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# The Turning Point in the Vietnamese Economy: Revisiting Labor Surplus Theory

Takahiro YAMADA

47-5
名古屋大学大学院国際開発研究科
GRADUATE SCHOOL OF INTERNATIONAL DEVELOPMENT
NAGOYA UNIVERSITY

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# The Turning Point in the Vietnamese Economy: Revisiting Labor Surplus Theory

Takahiro YAMADA *

**Abstract**

This paper discusses the reason for economic growth and inter-sectoral wage inequality in Vietnam from the perspective of dynamic labor mobility during the period of 2004–2010. To analyze dynamic labor mobility, I revisit labor surplus theory under the dualistic economy as proposed by Lewis (1954). According to the analytical results, notably with the comparison between the marginal productivity of labor and the real wage rate in the agricultural sector, the marginal productivity of labor is still greater than the real wage rate in the sector. That is, the marginal productivity of labor is still 69.1 percent of the real wage rate as of 2010. Hence, it is plausible that the Vietnamese economy did not reach the turning point by the end of the decade, implying the existence of vast amounts of cheap labor in the agricultural sector and a continuously diverging real wage rate gap between agricultural and non-agricultural sectors. Vietnamese growth would be sustained awhile by the development of the non-agricultural sector with the absorption of cheap labor supplied from the agricultural sector.

**Keywords**: Economic Development, Labor Migration, Labor Surplus, Marginal Productivity of Labor, Labor Market

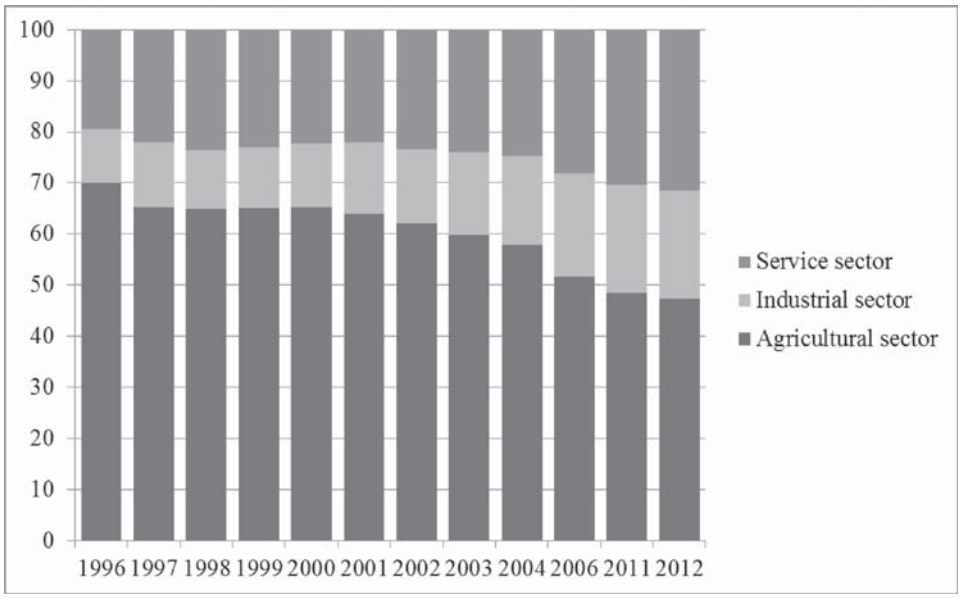
**JEL Classification**: O14, O15, O18, O41, O47, O53.

## 1. Introduction

Vietnam launched the *DoiMoi* reforms aimed at liberalization and integration into the international economy, with effects spanning broadly from 1986 into the 1990s.[1] After the introduction of DoiMoi, the basis for the socio-economic development has been strengthened. As a result, real GDP growth was robust, reaching 6.6 percent (constant price)[2] on average from 1986 to 2012, and with remarkable poverty reduction reaching 2.4 percent of the poverty headcount ratio in 2012, a monumental improvement from 63.8 percent in 1993.[3] When it comes to the country's employment rate, a clear trend is observed in that the share of agricultural employment has slightly decreased with the enlargement of service and industrial sectors over time, as shown in Figure 1. Also, the share of the labor force in urban areas has been increasing, while rural labor force has been decreasing, as shown in Figure 2.

