill premium in particular.

³³ See also See Goldberg and Pavcnik (2007) for a brief review of the alternative theories.

In brief, the Stolper-Samuelson theorem suggests trade liberalization would narrow income differentials between laborers in HHBs and the formal sector. Meanwhile, the empirical evidence largely suggests increases in income differentials between skilled and un-skilled laborers (Goldberg and Pavcnik, 2007) and indirectly implies increases in differentials. However, the authors also note about the impacts of trade liberalization on inequality that “the relevant mechanisms through which inequality was affected are case specific”. Furthermore, indirect initial empirical evidence for Vietnam is ambiguous.

In above discussions, self-employers including household business owners and wage workers in HHBs are regarded as one type of employment. But both theoretical and empirical studies of the household business sector find that they are different. As discussed in Chapter 1, self-employment significantly links with the upper-tier of the informal sector where laborers voluntarily select this type of employment while the wage-work in HHBs represents the lower-tier of the sector which workers has to join involuntarily. Cling et al. (2010) report a significant proportion of household business owners choose the job for higher income and independence in their employment, as compared with wage employment in the formal sector. Meanwhile, wage workers in HHBs are apparently disadvantaged to their counterparts in the formal sector both in terms of non-monetary benefits and income³⁴ when personal and work characteristics are controlled for. Directly, a report of Vu and Nguyen (2011) for labor markets in Hanoi and HCMC indicates that factors affecting employment attainments and income differentials are different between skilled self-employers and skilled wage workers in household businesses. These pieces of evidence point to the differences between the two types of employment in HHBs in Vietnam. Therefore, in our empirical analysis we divide them into two different groups. Of course, as noted in Chapter 1, the separation of HHBs into wage workers and self-employers is not perfect as self-employers is not only the upper tier of the informal sector. However, we do not have a clear distinction of the upper and lower tiers of the informal sector among the self-employers. Therefore, we cannot further split self-employers into sub-groups.

2. Opening the domestic market of Vietnam

Opening the domestic market is often understood as process of open the domestic market for imported goods and services. This process covers different aspects, including (1) opening in policy that an economy remove or lower restrictions on imports products such as removal of quotas, or tariff reduction and (2) opening in reality such as proportion of imported goods and

³⁴ McCaig and Pavcnik (2012) report a lower of 7 per cent in income of wage workers in the household businesses to their counterparts in the formal sector.

services in the domestic market. In this section, we discuss opening the domestic market in Vietnam, mostly in terms of policy and then we analyze a selected feature of the country's international trade.

As a part of transition process as well as following its economic growth strategies, Vietnam has actively engaged in a number of trade related agreements. Before joining the WTO, it was recorded that Vietnam had been involved in bilateral trade agreements with 40 partners but the primary purpose of the agreements had been to reciprocally recognize the MFN status (WTO Secretariat, 2013). However, ASEAN related trade agreement and the US-Vietnam bilateral trade agreement are exceptional. Their contents and mutual commitments were followed and even went beyond the WTO's general principles. Under these agreements, Vietnam commits open its domestic market significantly. Therefore, we shall briefly review these agreements as well as Vietnam's commitments under the WTO accession. Non-tariff barriers, which Vietnam used in regulating its imports, is subsequently analyzed.

2.1. Trade agreements

ASEAN related trade agreements

The initial form of granting preferences on intra-region trade of the ASEAN was the Common Effective Preferential Tariffs (CEPT). The basic idea of the CEPT was to divide goods into four groups of the Inclusion List (IL), the Temporary Exclusion List (TEL), Sensitive List (SL) or General Exclusion List (GEL) with different treatments on each group. The CEPT was the base for forming the ASEAN Free Trade Area (AFTA) in 2002. In 2009, the CEPT/AFTA and other agreements on trade related matters such as the ASEAN Agreement on Customs, the ASEAN Framework Agreement on the Facilitation of Goods in Transit were integrated into the ASEAN Trade in Goods Agreement (ATIGA). The consolidated agreement came into force on 17 May 2010.

Vietnam started to get engaged in the CEPT in 1995 in the wake of joining ASEAN. Initially, the Temporary Exclusion List covered most goods produced in Vietnam. However, items on this list were all shifted into the Inclusion List in 2003, with tariffs reduced to 0-5 percent by 2006. As per the latest commitment, Vietnam eliminated all tariffs for goods imported from other ASEAN countries by 2015, with flexibilities of 7% as the maximum for sensitive products until 2018 (WTO secretariat, 2013).

Vietnam's General Exclusion List appears not to completely comply with the principle of the CEPT, which specified that such a list should only include products that comply with Article XX of the GATT (the corresponding Article is 9B of the AFTA), where measures are allowed to protect national security, public morals, human, animal or plant life and health, and the

protection of articles of artistic, historic and archaeological value. The CEPT Agreement specifically states that General Exclusion provisions must not be used to provide industry protection or to protect revenue. Vietnam's List, however, includes items such as vehicles with less than 16 seats, scraps and used consumer goods. These are all items where Vietnam has strong protection and tariff revenue objectives.

Apart from the ATIGA and other agreements in effect of ASEAN, Vietnam has also been involved in trade related agreements between ASEAN and its partners include:

1. ASEAN-China Free Trade Area
2. ASEAN-Korea Comprehensive Economic Cooperation Agreement
3. ASEAN-Japan Comprehensive Economic Partnership
4. ASEAN-India Regional Trade and Investment Area
5. ASEAN-Australia and New Zealand Free Trade Agreement

Effectiveness of these agreements has resulted in concessions of Vietnam on products from the partners. Analysis of tariffs of Vietnam imposed on imports from selected countries to be done subsequently shall partly assess the effects of these agreements.

The VN-US Bilateral Trade Agreement

The VN-US Bilateral Trade Agreement came into force in December 2001 after a long period of negotiation. The agreement has similar contents as main WTO agreements, which cover numerous areas including economic participation, tariff and non-tariff measures affecting trade of goods between entities of the two countries, technical barrier to trade (TBT) including sanitary and phytosanitary (SPS) measures, trading in services, investment relation and dispute settlement mechanisms. In some fields, the agreement goes beyond provisions in WTO agreements at that time such as economic participation and investment relation. But in some fields, the provisions in the agreement are not as strict as their counterparts in WTO agreements such as tariff reduction or SPS measures.

Under the agreement, Vietnam is required to grant trading rights to US firms within three to six years and remove quantitative restrictions on imports for almost all products within three to seven years since the agreement came into force. Another important commitment is that Vietnam has to reduce restrictions on foreign entry into a number of service sectors such as banking, tourism, telecommunications and others.

Based on this agreement as well as upon the accession of Vietnam to the WTO in early 2007, the two economies signed the Vietnam-US Trade and Investment Framework Agreement (TIFA) on June 22, 2007. No further commitments were added but a joint agency (United States-Vietnam Council on Trade and Investment) for the monitoring of implementation of Vietnam's commitments under the WTO accession and in the BTA was established.

The WTO commitments

Vietnam's commitments to the WTO are relatively strict given the country's level of economic development. They include not only tariff reduction but also opening its market and following WTO agreements on standards and rules such as customs valuation or non-discrimination between domestic and foreign businesses upon accession without a transition period.

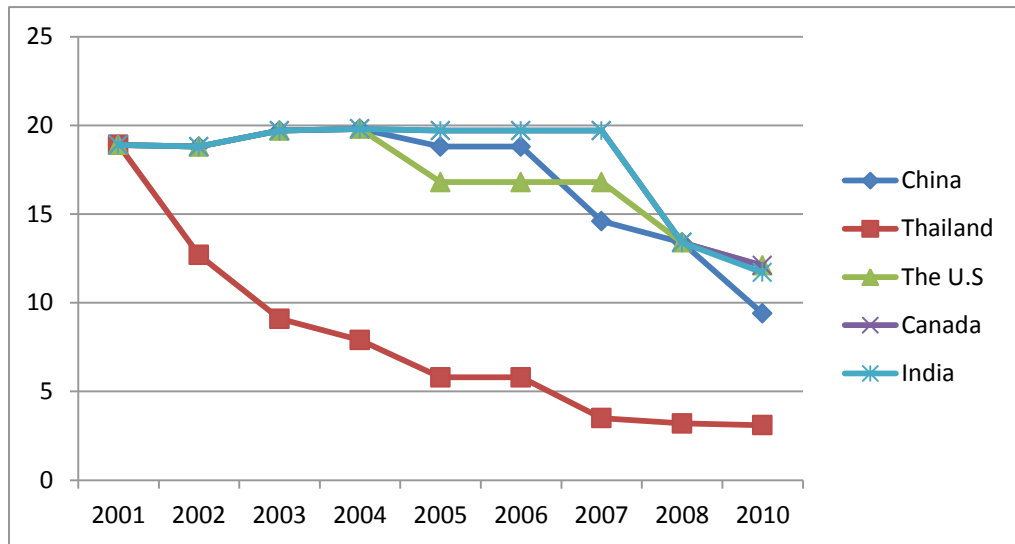
In terms of tariff reduction, MFN rates have been significantly cut since 2007 in accordance with the accession's commitment. The simple average MFN applied tariff of non-agricultural products was cut from 17.4 per cent to as low as 9.3 percent in 2013. And the corresponding figures for agriculture related products were 29.4 percent and 17.4 percent respectively (WTO Secretariat, 2013).

Vietnam also commits to substantially open its services market³⁵. After three years of accession, foreign juridical persons can provide services in a majority of sub-sectors including construction and distributional services. Indeed, common measures of trade liberalization do not capture liberalization in the services sector. Although a large number of laborers work in the services sector, they may not be impacted significantly, because their petty services are very different from high end services that have been opened up to foreign competition. Furthermore, the current study, as will be noted later, only investigates the manufacturing sector.

In brief, Vietnam's commitments of opening up its domestic market in the last decade are tremendous. The commitments include both reductions in tariffs and removals of non-tariff barriers. The MFN tariff was stable up to 2007. Since then, the rates have been significantly cut down. However, Vietnam granted tariff preferences to products from selected countries through ASEAN trade related agreements and the bilateral trade agreement with the U.S before 2007 as depicted in Figure 3-1. This causes difficulties in capturing the true picture of opening the domestic market in the respective period.

³⁵ Indeed, liberalization in the service sector is more relevant to investment, instead of trade, activities.

Figure 3-1: Simple average tariffs imposed on products from selected countries (%)



Source: Authors' calculation with data from the UNCTAD-TRAINS.

