

Chapter 2

Research Development of Theories and Empirics of Factor Income Distribution

This chapter discusses the research development of factor income distribution. In the following, we are going to review related research about labor's share of income, which is a commonly used proxy for factor income distribution. We will not only discuss the research development based on the decline of labor's share of income mainly in European countries from 1980s, but also examine the development of literature on the recent decline of labor's share of income in China, starting from mid-1990s. By reviewing past research outcomes both at home and abroad, it is found that the decline of labor's share of income is closely related to "two transitions" of world economy after the middle of 20th century. The first transition is globalization. It is well known that the global economy has transformed from a closed and self-sufficient system to an interactive and open one after the Second World War. One prominent feature that accelerated the process of economic globalization was the join of competition system of the global market by emerging countries such as China and other Asian countries. Trade and investment activities become increasingly important among rich countries, but between developed and developing countries as well, weaving a complicated global market networks. The transition in the goods market has strong impact on the internal labor market in almost every country. Recent studies suggested that the decline of labor's share of income in industrialized countries is closely related to the new round of globalization. The second transition is marketization. In the 1980s, countries which adopted planning economic system have transformed to the market economy either by implementing radical economic reform in Russia and Eastern European countries or by gradual economic reform in China. Despite different extent and impacts of these economic reforms, such drastic changes in economic and institutional structure have created prominent impacts on their labor markets without doubt.

In the recent history of economic development, China has not only experienced the process of embracing globalization, but also went through fast changes in its economic and institutional structure. Therefore, the key to understand the movement of factor shares in China is to capture two important features, i.e., opening up and transition. In the condition of openness, trade and investment promoted economic efficiency thus decreased labor's share of income. Meanwhile, in the process of economic transition, the decrease of labor's share of income was mainly caused by the industry structure change from agriculture industry to non-agriculture

industry and the ownership structure change from state-owned economy to private-owned economy. Current studies mainly focused on impacts of industrial and economic structure on the decrease of labor's share of income. However, there are further research potentials not only about the measurement but also in the theoretical explanation about the labor's share. Especially, this chapter suggests that globalization and opening up is one of the major sources for explaining decreasing labor's share of income in China which is largely neglected by the current literature.

2.1 Measurement Issues of the Labor's Share of Income

From the perspective of macroeconomic operation, various factors' income which acts as the cost for final products for the whole society composes the national income account. These factors' income contains: labor compensation in the forms of wages and bonuses to the owner of labor, rent to the owner of land, interest and profits to the owner of capital. Just as its name implies, labor's share of income shows how much of national income accrues to the labor. It reflects the extent of the share in the final distribution of labor which is one of key factors during the production process. It is normally calculated as the ratio of total compensation of employees (wages and salaries before taxes, as well as employers' social contributions) over a product or income aggregate, such as gross domestic product (GDP) or gross national income (GNI) (Lübker 2007).

More commonly, labor's share of income can be calculated through the income approach of GDP or GNI. The micro foundation for income approach is the financial reports about sales and costs recorded by firms.¹ In order to discuss the definition of labor's share of income more precisely, Gomme and Rupert (2004) divide total value-added by factor entities into four parts (see Table 2.1). The first part is compensation of employees which contains wages, bonuses and welfare is unambiguously labor income; the second part is the source of income which can be unambiguously attributed to capital income, such as corporate profits, rental income, net interest income, and depreciation; the third part is the difference between taxes collected by the government and subsidies provided by government, which are neither labor income nor capital and can be regarded as a wedge between labor income and capital income; the last part is the proprietors' income which is ambiguous in accruing to labor or capital.² One part of the income earned by self-employed individual businessmen is the labor income as a laborer, and the rest

¹The firm here has a wide meaning. It not only includes registered corporations in the general sense, but also includes unregistered firms such as self-employed farmers, individual merchants and etc.

²Proprietors' income means the income earned by self-employed individual businessmen or the owners of unincorporated businesses.

Table 2.1 Composition of national income accounts based on firm's financial reports

Total value added:			
Compensation of employees	Corporate profits, rental income, net interest income and depreciation	Indirect taxes less subsidies	Proprietors' income
Labor income	Capital income	Government income	Hard to define

part is the economic return as investor. It is very difficult to distinguish between labor income and capital income in practice since the owner of labor and capital is one entity.

At first glance, computing labor's share of income appears straightforward. We can just divide compensation of employees by GDP and we're done. However, such calculation conceals some potential issues hard to deal with. The first issue is about the treatment of the net indirect taxes. If our main concern is on the distribution relations between labor and capital, shall we exclude the impacts of net taxes on production on the firms collected by the government? The second issue concerns the apportionment of proprietors' income. If proprietors' income is hard to define, what rules shall we apply for proprietors' income to be divided between labor and capital?

In addition, Gomme and Rupert (2004) point out that the different composition of value-added in each economic sector would affect accurate measurement of labor's share of income. In the government sector, value added by the government is simply wage and salary income plus consumption of fixed capital and there is no capital income. Including the government sector biases the measured share of labor compensation up, because government capital income is missing. Therefore, we shall consider whether we should include or exclude the government sector when calculating labor's share of income. Also in the resident sector, the national income account imputes rental income as capital income but does not impute any labor income. Including the resident sector biases the measured share of labor compensation down because it neglects labor service to lodger provided by the house owner. Again, we need to consider whether we shall exclude the resident sector or impute labor income for this sector? Even in the narrowly defined firm sector, there are many occasions that are hard to distinguish labor income and capital income in a clear way. Krueger (1999) argues that in modern firms, Chief Executive Officers (CEOs), especially those working in the Wall Street, can not only get abundant labor income but also various forms of equity incentives such as stock options and stock grants. Therefore, it is debatable for imputing high salaries of CEOs as labor income or capital income. Krueger (1999) also finds that a large part of labor compensation can be explained by the return to human capital, which is again difficult to attribute to labor income or capital income.

2.2 Methods for Measuring the Labor's Share of Income

2.2.1 Treatment on the Net Taxes on Production

In order to solve issues of measurement of labor's share of income, researchers have provided several adjustment methods. Let's deal with the treatment of net taxes on production first. As we know from Gomme and Rupert (2004) that net taxes on production are a wedge out of labor income and capital income. When net taxes on production increase faster than the national income, the labor's share of income will fall if taxes are included as the denominator. Such fall of labor's share of income is not caused by the increasing power of capital thus leads to an overestimate of extent of decreasing labor's share of income. This is the case in China when taxes' share of income experienced an evident increase from 1993 to 2004. Therefore, one way of measuring labor's share of income accurately is to exclude the net taxes on production out of GDP. More specifically, if Y_L is labor income, Y_K is capital income, Y_T is the net taxes on production and Y is the aggregate national income, labor's share of income, α_L , can be expressed as:

$$\alpha_L = \frac{Y_L}{Y - Y_T} \quad (2.1)$$

Zhou et al. (2010a) find that the decrease of Chinese labor's share of income postpones from 1995 to 1998 if the impact of wedge is eliminated. Bai and Qian (2009a, b) and Luo and Zhang (2009b) also exclude the impact of net taxes on production on measuring labor's share.

Some studies argue that the impact of taxes on factor income distribution is not neutral (Bai and Qian 2010; Guo and Lv 2011; Lv and Guo 2012). More explicitly, Lv and Guo (2012) argue that different types of taxes have different effects on the distribution of factor income, leading noticeable difference between before and after tax labor's share of income. Therefore, the after-tax labor's share can be expressed as α_L^{AT} :

$$\alpha_L^{AT} = \frac{Y_L - Y_{TL}}{Y - Y_{TL} - Y_{TK}} \quad (2.2)$$

Here, Y_{TL} is taxes on labor income and Y_{TK} is taxes on capital income. Lv and Guo (2012) find that after-tax labor's share of income is consistently lower compared with before-tax labor's share of income from 1978 to 2008 in China.

2.2.2 *Distribution of Labor and Capital in Proprietors' Income*

Another difficulty in measuring labor's share of income is the imputation of proprietors' income (Krueger 1999). As mentioned earlier, one part of proprietors' income can be considered as labor income, while the other part is the economic return of capital investment. However, it is very difficult to distinguish between labor income and capital income in practice since the owner of labor and capital is one entity. By using US historical data from 1850 to 1952, Johnson (1954) and Kravis (1959) find that labor's share of income stabilizes around 65 %. After that, the standard treatment on the imputation of proprietor's income by the literature is that two thirds impute to labor while the rest one third imputes to capital. Such simple rule of thumb is confirmed by later studies using more recent data. Solow (1958), Krueger (1999) and Young (2006) find that US labor's share of income stabilizes between 65 and 70 % from 1929 to 1998. However, this rule of thumb cannot be simply applied to developing countries such as China. Compared with developed countries, Chinese labor's share of income is relatively lower and it moves downwards instead of stabilization. Luo and Zhang (2009b) find that labor's share of income in China has decreased below 40 % in recent years, which is only higher than those Latin American countries with extreme high income inequality such as Brazil. The preliminary estimation by the author also shows that Chinese labor's share of income is around 40 to 50 % from 1978 to 2007.

Gomme and Rupert (2004) further argue that the convenient rule of thumb can be applied to both proprietors' income and non-proprietors' income. In other words, labor's shares of income are assumed to be the same in both sectors. With this assumption, we can obtain a more general way of calculating labor's share of income. For the purpose of illustration, we redefine various incomes as follows: let Y_{UL} denote unambiguous labor income (compensation of employees), Y_{UK} be unambiguous capital income (corporate profits, rental income, interest income, and depreciation), Y_A be ambiguous income (proprietors' income) and Y_T be indirect taxes less subsidies (net taxes on production). Then total labor income, Y_L , would be:

$$Y_L = Y_{UL} + \alpha_A Y_A \quad (2.3)$$

Here, α_A is the share of labor income in proprietors' income. We also know that total labor income can be expressed as a part of national income net taxes:

$$Y_L = \alpha_L (Y - Y_T) = \alpha_L (Y_{UL} + Y_{UK} + Y_A) \quad (2.4)$$

Here, α_L is the share of labor income in total national income. According to the assumption, labor's shares of income are assumed to be the same in both sectors,

i.e., $\alpha_A = \alpha_L = \alpha$. From both Eqs. (2.3) and (2.4), we know that total labor's share of income, α , can be shown as:

$$\alpha = \frac{Y_{UL}}{Y_{UL} + Y_{UK}} = \frac{Y_{UL}}{Y - Y_T - Y_A} \quad (2.5)$$

Therefore, in practice, labor's share of income can be expressed as unambiguous labor income, Y_{UL} , divided by net national income excluding proprietors' income, $Y - Y_T - Y_A$ (Gollin 2002). The obvious advantage of this method is clear and easy to calculate. Because labor's share of income exhibits remarkable stability over longer periods of time in US, the rule of thumb is equivalent as Gomme and Rupert's method. However, the implicit assumption of this method relies on the homogeneity among different economic sectors which contradicts to the real world. Economic sectors differ from size and structure, leading to different labor's share of income in each sector. The assumption has at least two problems. First, proprietors' economy is concentrated in resident sector rather than in government and firm sector. Second, self-employed individual businessmen engage in labor intensive industries, e.g., a barber's shop, which have higher labor's share of income. Therefore, this method may underestimate the total labor's share of income in the economy.

Considering the labor intensive feature of self-employed individual business, we can directly merge proprietors' income, Y_A , together with unambiguous labor income, Y_{UL} , as the denominator, and then divided by total value-added net taxes:

$$\alpha_L = \frac{Y_{UL} + Y_A}{Y - Y_T} \quad (2.6)$$

This method is also clear and easy to calculate. Gollin (2002) argues that, in many developing countries, proprietors' economy mainly includes pure labor service industry, e.g., housekeeping, so that such method is reasonable. However, even in many developing countries, a large part in the proprietors' economy belongs to the return obtained by investment. For example, even a barber's shop needs to pay rents and buy equipment for haircutting and hairdressing. Therefore, Eq. (2.6) may overestimate the total labor's share of income in the economy. This is the case for China. Before 2004, *China's National System of Accounts 2002* states that "the net income received by self-employed individual laborers through production and operation shall be regarded as compensation of laborers, including both compensation of employees and profits through operating business" (National Bureau of Statistics 2003). This indicates that China's National Bureau of Statistics (NBS) adopts the third method for calculating the labor's share of income before 2004. It implies that although labor's share of income is relatively low in China, there are still chances for overestimation.