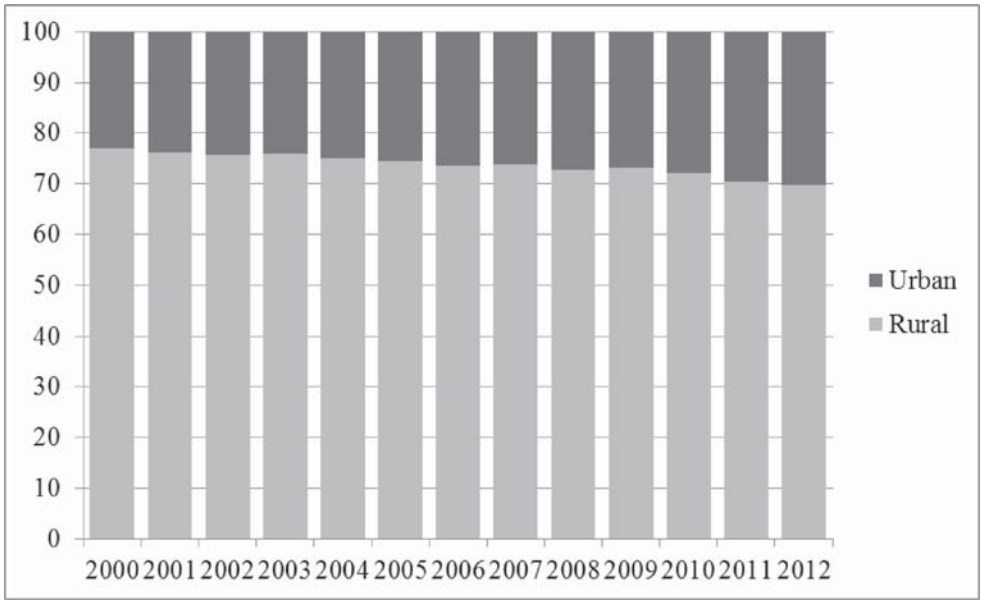
* Doctoral student at Nagoya University. The author appreciates the valuable comments of the anonymous referees.

**Figure 1 Share of Employment by Industry (Percent of Total Employment)**[4]




Source: World Development Indicators (WDI), the World Bank

**Figure 2 Share of Labor Force 15 years of Age and Above by Area (Percent)**




Source: WDI, the World Bank

Given these facts, two questions are raised regarding the recent development of Vietnam:

- Question 1: What has been the main driver of economic growth?

・Question 2: In which phase of economic development is Vietnam located?

To answer these questions from the perspective of dynamic labor mobility, the theoretical framework of labor surplus under the dualistic economy proposed by Lewis (1954) and extended by Ranis and Fei (1961) is worth revisiting. This is because dual economic theory helps explain the dynamic allocation of labor from traditional (agriculture) to modern (non-agricultural) sectors in the process of economic growth rather than undertaking a neoclassical static analysis using econometrics at this time. Under the theory of dual economy, Lewis omits the neoclassical assumptions of perfect competition, full employment, and market clearance from consideration. Hence, some strong assumptions must be overlooked. These include a labor shift that is triggered by the real wage rate gap between agricultural and non-agricultural sectors, an institutionally determined and somewhat rigid real wage rate in the agrarian economy, and zero marginal productivity of labor in the agricultural sector.[5] However, dual economic theory is still useful in order to grasp the big picture of paths of economic development in developing countries that have large amounts of labor in the agricultural sector and are composed largely of the agricultural sector in their GDP (around 50% in Vietnam as of 2012). According to Ranis (2004),

> [T]he Lewis model and its many offspring continue to be viewed as relevant in the South and considered a valuable guide to policy in places like China, India, Bangladesh, Central America and even some parts of sub-Saharan Africa, i.e., wherever heavy population pressure on scarce cultivable land remains a feature of the landscape. Bourguignon-Morrisson (1995) still see the persistence of economic dualism as a powerful explanatory factor underlying cross-country differences in inequality in the Lewis and Kuznets tradition, explicitly or implicitly embracing the dualistic model. (13)

Temple (2005) also supported the value of dual economic framework with respect to providing the idea of economic transition in comparison to one-sector growth models. To address the questions above by employing dual economic theory, I propose a hypothesis as follows.

・Hypothesis: In the case of Vietnam, higher growth has been achieved through the labor supplied from the lower productive sector (agriculture) to the higher productive sector (industry or services), notably in the form of rural-urban labor migration.