2.2. Non-tariff barriers

As a commitment in the trade agreements previously discussed, Vietnam has gradually adopted international practices in regulating its international trade. Since the beginning of the last decade, the country has used tariffs as the major instruments in managing its imports (Athukorala, 2006). However, non-tariff barriers have been used in certain extents.

In this section, we shall discuss a number of non-tariff barriers used by Vietnam in the last decade. We focus on changes of these barriers over time and highlight their potential effects across manufacturing industries.

There have been three Decrees of the government generally and directly regulating import and export activities in the last decade. They include Decree No. 57/1998/NĐ-CP dated 31st July 1998; Decree No. 12/2006/NĐ-CP dated 23rd January 2006; and Decree No. 187/2013/ND-CP dated 20th November 2013. These Decrees have listed in general products banned from imports, products imported under quotas or tariff quotas and products imported under line managements.

Import prohibitions

In line with international treaties and practices, goods which are considered as potentially harmful to human health and safety have been prohibited from imports to Vietnam. With only minor amendments over time, such as cigarettes are removed from the list since 2006, products and materials containing asbestos of the amphibole group were banned since 2006 or

incompatibility radio equipment and radio-wave appliances was added in 2013, products banned from imports consistently includes weapons, fireworks, publications banned from dissemination and circulation; toxic chemicals including pesticides banned from use in Vietnam, used consumer goods, used vehicles; right-hand drive means of transport.

Import quota

In 1998, products imported under quotas accounted for about 40% of total import of the country (CIEM, 1999). However, since the beginning of the first decade of the 21st century, import quotas have been removed significantly. In 2002, there were only four commodities including petroleum, sugar, cement and motorcycles being subject to the quotas. Two of them, cement and motorcycles were excluded from the list in 2003 (Athukorala, 2006) and sugar were also removed in 2006³⁶. Since then, only petroleum has been subject to this kind of barrier.

Tariff rate quotas

Since 2003, Vietnam has introduced tariff rate quotas on import of some commodities. Initially, the list included seven agricultural products: raw milk, condensed milk, poultry eggs, maize, raw tobacco, salt, and cotton³⁷. In 2006, raw milk, condensed milk, maize, and cotton were removed from this list³⁸. Imports of refined sugar, crude sugar were changed from an import quota to this kind of barrier. Consequently, only four products were subject to this kind of instruments in 2006 and this list was kept in the latest Decree (No. 187/2013/ND-CP).

As we can see, non-tariff barriers imposed on a number of imported products have been relatively stable in the last decade, especially manufacturing products. Certain changes include removals of import quotas and introduction of tariff rate quotas. The first change happened in early years of the last decade and the latter changes only affected agricultural products. Hence, non-tariff barriers imposed on imports of manufacturing products has been only slightly changed in the 2004-2010 period.

Other regulatory instruments

For several purposes, Vietnam has promulgated some specific regulations on imports of selected commodities. Indeed, it is impossible to review all policies that potentially affect imports of selected goods. Therefore, we highlight two policies which directly administer the import of selected goods.

³⁶ Decree 12/2006/NĐ-CP.

³⁷ Decision No.91/2003/QĐ dated 9th May 2003 of the Prime Minister.

³⁸ Decree 12/2006/NĐ-CP.

For purposes of controlling inflation and stabilizing macro-economy, in April 2010, the Ministry of Industry and Trade issued decision No. 1899/QĐ-BCT containing a long list of "non-essential" commodities and consumer goods which are discouraged for import. Products in the list were from more than 50% chapter of manufacturing products in the HS Nomenclature. This decision was subsequently replaced by the decision 1380/QĐ-BCT dated 25th March 2011 which is still in effectiveness. The underlying policy instrument makes this measure effective is to restrict foreign currency purchasing of importers as the request in Official Dispatch No. 3215/NHNN-CSTT dated 29th April 2010 of the State Bank of Vietnam to commercial banks. However, efficacy and impact of this measure is quite ambiguous as it is not clear on how commercial banks have behaved and responded to the request.

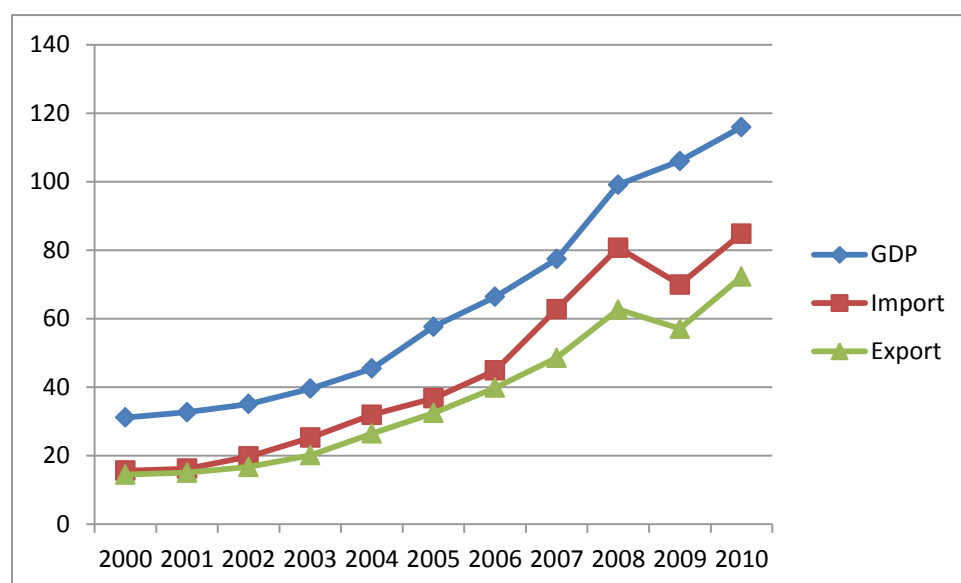
In short, standard non-tariff barriers of Vietnam have been stable in the last decade and impacts of other regulatory impediments affecting imports are ambiguous across products. Consequently, impacts of non-tariff barriers on imports of different manufacturing products should not be significant in the last decade.

2.3. Selected features of the foreign trade performance

Vietnam exhibited strong growth in both GDP and foreign trade in the last decade (Figure 3-2). The nominal GDP expanded by 3.7 times within only a decade of 2010-2000. The foreign trade witnessed a better performance. In the same period, the foreign trade increased by 5.2 times, from 30 billion USD in 2000 to 157 billion in 2010. The higher growth of the foreign trade implies the economy have more and more integrated in the world economy. The ratio of export to GDP increased from 55% in 2000 to 87% in 2010. Another feature should be noted about the foreign trade in Vietnam in the period is trade deficit. The trade deficit significantly increased over the period and reached a peak of 18 million USD in 2008. This is understandable that the economy was in an investment period and it needed to import machinery, equipment and materials for production and investment on infrastructure, especially when the production capacity of the economy was low in 2000.

However, the picture was not brilliant if we look at the ownership of export. The foreign invested sector has accounted more and more in the total export. Its share accounted 47% of total export revenues in 2000, increased to 58% in 2006 and decreased a bit to 54.2% in 2010. One important reason for the increasing share of the FDI sector in the total exports is this sector have pretty higher productivity, compared with that in the domestic sector and the higher productivity may result in less employment effects when the export increase.

Figure 3-2. GDP and international trade of Vietnam, 2000-2010 (current price, billion USD)



Source: World Bank Indicators and GSO.

Regarding destinations, foreign trade of Vietnam (both import and export) has been concentrated in a few main markets. ASEAN countries, the European Community, Japan, China, the U.S, Taiwan Province of China, and the Republic of Korea, are major trading partners of Vietnam, as shown in Table 3-1. These partners have made up over 80 percent of the country's import and the first five partners have been destinations of more than 70 percent of Vietnam's export since 2002. Among these trading partners, China has emerged as the biggest provider of Vietnam's imports at the expense of ASEAN's countries and, to a lesser extent, the EU in recent years. The concentration in trading partners result in a risk of vulnerability of trade performances, with unfavorable impacts on the economy, as discussed in a previous paragraph.

Table 3-1. Shares of selected markets (%)

Years	Shares in the total export			Shares in the total import		
	2004	2008	2010	2004	2008	2010
United States	19.1	19.1	19.8	3.6	3.3	4.5
EU	18.9	17.5	15.9	8.5	6.9	7.5
ASEAN	15.3	16.5	14.4	24.4	24.3	19.4
Japan	13.4	13.6	10.8	11.2	10.3	10.7
China	10.6	7.4	10.3	14.0	19.5	23.7
Australia	7.1	7.0	3.8			
Republic of Korea	2.3	2.9	4.3	10.6	9.0	11.5
Taiwan, China				11.6	10.4	8.2
Total	86.8	84.0	79.2	83.8	83.7	85.5

Source: Authors' calculation with data from the UN Comtrade.

Similar to other developing countries, a number of Vietnam's exports have low value added, being done at the lowest end of the global value chain. To illustrate this point, Table 3-2 presents performance of Vietnam's two major exports. While textile and garment represent traditional exports, electrical machinery and equipment has emerged as a rising star in recent years. These products accounted for almost 30 percent of total export in 2010. Export values are not significantly higher than import values of inputs into production of these products. As assembled products dominate these export items, labor skill requirements are not high, resulting in easy movements of workers into these sectors. This fact implies that the increase in export as well as import may result in higher employment in formal firms in the industry but the effects on income differential is possibly moderate as demand for skills is not high.

Table 3-2. Performance of selected products in foreign trade of Vietnam

Textile and garments				
Year	Export value (million USD)	Share in total export (%)	Import value (million USD)	Share in the total import (%)
2004	4 785.1	18.1	3713.5	11.7
2008	10150.7	16.3	6673	8.3
2010	13303.7	18.5	8469.1	10.0
Electrical machinery and equipment and parts thereof				
2004	1307.3	5.0	2616.9	8.2
2008	3655.6	5.9	7416.4	9.2
2010	7080	9.9	9868.5	11.7

Source: Authors' calculation with data from the UN Comtrade.

Foreign trade of Vietnam has significantly expanded in the last decade. While this has made an important contribution to economic growth, it could result in rising vulnerability, especially when certain goods are traded with few trading partners. The dominance of exports of low value added implies that labor skill requirement is limited. In another aspect, the presence of substantial FDI sector in export activities may mitigate direct impacts of opening the domestic market on employment.

3. Empirical models and data

To answer the research questions empirically, we employ an extension of the two-step model proposed by Goldberg and Pavcnik (2003) to estimate impacts of opening the domestic market on labor allocation and then modify it for estimating income differentials.