2.2.3 *Adjustment of the Labor's Share Through Employment Numbers*

We can adjust labor's share, especially labor's share of proprietors' income, by using information such as employment structure. One way of adjustment is to use related data of employment structure to adjust the part of labor compensation accruing to proprietors' economy (Gollin 2002; Ruiz 2005). First, we divide unambiguous labor income by the number employees in non-proprietors' economy to get average labor compensation. Then we multiply average labor compensation by total employment to get total labor compensation which includes labor compensation in proprietors' economy. In particular, let L_A denote the number of employees in proprietors' economy and L be the total employment, then labor's share of income can be adjusted as:

$$\alpha_L = \frac{Y_{UL} \times L / (L - L_A)}{Y - Y_T} \quad (2.7)$$

In this way, we succeed in adjusting the labor's share of income and avoiding direct discussion about the distribution of labor and capital in proprietors' income. However, the implicit assumption underlie this method is that labor compensation of proprietors' economy and other economies is set to be equal. If there are significant differences in earnings between self-employed individual businessmen and employees in the firm, such method will bias the number heavily.

Another way of adjustment is to use related data of employment structure to adjust the part of labor compensation accruing to overall operational surplus (Bernanke and Gurkaynak 2001). First, we divide total operational surplus by the total employment to get average operational surplus. Then we multiply average operational surplus by number of employees in proprietors' economy to estimate operational surplus in proprietors' economy. Finally, we can obtain total labor compensation by adding unambiguous labor income and operational surplus in proprietors' economy together. In particular, let Y_O denote the total operational surplus, L_A be the number of employees in proprietors' economy and L be the total employment, then labor's share of income can be adjusted as:

$$\alpha_L = \frac{Y_{UL} + Y_O \times L_A / L}{Y - Y_T} \quad (2.8)$$

In this way, we can calculate labor's share of income when total operational surplus is available instead of operational surplus in proprietors' economy. However, if we use the ratio of number of employees in proprietors' economy to total employment as a proxy for share of proprietor's economy, it implicitly assumes that unit capital income is the same in both proprietors' economy and

non-proprietors' economy. Again, if there are significant differences in the return to capital between self-employed individual businessmen and physical capital in the firm, such method will bias the number heavily.

As mentioned earlier, before 2004, "proprietors' income is all regarded as labor compensation" thus labor's share of income can be calculated as Eq. (2.6). However, NBS announces that, after 2004, "In terms of proprietors' economy, the labor compensation and operational profits of the proprietors' cannot be distinguished easily, the two components will all be considered as operational profits. Labor compensation only includes compensation of employees in proprietors' economy" (NBS 2007b; 2008). Therefore, the statistical caliber for imputing proprietors' income has experienced significant change before and after 2004. Above two ways of adjusting labor's share of income are proposed to solve the inconsistent problems due to the changes of statistical caliber in China before and after 2004. Although two methods differ in the ways that the former directly adjust to the labor compensation in proprietors' economy while the latter indirectly adjust to the operational surplus in proprietors' economy, they help to make the data comparable and consistent before and after 2004. Still above adjustments are not perfect: first, they don't essentially deal with the problem of real distribution of labor and capital in proprietors' economy; second, the assumptions of the two methods may not be established and the adjustment results may be heavily biased when there are significant differences between proprietors' economy and other economic sectors.

2.2.4 *Methods for Distinguishing Raw Labor and Human Capital*

We know that labor compensation is closely related to the human capital owned by the laborers. Another issue about measuring labor's share of income is whether return to human capital shall be considered as labor income or capital income and whether labor compensation can be further divided into small components. Krueger (1999) divide labor compensation into two parts. One part is the return to human capital and the other part is return to physical labor expenditure, which we call it raw labor compensation. By using Mincerian earnings regression (Mincer 1974; Krueger 1999) distinguishes raw labor and human capital within labor compensation:

$$\ln W_i = b_0 + b_1 S_i + b_2 X_i + b_3 X_i^2 + e_i \quad (2.9)$$

Here, $\ln W_i$ represents the log wage of worker i , S_i is the year of education, X_i represents working experience, X_i^2 is the square term of experience, e_i is the error term,

b_0 is the intercept and b_1, b_2, b_3 are coefficients of regressors. Thus unit raw labor compensation can be expressed as a function of intercept, $W_0 = \exp(b_0 + 0.5\sigma^2)$, where σ^2 is the variance of the regression. Therefore, raw labor can be also called the intercept labor. Then we can obtain the ratio of raw labor in the total labor compensation which can be considered as $S_R = \sum W_0 / \sum W_i$. Finally, we can get raw labor's share of income by multiplying the ratio with total labor's share of income:

$$\alpha_R = \frac{Y_L}{Y - Y_T} \frac{\sum W_0}{\sum W_i} = \alpha_L S_R \quad (2.10)$$

We shall be aware of the impact of institutional arrangement on the size of raw labor's share of income. First, minimum wage policy might help to overestimate the raw labor's share of income; second, union organization helps union workers to obtain some rents which tend to overestimate the share of human capital; third, linear regression may not be the best way to distinguish raw labor and human capital returns, especially underestimating the raw labor's share of income of workers with high education.

In order to overcome the above drawbacks, Young and Zuleta (2008) propose another way aiming to directly measure the raw labor's share of income. They suggest that we can pick up those workers who have very little education and no working experience at first, and then we can calculate their wages to obtain the wage rate of raw labor W_0 , finally we can divide the sum of wage rate and total employment by national income to get raw labor's share of income. More specifically, let the real wage rate of low educated and no experienced workers be W_0 and total employment number be L , then the raw labor's share of income can be expressed as:

$$\alpha_R = \frac{W_0 L}{Y - Y_T} \quad (2.11)$$

In order to get robust results, they use three groups of estimation. First, they use those workers whose age are between 16 and 17, and whose education below 8 years as benchmark group; second, they also include high school dropouts into the benchmark group; third, they further expand the age range, including workers whose age are between 18 and 24. Young and Zuleta (2008) compare the raw labor's share of income measured by Krueger (1999) and find that his estimation is higher than theirs. At the same time, they find that the trend before 1979 is the same for both measurements. After 1979, the former shows an increasing trend, while the latter shows the decreasing trend.

2.3 Theories of Determination of the Labor's Share of Income in Autarky

2.3.1 *Early Theoretical Studies About Determination of the Labor's Share of Income*

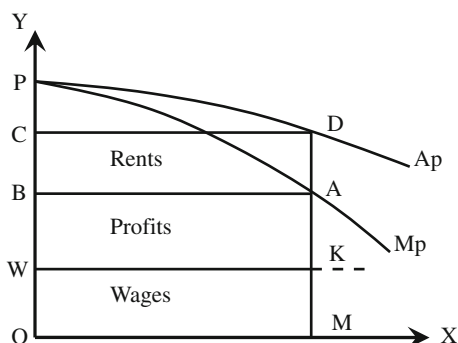
The earliest theoretical studies about labor's share of income can be traced back to classical economist David Ricardo (1981). He argues that the main research theme for political economy is the distribution law of owners of land, labor and capital in the production of commodities. Karl Marx (1972) succeeds Ricardo's class analysis and argues that capitalists exploit laborers by occupying the surplus value created by the laborers, forming hostile relations between labor and capital in the economic distribution. Unlike Marx's production relations' perspective, neoclassical economists explain ways of income distribution from technology conditions of production. They argue that the distribution pattern of wage and profits in the market institution is determined by marginal productivity of labor and capital. Therefore, neoclassical economists not only succeed the classical tradition of discussing distribution law through production factors, but also consider the contribution of factors as their basis for distribution, forming the so called "functional" income distribution.

2.3.1.1 Ricardo's Theory of Distribution

Ricardo (1981) argues that economic production is distributed through production factors such as land, capital and labor. His theory of distribution is mainly relied on "marginal" and "residual" principles. The "marginal" principle is used to explain the share of rents while the "residual" principle is to explain the distribution of wage and profits excluding the rents. In Ricardo's model, the economy of one country is divided into agriculture and industrial sector. The economic operation of the former sector determines the distribution of the latter sector. The distribution relations in the agriculture sector can be illustrated by Fig. 2.1, where axis Y stands for agriculture products and axis X represents the labor input in the agriculture production. Curve PAp and PMp stand for unit average labor products and marginal labor products respectively. The diminishing return to land indicates that average and marginal labor products decrease when labor input increases. Thus the production of agriculture products is determined by the labor input which can be illustrated by the area of rectangle OMDC. Accordingly, the rents can be calculated by multiplying the number of laborers with the difference between average and marginal labor, i.e., the area of rectangle BADC.

However, the marginal labor production in agriculture sector is not directly equal to wage, but the sum of wage and profits. Ricardo argues that, given any prices, the supply of labor is infinite and the supply curve of labor is OW. Therefore, the demand for labor is not determined by curve PMp, but rather by the accumulated

Fig. 2.1 Factor production and distribution in agriculture sector



capital in the economy. If the number of laborers is determined as OM by the capital, given wage W, the total wage of laborers is the area of rectangle OMKW, leaving the rest area of rectangle WKBA as the capital profits.

In equilibrium, capital stops moving between agriculture and industrial sectors, keeping the rate of profits same in both sectors. Because both input and output in the agriculture sector are agriculture products, profit rate is determined by profit size of agriculture products. In the industrial sector, the input is labor paid by the agriculture products while the output is industrial products. Therefore, the price of industrial products is adjusted by the profit rate in the agriculture sector. And the profit rate in the agriculture sector is determined by the condition of cultivation and extent of capital deepening.

Another key assumption by Ricardo is that the wage is only measured by the agriculture products and all wages are used to consume agriculture products. He further assumes that agriculture products are the wage commodities and industrial products are the non-wage products. This means that all the wages earned by workers are used to consume agriculture products and all the profits earned by capitalists are used to consume industrial products. Therefore, the output in the agriculture sector can be considered as the wage funds for the whole society, where the area of rectangle OMKW is the wages for workers in the agriculture sector and WKCD is the wages for workers in the industrial sector.

Ricardo has mentioned two cases of influencing the distribution ratio between wage and profits. One case is the agriculture protection policy by the government which increases the area OMKW and lowers the profitability and thus the economic growth. Another case is when the government collects taxes other than land taxes, such taxes will be bear by profits which lower the profit rate and lead to economic stagnation.

2.3.1.2 Distribution Theory of Marx

The distribution theory of Marx (1972) has adopted the “residual” principle and abandoned the “marginal” principle of Ricardo and applied the “residual” principle

into the whole economic operation instead of the industrial sector. The main differences between Marx and Ricardo are the followings: (1) Marx doesn't acknowledge the diminishing return law so that there is no need for using this law to determine the distribution of wage and profits; (2) Marx argues that the supply price of labor is not determined by non-agriculture products but by all commodities so that the share of profits in total output is determined by the difference between average labor production and labor supply price.