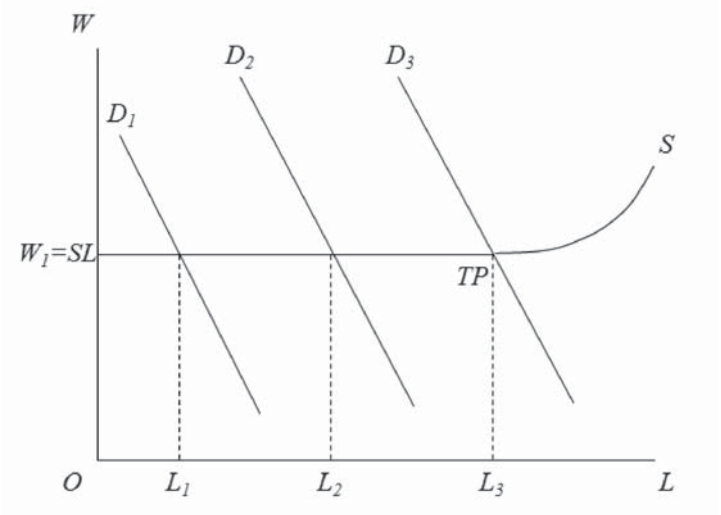
Lewis (1954) first proposed the end of an unlimited supply of labor in the dualistic economy that is composed of agricultural and non-agricultural sectors. This theory depicts developing economies as initially possessing a large agricultural subsistence sector with an unlimited supply of labor, close to zero marginal productivity of labor and a relatively small non-agricultural sector[6]. Each sector produces its output with its exclusive inputs, meaning there are no joint production, no externality and no spillover in economics. Therefore, this is described as follows, where output ($Y$) is the function of labor ($L$), capital ($K$) and land ($T$) in sector $i$.

$$Y_i = f_i(L_i, K_i, T_i)^7 \tag{1}$$

$i = 1,2$ (1 = agricultural sector and 2 = non-agricultural sector) (2)

Output of the agricultural sector depends mostly on the quantities of labor and land, and output of the industrial sector depends mostly on the quantities of labor and capital. The idea of the marginal productivity of labor in economics is the change of output (e.g. production of certain goods) resulting from additional input/employment of labor. Therefore, zero marginal productivity of labor means that increase of labor input does not lead to the increase of output. Regarding this assumption, it is important that agricultural output is not substantially reduced with the migration of labor from the agricultural sector, and the real wage rate in the agricultural sector is not affected by migration. The real wage rate in the agricultural sector is equal to the average productivity in the sector, which is also equal to the subsistence level. The non-agricultural sector employs labor at a real wage rate that is 30 percent higher than the real wage rate in the agricultural sector. This additional 30 percent is regarded as compensation for expenses such as transportation costs and higher living expenses in urban areas. The development of the non-agricultural sector is materialized (accumulation of capital) with the infinite use of cheap labor supplied from the agricultural sector, where labor is supplied at minimum subsistence (fixed) real wage rate $W_1 = SL$[8] on the labor supply curve ($S$), despite the shift of the demand curve ($D$) from $L_1$ to $L_3$ in the horizontal axis, as shown in Figure 3. When labor supplied from the agricultural sector faces shortage, the labor supply curve in the non-agricultural sector starts moving in the upper side at a point that is called the turning point ($TP$). The non-agricultural sector cannot utilize labor from the agricultural sector with $W_1$ after the turning point, meaning real wage rate increases as the demand increases (shift of demand curve to the right).

**Figure 3 Agricultural Labor Supply and Demand under the Surplus Labor Theory**




Sources: Author, based on Tran (2010) and Lewis (1954)

Extending the dual economic theory by Lewis (1954), Ranis and Fei (1961) incorporated the idea of Rostow's stages of growth (1956)[9] and integrated three phases of economic development into Lewis's model, as shown in Figure 4, where the output in the agricultural sector is described by the vertical axis ($Q$), and the input of labor from the agricultural sector is described by the horizontal axis ($L$). In Phase 1, the marginal productivity of labor ($MPL$) is extremely close to zero, and the average productivity of labor ($APL$) defines the real wage rate ($W_1$) in the agricultural sector.

$$\text{In Phase 1: } MPL = 0 \text{ and } APL = W_1 = SL \tag{3}$$

In Phase 2, labor supplied from the agricultural sector to the non-agricultural sector presents a shortage at point $S$, where the marginal productivity of labor starts becoming positive but is still smaller than the average productivity of labor and $W_1$. Until Phase 2, the non-agricultural sector enables the use of labor supplied from the agricultural sector with the real wage rate $W_1$[10], leading to the expansion of the non-agricultural sector.