3.1. Estimating of impact of trade liberalization on employment allocation

Let P_{ijts} denote for employment type S of laborer i in industry j at year t ; X_{ijts} is a vector of the laborer's characteristics such as age, gender, education, ethnicity group, location...; I_{ijts} a

vector of dummy variables expressing working industries of the laborer. The probability of laborer i being involved in his/her employment is expressed as:

$$P_{ijts} = X_{ijts} B_{Xis} + I_{ijts} \phi_{jts} + \varepsilon_{ijts} \quad (1)$$

Where $S=1, 2, 3$ denotes three types of employment as wage employment in the formal sector, self-employment, and wage employment in the household business respectively.

When we have three outcomes, (1) is formed into a standard multinomial logit model. (1) shall be estimated for each year separately.

The key in the equation is ϕ_{jts} , if we select $S=1$ as the base, ϕ_{jts} could be called as industry employment differentials to the base, as we follow the term given by of Goldberg and Pavcnik. ϕ_{jts} can be alternatively the marginal effects to have free base effects.

In the second step, the industry employment differentials are the dependent variable in the following equation:

$$\phi_{jts} = T_{jt} \varphi_S + D_j \gamma_S + Y \rho_S + \zeta_{jts} \quad (2)$$

T_{jt} is a vector of measures of opening the domestic market such as tariffs, and quotas imposed at the industry level. D_j and Y are vectors of industry and time dummies respectively.

As data for equation (2) is panel-data at the industry level, fixed effect can be applied. Furthermore, trends of industries can be included in (2) to capture industry specifics over time.

$$\phi_{jts} = T_{jt} \varphi_S + D_j \gamma_S + Y \rho_S + D_j Y \kappa_j + \zeta_{jts} \quad (3)$$

VHLSSs are a series of surveys with a rotating panel component. Therefore we can construct two three-wave-panels of 2002-2004-2006 or 2004—2006-2008 and (1) and (2) could be consolidated into a one-equation-model as below:

$$P_{ijts} = X_{ijts} B_{Xis} + T_{jt} \varphi_S + D_j \gamma_S + Y \rho_S + v_{ijts} \quad (4)$$

Again, three outcomes of (4) form a standard multinomial logit model and trends of industry can be included as well.

However, the panel suffers from significant decreases in number of observations if we expand time dimension. 3,931 panel households between 2002 and 2004, 4,193 panel households between 2004 and 2006, and 1,844 panel households between 2002 and 2006 could be constructed (Le and Pham, 2009). Attrition is another issue; with Baulch and Vu (2011) reporting an estimation of 14.0% of attrition between 2002 and 2004, and this figure is 9.5% between 2004 and 2006 for the panel. Additionally, when we fix our sample to a specific panel

group, we may miss different patterns of new entering or exiting laborers. Thus, we prefer the two-step model.

Normally, individual industries are included in estimation as dummies and one industry dummy has to be excluded in (1) to secure the rank condition. Consequently, estimation results are interpreted with regard to the omitted industry as the reference one. However, the industry employment differentials are interpreted in a different way in the current study. The industry employment differentials are defined as deviations from the mean of all individual industry effects. These are free-base industry individual effects on employment attainment. The deviations are attained by the normalization technique in DeNew and Schmidt (1997).

3.2. Estimating impact of trade liberalization on income differentials

For studying income differentials, we apply the same approach. First, industry pair-employment income differentials, Ω_{jtW} , are estimated, and then equation (2) are estimated to investigate impacts of opening the domestic market on income differentials.

There are several ways to estimate Ω_{jtW} . Aleman-Castilla (2006) estimate a modified Mincerian unique wage equation for both formal and informal wage workers with interactions between industries and the informality status to capture, industry informality income differentials. Moreover, interactions between productive characteristics and the informality status are included in his estimation to capture potential differences in returns to productive characteristics between formal and informal wage workers. In the current Chapter, we apply another approach, industry pair-employment income differentials are calculated by differentiating deviations from the mean of industry premiums of each types of employment. We briefly present the approach as follows:

$$INCOME_{ijtS} = X_{ijtS} B_{XIS} + I_{ijtS} \eta_{jtS} + \varepsilon_{ijtS} \quad (5)$$

$INCOME_{ijtS}$ is the income of labor i in employment S in industry j at time t . X_{ijtS} , I_{ijtS} are defined as (1). η_{jtS} is a vector of coefficients capturing industry effects on income.

(5) is also an modification of Mincerian income equation, and it is estimated for each type of employment in each year. It is well documented in labor economics literature that (5) suffer from selection bias because we only have observation of income of labor i in his/her employments and there are unobservable factors that affect his/her employments.

The deviations obtained from the normalization technique for each industry (η_{jtS}) can be regarded as individual industry premiums within each type of employment. Therefore, differences between the deviations across types of employments plus differences between

means of industry employment income effects are income differences across employments within industry or industry pair-employment income differentials. It should be noted that differences between means of industry employment income effects are constant across industries for each year and they can be captured by year fixed effects.

3.3. Data and sample

The main data source of the current chapter is sourced from five consecutive surveys of VHLSSs series in 2002-2010. General information of VHLSS is presented in the introduction and we would not repeat it here. We discuss here measures of the opening domestic market as well as construction of individual-panel data from VHLSS.

The key variables in the empirical models in the current chapter are measures of opening the domestic market. Unfortunately, there are so many alternatives and a number of them do not well correlate with each other (McCulloch, Winters and Cirera, 2002). In the current chapter, we employ four measures including simple average tariffs, weighted average tariffs, effective rate of protection and import penetration. The first and the last measures belong to two different approaches to measure opening the domestic market or its different aspects, openness in policy and openness in practices, meanwhile the second and the third can be considered as hybrids between them. All these are measured at the 2-digit level. Recalling Section 2.2, standard non-tariff restrictions on imports have only slightly changed in the study period. Hence, absence of measures of non-tariff restrictions should not significantly affect the results.

Data of simple and weighted average tariffs is obtained from the UNCTAD-TRAINS and UN COMTRADE which provide data of applied MFN tariffs and trade values at 6-digit-level of the economy. The Import penetration and the effective rate of protection are sourced from Pham Dinh Long (2013). Nevertheless, these measures are only obtained for 2003 to 2008. Consequently, data of 2008 is used for the year 2010.

Definitions of a majority of variables included in the empirical models such as gender, ethnicity, education or living areas follows their popular definitions in studies for Vietnam and they are easily calculated from primary indicators of the surveys. We also include households demographic such as household size or proportions of children to capture effects these factors on employments of household members.

We turn to one of our main interests, income of laborers. Income and benefits of wage workers are reported in the surveys and it is easy to estimate the hourly income of this kind of laborers. However, income of non-farm activities is only available at the household level. Therefore, we

allocate the household's income to its members involved in the households' activities based on their working time for the activities. Apparently, this approach suffers from a disadvantage that it does not take into account productivity differences across ages or experiences. However, as long as age compositions of laborers are random across industry, industry premiums are still unbiased.

We restrict our sample to manufacturing sector as the measures of opening the domestic market are only applicable to commodity trade which includes manufactured and agricultural products. However, impacts of opening the domestic market on the two product groups are possibly different and we only investigate the former to obtain more precise results as a consequence.

VHLSS has been also designed as a rotation survey. Therefore, we can construct a panel of a haft of households for two waves and a panel of one- fourth of households for three waves. However, we cannot attain these theoretical numbers of households due to attrition problem.

We construct the three-wave panel of 2004-2006-2008 for the one-equation approach. There are two panels of balance and unbalance. We prefer the unbalance one as it is a hybrid between the three- wave-balance panel and the pooled cross-sectional sample and have advantages over the two remaining samples as discussed in Chapter 2. Consequently, the total number of observation of the panel sample is 58 288, of which 19 734 is three-wave-panel and the remaining are two-wave panels. However, the panel needs to be cleaned as there are potential errors in panel over years. The cleaning procedure is the same as that in Chapter 2.

4. Estimation results

4.1. Descriptive analysis

Labor allocation and income

Allocation of labor across type of employments over years of manufacturing industries is given in Table 3-3. In general, proportions of self-employment and wage employment in HHBs have decreased with an increase in wage employment in the formal sector as the complement. The tendencies of changes in share of self-employment and wage employment in the formal sector have been quite steady over time. Accumulatively, ratio of the former has decreased by 8.3 percentage points and that of the latter has increased 14.3 percentage points. However, it should be noted proportion of self-employment have rebound in 2010. Between 2010 and 2002, the proportion of wage employment in HHBs also decreased by 6 percentage points but

the trend was not clear enough, and then it fluctuated between 2002 and 2008 before dropped considerably in 2010.

Table 3-3. Compositions of employment

Years	2002	2004	2006	2008	2010
Self-employment	39.83	35.88	33.62	29.75	31.46
Wage work in HHBs	27.22	24.47	23.63	26.81	21.23
Wage work in formal sector	32.95	39.65	42.75	43.43	47.31

Source: Authors' calculations with data from VHLSS, 2002-2010.

Hourly incomes reported in Table 3-4 are nominal value, thus we cannot comments about the trend. In addition, our sample here is only manufacturing industries which are different from those in Chapter 1. However, our interest is the relative incomes across types of employment. Income disadvantage of wage workers in HHBs, compared with their colleagues in the formal sector is not new and this disadvantage has been quite stable over time. The ratio has been identical in three out of four years in the sample. However, this situation is not observed for the relative income between self-employers and wage workers in the formal sector. The relative income steadily increased during 2004-2008 but enormously dropped in 2010. Difficulties in Vietnam's economy in the period of 2008-2010 as well as behaviors of the labor market³⁹ are good candidates of reasons for the fall in the relative income of self-employers. This result is not inconsistent with those in Chapter 1 that income of non-farm self-employers has been comparable with that of wage workers in the formal sector. In the Chapter 1, we estimate for all non-farm self-employers including construction and service industries. Meanwhile, the estimation here is only applied for manufacturing industries.

Table 3-4. Hourly income of different types of employment (1 000 VND)

Year	2004	2006	2008	2010
Self-employment (1)	4.94	6.72	11.31	12.13
Wage work in HHBs (2)	3.57	4.57	6.58	9.72
Wage work in formal sector (3)	5.68	6.97	10.40	15.51
Ratios across types of employment				
(1)/(3)	0.87	0.96	1.09	0.78
(2)/(3)	0.63	0.66	0.63	0.63

Source: Authors' calculations with data from VHLSS, 2004-2010.