Marx argues that the industrial revolution has made a large number of handicraft mills go bankrupt in face of fierce competition from mass production by capitalist. However, the new production mode doesn't have sufficient ability to absorb the "reserve army" formed by unemployed workers in the handicraft industry. Therefore, when the labor supply surpasses the labor demand, wage is only sufficient to maintain the minimum level of workers' daily life and working necessities. Profit maximization is the main drive for capital accumulation in Ricardo's view. Unlike Ricardo, Marx argues that capital accumulation is not only a choice but also is a must because of competition among capitalists. Therefore, capitalist firms will use expanded reproduction to avoid competition. Because of such motive, the production will be concentrated into a small number of capitalists, turning the economy into the stage of monopolistic capitalism. In this stage, the organic composition of the capital increases, i.e., the ratio of constant capital formed by machines and equipment increases and the ratio of variable capital containing wages to the workers decreases. Therefore, the share of wage in total output decreases and workers fall into relative poverty or even absolute poverty.

In Marx's model, the share of wage in total output will fall along with the economic development. In Marx's view, the only way to increase wage of workers and its share is to increase the collective bargaining power of the working class by lowering the extent of exploitation from capitalists and returning a part of "surplus value" back to laborers. Therefore, the distribution theory of Marx implies that the collective organization of workers and its bargaining power should coincide with the level of economic development in order to maintain a stable distributional relation between wage and profits.

2.3.1.3 Distribution Theory of Neoclassical Economics

The value and distribution theory of neoclassical economics adopts "marginal" principle of Ricardo which is the opposite of Marx's theory. However, the distribution theory of neoclassical economics also differs from that of Ricardo's: (1) neoclassical economics extends Ricardo's substitutive principle between land and labor factors and argues that land, capital and labor all substitute with each other pairwise; (2) neoclassical economics argues that the share of factor returns in the total output is not related to the supply price of the factors but related to the marginal substitution between factors. We can illustrate this point by looking at Fig. 2.1. Assume that OX is the labor input in the production. Given other factors, curve PMp is the marginal production function of the labor factor, then AM

represents the unit demand price and area OMBA is the share of labor returns in the total output. Since the “marginal” principle can be extended to other factors, therefore, area BADC is the return to land or capital which is determined by their marginal productivity. From production perspective, Marshall (1890) further argues that the division of total production by labor and capital is the result of short term profit maximization of firms.

In the neoclassical framework, the relation between the input of factors and output of products is determined by first order homogenous production function. The most famous production function is proposed by Cobb and Douglas in (1928), where the functional form is $Y = AK^\alpha L^{1-\alpha}$. The function implies that the contribution of labor in total output, i.e., the labor's share of income, is the parameter $(1 - \alpha)$ on the labor in the Cobb-Douglas (CD) production function. This also means that labor's share of income is a constant parameter which doesn't change over time. Therefore, we can get three main conclusions from the analytical framework of neoclassical theory of distribution: (1) the return to each factor is determined by the contribution or the function of this factor in the production process, therefore, the neoclassical theory of distribution is also called the functional distribution theory; (2) Although the neoclassical framework attempts to build relations between all types of technological progress and labor's share of income, this endeavor contradicts with the constant labor's share of income embedded in the CD production function; (3) As Ricardo's theory of distribution, neoclassical theory also believes that factor distribution is governed by a general “natural law”. Therefore, the neoclassical theory of factor distribution doesn't have any real and practical value, leading other theories to find meaningful explanation of distribution beyond neoclassical framework.

2.3.1.4 Keynesian Theory of Distribution

In the book *The General Theory* (short for *The General Theory of Employment, Interest, and Money*), Keynes mainly discusses about how investment can have a determinist effect on employment number and national income level, assuming price and wage are exogenously given. Although Keynes himself is indifferent to issues of income distribution, the economists of New Cambridge School³ have inherited his theoretical system and extend it into the area of income distribution, forming a distribution theory with Keynesian feature, named as “Keynesian Distribution Theory”. The New Cambridge School economists think that the analytical framework of “investment-saving” of Keynes can be used to analyze the distributional relationship between wage and profit, assuming employment and output are exogenously given. Kaldor (1955) proposes that when economy satisfies

³New Cambridge School is one of the main branches of Keynesian economics, including representatives such as Joan Robinson, Nicholas Kaldor, Piero Sraffa, Luigi Pasinetti, John Eatwell and so on.

the condition of full employment, total output can be divided into two parts, wage and profit. These two parts are separately distributed to two groups, workers and capitalists, who save their money with different saving rates. When the total investment in the society equals the total saving, the economy is in an equilibrium status, which determines the ratio between wage and profit at the same time:

$$\frac{P}{Y} = \frac{1}{s_p - s_w} \frac{I}{Y} - \frac{s_w}{s_p - s_w} \quad (2.12)$$

Equation (2.12) suggests that profit share (P/Y) is determined by investment rate (I/Y) and the saving rates of workers and capitalists (S_w and S_p). When saving rate of workers S_w equals to zero, i.e., workers have consumed all his income, the share of profit can be simplified as:

$$\frac{P}{Y} = \frac{1}{s_p} \frac{I}{Y} \quad (2.13)$$

Equation (2.13) means, when entrepreneurs (capitalists) increase their consumption level, their profits will be increased. This is as what Kalecki's profit theory suggests: "The capitalists earn what they spend, and the workers spend what they earn". On the contrary to Ricardo's (or Marx's) model, Keynesian distribution model argues that profit is determined by the propensity to invest and the propensity to consume of capitalist. Therefore, profit is the "priority payment" in national output and wage becomes the "residual" part. Ricardo argues that all taxes (except for the taxes on land rents) should be undertaken by profit, however, Keynesian model proposes all taxes, like income tax, profit tax and commodity tax, eventually will be borne by wage. Assume that investment rate (I/Y) and the saving rate of capitalist (S_p) doesn't change over time, thus the share of wage will be constant. This means that every year, when real wage increases at the natural rate, output per capita will also increase in the same rate so that the share of wage remains constant over time.

In the Keynesian model, wage and profit correspond to the income of two groups of people who are workers and capitalists. Pasinetti (1962) argues that the assumption of no savings for workers is not realistic. He suggests that workers will also save their income and lend it to the capitalists, in order to gain interest and occupy a part of profit of the capitalists. Under this circumstance, the distribution of profit consists two parts: one belongs to the capitalists, and the other belongs to the workers. Pasinetti's (1962) research shows that in this case, without making any assumptions to the saving behavior of workers and capitalists, Eq. (2.12) can still be realized.

Different from Pasinetti (1962), Goodwin (1967) has extended the Keynesian distribution model from another perspective so as to discuss the relationship between labor's share of income and cyclical economic fluctuations. In this model, labor's share of income and unemployment rate will have a predator-prey relationship: when labor's share of income is too high, labor forces are faced with the

risk of unemployment, the unemployment rate will increase in turn (in this case, labor's share of income is the predator); when unemployment rate increases, the labor cost will decrease, labor's share of income will return back to a lower level and start to increase again (in this case, the unemployment rate is the predator), bringing the chasing circle into another time. Goodwin (1967) argues that in the long run, the unemployment rate is not allowed to persist so that labor's share of income will be stable in the long run.

It is observed that although Keynesian theory has discussed the determinist factors of labor's share of income from the demand side, it reaches a similar conclusion with the neoclassical theory that labor's share of income will be stable in the long run. Therefore, the "marginalist" distribution theory of neoclassic seems to dominate the discussions about distribution issues in western economics. The newly discussion about labor's share of income is still based on neoclassical framework. Economists extend the framework by adding the factors such as technological progress, imperfect market competition so as to supplement the thoughts of "marginalism".

2.3.2 The Relationship Between the Labor's Share of Income and the Capital Output Ratio

When we apply the theory of neoclassical economics to the estimation of Cobb-Douglas (CD) production function, labor's share of income will not change over time since it can be considered as the constant parameter in CD production function. Meanwhile, the series of research in the beginning of 20th century show that labor's share of income remains stable in the long run (Hicks 1932; Keynes 1939; Solow 1958). Kaldor (1961) further argues that constant labor's share of income is one of several features for the macroeconomic growth, named as "Kaldor stylized facts".⁴

When the production function is not the typical CD production function, there is a clear functional relationship between labor's share of income and capital output ratio (Bentolila and Saint-Paul 2003). Assume that production function is a homogeneous linear function with constant return of scale (CRS):

$$Y = F(K, L) = Kf(1, L/K) = Kf(l) \quad (2.14)$$

⁴"Kaldor stylized facts" means that in the long run, the increase of economy has the following features: the increase rate of output per person, the ratio of capital output, the return rate of capital and the share of labor and capital in national income are almost constant.

K and L are capital and labor respectively, $F(\cdot)$ and $f(\cdot)$ represent the form of production function, and l stands the labor capital ratio (L/K). Assume that firm maximizes profits as its objectives:

$$\max \pi = pY - wL - rK \Leftrightarrow \max \pi = Kpf(l) - Kw l - rK \quad (2.15)$$

Then the condition of goods market equilibrium is:

$$\partial \pi / \partial l = Kpf'(l) - Kw = 0 \Rightarrow w/p = f'(l) \quad (2.16)$$

Using the above function, labor's share of income can be expressed as:

$$\alpha_L = wL/pY = pf'(l)L/pKf(l) = lf'(l)/f(l) \quad (2.17)$$

Define $k = K/Y$ as capital output ratio, then $k = 1/f(l)$. From Eq. (2.17), the labor's share of income α_L has an one-to-one relationship with capital output ratio k , representing as $\alpha_L = g(k)$.

Assume that production function is as CD functional form, then $Y = AK^\alpha L^{1-\alpha}$. From Eq. (2.17), we know that the labor's share of income is equal to the output elasticity, i.e., the parameter on the labor in CD production function ($1 - \alpha$). In this case, labor's share of income is constant and irrelevant to the capital output ratio, which is consistent with "Kaldor stylized facts".

When production function follows the constant elasticity of substitution (CES) functional form:

$$Y = \left[\alpha K^{(\sigma-1)/\sigma} + (1 - \alpha) L^{(\sigma-1)/\sigma} \right]^{\sigma/(\sigma-1)} \quad (2.18)$$

Assume that the technological progress is Hicks neutral, σ is the substitution elasticity between labor and capital, and α is the output elasticity of capital. Using Eq. (2.17), capital output ratio k and labor's share of income α_L can be expressed as the following two equations respectively.

$$k = \left[\frac{K^{(\sigma-1)/\sigma}}{\alpha K^{(\sigma-1)/\sigma} + (1 - \alpha) L^{(\sigma-1)/\sigma}} \right]^{\sigma/(\sigma-1)} \quad (2.19)$$

$$\alpha_L = \frac{(1 - \alpha) L^{(\sigma-1)/\sigma}}{\alpha K^{(\sigma-1)/\sigma} + (1 - \alpha) L^{(\sigma-1)/\sigma}} \quad (2.20)$$

Then the relationship between labor's share of income and capital output ratio can be expressed as:

$$\alpha_L = 1 - \alpha k^{(\sigma-1)/\sigma} \quad (2.21)$$

From the above equation, we know that labor's share of income is a monotonic function of capital output ratio. However, whether labor's share of income increases or decreases along with capital output ratio, depends on the substitution elasticity (σ) between labor and capital. When the substitution elasticity (σ) is equal to one, the labor's share of income is a constant; when substitution elasticity (σ) is higher than one, the labor's share of income will decrease when capital output increase; when substitution elasticity (σ) is less than one, which means capital and labor substitute with each other, the labor's share of income will increase when capital output increase. For illustrative purpose, we use a figure to show the relationship between these two variables (see Fig. 2.2). The horizontal axis is the capital output ratio k and vertical axis is the labor's share of income α_L . Bentolila and Saint-Paul (2003) call such relationship as *SK curve*. The research results concerning China show more supporting evidences that the substitution elasticity is less than one (Bai and Qian 2009b; Luo and Zhang 2009b).⁵ According to these results, *SK curve* is shown as a monotonic increasing curve, the increase of capital output ratio will move labor's share of income from point A to point A_1 .