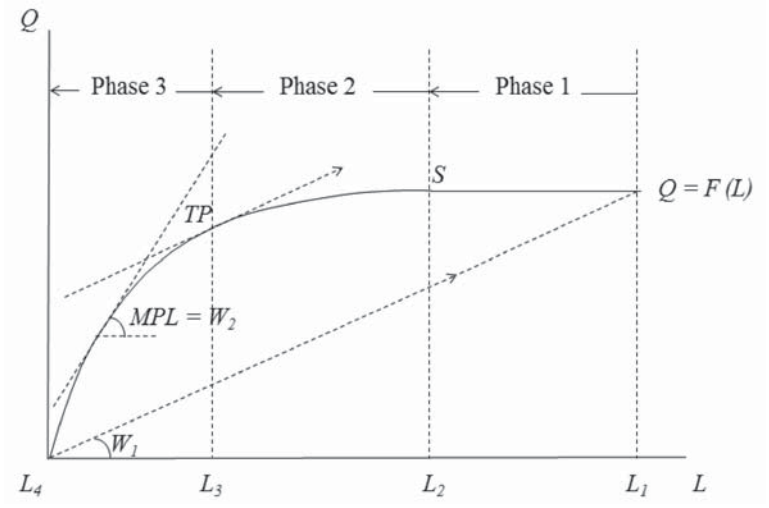
$$\text{In Phase 2: } 0 < MPL < APL = W_1 = SL \tag{4}$$

In Phase 3, the economy reaches the turning point $TP$ where the marginal productivity of labor is equal to $W_1$ and where the agricultural labor market begins working under the force of supply and demand functions of labor, which is summarized as follows.

$$\text{At the point } TP\text{: } MPL = W_1 \tag{5}$$

$$\text{In Phase 3: } W_1 < MPL = W_2 \tag{6}$$

**Figure 4 Lewis-Ranis-Fei Model**




Source: Author, based on Ranis and Fei (1961)

Lewis (1958) and Fei and Ranis (1964) empirically examined when Japan reached the turning point under dualistic economic theory. The two studies concluded that the turning point of Japan occurred from the 1950s to 1960s and during post-WWI (1916 to 1919), respectively. On the other hand, Minami (1968) argued that the turning point of Japan was around 1960, with the reasonable criticisms of his previous works by Lewis (1958) and Fei and Ranis (1964). Subsequently, Fei and Ranis (1975) and Chen (1983) worked on similar exercises using the Taiwanese case, indicating Taiwan's turning point to be from 1965 to 1966 and 1967, respectively. In terms of Korea, Fei and Ranis (1975) and Kim (1983) showed that the turning point was from 1966 to 1967 and 1970, respectively, and Ercolani and Wei (2011) indicated that the Chinese economy entered Phase 2 under the Lewis-Ranis-Fei model but has not yet reached Phase 3. However, rigorous empirical analyses based on Lewis's turning point have not discussed the case of Vietnam.[11]

## 2. Data and Methodology

### 2.1. Data

In this paper, the following data are employed for the empirical analyses: (i) nominal wage rates in the agricultural and industrial sectors (from the Vietnam Household Living Standards Surveys [VHLSSs])[12] in the years 2004, 2006, 2008 and 2010; (ii) inflation with the base year 2005 for constant prices in the years 2004, 2006, 2008 and 2010 (from the WEO Database, IMF)[13]; (iii) agriculture production value during the period of 1980–2007 (from FAOSTAT); (iv) capital stock during the period of 1980–2007 (from WDI); (v) land size during the period of 1980–2007 (from WDI); and (vi) the number of labor in agricultural sector during the period of 1980–2007 (from FAOSTAT). As a proxy for unskilled labor in the agricultural sector, I shall use labor working in agriculture, because the agricultural sector is mostly comprised of agriculture. Also, I shall use skilled labor working in the industrial sector as a better proxy variable for labor in the non-agricultural sector, as in the work of Minami (1968). For each detail of data, please see the Appendix.

### 2.2. Methodology

To determine the turning point, I follow some criteria that are summarized by Minami (1973): i) comparison between the real wage rate and marginal productivity of labor in the agricultural sector, ii) the change in the real wage rate in the agricultural sector and iii) the change in the real wage rate gap between the agricultural and non-agricultural sectors.

#### i. Comparison between the real wage rate and marginal productivity of labor in the agricultural sector

As discussed in the theory of dual economy, the turning point is defined by the relationship between

the marginal productivity of labor and the real wage rate in the agricultural sector. Unlimited supply of labor from the agricultural sector has the condition that the marginal productivity of labor is smaller than the real wage rate in the agricultural sector. If the marginal productivity of labor surpasses the real wage rate in the agricultural sector, it would be accurate to say that the turning point has been passed.