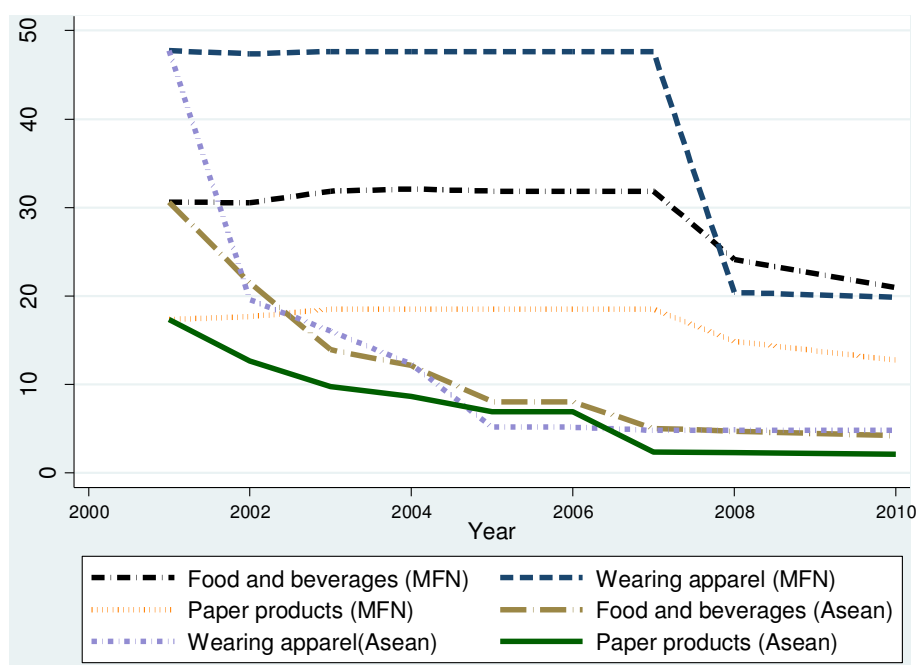
³⁹ The increase of self-employment is indeed observed in the manufacturing industries as depicted in Table 3-3. However, it should be cautious in interpreting the change between 2008 and 2010 as there is a change in the master sampling frame of VHLSS between the two years. It should note that pro-and counter-cyclicity. i.e. share of self-employer decline during difficult time is only found in Hanoi and HCMC. Other areas still follows conventional models of self-employers including those in the agricultural sector.

Measures of opening the domestic market

It is useful to evaluate the capacity of measures of opening the domestic market employed in the current chapter in capturing the context discussed in Section 2 as well as their variances. The latter characteristic is an important indicator for validating results of empirical models as those are based on the variances of opening the domestic market across industries.

Figure 3-3 presents the simple averages of MFN and ASEAN preferential tariffs of selected manufacturing industries. The average MFN tariffs of all three industries under presented were stable before dropping since 2007. However, Vietnam gradually cut its tariffs on ASEAN products before this milestone as shown in the Figure. Therefore, we have to capture these two separate lines of the tariffs in empirical estimation later on.

Figure 3-3. Simple average tariff of selected manufacturing industries

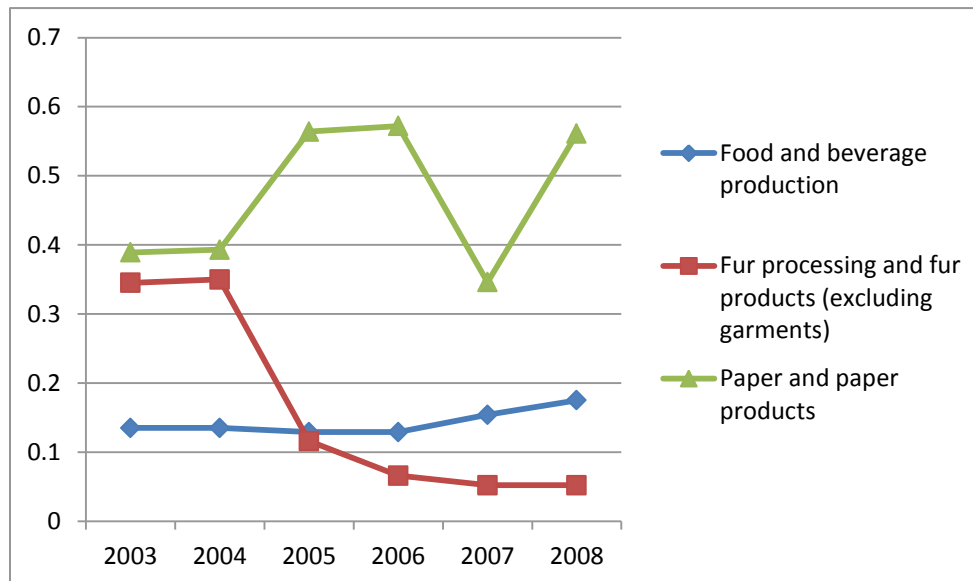


Source: Authors' calculation with data from the UNCTAD-TRAINS.

Indeed, the simple average tariffs are not perfect ones in capturing levels of opening the domestic market at the industrial level as the aggregation does not take into account weights of individual goods corresponding to each tariff line (Kee, Nicita and Olarreaga, 2009). Consequently, they overstate the true level of restrictiveness. An alternative aggregation procedure is to use import volumes as economic weights of individual commodities. However, this aggregation is subject to endogeneity problem and underestimates the true level of restrictiveness. To partially overcome the problem, we employ the methods used in Macmap

(Market Access Map) program which is called group reference. Accordingly, averages of imported values of individual products of similar countries are employed as weights for tariff aggregation. For Vietnam, we take Indonesia, Malaysia, Philippines and Thailand and Vietnam itself as the reference group.

Figure 3-4. Import penetration of selected manufacturing industries



Source: Pham (2013).

The import penetration measured at the 2-digit level of industries has been quite fluctuating as depicted in Figure 3-4. There have been clear trends for industries of fur processing and fur products as well as food and beverage production but the paper industry has exhibited fluctuation without a trend. As noted, the import penetration is a practical measure of trade liberalization; it is affected by both opening the domestic market in policy as well as responses of stakeholders. However, this measure is also influenced by the intra-industry trade.

It is important to investigate disadvantages as well as underlying meaning of alternative measures. The import penetration is mixed between the import share in the domestic market and the intra-industry trade. Indeed, the latter component has significantly increased in the studying period for Vietnam. For example, the Grubel-Lloyd Index of intra-industry trade between Vietnam and Thailand has increased from 0.094 in 2000-2004 to 0.221 in 2010-2011; figures of the index between Vietnam and Singapore for the corresponding periods are 0.063 and 0.225 respectively (UNCTAD, 2013). As a result, in the case of Vietnam, the import penetration reflects not only the increasingly opening of the domestic market but also the increase in the intra-industry trade. Put differently, the measure captures a broader situation,

exposing to international trade of the economy. Consequently, we shall interpret this measure in this way. Meanwhile, the effective rate of protection is based on weighted average tariffs and it suffers from endogenous problem. Therefore, we should bear in minds shortcomings as well as meanings of each measure in analyses.

We now move to a direct picture of changes in employment allocation and changes in a measure of opening the domestic market. Figure 3-5 and Figure 3-6 show changes in the share of self-employers and wage workers in HHBs and reduction in the simple average tariff between 2002 and 2010 in manufacturing industries respectively. The shares of the two types of employment exhibit opposite links. For self-employers, there has been a positive correlation between the share of this type of employment and the reduction in the average tariffs. If the tariff reduces larger, the share of self-employment also decline larger.

Figure 3-5. Changes in share of self-employment versus changes in average tariff, 2002-2010

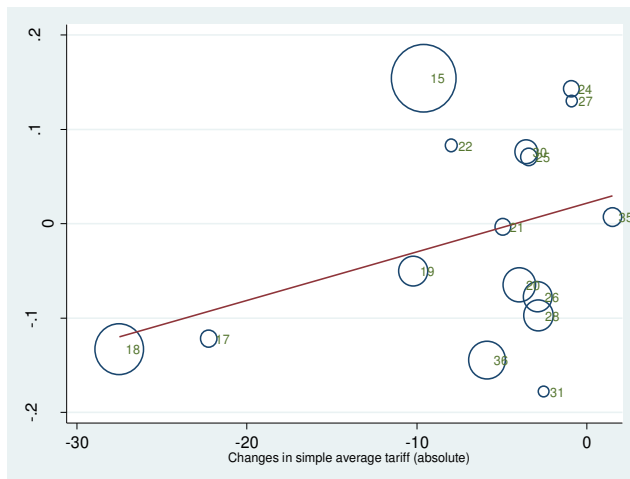
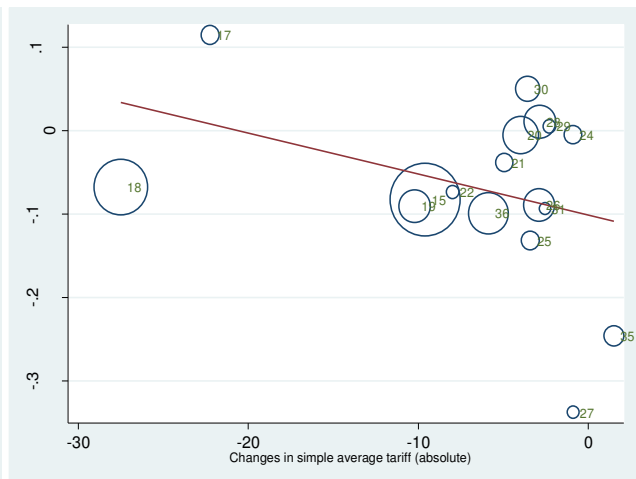


Figure 3-6. Changes in share of wage employment in HHBs versus changes in average tariff, 2002-2010



* Sizes of circles reflect numbers of employment of industries in 2010; numbers are 2-digit industrial codes under VSIC 1993.

Source: Authors' calculation with data from VHLSS 2002, 2010 and UN Comtrade.

Oppositely, the share of wage workers in HHBs negatively correlates with the reduction in the tariffs. If an industry exhibits a lower cut in the tariff, it experiences a higher reduction in share of wage workers in HHBs. This fact is quite interesting; it can be the case that industry with lower tariffs in 2002 that also experiences a lower cut in tariff and the industry perform relatively well. This process can result in a larger decline in wage workers in HHBs. The difference in correlations between changes in share of difference types of employment in HHBs

and the simple average tariffs also implies that the effects of opening the domestic market potentially different between self-employers and wage workers in HHBs.