2.3.3 The Impact of Technological Progress on the Labor's Share of Income

When production function is CD functional form, we know that the labor's share of income is a constant. Therefore, the technological progress will not affect the labor's share of income. When the production function is CES functional form, technological progress plays its role. First, we assume that technological progress is Hicks neutral, and then the production function can be expressed as:

$$Y = A \left[\alpha K^{(\sigma-1)/\sigma} + (1 - \alpha) L^{(\sigma-1)/\sigma} \right]^{\sigma/(\sigma-1)} \quad (2.22)$$

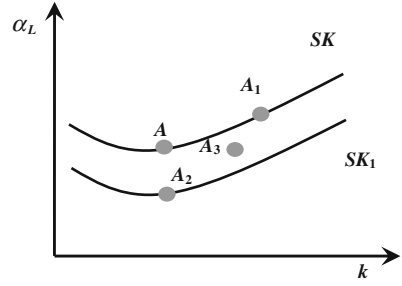
Here, A is the level of technology. Using the equation of (2.16) and (2.17), we can get the relationship between labor's share of income and capital output ratio with consideration of technological progress.

$$S_L = 1 - \alpha (Ak)^{(\sigma-1)/\sigma} \quad (2.23)$$

From the equation above, we know that labor's share of income will be affected by the technological progress. This can be illustrated by Fig. 2.2, when there is no technological progress, labor's share of income will be fixed at point A . When there

⁵If state specifically elsewhere, when discussing the impacts of other factors on the labor's share of income, it is assumed that substitution elasticity between labor and capital is less than one in order to get a better understanding about the situation in China.

Fig. 2.2 Labor's share of income and capital output ratio



is technological progress, SK curve will shift down to SK_1 and the labor's share of income will decrease from point A to point A_2 .

However, recent research proposes that technological progress is not usually Hicks neutral but biased. If we categorize the type of technological progress in terms of production factors, we can divide it into capital-biased technological progress and labor-biased technological progress. According to Acemoglu's (2003) definition, the so-called labor-augmenting technological progress means that technological progress will cause an outward shift of isoquant curve in the direction paralleling to the labor axis; while capital-augmenting technological progress means that technological progress will cause an outward shift of isoquant curve in the direction of paralleling to the capital axis. If we assume CES functional form, the production function can be expressed as:

$$Y = \left[\alpha(A_1 K)^{(\sigma-1)/\sigma} + (1-\alpha)(A_2 L)^{(\sigma-1)/\sigma} \right]^{\sigma/(\sigma-1)} \quad (2.24)$$

A_1 , A_2 and σ are parameters of capital-augmenting technology, labor-augmenting technology and the substitution elasticity between labor's share of income and capital output ratio respectively. Using Eq. (2.17), capital output ratio k and labor's share of income α_L can be expressed as the following two equations respectively.

$$k = \left[\frac{K^{(\sigma-1)/\sigma}}{\alpha(A_1 K)^{(\sigma-1)/\sigma} + (1-\alpha)(A_2 L)^{(\sigma-1)/\sigma}} \right]^{\sigma/(\sigma-1)} \quad (2.25)$$

$$\alpha_L = \frac{(1-\alpha)(A_2 L)^{(\sigma-1)/\sigma}}{\alpha(A_1 K)^{(\sigma-1)/\sigma} + (1-\alpha)(A_2 L)^{(\sigma-1)/\sigma}} \quad (2.26)$$

Then the relationship between labor's share of income and capital output ratio can be expressed as:

$$\alpha_L = 1 - \alpha(A_1 k)^{(\sigma-1)/\sigma} \quad (2.27)$$

From Eq. (2.27), we can find an interesting conclusion that capital-augmenting technological progress will affect the labor's share of income while labor-augmenting technological progress has no relationship with the labor's share of income. Acemoglu (2003) argues that, in the long run, the economy operates on a balanced growth path together with only labor-augmenting technological progress. Since labor-augmenting technological progress has no effects on the labor's share of income, therefore the labor's share of income will be constant along the balanced growth path; in the short run, when the economy operates on a transition path, the technological progress is capital-augmenting. Under this circumstance, the labor's share of income will change along with the technological progress, such changes are the same as the case with a Hicks neutral technological progress. This can be illustrated by Fig. 2.2, capital-augmenting technological progress will shift SK curve to SK_1 and the labor's share of income will decrease from A to A_2 .

Zeira (1998) and Zuleta (2008) explore the effects of biased technological progress on the labor's share of income from different angles. By constructing model, they argue that factor scarcity will create strong incentives for people to conduct factor saving innovation investment. In another word, the aim of people conducting factor saving innovation investment is to decrease demand of scarce factors and increase the utilization of abundant factors respectively. If the price of factors is determined by the marginal production of such factor, then capital-saving technological progress will increase the labor's share of income and labor-saving technological progress will decrease the labor's share of income. Huang and Xu (2009) have decomposed the change of labor's share of income into multiplier effect, capital deepening effect and the effect of labor-saving (or capital-saving) technological progress by introducing Hicks' factor biased technological progress. Their research also confirms that labor and capital saving technological progress will impose opposite effects on the labor's share of income and the final effect of technological progress is determined by the difference between the two offsetting effects. However, these studies exit some differences with the models above, which suggest that only capital-augmenting technological progress⁶ can result in the decrease of labor's share of income.

China's economy operates on the transition path, meaning that labor's share of income will be affected by the technological progress, especially capital biased technological progress. However, technological progress is normally endogenous, which cannot explain fully about the dynamic changing process of labor's share of income.

⁶In fact, labor-saving is equal to capital-augmenting and capital-saving is equal to labor-augmenting.

2.3.4 *The Impacts of Imperfect Competition on the Labor's Share of Income*

2.3.4.1 Imperfect Competition in Goods Market

So far, all discussions are conducted under the assumption of perfect competition. In the condition of perfect market competition, wage equals the marginal products of labor, interest equals to the marginal production of capital and the price of good equals to its marginal cost. However, under the imperfect market competition, the price of firm products can be different from marginal cost. Instead, the price contains a mark-up over marginal cost.

Kalecki (1938, 1954) first analyzes the determinist theory of labor income distribution in imperfect market competition. He argues that, in the short run, labor and capital are not “substitutional” but “limitational” factors. The marginal cost of each factor equals its average cost and labor's share of income (capital's share of income) is entirely determined by the elasticity of demand faced by firms.

We can express his idea in mathematical equation. Considering the price mark-up of firms, the first order condition for maximizing firm's profit in Eq. (2.16) has changed to:

$$\mu w/p = f'(l) \quad (2.28)$$

Here, μ stands for the ratio of mark-up,⁷ then, the labor's share of income can be expressed as:

$$\alpha_L = \mu^{-1} l f'(l) / f(l) = \mu^{-1} g(k) \quad (2.29)$$

The above equation means that with a constant mark-up, the labor's share of income will still have a one-to-one corresponding relationship with capital output ratio. Usually, the mark-up will change with economic fluctuation. If the mark-up (μ) is pro-cyclical, then labor's share of income will exhibit a counter-cyclical feature. This provides a perspective for exploring the relationship between labor's share of income and economic cycle. This can be illustrated by Fig. 2.2, the change of mark-up will not change the labor's share of income by shifting SK curve, but directly deviates the equilibrium point of labor's share of income away from the SK curve. The labor's share of income will decrease from point A to point A_3 .

⁷Ratio of mark-up = (price of goods – marginal cost)/price of goods.

2.3.4.2 Imperfect Competition in Labor Market

Besides the imperfect competition feature in goods market, trade union plays a significant role in forming the imperfect competition feature of labor market in the western countries. More specifically, trade union has strong bargaining power on wage setting issues, which makes the labor market have features of imperfect market competition. Therefore, the power of trade union and the form of wage contract will have an impact on the labor's share of income. Let's take the "effective bargaining" model as an illustrative example. Firm and trade union negotiate on the wage and the number of employment. Such negotiation determines the number of employment at the level when marginal production of labor equals the reservation wage. At the same time, it determines the real wage as a weighted average of the real reservation wage and average labor between the average product of labor and real reservation wage, where the weight is determined by the bargaining power of workers, representing as θ (Blanchard 1997; Bentolila and Saint-Paul 2003). To be more specific, we can change the first order condition of maximizing profit in Eq. (2.16) to:

$$\frac{w}{p} = \theta \frac{f(l)}{l} + (1 - \theta) \frac{\bar{w}}{p} \quad (2.30)$$

According to the above equation, the deterministic function of labor's share of income can be expressed as:

$$\alpha_L = \frac{wL}{pY} = \frac{wl}{pf(l)} = \theta + (1 - \theta) \frac{lf'(l)}{f(l)} = \theta + (1 - \theta)g(k) \quad (2.31)$$

When the functional form is CES and technological progress is Hicks neutral, i.e., Eq. (2.21), then the relationship between the labor's share of income and capital output ratio can be expressed as:

$$\alpha_L = 1 - \alpha(1 - \theta)(Ak)^{(\sigma-1)/\sigma} \quad (2.32)$$

Equations (2.31) and (2.32) show that decreasing bargaining power of trade union will shift down the SK curve to SK_1 and move the equilibrium point from point A to point A_2 , meaning that the decreasing bargaining power of trade union will also lead to the decrease of labor's share of income. Meanwhile, it can be shown from the above equations that the addition of bargaining power of trade union weakens the sensitivity of labor's share of income from the change of capital output ratio. When discussing the effects of bargaining power of trade union, results are sensitive for different model specifications. For example, Bentolila and Saint-Paul (2003) adopt a "right to manage" model and argue that the labor's share of income is still determined by Eq. (2.16) in such model. In this case, the labor's share of income is not related to the change of the bargaining power of trade union.

2.3.5 *The Impacts of Labor Heterogeneity on the Labor's Share of Income*

Up till now, we assume that the workers are homogeneous. However, there are significant skill differences among workers. Meanwhile, large amounts of literature have discussed the reasons why there are significant differences in skill premium among different types of workers.⁷ In the literature, workers are normally categorized as skilled workers and unskilled workers based on their skills types. Then, in the world of heterogeneous workers, the question now is whether the difference in skill premium will affect labor's share of income. Therefore, we can extend the above model to discuss the deterministic factors of labor's share of income when considering "labor heterogeneity". Bentolila and Saint-Paul's (2003) research shows that when we make some constraints on the production function, there is still a definite functional relationship between labor's share of income and capital output ratio. Such function can be expressed as:

$$Y = H[K, G(B_1L_1 + B_2L_2)] \quad (2.33)$$

Here, B_1 and B_2 are parameters of technological progress for unskilled workers (L_1) and Skilled workers (L_2) respectively,⁸ $H(\cdot)$ and $G(\cdot)$ are homogeneous linear function.

Then the first order condition for maximizing profit is as the following:

$$\frac{\partial Y}{\partial L_i} = \frac{w_i}{p} = B_i \frac{\partial H}{\partial G} \frac{\partial G}{\partial (B_i L_i)}, (i = 1, 2) \quad (2.34)$$

Therefore, the labor's share of income can be expressed as:

$$\alpha_L = \frac{w_1L_1 + w_2L_2}{pY} = \frac{\sum_{i=1}^2 B_i L_i \frac{\partial H}{\partial G} \frac{\partial G}{\partial (B_i L_i)}}{H(K, G(B_1L_1, B_2L_2))} = \frac{G \frac{\partial H}{\partial G}}{H(K, G)} = \phi \left(\frac{G}{K} \right) \quad (2.35)$$

Here, capital output ratio is $k = K/H$, which is directly related to G/K . Therefore, there is still a one-to-one corresponding relationship between labor's share of income and capital output ratio even if we consider the further divisions of labor.

To further analyze the relationship between labor's share of income and differences in skill premium, we still use CES function to explore such relationship. According to Krusell et al. (2000), the production function can be written as a nested CES function.