**ii. Change in the real wage rate in the agricultural sector**

Under dual economic theory, the real wage rate in the agricultural sector is determined by the subsistence level before the turning point. Therefore, if the real wage rate shows an upward trajectory in the sector, this could be a sign of the end of the unlimited supply of labor. However, the possible rise of the subsistence level itself triggered by the increase in the marginal productivity of labor in the sector must be distinguished (to be explained in greater detail later).

**iii. Change in the real wage rate gap between unskilled labor in the agricultural sector and skilled labor in the non-agricultural sector**

A converging real wage rate difference between unskilled labor in the agricultural sector and skilled labor in the non-agricultural sector implies the end of the unlimited supply of labor. If the real wage rate difference is still diverging, it is likely to be a sign of the sustained flow of an unlimited supply of labor from the agricultural sector.

Based on these criteria, I verify the higher economic growth in Vietnam by investigating whether Vietnam has passed the turning point or not in the following sections, with detailed theoretical explanations of each method. It should be noted that each method is imperfect, so it is necessary to decide whether the turning point has passed or not in a comprehensive manner after obtaining all results.

## 3. Analysis

### 3.1. Estimating the Elasticity of Agricultural Output with Respect to Labor Input

Before the turning point, marginal productivity of labor in the agricultural sector is lower than the real wage rate. Real wage rate is determined by the subsistence level, and after the turning point, the magnitude relationship between marginal productivity of labor and real wage rate in the sector inverts.

$$\text{Before the turning point: } MPL < W = SL \tag{7}$$

$$\text{After the turning point: } MPL = W > SL \tag{8}$$

Also, if marginal productivity of labor correlates to real wage rate in the sector, it could prove that

the real wage rate is determined along with "marginal productivity theory" in the sector in a similar fashion to the non-agricultural sector.

Marginal productivity of labor in the agricultural sector is calculated by the average productivity of labor multiplied by the elasticity of labor productivity ($\alpha$). The elasticity of labor productivity is the coefficient of the logarithm of the size of the labor force in the agricultural sector calculated by the estimation result of agricultural production function. Agricultural production function is described as the logarithm of the Cobb-Douglas production function (assuming a constant returns to scale), where $Y$ = value in agriculture; $L$ = the size of the labor force in agriculture; $K$ = capital stock in agriculture; $T$ = land size in agriculture; and = residuals. The Cobb-Douglas production function is used to represent the relationship between outputs and inputs.

$$MPL = \alpha APL \tag{9}$$

$$\alpha + \beta + \gamma = 1 \ (\textit{constant returns to scale}) \tag{10}$$

$$\ln Y = a + \alpha \ln L + \beta \ln K + \gamma \ln T + \mu \tag{11}$$

Estimation results of agricultural production function are exhibited in Table 1. $\alpha$ is 0.342, which, while not statistically significant, is likely to be influenced by the limited sample size. Compared to the Japanese case of reaching the turning point in early 1960 (Minami, 1968), $\alpha$ (= 0.342) in Vietnam was between 0.294 in 1940 (Minami, 1981) and 0.562 in 1955 (Minami, 1973) of Japanese elasticity of labor productivity.

**Table 1 Estimation Result of Agricultural Production Function**

| Variables | ln$Y$ | |
|---|---|---|
| ln$T$ | 0.397 | (0.294) |
| ln$K$ | 0.261 *** | (0.023) |
| ln$L$ | 0.342 | (0.293) |
| Constant | 6.365 *** | (0.348) |
| Observations | 28 | |

*** $p < 0.01$

Note: The numbers in parentheses are robust standard errors.

Sources: Author' estimation based on WDI, the World Bank, and FAOSTAT during the period of 1980–2007

Compared to the real wage rate, the marginal productivity of labor is smaller during the period of 2004–2010, as shown in Table 2. While it is desirable to estimate the elasticity of labor productivity in each year by agricultural production functions to observe more sensitive changes in marginal productivity of labor, a certain amount of the sample size must be secured to maintain a robust result.

Hence, the elasticity of labor productivity would be a little larger than 0.342 if I use only the recent years' data, because the elasticity of labor productivity increases as the economic development and time passes in general.

Although both the real wage rate and the marginal productivity of labor show robust growth, the difference between them does not show convergence. Therefore, it can be said that Vietnam did not reach the turning point as of 2010, given criteria i). It is plausible that Vietnam still has a surplus of labor in the agricultural sector.