However, if we employ an alternative measure of opening the domestic market, the import penetration, we have a different picture. This fact is an illustration for argument of McCulloch, Winters and Cirera (2002) about poor correlations between measures of trade liberalization. Appendixes 3-1 and 3-2 demonstrate changes in the shares of self-employment and wage employment in HHBs and changes in the import penetration. We now have a positive association between the share of self-employment and the import penetration and a negative association for the share of wage employment in HHBs. Therefore, we may face possibly different associations between alternative measures of opening the domestic market and the shares of self-employment and wage employment in HHBs in empirical results later. As discussed above, the tariff only measures opening of the economy in policy. Meanwhile, the import penetration measures the exposure to trade in reality. Therefore, we prioritize the latter in our analysis if there are inconsistent results between different measures.

Figure 3-7. Changes in income gaps between wage workers in the formal sector and self-employers versus changes in the average tariff, 2002-2010.

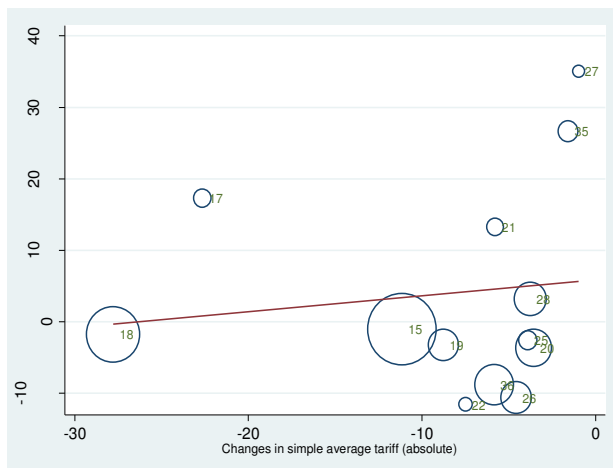
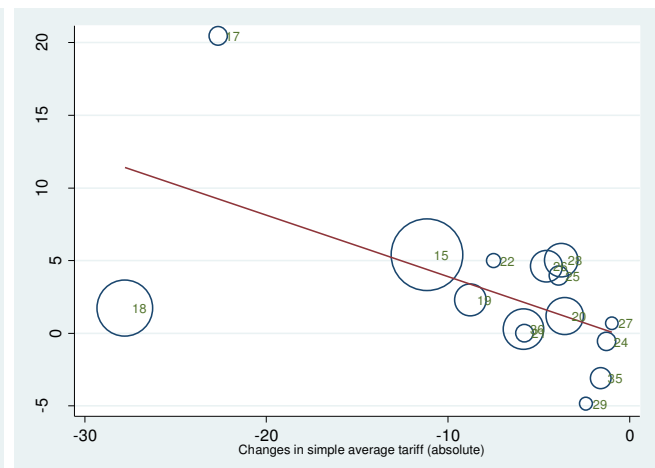


Figure 3-8. Changes in income gaps between wage workers in the formal and informal sector versus changes in the average tariff, 2002-2010.



* Sizes of circles reflect numbers of employment of industries in 2010; numbers are 2-digit industrial codes under VSIC 1993.

Source: Authors' calculation with data from VHLSS 2002, 2010 and UN Comtrade.

One again, we have opposite correlations between changes in income gaps and reduction in tariffs as depicted in Figure 3-7 and Figure 3-8. For self-employers, change is less clear and it seems that industries with larger reductions on tariffs have lower gaps between wage workers

in the formal sector and self-employers. For wage workers in HHBs, industries with less reductions in tariffs also exhibits lower increases in the gaps between wage workers in the formal sector and their counterparts in HHBs. Furthermore, the correlation seems to be stronger, comparing with the case of self-employers.

4.2. Estimation results

4.2.1. Opening the domestic market and labor allocation

As discussed in Section 3, there are two approaches can be used to answer the question of labor allocation. In addition, we estimate all models with and without industry trends to see how trends affect the impacts. However, we only report the estimate results of specifications with trends.

Under the two step approach, the main interests are results of the second step. However, it is worth to briefly discuss the results of the first step as an evaluation of validity of the estimation strategy.

Employment attainments

In the model of employment attainments, a wide range personal, household and community characteristics are included in the model of job attainments. As noted in Section 3, attainments of three types of employments are estimated with the multinomial logit model. wage employment in the formal sector is selected as the base. Estimation results of selected years are presented in Appendix 3-5.

In general, included variables are relevant and their directions in determining employments are also as expected. As depicted in Appendix 3-5, almost variables are significant in at least one year. This result is evident for the relevance of the variables. In terms of directions, male laborers have lower probability to work as self-employers but higher probability to work as wage workers in HHBs, compared with their female counterparts. The higher education the laborers attained, the lower probability of working as self-employers or wage workers in HHBs.

In another aspect, ethnicity and living areas which are normally found to be strong determinants of employment attainments in Vietnam are only marginally significant in a couple of equations over years. As the sample is restricted to manufacturing industries, workers are indeed filtered one time. The differences in employment attainments between workers across locations or ethnic groups found in other studies are presumably caused by differences in industry attainments of which employment compositions are different.

Estimated coefficients of industry dummies are not presented in Appendix 3-5. The results demonstrate relevance of the industry individual effects as a number of coefficients is significant at any conventional level of significance. Furthermore, the test for joint insignificance of industry dummies is rejected at 1% level.

Opening the domestic market and labor allocation

We now turn to our main interest, association between labor allocation and opening the domestic market. Alternative measures of opening the domestic market as well as their combinations are included in the regressions. It should be noted that first lagged values of the measures are used as an effort to avoid endogeneity problem.

Estimation results of relative allocations between self-employment, wage employment in HHBs and wage employment in the formal sector are presented in Table 3-5 and Table 3-6 respectively. R-squares of all alternative estimations are relatively high for the case of self-employment. The result indicates that the specifications are effective in capturing changes in labor allocation across different types of employments in Vietnam. However, a majority of variables presented in Tables 3-5 and 3-6 is statistically insignificant and the main variances are captured by industry fixed effects and industry trends.

Table 3-5. Association of opening the domestic market and labor allocation: self-employment versus wage employment in the formal sector

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year 2002	0.435 (0.806)	0.072 (1.140)					
Year 2004	0.425 (0.316)	0.142 (0.718)	0.018 (0.139)	-0.235 (0.320)	-0.224 (0.799)	-0.288 (0.478)	0.425 (0.764)
Year 2006	0.403* (0.212)	0.202 (0.398)	0.181 (0.187)	-0.144*** (0.010)	-0.246 (0.286)	-0.239 (0.167)	0.107 (0.209)
Year 2008	0.309 (0.226)	0.181 (0.333)	0.063 (0.139)	-0.070 (0.150)	-0.203 (0.271)	-0.186 (0.252)	0.053 (0.169)
Year 2010				Base			
Simple average tariff (lag) (MFN)	-0.010 (0.016)				0.024 (0.029)		
Simple average tariff (lag) (Asean)	0.018 (0.037)				-0.008 (0.093)		
Weighted average tariff (lag) (MFN)		0.001 (0.028)				0.022 (0.024)	
Weighted average tariff (lag) (Asean)		0.029 (0.045)				0.006 (0.053)	

Effective rate of protection (lag)			0.291 (0.563)				-1.050 (0.881)
Import penetration (lag)				1.784 (1.117)	2.065 (1.229)	1.938 (1.206)	2.132* (1.092)
Constant	-1.711*** (0.190)	-1.642*** (0.300)	-1.124*** (0.160)	-1.352*** (0.414)	-1.919* (1.018)	-1.886** (0.873)	-1.894** (0.753)
Industry trends	YES	YES	YES	YES	YES	YES	YES
Observations	84	84	64	58	58	58	58
R-squared	0.457	0.458	0.410	0.544	0.555	0.553	0.570
Number of industries	17	17	16	16	16	16	16
Dependent variable: Industry employment differentials: self-employment versus wage employment in the formal sector; the panel model with fixed effects is applied.							
*** p<0.01, ** p<0.05, * p<0.1							
Robust standard errors in parentheses							

Source: Authors' estimation with data from VHLSS, 2002-2010 and measures reported in Section 3.3.

Self-employment in manufacturing industries seems to decrease as coefficients of year dummies almost have the negative sign with the base of year 2010. However, none of estimated coefficients, except one of 2006 in the specification of the import penetration only, are statistically significant. This same result is observed for wage employment in HHBs.

Returning to estimated coefficients of our alternatives of measures of opening the domestic market, only an estimated coefficient of the import penetration in one specification is marginally statistically significant at 10% for the case of self-employment. The coefficient is positive, implying that increase in the import penetration would increase this type of employment relatively. This is consistent with the result of descriptive analysis. However, we cannot have a robust conclusion for this type of employment as the results are inconsistent across approaches as analyzed in more detail later.

For the case of wage employment in HHBs, only estimated coefficient of the import penetration is statistically significant, all coefficients of other variables of this type of employment are statistically insignificant. The Import penetration is negative associated with probability of wage employment in HHBs versus that in the formal sector in all specifications. As noted in Section 3.1, the measure captures the exposure to the international trade. Therefore, the results imply that when the exposure to the international trade increases, wage employment in HHBs decreases. It is consistent with correlation between changes in the share of wage employment in HHBs and the import penetration (Appendix 3-2) that an increase in the import penetration

reduces the share of wage employment in HHBs. This result is also somewhat consistent with that in McCaig and Pavcnik (2018) who report significant and positive impacts of the VN-US bilateral trade agreement on labor allocation between HHBs and the formal sector. However, they report that the result is also valid for the case of self-employment only of which we do not obtain robust results across different approaches.

Table 3-6. Association of opening the domestic market and labor allocation: wage employment in HHBs versus the formal sector

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year 2002	1.472 (1.884)	3.392 (3.441)					
Year 2004	0.760 (0.919)	2.265 (2.275)	0.246 (0.486)	0.599 (1.073)	0.335 (2.008)	-0.067 (1.131)	-2.301 (2.025)
Year 2006	-0.023 (0.597)	1.068 (0.686)	-0.470 (0.864)	0.016 (0.041)	0.708 (1.011)	0.322 (0.555)	-1.087 (0.804)
Year 2008	0.123 (0.344)	0.916 (0.892)	-0.018 (0.245)	0.046 (0.667)	1.018 (1.434)	0.786 (1.147)	-0.495 (0.548)
Year 2010				Base			
Simple average tariff (lag) (MFN)	-0.003 (0.021)				-0.177 (0.160)		
Simple average tariff (lag) (Asean)	-0.062 (0.090)				0.087 (0.227)		
Weighted average tariff (lag) (MFN)		-0.089 (0.076)				-0.150 (0.113)	
Weighted average tariff (lag) (Asean)		-0.122 (0.136)				0.115 (0.169)	
Effective rate of protection (lag)			-0.807 (1.232)				4.613 (3.442)
Import penetration (lag)				-10.441** (4.502)	-12.637** (5.403)	-12.352** (4.887)	-11.972** (4.748)
Industry trends							
Constant	-0.699*** (0.233)	-0.528 (0.492)	-0.218 (0.332)	4.074** (1.559)	8.232 (4.765)	7.356* (3.492)	6.456** (2.760)
Industry trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	84	84	64	58	58	58	58
R-squared	0.048	0.072	0.125	0.494	0.537	0.537	0.530

Dependent variable: Industry employment differentials: wage employment in HHBs versus formal sector; the panel model with fixed effects is applied.