⁸Studies about differences of skill premium in US support for the existence of skill biased technological progress, implying $B_2 > B_1$.

$$Y = [(AK + B_1L_1)^\varepsilon + (B_2L_2)^\varepsilon]^{1/\varepsilon}, \varepsilon = (\sigma - 1)/\sigma \quad (2.36)$$

We know that σ is the substitution elasticity between labor and capital. The CES function above means that capital and unskilled workers can substitute with each other, while skilled workers supplement capital, having managing and monitoring effects on unskilled workers and capital. Therefore, the first order condition of maximizing profit can be expressed as:

$$w_1 = ((AK + B_1L_1)^\varepsilon + (B_2L_2)^\varepsilon)^{1/\varepsilon-1} (AK + B_1L_1)^{\varepsilon-1} B_1 \quad (2.37)$$

$$w_2 = ((AK + B_1L_1)^\varepsilon + (B_2L_2)^\varepsilon)^{1/\varepsilon-1} B_2^\varepsilon L_2^{\varepsilon-1} \quad (2.38)$$

Then, the labor's share of income can be expressed as:

$$S_L = \frac{B_1L_1(AK + B_1L_1)^{\varepsilon-1} + (B_2L_2)^\varepsilon}{(AK + B_1L_1)^\varepsilon + (B_2L_2)^\varepsilon} \quad (2.39)$$

Therefore, skill premium and capital output ratio of two types of can be expressed as the following two equations.

$$\omega \equiv w_2/w_1 = \frac{B_2(B_2L_2)^{\varepsilon-1}}{B_1(AK + B_1L_1)^{\varepsilon-1}} \quad (2.40)$$

$$(AK)^\varepsilon = \frac{(AK)^\varepsilon}{(B_2L_2)^\varepsilon \left(1 + (B_1\omega/B_2)^{1/\varepsilon-1}\right)^\varepsilon} \quad (2.41)$$

Replace Eqs. (2.40) and (2.41) into Eq. (2.39), the functional relationship between labor's share of income and capital output can be expressed as:

$$S_L = 1 - Ak(B_1\omega/B_2) \left(1 + (B_1\omega/B_2)^{\frac{\varepsilon}{\varepsilon-1}}\right)^{1/\varepsilon-1} \quad (2.42)$$

Therefore, labor's share of income is not only related to capital output ratio but also related to the differences in skill premium for two types of workers. Meanwhile, skill biased technological progress will also affect labor's share of income. This can also be illustrated by Fig. 2.2. It will shift SK curve up to SK_1 , and the equilibrium point will change from point A to point A_1 . Therefore skill biased technological progress poses the same effect as capital biased technological progress which all produce a downward pressure to labor's share of income.

Song (2010) investigates the existence of skill biased technological progress in China and finds that capital biased technological progress and skill biased technological progress have a complementary relationship in China. He argues that technological progress exhibits both capital and skill biased features in China.

Wang and Sheng (2010) construct a model including skilled labor, unskilled labor and physical capital. In that model, they also introduce the supplementary relationship between capital and skilled labor. They suggest that there are three channels through which skill biased technological progress will have impacts on labor's share of income. First, skill biased technological progress will increase labor's share of income through increasing demand of skilled labor; Second, since physical capital is normally matched with skilled labor, skill biased technological progress will increase the returns of physical capital and decrease labor's share of income; Third, skill biased technological progress will further decrease labor's share of income by decreasing demand of unskilled labor. Among those three channels, they argue that the second channel is more important to explain why labor's share of income is decreasing in China in recent years.

2.4 The Deterministic Theory of Labor's Share of Income Under Economic Globalization

The 1994 edition of *Dictionary of World Economics* defines economic globalization as "all economic relations based on production forces which are in the developing process and status of extending and interconnecting globally". The economic globalization can be shown the globalization of market economy, financial globalization and drastic development of multinational corporations and information technologies (Li 1994). United Nations Economic and Social Commission for Western Asia (UN-ESCWA 2002) provides another similar definition that "from the perspective of economy, globalization is related to reducing tariff caused by national boundary, facilitating the flow of commodity, capital, service, technology and labor among countries." Therefore, the impacts of globalization on labor's share of income are mainly through channels which are international trade and foreign direct investment.

2.4.1 *The Labor's Share of Income in the Neoclassical Trade Model*

Discussions about effects of trade on the factor's share of income are mainly based on neoclassical trade theory. Heckscher (1919) and Ohlin (1933) argue that countries with different endowments have different comparative advantages which are the reasons for international trade. Heckscher–Ohlin (HO) model predicts that a country will specialize to product and export the goods which it can effectively use its abundant factors. Meanwhile, it will import the goods which it can effectively use its scarce factors. This means that a country will specialize in production by using of the factors with high production elasticity. Therefore, international trade and

specialization increase the production elasticity of the factors which are relatively abundant domestically and decrease the production elasticity of relatively scarce factors. At last, if the factor's share of income equals production elasticity of each factor, then international trade and specialization will increase the income share of abundant factors and decrease the income share of scarce factors. In developed countries, capital factor is relatively abundant while labor factor is relatively scarce so that developed countries will export capital intensive goods and import labor-intensive goods. This will increase the capital's (abundant factor) share of income and decrease the labor's (scarce factor) share of income. Finally, Stolper and Samuelson's (1941) theory proposes that the situation will be the opposite in developing countries. They argue that the final result of trade will equalize factor prices among all countries, leading a stable labor's share of income in each country. Therefore, neoclassical trade theory provides a reasonable theoretical explanation to the recent decrease of labor's share of income in industrialized countries and receives wide supports from various studies (Harrison 2002; Guscina 2006; Jaumotte and Tytell 2007). However, in China, the labor factor is relatively abundant while the capital factor is relatively scarce. Based on the neoclassical trade theory, the labor's share of income shall decrease and the capital's share of income shall decrease. Contrary to the prediction, the labor's share of income has experienced a declining trend in recent years in China. In the composition of income approach of GDP, the ratio of labor compensation in GDP has decreased from 52.9 % in 1985 to 39.7 % in 2007, decreasing as many as 13 percentage points.⁹ Therefore, the prediction by neoclassical trade theory cannot be supported easily, contradicting the empirical evidences, at least in China.

2.4.2 *Trade in Intermediate Inputs and the Labor's Share of Income*

Feenstra and Hanson (2001) argue that trade are more shown as trade in intermediate inputs as the form of outsourcing around the 21st century. They call such trade as "global product sharing". They think that outsourcing is not only transferring the low-skilled production in developed countries but also involving developing countries in more complicated manufacturing and processing. This can help developing countries to effectively use the relatively scarce factor such as capital and skilled workers. Therefore, after considering trade in intermediate inputs, the developing countries may experience a decrease in labor's share of income and an increase in capital's share of income. Feenstra and Hanson (2001) have added the trade in intermediate inputs into the production function and explore the influence

⁹Bai and Qian's (2009a, b) study shows that part of the reason for decreasing labor's share of income is the changing statistic calibers in China. However, there is still a clear declining trend of labor's share of income, decreasing 4.3 % since 1995, even if we eliminate the statistical factors.

of trade in intermediate inputs on the differences in skill premium. This chapter makes some modification to this model and makes this model adaptable to the discussion of the relationship between trade in intermediate inputs and labor's share of income.

Assume that the country will produce one good and needs two inputs. The production of two inputs need two factors, capital K and labor L , so that the homogeneous linear production function of two inputs can be expressed as:

$$y_i = f_i(L_i, K_i), (i = 1, 2) \quad (2.43)$$

Assume that input factor y_1 is a labor-intensive product like manufacturing products while input factor y_2 is capital-intensive goods like research and development (R&D), marketing and after-sale service. Two input factors are the input factors for producing final goods. Further assume that the country is relatively abundant in capital and technology, according to HO theory, this country can engage more high skilled production like R&D and outsource the low skilled production such as manufacturing. This means that import input y_1 and export input y_2 . The production function of final goods can be expressed by inputs and their trade volumes:

$$y_m = f_m(y_1 - x_1, y_2 - x_2) \quad (2.44)$$

Here, x_1 and x_2 are the trade volumes for input y_1 and input y_2 respectively. We further assume that x_1 is negative, meaning that firm import input y_1 from other countries. Meanwhile, we assume that the price of exports of input 2 is standardized by one and price of imports of input 1 is p , and the price of final goods is p_m . Maximizing production requires:

$$\begin{aligned} \max_{x_1, L_i, K_i} F(L_m, K_m, p_m, p) &= p_m y_m + p x_1 + x_2 \\ s.t. L_m &= L_1 + L_2; K_m = K_1 + K_2 \end{aligned} \quad (2.45)$$

To firm, it is equivalent for maximizing output as for minimizing the cost. Therefore, the optimization requires:

$$\begin{aligned} \min_{L_m, H_m, K_m} C(w, r, Y_m, p/p_m) &= w L_m + r K_m \\ s.t. L_m &= L_1 + L_2; K_m = K_1 + K_2 \end{aligned} \quad (2.46)$$

Here, w and r are the price of labor and capital respectively; Meanwhile, let's assume that the capital can be adjusted in the long run and the cost function is also homogeneous linear.

To specify the effect of trade factors on labor's share of income, we need to confirm the specific form of cost function. Therefore, we define the cost function as $C(L_m, K_m, Z)$ where Z is a vector of exogenous and structural variables which will

shift the entire cost function. Following Kohli (1991), let's assume that the cost function is homogeneous linear with trans-logarithmic form:

$$\ln C = \theta_0 + \beta_1 \ln L_m + \beta_2 \ln K_m + \frac{1}{2} \beta_3 (\ln L_m)^2 + \frac{1}{2} \beta_4 (\ln K_m)^2 + \beta_5 \ln L_m \times \ln K_m + \sum \delta_j Z_j + \sum \varphi_j Z_j \ln L_m + \sum \phi_j Z_j \ln K_m \quad (2.47)$$

Here, j is the subscript for the structure variables. We take the derivative to capital and labor respectively and then we can get:

$$\frac{\partial \ln C}{\partial \ln L_m} = \frac{L_m \cdot \partial C / \partial L_m}{C} = \beta_1 + \beta_3 \ln L_m + \beta_5 \ln K_m + \sum \varphi_j Z_j = \alpha_L \quad (2.48)$$

$$\frac{\partial \ln C}{\partial \ln K_m} = \frac{K_m \cdot \partial C / \partial K_m}{C} = \beta_2 + \beta_4 \ln K_m + \beta_5 \ln L_m + \sum \phi_j Z_j = \alpha_K \quad (2.49)$$

If we take derivative to labor with regard to cost function, we can get labor's share of income. Similarly, we can get capital's share of income by taking derivative to capital with regard to cost function. In this model, trade acts as a structure variable influencing labor's and capital's share of income.

2.4.3 Foreign Direct Investment and the Labor's Share of Income

Dunning's (1988) specific location advantage theory argues that the natural and factor endowment of a specific location will determine whether this place will have the advantage of attracting foreign investment. Therefore, firms producing labor-intensive goods will choose to invest in the countries which are relatively abundant in labor and firms producing capital-intensive goods will choose to invest in the countries which are relatively abundant in capital. This means that foreign direct investment will further expand the factor abundant sectors in the host countries. Therefore, FDI should be able to increase the output elasticity and income share of the abundant factor. Location advantage theory also provides a relatively reasonable explanation to decrease labor's share of income and increase capital's share of income in developed countries. However, this still cannot be used to explain the fact that labor's share of income is decreasing in China.

Decreuse and Maarek (2008) have constructed a theoretical model to discuss the effect of FDI on labor's share of income. First, they assume that there is product heterogeneity between foreign-invest firms and domestic firms. In addition, labor market is a frictional market that aims to match labor force with two types of firms,

i.e., foreign and domestic firms. Therefore, using “searching and matching” model, they argue that FDI has two opposite effects on labor’s share of income. On the one hand, foreign firms have stronger ability of financing and more advanced technology, which can quickly increase the labor while maintaining low level of increase in workers’ wage. This will lead to the decrease of labor’s share of income in the foreign firms; on the other hand, because of the competition between foreign and domestic firms, this will increase the wage level and increase labor’s share of income. Therefore, FDI’s impact on labor’s share of income is a U-shape curve.