**Table 2 Comparison between the Marginal Productivity of Labor and the Real Wage Rate in the Agricultural Sector**

| Year | $\alpha$ | *APL* | *MPL* | *W* |
|---|---|---|---|---|
| 2004 | 0.342 | 12,536.3 | 4,287.4 | 5,205.7 |
| 2006 | 0.342 | 14,569.1 | 4,982.6 | 6,121.1 |
| 2008 | 0.342 | 15,249.9 | 5,215.5 | 7,390.8 |
| 2010 | 0.342 | 15,456.3 | 5,286.1 | 7,645.8 |

Note: The units of average productivity of labor (*APL*), marginal productivity of labor (*MPL*) and real wage rate (*W*) are 1,000 Vietnam Dong.

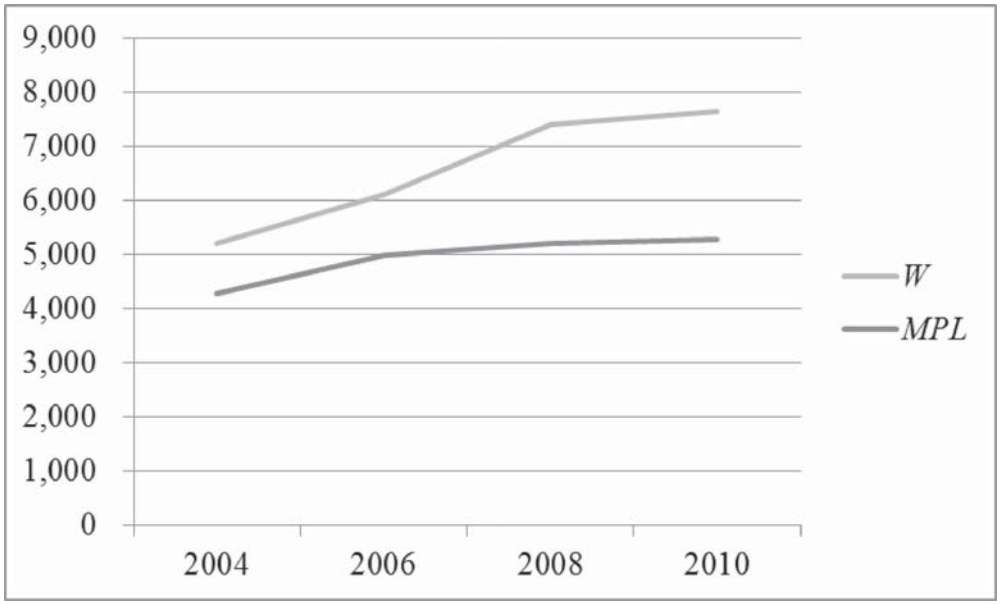
Sources: Author' calculation based on VHLSS, WDI, the World Bank, FAOSTAT and WEO Database, IMF

### 3.2. Changes in the Real Wage Rate in the Agricultural Sector

The real wage rate in the agricultural sector should show an upward trend after the turning point, because it is determined by the marginal productivity of labor, and it is also determined by the subsistence level before the turning point. It is important to note, however, that in cases in which the standard of living increases in accordance with changes in the institutional framework, the subsistence level may rise (Minami, 1968).[14] According to Ohkawa and Minami (1964, Section I and II), as long as it is assumed that the subsistence level increases independently of the increase of productivity in the agricultural sector, the concept of unlimited labor supply stands unaltered.

Nominal wage rate in agriculture is deflated by the consumer price index to create the real wage rate in the agricultural sector, as shown in Figure 5. The movement of the real wage rate in the sector is small, though gradually increasing. Strictly following the surplus labor theory, the real wage rate increase is not observed before the turning point. However, having excluded the effects of the increase in the standard of living and some of the constituent members working on agriculture without the real wage rate that is at the subsistence level (e.g. those who are working in large-scale commercialized farming), the slope of the real wage rate growth should be slackening. Hence, it could be said that the real wage rate growth in the sector is not remarkable, though not negligible, suggesting that the Vietnamese economy has not passed the turning point yet.