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses

Source: Authors' estimation with data from VHLSS, 2002-2010 and measures reported in Section 3.3.

The only significance of the measure of import penetration is possibly caused by different meanings of the measure. Other measures mainly capture opening the domestic market in theory. Meanwhile, the import penetration reflects opening in practice as well as intra-industry trade that is also induced by increasing in exports of industries. Put differently, the import penetration also partially reflects the increase in accessing to foreign markets. This is a shortcoming of the current Chapter that we do not include simultaneously any measures of opportunities in accessing to foreign markets as the study of McCaig and Pavcnik (2018).

One equation model

As an alternative, we try to estimate equation (3) with individuals from the panel of 2004-2006-2008. We estimate the specification with unbalance panel data as noted above, with inclusion of industry fixed effects and industry trends. The total number of observations in estimation is reported in the ending row of Tables 3-7 and 3-8 which presents parts of estimation results of the multinomial logit model denoted as equation (4).

Industries with less than 50 observations are excluded to control for possible outliers and measurement errors. That results in differences in industries included in estimation for the two-step and the one-equation models. Specifically, there are 16 and 12 industries included in estimation of the former and latter models respectively.

Results in Tables 3-7 and 3-8 depict that time have significant impacts on labor attainments of self-employment or wage employment in HHBs versus wage employment in the formal sector but in opposite directions. The positive coefficients of year 2004 and 2006 indicate that self-employment in 2008 relatively reduce to wage employment in the formal sector as the same the results of the two-step approach. Meanwhile, negative coefficients of year variables imply an increase in probability of attaining wage employment in HHBs versus that in the formal sector in 2008, compared with that in 2004 or 2006. It is somewhat inconsistent with the result of the two-step model as they are positive in a number of specifications in the approach. However, they are all insignificant. It should be noted that Tables 3-7 and 3-8 only presents parts of full estimation result of the one-equation model.

Indeed, it is not fully comparable between the estimated coefficients in Table 3-5 versus Table 3-7 and Table 3-6 versus Table 3-8 as differences in the study periods. However, we still have rough ideas of comparisons. For self-employment versus wage employment in the formal

sector, a number of signs of estimated coefficients of the measures alter between the two approaches.

Table 3-7. Association of opening the domestic market and labor allocation under individual approach: self-employment versus wage employment in the formal sector

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year 2004	1.857*** (0.640)	2.062*** (0.670)	1.765*** (0.528)	1.781** (0.875)	1.034 (1.148)	1.335 (1.191)	1.002 (1.155)
Year 2006	0.857*** (0.301)	1.022*** (0.314)	0.837*** (0.289)	0.839** (0.424)	0.632 (0.473)	0.804 (0.499)	0.638 (0.469)
Year 2008				Base			
Simple average tariff (lag) (MFN)	-0.047 (0.136)				-0.342 (0.255)		
Simple average tariff (lag) (Asean)	-0.014 (0.055)				0.089 (0.092)		
Weighted average tariff (lag) (MFN)		0.673* (0.381)				0.294 (0.463)	
Weighted average tariff (lag) (Asean)		-0.111* (0.066)				0.022 (0.122)	
Effective rate of protection (lag)			0.009 (0.584)				0.992 (0.989)
Import penetration (lag)				-1.918 (2.144)	-4.245 (3.147)	-4.278 (4.248)	-3.768 (2.763)
Industry trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.199 (6.884)	-9.155 (9.134)	3.038 (6.045)	1.294 (6.803)	9.639 (9.178)	-3.898 (10.895)	1.217 (6.803)
Observations	2869	2869	2869	2616	2616	2616	2616
Dependent variable: individuals' employment attainments in terms of self-employment, wage employment in HHBs and that in the formal sector							
*** p<0.01, ** p<0.05, * p<0.1							
Robust standard errors in parentheses							

Source: Authors' estimation with data from VHLSS, 2004-2008 and measures reported in Section 3.3.

The coefficients of weighted average tariffs are marginally significant at 10% level in one-equation approach as depicted in Table 3-7 for self-employment. We have opposite direction of impacts for its two indicators. If the MFN weighted average tariff applied for products from

economies rather than ASEAN decreases, it would decrease probabilities of self-employment. Meanwhile, the coefficient of the average tariff applied for products from ASEAN implies the opposite direction. Recalling that one estimated coefficient of import penetration is also marginally significant in one specification in the two-step approach and it implies a positive impact of import penetration, the results for this type of employment are inconsistent across approaches and specifications. Therefore, we cannot have a robust conclusion for this type of employment.

Estimated coefficients of all measures are statistically insignificant in estimations for wage employment in HHBs. Coefficients of the import penetration are still negative as the same as results with the two-step approach but they are insignificant in the one-equation approach. A shorter study period in the one-equation approach is a potential reason for the insignificance of estimated coefficients in this approach.

Table 3-8. Association of opening the domestic market and labor allocation under individual approach: wage employment in HHBs versus the formal sector

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year 2004	-0.231 (0.611)	-0.039 (0.647)	-0.433 (0.484)	-0.444 (0.822)	-0.616 (1.012)	-0.276 (0.982)	-0.797 (1.129)
Year 2006	-0.274 (0.294)	-0.147 (0.310)	-0.349 (0.274)	-0.335 (0.395)	-0.382 (0.434)	-0.159 (0.442)	-0.427 (0.448)
Year 2008				Base			
Simple average tariff (lag) (MFN)	0.048 (0.133)				0.065 (0.255)		
Simple average tariff (lag) (Asean)	-0.034 (0.058)				0.020 (0.079)		
Weighted average tariff (lag) (MFN)		0.427 (0.421)				0.560 (0.474)	
Weighted average tariff (lag) (Asean)		-0.094 (0.069)				-0.080 (0.093)	
Effective rate of protection (lag)			-0.196 (0.618)				0.456 (1.035)
Import penetration (lag)				-2.020 (2.239)	-2.420 (2.876)	-1.374 (3.211)	-2.734 (2.809)
Industry trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	17.31*** (6.424)	10.650 (9.463)	18.47*** (5.514)	17.76*** (5.894)	16.24* (8.595)	7.51 (10.510)	17.72*** (5.900)

Observations	2869	2869	2869	2616	2616	2616	2616
Dependent variable: individuals' employment attainments in terms of self-employment, wage employment in HHBs and that in the formal sector.							
*** p<0.01, ** p<0.05, * p<0.1							
Robust standard errors in parentheses							

Source: Authors' estimation with data from VHLSS, 2004-2008 and measures reported in Section 3.3.

4.2.2. Opening the domestic sector and income differentials

Income equations

Estimation results of income equations are given in Appendix 3-6 and besides conventional variables of education, gender and age (as proxy for experiences), location and ethnicity of laborers which are often found to be significant determinants of income in studies for Vietnam are included in regressions. As noted, the equation is estimated by OLS may suffer from the problem of selection bias. However, we cannot find proper instrumental variables for employment selection of those does not affect the income. Consequently, OLS is still used to estimate. It should be noted that information of employment in VHLSS 2002 is not sufficient to precisely estimate income of self-employers and that year is consequently excluded.

The estimation results indicate that gender and age are strong determinants of income as all coefficients except ones of age in formal wage employment in 2006 are statistically significant at 1% level. Meanwhile, education is less relevant in self-employment and wage employment in HHBs. This result reveals that the production technology in HHBs in the manufacturing industries in Vietnam is simple and it requires simple skills only. In addition, few laborers attaining vocational training or college/university education can be also a reason for insignificance of these levels of education in HHBs.

Laborers living urban areas or belonging to Kinh-Hoa group are normally found to have higher income compared with their counterparts in rural areas or from Ethnic Minorities. However, these common results are only found for the living areas in the estimation results in Appendix 3-2 that laborers in the urban areas have higher income in all types of employments over years. Meanwhile, the coefficient of Kinh-Hoa group is not statistically significant for year 2008 and 2010 in both kinds of wage works. This unexpected result needs further investigation to be appropriately explained but it goes beyond scope of the current study.

Opening the domestic market and income differentials

Tables 3-9 and 3-10 present estimation results of the second step, for income differentials between self-employers, wage workers in HHBs and wage workers in the formal sector

respectively. Estimated coefficients of year dummies exhibit two different trends in differentials. Negative sign of the coefficients observed in the results between workers in HHBs and their counterparts in the formal sector indicate a reduction in differentials. However, only several coefficients are significant at 10% level. Meanwhile, a majority of the coefficients in the results of the income differentials between self-employers and wage workers in the formal sector is positive that implies an increase in the gap but none of them are significant.

Table 3-9. Association of opening the domestic market and income differentials between self-employer and wage worker in the formal sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year 2004	0.197 (0.550)	0.684 (0.783)	0.110 (0.129)	0.155 (0.232)	0.239 (0.581)	0.318 (0.387)	0.594 (0.386)
Year 2006	-0.160 (0.193)	0.144 (0.359)	-0.144 (0.159)	-0.029*** (0.004)	-0.070 (0.187)	-0.025 (0.130)	0.138 (0.126)
Year 2008	-0.010 (0.133)	0.141 (0.215)	0.026 (0.075)	0.086 (0.083)	0.002 (0.143)	0.020 (0.138)	0.168 (0.103)
Year 2010				Base			
Simple average tariff (lag) (MFN)	0.012 (0.017)				0.015 (0.019)		
Simple average tariff (lag) (Asean)	-0.018 (0.074)				-0.017 (0.066)		
Weighted average tariff (lag) (MFN)		0.003 (0.017)				0.014 (0.018)	
Weighted average tariff (lag) (Asean)		-0.057 (0.072)				-0.026 (0.043)	
Effective rate of protection (lag)			0.124 (0.822)				-0.699 (0.522)
Import penetration (lag)				0.226 (0.411)	0.460 (0.422)	0.492 (0.372)	0.458 (0.293)
Constant	-0.798** (0.356)	-0.867*** (0.199)	-0.726*** (0.155)	-1.062*** (0.346)	-1.416** (0.491)	-1.340** (0.492)	-1.422*** (0.347)
Industry trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67	67	64	58	58	58	58
R-squared	0.526	0.568	0.522	0.798	0.807	0.813	0.815
Dependent variable: industry-employment income differentials: self-employment versus wage employment in formal sector; The panel model with fixed effects is applied.							
*** p<0.01, ** p<0.05, * p<0.1							
Robust standard errors in parentheses							

Source: Authors' estimation with data from VHLSS, 2004-2010 and measures reported in Section 3.3.