From the perspective of China, studies also find both positive and negative effects of FDI on labor’s share of income. The positive effect of FDI can be summarized into four aspects. First, at the beginning of reform and opening up, China is facing “two gaps” in saving and foreign currency which make the capital a strong position apparently. The introduction of foreign investments alleviates the shortage of capital. According to the “bargaining power” model, utilizing foreign investments ought to increase status of laborers and improve their income (Luo and Zhang 2009b). Second, foreign investments in China are mainly in the form of Greenfield investment so that the introduction of them means new projects and employment opportunities (Luo and Zhang 2008). Third, the introduction of foreign investments will also have ‘wage spillover’ effect (Fosfuri et al. 2001). Compared to local firms, foreign-invested firms tend to pay higher wage (Zhao 2001, 2002; Liu et al. 2004), which will have an increasing effect on the labor compensation in the whole economy. Fourth, foreign-invested firms, especially western countries’ firms, will normally import the norms and standards of employing workers from the parent country (e.g., labor protection, overtime payment, dismissal payment and holiday arrangement), which will improve the living conditions of the labor force (Liu et al. 2004).

However, other studies show that the foreign direct investment will also pose a negative influence on labor’s share of income because of unique feature of China. Luo and Zhang (2009a, b) argue that the competition of attracting foreign investments in different regions in China can be the main factor to strengthen the bargaining power of capital. The local governments have put the low labor cost and low labor protection as the main strategy to attract foreign investment which increase the bargaining power of capital and weaken the bargaining status of labor force. Foreign capital can move across different provinces easily by the way of “vote by foot” but labor force has various hindrances for mobility because of the constraints such as House Registration System (Hukou System). Second, the funds of Chinese FDI mainly come from countries and regions nearby and 40 % of foreign investment appears as round-tripping investment (Xiao 2004). The motive of these round-tripping flows is mainly for the preferential policy and cheap labor force, which puts a limit on the increase labor compensation.

2.5 The Deterministic Theory of Labor's Share of Income During Economic Transition

However, both neoclassical framework and the perspective of open economy still cannot explain fully about the factors that change the labor's share of income. The transition of economic structure is very important for understanding the operation of economy. Especially, developed countries have entered a post-contemporary period where service industry has become the pillar of national economy. Therefore, the change of labor's share of income will also be influenced by such structure change. Developing countries like China are still in the accelerating stage of industrialization. Meanwhile, the urban-rural dualistic economic structure has made the exploration of reasons for movements of the labor's share of income in some developing countries like China more complicated.

2.5.1 *The Evolution of Labor's Share of Income in the Post Modernization*

Young (2006) and Zuleta (2009) construct economic model of two sectors to analyze the impacts of changes of industry structure in developed countries. Let's assume that one sector produces tradable manufacturing products whose input factors are labor and capital. The other sector is non-tradable service sector whose input factor is only labor. The production functions of two types of products (X and Y) are:

$$Y = K^\alpha L_y^{1-\alpha}; X = BL_x \quad (2.50)$$

Here, K is capital, L is labor, B is the labor productivity for producing product X . Subscript x and y are the input of labor factors for producing product X and Y respectively. By making some proper assumptions on the consumption of two goods, Zuleta (2007) shows that the labor's share of income can be expressed as:

$$\alpha_L = \frac{1 - \alpha}{1 - \alpha L_x} \quad (2.51)$$

The equation above means that labor's share of income is related to output elasticity and the numbers of laborers in service industry. Zuleta (2009) argues that, in developed countries, the share of service industry will grow steadily along with the economic development, which means the labor's share of income will also increase at the same time.

2.5.2 The Movement of the Labor's Share of Income in Dual Economy

In order to provide a more reasonable explanation for the reality of the labor's share of income in China, Li et al. (2009) use the theory of dual economy of Lewis to construct a mathematical model about the transfer of labor force. They argue that although the dual economic structure in China has hoarded a large amount of labor force in the countryside, the economic development with the feature of urbanization and industrialization has transferred labor force from agriculture sector to industrial sector. Their research argues that in the process of labor transferring, the movements of labor's share of income can be divided into three phases. At the beginning of labor transferring, the increase in the industrial output will compensate more than the decrease in the agriculture output of agriculture. Meanwhile, the growth of industrial output is higher than the growth of workers' wage, resulting in a declining trend of labor's share of income; in the middle stage of labor transferring, the increase of marginal product in agriculture and the increasing growth of wage has made labor's share of income move to the bottom; in the last stage of labor transferring, the marginal product in the industrial sector will increase which makes the growth of industrial output lower than the growth of wage resulting in an increasing trend of labor's share of income. Therefore, labor's share of income will decrease first and increase after in this process, appearing a U-shape curve. However, the model of Li et al. (2009) has several drawbacks. First, labor is assumed only to transfer between agriculture and industrial sector which ignores the impacts of labor-intensive service industry on labor's share of income. Second, this model still assumes that labor and capital are fully utilized from the perspective of production, meaning that the analytical framework is still neoclassical. However, this cannot fully manifest the assumption of Lewis (1954) about the infinite labor force in dual economy.

Gong and Yang (2010a, b) suggest that the economy society contemplated by Keynes is more suitable to describe the reality in China. Therefore, they construct an unbalanced dynamic model with Keynesian feature. By constructing the model, they propose that under the condition of dual economy in China, infinite labor supply is the main reason of decreasing labor's share of income. Also, under the dual economy, the infinite labor supply not only hinder the wage increase despite the increasing demand of labor force, but also makes the labor productivity and the change of price less sensitive with to the change of wages. This means that when the labor productivity or the price of goods increases, the increase of wage is not remarkable, which transfers the benefit from economic growth and labor productivity increase into profits rather than wages, meaning that the fruits of economic growth cannot be shared by laborers. Therefore, their demand perspective has provided a different mechanism from Li et al. (2009) in explaining the decreasing labor's share of income. Meanwhile, Gong and Yang (2010a, b) also argue that the increasing demand of labor will exhaust the surplus labor with further economic development, so that wage will gradually play the role of reflecting the demand-supply relationship in labor market again.

This means that when the economy develops to a certain stage, wage will increase faster as economy develops, which will turn over the decreasing trend of labor's share of income. Therefore, labor's share of income will also appear as a U-shape curve which is consistent with the conclusion of Li et al. (2009).

2.6 The Empirical Analysis of the Determination of the Labor's Share of Income

Whether labor's share of income is stable or not, the academia of economy still exist clear dispute. The main focus is whether labor's share of income is consistent with "Kaldor fact" or "Kuznets fact".¹⁰ If "Kuznets fact" is more convincing, then we should connect the change of labor's share of income with the change of economic structure. Therefore, current studies decompose labor's share of income to discuss the impacts of intra-industry and inter-industry movements on the total labor's share of income.

2.6.1 *The Dispute About Stability of Labor's Share of Income*

At the beginning of 20th century, studies show that labor's share of income keeps stable in the long run which is described as "Bowley's law" in Hicks' (1932) *Wage Theory*. Keynes (1939) calls the stability of labor's share of income as "one of the most surprising, yet best-established facts in the whole range of economic statistics". Kaldor (1961) further considers this as one of the "stylized facts" of Macroeconomic growth. Solow (1958) argues that when the fluctuation of total labor's share of income is less than that of individual industry's labor's share of income, we can conclude that labor's share of income is relatively stable. Although he argues that labor's share of income fluctuates with the change of the industrial structure in the short run, such skeptical note cannot exclude the fact that labor's share of income is stable in a long run in US. Recent studies show that "Kaldor fact" still holds in US, as labor's share of income keeps stable around 75 to 80 % (Kruger 1999; Young 2006). The stability of labor's share of income in US is confusing and surprising since economic structure and production technology has experienced drastic changes. Meanwhile, the situations in UK are also consistent with "Kaldor fact". Labor's share of income keeps a random walk status around

¹⁰From the perspective of labor's share of income, the so-called "Kuznets fact" means that, with economic development, the change of the industry structure and the difference of labor's share of income in each industry lead to the unstable distribution between labor and capital.

70 % between 1960 and 1995 (Bentolila and Saint-Paul 2003). For the time dimension, labor's share of income keeps a relatively stable trend. Then, what will be the situation for the cross-section dimension? After considering attribution issues of labor compensation in proprietors' economy, Gollin (2002) has pointed out that the labor's share of income are not statistically different across multinational samples, which keeps stable between 65 and 80 %.

However, many economists argue that the stability of labor's share of income doesn't hold. First, labor's share of income has decreased in many industrialized countries in middle and later 20th century, especially for Germany and France, two countries in the European mainland, which experience largest decreases (Guscina 2006); Second, although the cross-county differences of labor's share of income become smaller after considering the proprietors' economy, such modification dramatically decreases the number of multinational sample which makes the result less representative (Harrison 2002). Meanwhile, Harrison extends the cross section data into panel data and finds that changes in the labor's share of income are still unstable within each country even if attribution issues in proprietors' economy are considered. Last, among the emerging market economies, China's labor's share of income appears a downward trend, decreasing from 51.9 % in 1995 to 39.7 % in 2007. Luo and Zhang (2009a) argue that the fluctuation in labor's share of income in China is more consistent with "Kuznets fact" rather than "Kaldor fact".

If the labor's share of income is stable, according with "Kaldor fact", it won't affect growth, consumption or other macroeconomic variables. However, when the movement of labor's share of income is consistent with 'Kuznets fact', it will pose important effects on various variables in the economy. The decrease of labor's share of income will result in the decrease of income share in the residents' sector in national income distribution (Li and Yin 2007; Bai and Qian 2009c; Liu and Cai 2010). The decrease of residents' income will directly cause insufficient consumption which will further constrain the sustainable development of China's economy and its momentum to grow (Kuijijis 2006; Economists 2007; Huang and Wei 2010). On the other hand, the decrease of labor's share of income means that capital's share of income will increase. This will increase the income share of capital owners and enlarge the income disparity within the residents' sector, which will challenge the social and political stability (Subramanian 2008).

2.6.2 The Structural Factors of the Labor's Share of Income

If we want to infer from the micro conclusion of "constant factor share" by neo-classical equilibrium model to the "stability of factor share" at the macro level, we need to identify many intermediate variables, e.g., the elasticity of substitution, the demand of goods, the demand condition of factors, markets with different extent of competition and monopoly and non-neutral taxes. Therefore, Solow (1958)

suggests that labor's share of income will respond to the changes of these. Solow suggests using the method of decomposing industries to study the within-industry changes of labor's share of income, avoiding contradictions between microeconomic and macroeconomic theories.

If labor's share of income in each industry is different and the total labor's share of income doesn't change over time, then the stability of labor's share of income comes from the macro level. However, the total labor's share of income is not the simple addition of each industry's labor's share of income, but a weighted average based on the share of value-added of each industry. Such relations can be expressed as:

$$S = \sum_{i=1}^k w_i S_i \quad (2.52)$$

Here, S_i is industry i 's labor's share of income and w_i is the share of value-added of this industry in the total value-added. Therefore, the change of total labor's share of income is caused by two changes: the changes of labor's share of income in each industry and the changes of value-added weights of each industry. We can use the variance to evaluate the degree of changes of labor's share of income. Assume that σ_i is the variance of the change of labor's share of income in one industry, the theoretical value of variance of the total labor's share of income is:

$$\sigma^2 = \sum_{i=1}^k w_i^2 \sigma_i^2 + 2 \sum_{i=1}^k \sum_{j=1, j < i}^k w_i w_j \text{cov}(\sigma_i, \sigma_j) \quad (2.53)$$

When industrial variance of labor's share of income is independent to each other, the covariance between two industries, $\text{cov}(\sigma_i, \sigma_j)$, is zero. Therefore, the variance of total labor's share of income is the weighted average of variances in each industry. Therefore, Solow proposes two ways of evaluating the stability of labor's share of income. The first way is to measure the absolute stability, which means observing the extent of changes (express by serial variance) of total labor's share of income in a period of time. However, such measuring method does not have a clear standard to decide whether labor's share of income is stable or not. The other way is called the relative stability. Only when the total variance is less than the within-industry variances, labor's share of income is relatively stable. Although Solow doubts the existence of relative stability of labor's share of income in US, the result of research shows that it satisfies the requirement of relative stability regardless of industry classification, whether it is a more broad classification across the whole industries or a more narrow classification within the industry sector.