**Figure 5 The Real Wage Rate and the Marginal Productivity of Labor in the Agricultural Sector (year, 1,000 Vietnam Dong)**



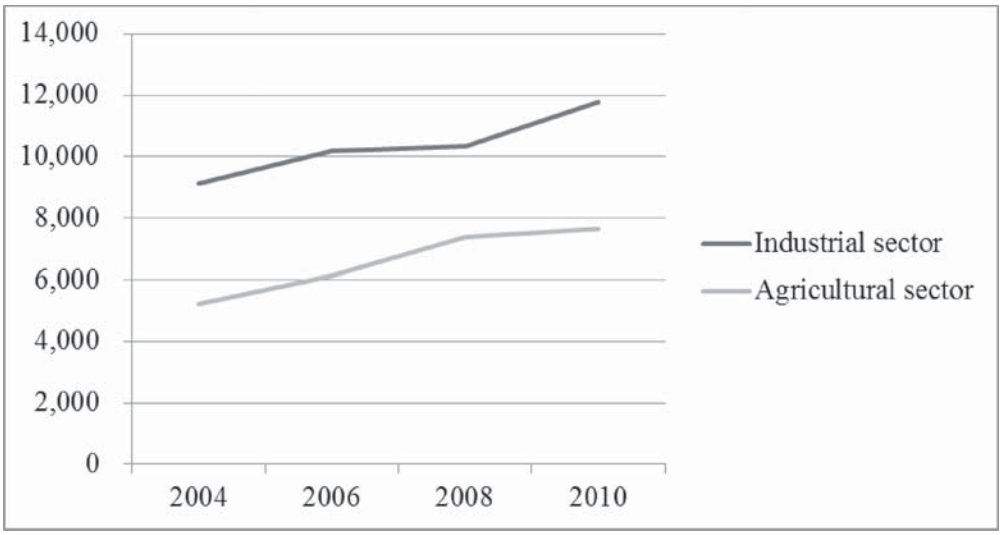

Sources: Author's calculation based on VHLSS and WEO Database, IMF

### 3.3. Changes in the Real Wage Rate Gap between Labor in the Agricultural and Non-agricultural Sectors

The turning point theory supposes a labor market composed of unskilled labor in the agricultural sector (skilled labor is not considered). Unskilled labor is supplied from the sector, where it is mostly working in agricultural activities, with the real wage rate at the subsistence level. The supply of skilled labor is limited in an initial stage of development of countries, which leads to the real wage rate increase of skilled labor. Hence, before the turning point, the real wage rate difference between skilled and unskilled labor should be widening. However, once the turning point is reached, the real wage rate gap ceases or starts narrowing because the supply of unskilled labor also becomes insufficient.

Comparing the real wage rate difference between unskilled and skilled labor, real wage rates in the agricultural and industrial sectors are employed as more effective proxies. This is because it is difficult to distinguish unskilled labor from skilled in each industry. As shown in Figure 6, it is difficult to say that the real wage rate difference between rural and urban areas is converging. Hence, this result suggests that labor surplus in the agricultural sector still exists in Vietnam.

**Figure 6 The Real Wage Rates in the Agricultural and Industrial Sectors (1,000 Vietnam Dong)**




Sources: Author's calculation based on VHLSS and WEO Database, IMF

## 4. Concluding Remarks

According to the analytical results in Section 3, it is plausible that the Vietnamese economy has not reached the turning point. Hence, it is confirmed that Vietnam still enjoys a supply of surplus labor from the agricultural sector, with cheaper prices to the non-agricultural sector that offers relatively higher productive industries. It is also confirmed that there is still a diverging real wage rate gap between the sectors. Cheaper labor provided by the agricultural sector is a typical source of higher economic growth in developing countries. Policy supports are expected, including provision of job information for labor in order to encourage smoothing of the shift from the agricultural to the non-agricultural sector, along with appropriate vocational training if needed. Since Vietnam will not be able to utilize the surplus of labor after the turning point, with the increase of labor productivity and the real wage rate in the agricultural sector, it is necessary to advance the industrial transformation from labor intensive to capital intensive.

For future research, the following extensions are expected, although some data are likely to be limited: (i) to prolong the estimation period of agricultural production function, average productivity of labor and marginal productivity of labor; (ii) to estimate the elasticity of labor productivity in each year to see more sensitive changes in the marginal productivity of labor; (iii) considering regional variations in estimating marginal productivity of labor, then comparing the market wage in each region; and (iv) adding an additional input in agricultural production function, including a variable composing fertilizers, public investments, etc.

## Notes

1 Dollar (2002) indicated that economic reforms conducted between the 1980s and 1990s in Vietnam, notably in the areas of macroeconomic stabilization, introduction of positive real interest rates, trade liberalization and initial property rights reform in agriculture contributed to the rapid economic growth in the 1990s.