For measures of opening the domestic market, none of them are significant for the case of income differentials between wage workers in HHBs and their counterparts in the formal sector, for both specification of with and without industry trends⁴⁰. Meanwhile, the coefficients of the simple average tariff are statistically significant at 10% for income differentials between self-employment and wage employment in the formal sector in a couple of specifications without trends. However, all of the measures are statically insignificant when the industry trends are included in the model. Therefore, it is safe to conclude that the measures of opening the domestic market under studying are not associated with income gaps between different types of employment. These results are consistent with analyses in Chapter 1 as well as the descriptive analysis that the income gaps across types of employment have been stable over years. The relatively low level of segmentation between types of employments in Vietnam labor market, compared with other countries as well as relatively good performance in terms of productivity increase of HHBs are possible underlying forces mitigating negative effects of opening the domestic market.

Table 3-10. Association of opening the domestic market and income different between wage workers in HHBs and the formal sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year 2004	0.011 (0.168)	0.113 (0.148)	0.080* (0.038)	0.067 (0.126)	0.067 (0.307)	0.082 (0.215)	0.194 (0.303)
Year 2006	-0.059 (0.103)	0.002 (0.082)	-0.027 (0.052)	-0.04*** (0.002)	-0.058 (0.075)	-0.031 (0.041)	0.005 (0.076)
Year 2008	-0.011 (0.098)	0.026 (0.094)	-0.012 (0.066)	-0.015 (0.061)	-0.033 (0.108)	-0.003 (0.095)	0.008 (0.062)
Year 2010				Base			
Simple average tariff (lag) (MFN)	0.000 (0.007)				0.003 (0.011)		
Simple average tariff (lag) (Asean)	0.012 (0.022)				-0.001 (0.035)		
Weighted average tariff (lag) (MFN)		-0.006 (0.005)				-0.002 (0.007)	
Weighted average tariff (lag) (Asean)		0.000 (0.013)				-0.002 (0.018)	
Effective rate of protection (lag)			0.027 (0.172)				-0.203 (0.325)
Import penetration				0.304	0.341	0.297	0.371

⁴⁰ The results without trends are not reported. It is available upon request.

(lag)				(0.184)	(0.373)	(0.285)	(0.275)
Constant	0.056 (0.108)	0.145*** (0.050)	0.018 (0.054)	-0.107 (0.190)	-0.185 (0.395)	-0.050 (0.291)	-0.212 (0.332)
Industry trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67	67	64	58	58	58	58
R-squared	0.489	0.490	0.442	0.417	0.419	0.418	0.427

Dependent variable: industry-employment income differentials: wage employment in HHBs and that in the formal sector; the panel model with fixed effects is applied.
*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses

Source: Authors' estimation with data from VHLSS, 2004-2008 and measures reported in Section 3.3.

Conclusion

The current chapter aims at exploiting the association between opening the domestic market and labor allocation as well as income differentials across types of employment in Vietnam. Classification of employment is based on institutions with further separation based on employment status of self-employment or wage employment in household businesses. This classification is induced by concept of informality and practical characteristics of employment in HHBs in Vietnam. Accordingly, employments are divided into self-employment, wage employment in HHBs and the formal sector of state-owned, private and FDI enterprises.

The main empirical models include two steps. Employment attainments and income of individuals are estimated in the first step to derive differences in employment allocation and income differentials at the industry level. Associations between employment allocation, income differentials and opening the domestic market measures at the industry level are investigated in the second step. Results of the first step are reasonable and industry individual effects are demonstrated to be relevant in determining employment attainments and income of laborers. Meanwhile, relative high goodness of fits in estimation results in the second step exhibit the capacity of the specification in the step of capturing variances of dependent variables-differences in labor allocation across industries and pair-employment income differentials.

Opening the domestic market does not have impacts on income differentials between different types of employments, both wage employment in HHBs and self-employment to that of wage employment in the formal sector. Result of descriptive analysis depict that the relative income across types of employment were stable in the study period. This result is also consistent with those in the Chapter 1 for the whole non-farm industries.

Opening the domestic market measured by import penetration is found to be negative associated with share of wage employment in HHBs versus that in the formal sector. This result is somewhat consistent with that of McCaig and Pavcnik (2018) who report positive and significant impacts of the VN-US bilateral trade agreement on labor allocation between HHBs and the formal sector. But our result is also different from their result as they also find a significant effect of the agreement on self-employment. Meanwhile, results are inconsistent across specifications in the current study. The significance of the only measure which partially reflects changes in accessing to foreign markets, the import penetration, among different measures of opening the domestic market, implies that the opposite in trade liberalization sides, opening up the domestic market versus increasing accessing to foreign markets, may have different impacts on labor allocations.

The chapter faces several shortcomings. First, both sides of trade liberalization should be simultaneously included in studying that would provide a more complete and more precise picture of impacts of trade liberalization on labor allocation and income differentials. Secondly, selection bias in income estimation of individuals should be corrected that means, better instrumental variables for employment attainments which do not affect income must be found. Thirdly, household businesses in the service sector which account for a majority of this type of business is not studied as we cannot access to direct measures of opening the domestic market of the sector.

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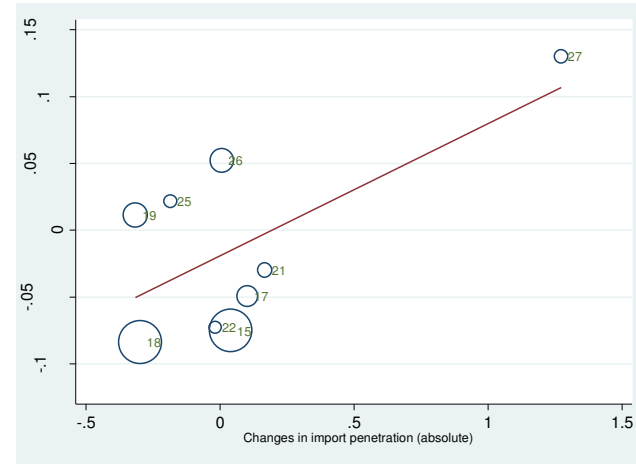
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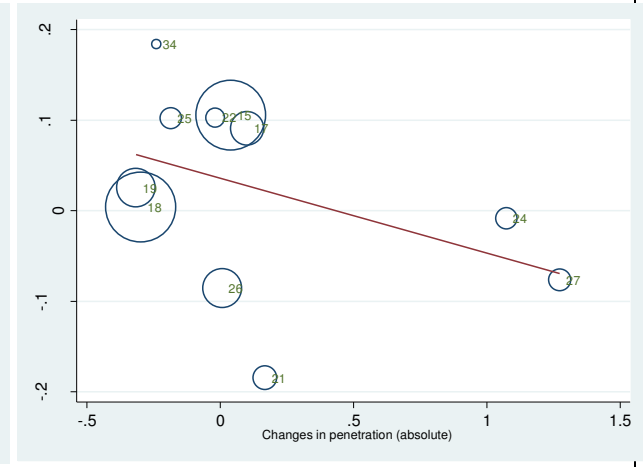
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Appendix 3-1. Changes in ratio of self-employment to the total employment and changes in import penetration, 2004-2008.



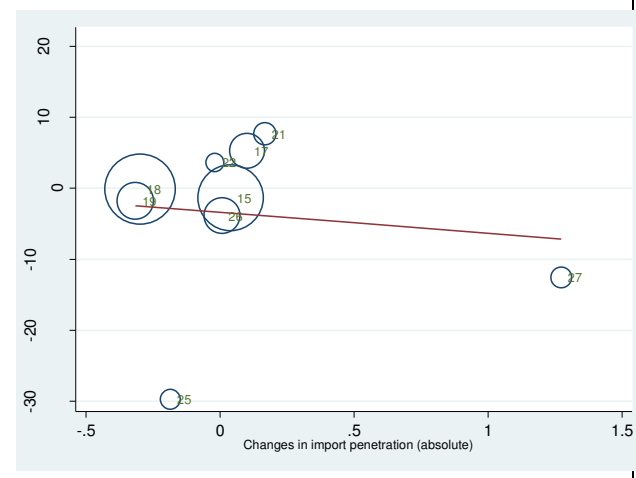
Appendix 3-2. Changes in ratio of wage employment in HHBs to the total employment and changes in import penetration, 2004-2008.



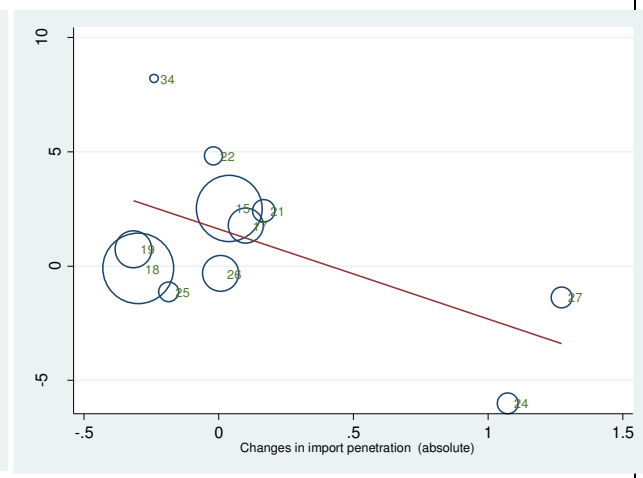
* Sizes of circles reflect numbers of employment of industries in 2008; numbers are 2-digit industrial codes under VSIC 1993.

Source: Authors' calculation with data from VHLSS 2004, 2008 and Pham (2013).

Appendix 3-3. Changes in income gaps between wage workers in the formal sector and self-employers and changes in import penetration, 2004-2008.



Appendix 3-4. Changes in income gaps between wage workers in the formal and informal sector and changes in import penetration, 2004-2008.



* Sizes of circles reflect numbers of employment of industries in 2008; numbers are 2-digit industrial codes under VSIC 1993.

Source: Authors' calculation with data from VHLSS 2004, 2008 and Pham (2013).