Besides this, Solow also use the fixed weights of total labor's share of income and compared with weighted average labor's share of income in weighted mean, exploring the effects of the adjustment of industry structure. The research shows that the change of industry structure has no influence on the labor's share of income from 1929 to 1954 in US. However, Solow finds that the movements of the labor's

share of income in different industries correlate with each other, which may influence the stability of total labor's share of income.

To examine the time trend of movements of the labor's share of income, Gujarati (1969) has provided testing regressions when exploring the labor's share of income in US manufacture from 1949 to 1964.

$$S_{it} = a + bt; S_{it} = a + bt + ct^2 \quad (2.54)$$

Here, S_{it} is the labor's share of income of industry i in year t . He records the year 1949 as $t = 1$, then t is the ascending series from 1 to 16. a , b and c are the regression coefficients and c is the coefficient for the quadratic form of time, testing the asymptotic effect of time. Gujarati's (1969) research shows that no matter from the whole manufacture industry or from within manufacture industry, the result of the test all suggests that the labor's share of income has a clear downward trend. Meanwhile, the quadratic form of time is not significant, meaning that the change of the labor's share of income is a linear function related to time. Close and Shulenburg (1971) modify the regression model and add the factor of economic cycle. Then the regressions become:

$$S_{it} = a + bt + cU; S_{it} = a + bt + ct^2 + dU \quad (2.55)$$

Here, U is the unemployment rate, the higher the employment rate, the more sluggish of the economy. They find that the movement of labor's share of income is counter-cyclical in all industries and sectors in US from 1948 to 1965. Besides this, different from Gujarati, their research result suggests that no matter from industries or sectors, the increases of the labor's share of income are the main trend. Only some industries exhibit no obvious trends and only a few industries have downward trends. However, both studies attempt to prove the assumption of constant labor's share of income.

Young (2006) expands the time range of industrial labor's share of income in US from 1959 to 1996. He adopts the method of volatility decomposition to decompose the movements of the labor's share of income into three effects: within-industry effect, structural effect and covariance effect. If we take the difference to total labor's share of income in Eq. (2.52) with regard to time, we can then get the decomposition equation as the following.

$$\Delta S_t = \sum_{i=1}^k w_{i,t-1} \Delta S_{i,t} + \sum_{i=1}^k \Delta w_{i,t} S_{i,t} + \sum_{i=1}^k \Delta w_{i,t} \Delta S_{i,t} \quad (2.56)$$

Here, Δ is the difference operator so that $\Delta S_t = S_t - S_{t-1}$. Therefore, the change of labor's share of income can be decomposed into three effects. The first effect is within-industry effect, which means the effect from the within-industry or within-sector changes of labor's share of income when the structure of industry or sector keeps constant at time period $t - 1$. The second effect is structural effect,

which means the effect of the changes of industry structure on the labor's share of income when the labor's share of income within-industry or within-sector keeps constant at time period $t - 1$. The third effect is covariance effect, which means the co-movement of structural effect and within-industry effect. Making use of this technology of decomposition, Young (2006) finds that the changes of the industry structure don't have a significant effect on the volatility of labor's share of income, although US has experienced decreasing shares of agriculture and manufacture industry and increasing shares of the service industry in this period. In addition, he also finds that the movements of labor's share of income in different industries correlate with each other. These results are consistent with those of Solow's.

However, compared with discussion of stability of the labor's share of income, such technology of decomposition is very useful for analyzing the reason behind the movements of labor's share of income. Bai and Qian (2009a) explore the moving trend of the labor's share of income in three main industries¹¹ in China during 1978 to 2004. After decomposing the three main industries, they find that the change of industry structure has a significant impact on the movements of total labor's share of income. The result shows that the decrease of the labor's share of income is partly caused by the transformation of industry structure, which means that the decrease of labor's share of income is caused by the transformation of industry from agriculture to non-agriculture industries, and partly caused by the decrease of the labor's share of income within the manufacture industries. Similarly, Luo and Zhang (2009a) also conduct empirical research about the movements of the labor's share of income in China from the perspective of industries. They find that the change of industry structure positively correlates and co-moves with the labor's share of income in different industries, intensifying the volatility of total labor's share of income. They argue that movements of the labor's share of income in China are neither "absolute stable" nor "relative stable" in the standards proposed by Solow (1958). The volatility of labor's share of income in China is more consistent with the "Kuznets fact" but not supports the "Kaldor fact". Using the industry level data, they decompose movements of the labor's share of income and find that before 1996, the labor's share of income in China is increasing, which is related to the increase of the labor's share of income within three main industries and the increasing share of the primary and tertiary industry. However, the main reason is the increase of labor's share of income in the secondary industry; after 1996, the share of the primary industry falls down continuously but the share of the tertiary industry does not have a remarkable increase, leading to the decrease of total labor's share of income. Besides this, the decrease of the labor's share of income in all three main industries is also the main reason for the downward trend of total labor's share of income in the whole economy.

Meanwhile, Luo and Zhang (2009a) also find that there are enormous regional differences of the labor's share of income in China. Most provinces in the eastern

¹¹The classifications of the three main industries are: the primary industry (agriculture), the secondary industry (industry and construction) and the tertiary industry (service).

regions have a lower labor's share of income than the nation average while the provinces in the central and western regions are the opposite. Fortunately, they find that such regional differences narrow down over time. They argue that, these are caused by the increasing share of the tertiary industry in eastern regions and the decreasing share of primary industry in the central and western regions. Besides the role of industry structure, the development of labor-intensive industries and non-state-owned economies in the eastern coastal regions and the remaining features of capital-intensive industries and state-owned economies in the central and western regions are also reasons for the narrowing regional differences of the labor's share of income within-industries.

2.6.3 The Determinist Factors of the Labor's Share of Income

Another way to explore the determinist factors of the labor's share of income is to use econometric regression analysis. Current studies mainly use variables such as ratio of input factors, technological progress, international trade, FDI, economic development, institutional factors and political factors to explain the change of labor's share of income, analyzing their impacting magnitudes and directions.

2.6.3.1 Ratio of Input Factors and Technological Progress

Bentolila and Saint-Paul (2003) conduct research about OECD countries between 1972 and 1993 and find that the capital output ratio has significant negative effect on labor's share of income, indicating a substitutive relationship between labor and capital. Through calculation, they find that the substitution elasticity is 1.06 ($\sigma > 1$). Diwan (2000) uses the data from 135 countries during 1975 to 1995 to analyze the effect of capital accumulation on labor's share of income. He finds that capital accumulation will pose different effects in rich and poor countries. In rich countries, the labor's share of income will increase along with increase of capital accumulation; while in poor countries, the labor's share of income will decrease when capital accumulation increases. Diwan argues that high level of capital stock will increase the bargaining power of labor relative to capital. When the level of capital stock is low, the increasing rate of the labor's share of income has to slow down in order to attract the influx of capital. Harrison (2002) discusses the impacts of labor capital ratio on the labor's share of income by using data for more than 100 countries in the world from 1996 to 1997. She finds that the higher the labor capital ratio, the lower the labor's share of income will be. This result implies that when the substitution elasticity of labor and capital is relatively low, the increase of labor force (or the decrease of capital stock) will decrease the labor's share of income counter-intuitively. Poterba (1998) has obtained similar conclusions when

analyzing US data. By using Chinese provincial data from 1987 to 2004, Luo and Zhang (2009b) find that the capital output ratio has a significant and positive correlation with the labor's share of income. They argue that because China is abundant in labor force, capital accumulation can increase the capital stock per labor and the marginal product of labor, forming a supplementary rather than a substitutive relationship between capital and labor. Through estimation, they find that the substitution elasticity between labor and capital in China is 0.94. Bai and Qian (2009b), Shao and Huang (2010) and Weng and Zhou (2010) further confirm that the substitution elasticity between capital and labor is less than 1 by using the provincial panel data in China. However, by using panel data of Chinese industrial firms from 1998 to 2005, Bai and Qian (2009a) find that capital output ratio has an insignificant on the labor's share of income and propose that the substitution elasticity between labor and capital is 1 accordingly. By using firm level survey data in China from 2000 to 2004, Li et al. (2009) find that capital output ratio is negatively correlated with labor's share of income, meaning a strong substitutive relationship between labor and capital. In all, there are still significant differences in estimating substitution elasticities between labor and capital whether using multinational data or Chinese data.

Bentolila and Saint-Paul (2003) use total factor productivity (TFP) to proxy technological progress and find that TFP has a negative effect on the labor's share of income in countries belong to Organization for Economic Co-operation and Development (OECD). Therefore, they argue that capital biased technological progress causes the decrease of the labor's share of income in OECD countries. By using GDP per unit of labor time (labor productivity) as the proxy for technological progress, Guscina (2006) analyzes the impacts of technological progress on the labor's share of income for 18 industrialized countries between 1960 to 2000 and obtain similar results. By using the capital stock share in telecommunications as the proxy for technological progress, Jaumotte and Tytell (2007) show that technological progress poses a negative effect on the labor's share of income, outweighing the effects of globalization factors such as international trade in OECD countries. The regression analyses of Chinese provincial panel data by Luo and Zhang (2009a, b) show that technological progress, measured by labor productivity, doesn't significantly increase the labor's share of income. They argue that this is because the growth of labor productivity is higher than workers' wage in China. By using panel data of Chinese industrial firms, Bai and Qian (2009a) also find that technological progress has little effect on the factor distribution share in Chinese industry sector. In addition, other studies in China also use capital per capita and capital output ratio to measure technology and discuss its impact (Bai et al. 2008; Li et al. 2009).

2.6.3.2 Factors of Economic Globalization

From the perspective of empirical studies, factors of economic globalization are usually measured by foreign trade dependence (such as import penetration rate, export sales ratio, rate of duties on imports and etc.), the share of FDI in GDP and

the existence of capital control. Harrison's (2002) study shows that the above three measurements of evaluating economic globalization are all negatively correlated with the labor's share of income which she explains by using neoclassical trade model and the "bargaining" model between capital and labor. Lee and Jayadev (2005), Jayadev (2007) and Guscina (2006) have obtained similar conclusions by conducting empirical researches about developed countries. Jaumotte and Tytell's (2007) empirical research about OECD countries show that the economic globalization (measured by trade, immigration, outsourcing and offshoring) is the main reason for the decline of labor's share of income in these countries after 1980s. Diwan (2000, 2001) notes that globalization poses difference effects on the labor's share of income in different countries and these effects are highly sensitive to different functional form. He points out that loosening capital control may pose a negative influence on the labor's share of income through financial crisis and bring a long-term trauma to the laborers.

By using Chinese provincial data from 1987 to 2004, Luo and Zhang (2009b) firstly examine the effect of globalization factors on the labor's share of income in China. Their research shows that FDI has a negative impact on the labor's share of income while export has a positive but insignificant effect on the labor's share of income. They argue that the competition of attracting foreign investments by local governments in China has weakened the bargaining power of laborers and the influx motive of foreign investments has due to the China's cheap labor and preferential policy lead to the decrease of the labor's share of income. Meanwhile, the increasing share of export by foreign firms and the increasing complexity of export goods have made the effect of export on the labor's share of income inconsistent with Stolper-Samuelson theorem (Stolper and Samuelson 1941). By using provincial panel data in the industrial sector, Shao and Huang (2010) analyze the effect of FDI on the declining labor's share of income. They argue that FDI has both increasing effects on the labor compensation and labor productivity. However, the effect of FDI on increasing labor productivity is stronger than the effect on increasing the labor compensation, resulting in the decrease of the labor's share of income.