2 Source: World Economic Outlook (WEO) Database, April 2015, IMF

3 These data are adapted from PovcalNet, the World Bank based on the World Bank's 1.25 international dollars a day using Purchasing Power Parity exchange rates for household consumption from the 2005 International Comparison Program with data from more than 1,000 household surveys across 128 developing countries, and 21 high-income countries.

4 Data from 2005, 2007, 2008, 2009 and 2010 are not available.

5 There are some strong assumptions under the surplus labor theory including i) developing economies have a surplus of inefficient labor in the agricultural sector, ii) the non-agricultural sector attracts labor from the agricultural sector due to the wage difference, iii) zero marginal productivity of labor in the agricultural sector before the turning point and iv) wages in non-agricultural sector do not rise with economic development. Contrary to the theory of dual economy, relatively recent literature such as Stark and Taylor (1991) insisted that migration flows are less sensitive to wage difference between one location and another because of the fixed nature of important factors in the migration decision. Munshi and Rosenzweig (2009) showed the relationship between social networks by a caste system restricting the mobility of people and social insurance under which insurance markets are undeveloped.

6 G. Ranis summarized recent views on the dual sector model as follows: "This is not in line with the neoclassical full employment labor market clearing assumption. With unskilled rural labor the abundant resource in many developing countries, especially at an early stage of their development, what determines the price of labor has continued to be a controversial issue, although it is clear that, in recent years, the neoclassical model and market clearing approaches have enjoyed increasing popularity in not only the theoretical but also the applied literature." (Ranis, 2012)

7 This production function satisfies the economic assumptions of monotonicity, concavity, constant returns to scale, and $F(0,0,0) = 0$.

8 *SL* is the abbreviation of subsistence level.

9 Rostow (1956) decomposed the path of economic development into five stages. They are "traditional society" (1st stage), "preconditions to takeoff" (2nd stage), "takeoff" (3rd stage), "drive to maturity" (4th stage) and "age of mass consumption" (5th stage).

10 Ranis and Fei (1961) called labor a disguised unemployment labor force until point $L_3$.

11 Tran Van Tho (2010) concluded the existence of labor surplus in the agricultural sector in Vietnam, but his analysis was not in line with the rigorous criteria well summarized by Minami (1973), like comparing the marginal productivity of labor and real wage rate in the agricultural sector.

12 VHLSS is a nationally representative household survey primarily conducted by the General Statistical Office (GSO) of Vietnam to evaluate the living standards for structuring, monitoring, supervising and evaluating socio-economic policies such as Five-Year Plans and Ten-Year Plans in the country. In the questionnaire on the household survey, the following sections are mainly included: basic information of interviewees, household characteristics, education, health care and disability, income, expenditure, fixed assets and durable appliances, accommodation, and participation in the poverty alleviation and hunger eradication program.

13 Urban-rural price differences cannot be reflected when computing real values.

14 According to Minami (1968: 384), an increasing subsistence level was admitted even by classical economists. Ricardo claimed that the natural price of labor was dependent on "the quantity of food, necessaries and conveniences essential to him from habit". The quantity of necessaries and conveniences increases in the course of cultural development.

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## Appendix: Data Description

| Name of data | Description |
|---|---|
| Nominal wage rates in the agricultural and industrial sectors | I computed nominal wage rates in the sectors based on the variables "total wage/salaries received in the past 12 months" and "industry code" that are available from Section 4A. Employment of Vietnamese Household Living Standard Surveys. |
| Inflation | The data "inflation, average consumer prices index" in the years 2004, 2006, 2008 and 2010 from World Economic Outlook Database, April 2015, IMF. Latest actual data is 2013. The base year is 2005 for constant prices. Urban-rural price differences cannot be reflected when computing real values. |
| Agricultural production value | The data "gross production value (constant 2004–2006 prices, 1,000 international dollars)" during the period of 1980–2007 from FAOSTAT. |
| Capital stock | As a proxy of capital stock, I used the data "agricultural machinery, tractors per 100 square km of arable land" during the period of 1980–2007 from World Development Indicators, the World Bank. Agricultural machinery refers to the number of wheel and crawler tractors (excluding garden tractors) in use in agriculture at the end of the calendar year specified or during the first quarter of the following year. |
| Land size | The data "agricultural land square km" during the period of 1980–2007 from World Development Indicators, the World Bank. Agricultural land refers to the share of land area that is arable, under permanent crops, and under permanent pastures. |
| The number of labor in the agricultural sector | The data "the total economically active population in agriculture" during the period of 1980–2007 from FAOSTAT. |