Appendix 3-5: Estimation results of multinomial logit models for employment attainments

Years	2002				2006				2010			
Variables	RRR		RRR		RRR		RRR		RRR		RRR	
	(1)		(2)		(1)		(2)		(1)		(2)	
Male	0.985		1.627 ***		0.681 ***		1.395 **		1.212		1.548 ***	
Age (log)	0 ***		0.003 ***		0 ***		0 ***		0 ***		0.001 **	
Age (log) square	15.054 ***		2.374 ***		11.298 ***		4.371 ***		15.153 ***		3.183 **	
Being household head	1.058		1.007		1.291		1.083		1.078		0.756 *	
Kinh-Hoa	0.638		1.075		0.775		0.875		0.366 ***		0.968	
Urban	0.802 *		1.103		0.775		0.845		0.701 **		1.026	
Household size (log)	0.927		1.656 ***		0.292 ***		1.136		0.318 ***		1.123	
Household composition												
Proportion of children aged 0-5	4.543 ***		0.992		9.105 ***		1.163		9.763 ***		0.605	
Proportion of children aged 6-10	2.092 **		0.979		11.998 ***		4.802 ***		11.166 ***		3.443 **	
Proportion of children aged 11-15	1.766 *		0.902		15.401 ***		1.47		12.112 ***		1.901	
Proportion of members aged 16-60					Base							
Proportion of adults aged over 60	1.574		1.213		2.691 **		1.349		2.759 **		0.931	
Education												
No degree	0.871		1.323 **		0.909		1.488 *		0.839		0.914	
Primary					Base							
Lower secondary	0.988		0.813 **		0.952		0.831		0.915		0.729 **	
Upper secondary	0.501 ***		0.372 ***		0.572 ***		0.486 ***		0.687 *		0.288 ***	
Vocation	0.145 ***		0.095 ***		0.181 ***		0.178 ***		0.195 ***		0.144 ***	

College/University	0.065	***	0.038	***	0.04	***	0.029	***	0.04	***	0.069	***
Marital status												
Unmarried	0.684	***	0.853		0.806		1.068		0.762		0.851	
In marriage							Base					
Widow, divorced	0.64	**	0.789		0.617		1.005		0.573	*	0.961	
Non-employment income (log)	1.026		0.437	***	3.543	***	0.504	***	3.732	***	0.598	***
Owning the house	1.477	**	0.958		0.94		1.107		4.365	***	3.719	***
Commune characteristics												
Commune is the remote area	0.664	**	0.826		0.633	*	0.479	***	1.378		1.643	**
Village has permanent car road	0.687	***	0.754	***	0.809		0.894		0.611	**	0.893	
Village has passenger transport stop	1.289	**	1.033		0.709	*	0.878		0.783		1.524	
Workers in commune have wage employment opportunities	0.475	***	0.668	***	0.61	**	0.954		0.502	***	0.808	
Commune has nonfarm traditional production	3.237	***	2.191	***	1.872	***	1.027		2.534	***	1.755	***
Constant	6.86E+11	***	98900607	***	4712		2.49E+09	***	34075.1	*	20544435	***

*** p<0.01, ** p<0.05, * p<0.1

(1): Self-employment; (2): wage employment in HHBs; (3): wage employment in formal sector. (3) is the base

Source: Authors' estimation with data from VHLSS, 2002-2010.

Appendix 3-6: Estimation results of income equations

Variables	Self-employment				Wage worker in Household Businesses				Formal wage work			
	2004	2006	2008	2010	2004	2006	2008	2010	2004	2006	2008	2010
Male	0.209*** (0.064)	0.219*** (0.061)	0.200*** (0.066)	0.276*** (0.073)	0.333*** (0.049)	0.344*** (0.044)	0.344*** (0.045)	0.464*** (0.054)	0.158*** (0.037)	0.156*** (0.029)	0.236*** (0.031)	0.152*** (0.029)
Age (log)	7.665*** (1.239)	5.723*** (1.215)	8.447*** (1.445)	7.138*** (1.684)	5.325*** (1.242)	6.207*** (0.969)	6.473*** (1.050)	6.566*** (1.246)	4.665*** (1.146)	1.253 (0.991)	2.508*** (0.907)	3.446*** (0.887)
Age (log) square	-1.12*** (0.177)	-0.81*** (0.173)	-1.20*** (0.208)	-1.01*** (0.240)	-0.76*** (0.181)	-0.89*** (0.143)	-0.92*** (0.154)	-0.95*** (0.183)	-0.63*** (0.172)	-0.14 (0.149)	-0.32** (0.134)	-0.47*** (0.131)
Urban	0.239*** (0.061)	0.223*** (0.055)	0.200*** (0.066)	0.275*** (0.067)	0.091 (0.056)	-0.039 (0.046)	-0.001 (0.045)	0.143*** (0.051)	0.119*** (0.037)	0.006 (0.032)	-0.044 (0.031)	0.075** (0.029)
Kinh-Hoa	-0.197* (0.117)	0.081 (0.151)	-0.190 (0.167)	-0.99*** (0.271)	-0.35*** (0.097)	-0.19*** (0.068)	0.077 (0.080)	0.043 (0.096)	-0.52*** (0.123)	-0.132 (0.092)	-0.071 (0.086)	-0.051 (0.066)
No degree	0.029 (0.085)	0.019 (0.084)	-0.084 (0.101)	-0.204* (0.114)	-0.047 (0.069)	0.006 (0.056)	-0.139** (0.060)	-0.124 (0.089)	-0.085 (0.063)	-0.056 (0.059)	-0.041 (0.069)	-0.20*** (0.059)
Primary school	Base											
Lower secondary	0.084 (0.067)	0.057 (0.063)	0.032 (0.065)	-0.038 (0.080)	-0.057 (0.048)	-0.063 (0.042)	-0.021 (0.050)	0.078* (0.046)	-0.023 (0.046)	0.030 (0.037)	0.058 (0.040)	-0.018 (0.037)
Upper secondary	0.081 (0.105)	0.062 (0.082)	0.228** (0.090)	0.031 (0.108)	0.012 (0.079)	0.114 (0.072)	0.078 (0.071)	-0.057 (0.090)	0.141** (0.056)	0.075 (0.049)	0.099** (0.043)	0.074* (0.043)
Vocational training	0.185* (0.099)	0.118 (0.095)	-0.039 (0.097)	0.235** (0.120)	0.168** (0.066)	-0.031 (0.108)	0.086 (0.072)	0.063 (0.078)	0.067 (0.050)	0.209*** (0.044)	0.182*** (0.044)	0.194*** (0.043)
College/University	0.434** (0.212)	0.263 (0.293)	0.502* (0.302)	0.103 (0.304)	-0.802 (0.917)	0.347 (0.409)	0.481*** (0.129)	0.106 (0.290)	0.471*** (0.082)	0.619*** (0.070)	0.795*** (0.073)	0.691*** (0.059)
Constant	-11.67***	-8.27***	-12.64***	-9.95***	-8.34***	-9.44***	-9.73***	-9.42***	-7.22***	-1.20	-3.02*	-4.06***

	(2.156)	(2.131)	(2.518)	(2.956)	(2.114)	(1.619)	(1.775)	(2.104)	(1.903)	(1.639)	(1.544)	(1.492)
Observations	894	893	854	822	604	663	732	647	950	1108	1146	1332
R-squared	0.296	0.294	0.287	0.242	0.286	0.268	0.291	0.354	0.328	0.299	0.337	0.328

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimation with data from VHLSS, 2002-2010.

Résumé

Cela fait environ 30 ans que Vietnam a lancé la politique de Doi Moi (Renouveau), son économie et son marché du travail ont changé radicalement. La thèse étudie l'allocation de la main-d'œuvre dans différents secteurs économiques et institutionnels ainsi que le revenu dynamique des travailleurs au Vietnam au cours de cette période. En outre, il examine les effets de l'ouverture du marché domestique et les systèmes de salaire minimum en tant qu'éléments représentatifs de la situation économique et de la régulations sur les deux processus.

Le premier chapitre analyse l'allocation de la main-d'œuvre et des revenus dynamiques de différents secteurs économiques et institutionnels dans différentes zones avec les variétés de niveaux d'urbanisation. Le deuxième chapitre examine les impacts positifs du salaire minimum sur les taux d'emploi, l'allocation du travail et la répartition des salaires, en tenant compte des effets retardés sur les impacts de l'emploi. Le troisième chapitre étudie les effets de l'ouverture du marché domestique sur les deux processus.

La thèse contribue à la littérature dans ce domaine sur trois points principaux.

Premièrement, il fournit une image globale du changement structurel du marché de travail vietnamien depuis le Doi Moi. Il montre que les réponses du marché du travail varient suivant les conditions macroéconomiques et la localisation. Les estimations de productivité du travail par type d'emplois constituent un éléments d'explication des transformations sur le marché du travail. Deuxièmement, la thèse fournit des estimations de l'impact des augmentations de salaire minimum en tenant compte des tendances et des effets retardés. Troisièmement, la thèse prend en compte l'hétérogénéité du secteur informel en étudiant des effets de l'ouverture du marché domestique sur l'allocation de la main-d'œuvre et les écarts de gains.

Mots Clés

Changements structurels, Allocation du travail, Écarts de revenus, Salaire minimum, Ouverture du marché intérieur

Abstract

It has been about 30 years since Vietnam launched Doi Moi (Renovation), the economy as well as its labor market have radically changed. The thesis investigates labor allocation across different economic and institutional sectors as well as income dynamics of laborers in Vietnam in that episode. Furthermore, it examines the effects of opening the domestic market and minimum wage schemes as representative elements of economic circumstances and regulations on the two processes. The first chapter analyzes labor allocation and income dynamics of different economic and institutional sectors in different areas with varying levels of urbanization. The second chapter investigates the effects of the minimum wage increases on employment rates, labor allocation and wage distribution with taking into account lagged effects on employment effects. The third chapter studies the effects of opening the domestic market on the two processes. The contribution of the thesis has threefold. Firstly, it provides a comprehensive picture structural change in Vietnam labor market since Doi Moi with different responses of the labor market in different macro-economic conditions as well as different locations. Furthermore, a complete estimation of productivity of all stakeholders in the economy for a more than decade provides explanations for several dynamics in the labor market. Secondly, the thesis provides estimations of impacts of minimum wage increases on the labor market taking into account trends and lagged effects. Thirdly, the thesis take into accounts heterogeneities in the informal sector in investigating effects of opening the domestic market on the labor allocation and income gaps.

Keywords

Structural changes, Labor allocation, Income gap, Minimum wage, Opening the domestic market