By using the provincial data in China from 1996 to 2006, Jiang and Zhang (2008) focus on exploring the effect of international trade on the labor's share of income. Their research shows that export has a positive effect on labor's share of income and import has a negative effect on labor's share of income. Therefore, international trade has a positive effect on labor's share of income overall, which shows that the employment effect of foreign trade is larger than the effect of labor productivity. By using provincial data in China from 1997 to 2003, Bai and Qian (2009b) examine the effect of FDI, import and export on the labor's share of income. In that paper, they argue that regions with heavy foreign investment have stronger economy dynamics and more sufficient competition. In addition, the dependence on foreign trade which is used to measure the degree of market opening can also measure the degree of market competition in that region. Therefore, the degree of market competition represented by these two measurements (FDI and dependence on trade) can help to increase labor's share of income and decrease

capital's share of income. However, their empirical research shows that the both coefficients are not significant. Regarding to such results, they argue that this is because the degree of market competition has no big changes in China after middle of 1990s.

2.6.3.3 Economic Development and Economic Cycle

"Kuznets curve" indicates that at the beginning of economic development of a country, income inequality will be enlarged continuously and after reaching a certain level of economic development, the income inequality will then decrease gradually. Cross-country study by Daudey and Garcia-Penalosa's (2007) shows that the higher the labor's share of income of a country, the smaller the income inequality (measured by Gini coefficient) will be. According to this logic, labor's share of income tends to be in the downward trend at the beginning of economic development and increase after a certain period which is consistent with "Kuznets curve". By using cross-country data, Li et al. (2009) find that labor's share of income will change along with the GDP per capita in a U-shape rule. Their research shows that the lowest point of the U-shape curve is around \$6000 GDP per capita (purchasing power parity in 2000). Therefore they argue that labor's share of income in China may enter into an upward trend in two years after 2009. Diwan's (2000) has added GDP per capita and its quadratic term into determinist function of the labor's share of income and finds that coefficient of GDP per capita is positive and the coefficient of quadratic term of GDP per capita is negative. This means an inverse U-shape relationship between labor's share of income and the level of economic development which is the opposite comparing with the prediction of "Kuznets curve". Studies by Lee and Jayadev (2005) and Jayadev (2007) show that the labor's share of income is positively correlated with economic development (measured by GDP per capita). Harrison (2002) introduces the average income level in domestic country relative to the foreign country into the determinist function of the labor's share of income and finds that it is negatively correlated with labor's share of income. She argues that when a country has higher average income level, the incentive for labor force to immigrate will be less and labor force will place in disadvantageous bargaining position, resulting in the lower labor's share of income.

As for the researches with regard to China, Luo and Zhang (2009b) uses the provincial panel data to conduct empirical research and show that the labor's share of income in China will decrease with the economic development. Specifically, when real GDP per capita (price in 1987) increases by 1 %, the labor's share of income will decrease by 0.13 %. Meanwhile, after adding the quadratic form of real GDP per capita, they also find that there is a U-shape relationship between economic development and the labor's share of income. Bai and Qian's (2009b) empirical research shows that capital's share of income will increase when GDP per capita increases, which indirectly proves a negative correlation between economic development and the labor's share of income. Meanwhile, GDP per capita contributes the biggest explaining power for the model. They argue that the main

reason is that the level of economic development (measured by GDP per capita) can reflect the change of China's industry structure. Because of short time span of the data, they haven't tested the U-shape relationship in the paper of Luo and Zhang (2009b).

In addition, many studies argue that the change of labor's share of income is related to the economic cycle. Most studies regress the labor's share of income with the unemployment rate, economic growth and inflation rate. Some studies find that the labor's share of income is cyclical (Beck 1958) while others claim that it has a counter-cyclical attribute (Close and Shulenburger 1971; Kalleberg and Wallace 1984; Krueger 1999; Jiang 2008, 2009).

2.6.3.4 Factors of Labor Market Institution and the Role of Government

Since the power of trade union has significant influences on the determination of labor's wage and employment, the studies about labor's share of income will normally consider the relationship between the power of trade union and labor's share of income. Kalleberg and Wallace (1984) analyze the determinist factors of labor's share of income in the printing industry in US. They argue that the bargaining power of labor and capital, measured by the coverage of union and frequency of strike, will remarkably increase labor's share of income. Meanwhile, when the power of trade union weakens, the ability for the union to increase labor's share of income will also be weakened. Guscina (2006) uses the ratio of workers participating into trade union and the dummy variable to measure the degree of protection for labor force. He points out that, after mid-1980s, the weakening power of trade union and the decreasing degree of protection for employment is one of the reasons for decreasing labor's share of income. Bentolila and Saint-Paul (2003) examine the effect of the number of labor conflict on labor's share of income and finds that the effect is negative but not significant.

Human capital accumulation may influence labor's share of income in two aspects: first, the improvement of education will increase the marginal product of labor so that labor's share of income will be increased; the other possibility is when level of education becomes higher, the physical capital needed to match with such educational level will be more. Therefore, the increasing bargaining power of capital is not helpful for increasing labor's share of income. Diwan's (2000) research shows that in rich countries, labor's share of income will be higher when human capital accumulates more while in poor countries, labor's share of income will be lower when human capital accumulates more. Luo and Zhang (2009b) argue that when government is excluded from the primary distribution, human capital accumulation will lead the income incline to the laborers.

In addition, government influences the labor's share of income through fiscal spending. Diwan's (2000) study shows that the increase of fiscal spending is helpful to increase labor's share of income in poor countries but not in rich countries. He argues that the reason of such difference is because fiscal spending in poor countries

is mainly used to compensate the income of labor while fiscal spending in rich countries are mainly transfer payment to specific groups (such as interest group). Harrison (2002) also supports the view that increasing government spending is helpful to increase the labor income and its share. Le and Jayadev (2005) and Jayadev (2007) use the ratio of government in national income to proxy the interference of government to economy and find that when this ratio is higher, the labor's share of income will also be higher. Moreover, they even find that government deficit also has positive effect on the labor's share of income. Luo and Zhang (2009b) introduce explanatory variables such as the ratio of government spending and government consumption to GDP and find that expansion of fiscal spending can help to increase the labor's share of income. More specifically, 1 % increase in fiscal spending will cause 0.14 % increase in the labor's share of income.

2.6.3.5 The Institutional Factors in Economic Transition

Since China is a typical country in economic transition, we need to pay more attention on the institutional factors in the economic transition path, when discussing about the determinist factors of labor's share of income. Li et al. (2009) use the share of state-owned enterprises (SOEs) as an explanatory variable for economic transition to analyze its effect. Their result shows that labor's share of income is negatively correlated with the share of SOEs. They argue that SOEs are mainly capital-intensive firms with lower labor's share of income, so that the increasing share of SOEs will cause the decrease of the labor's share of income. Bai and Qian (2009a) use the shares of state-owned, collective, corporation, foreign, and Hong Kong, Macau, and Taiwan (HMT) in the total capital as proxy for difference of firm targets. They find that the labor's share of income in the industrial sector has dropped 4.7 % because of the restructuring reform in SOEs. Regarding to this, they provide an opposite explanation compared with Li et al. (2009) that the average labor's share of income in SOEs is significant higher than non-SOEs and the decrease of labor's share of income is the result of decreasing distortion in the factor market. In addition, they find that the restructuring reform of SOEs is the main reason of the decrease of labor's share of income in the industrial sector, contributing 51 % of the explanatory power in the total predicted value. Luo and Zhang (2009b), however, analyze the same question from a different angle. They use the employment share of non-state-owned sector to represent privatization (i.e., one of the result of restructuring reform of SOEs). Their result shows that privatization has a significant and negative influence on the labor's share of income. They argue that the firm compensation system can better reflect the supply and demand relationship of the market after privatization which is the short-run result of the positive shock from the market (Luo 2008). Meanwhile, after the restructuring reform of SOEs, the abundant labor force has imposed supply shocks to the labor market, which poses a downward pressure to wages (Lu 2008; Weng and Zhou 2010).

2.7 Inspiration of Current Studies and Future Direction

From the perspective of the definition and measurement of the labor's share of income, this chapter first discusses the ratio of labor compensation in national income account and firms' account (i.e., the measurement issues of labor's share of income). We have discussed issues about the net taxes on production, attribution issues of capital and labor in proprietors' economy and distinguish between human capital and raw labor which are related to the measurement of the labor's share of income in details. We propose various modification methods which make the data more suitable for the needs of the research. Aiming at the current macroeconomic data of the labor's share of income in China, we discuss the effect from the change of statistical caliber and propose plans to modify the impacts from the change of statistical caliber.

Second, we retrospect and analyze the deterministic theories of labor's share of income of Ricardo, Marx, Neoclassic and Keynesianism and point out their common features and differences. Although the value and distribution theory of Marx has gained a huge success in socialist countries, the "marginalist" distribution theory of Neoclassic seems to dominate the direction of western economic research. Therefore, economists share common knowledge that the division between wage and profit is no longer determined by the bargaining and game between laborers and capitalists but determined by the marginal productivity of labor and capital factors.

Third, the current discussion of the labor's share of income is still Neoclassic (Bentolila and Saint-Paul 2003). Economists have made some extensions to the neoclassic theory by adding factors such as technological progress and imperfect market competition, further supplementing the "marginalist" thoughts. After considering the economic globalization, this chapter discusses how international trade and foreign direct investment affect the labor's share of income under open economy. In addition, this chapter also discusses the dynamic evolution of the labor's share of income in the process of economic transition and different features for developed and developing countries.

Finally, this chapter summarizes empirical researches about the labor's share of income both at home and abroad in two aspects. One is to follow Solow's (1958) idea to discuss the impacts changes of industry structure and changes within-industry labor's share of income on the total labor's share of income by decomposing weighted sum of labor's share of income based on the industry classification. This idea of decomposition is consistent with the theoretical part when discussing how labor's share of income evolves in the process of economic transition. The other is to use regression analyses to discuss the factors influencing labor's share of income, such as, input factors, technological progress, globalization, level of economic development, labor market institution, government and institutional factors in economic transition. We find that the cross-country studies (mainly aiming at developed countries) consider globalization and technological progress as the main reasons for decreasing labor's share of income in the

developed countries in the past two decades. Studies about China emphasize the role of institutional factors, such as restructuring reform of SOEs.

The phenomenon of decreasing labor's share of income in China during the reform and opening up has become a prominent issue in the development of China's economy and society. It not only means that there is an unbalanced distribution ratio between labor and capital but also reflects the trend of enlarging income inequality in China. Therefore, the issue of income distribution, especially in terms of factor distribution, has attracted wide attention in academia. Current research analyzes the moving trend and determinist factors of labor's share of income. To draw on the results of national and international studies, this paper thinks that we need to further explore the determinist factors and the mechanism of the labor's share of income in China.

Firstly, current studies about the labor's share of income in China use the statistical data directly to make trend and regression analyses. However, labor's share of income needs to be redefined and reevaluated, so that we could tailor the specific needs of different studies. For example, we need to further analyze and discuss the issues about handling indirect tax, attributing proprietors' income, differentiating price indexes to different factors and so on. More specifically, the attribution of proprietors' income is one of the most difficult issues for proper measuring labor's share of income. Current methods just use simple rules by either attributing proprietors' income to labor compensation or capital surplus, which inevitably overestimate or underestimate the labor's share of income. Meanwhile, a large number of proprietors' income in the economy hasn't been included in China's National System of Accounts (NSA). These issues will make us harder to judge the real situation of the evolution of income distribution structure. We know that most of the income of proprietors' income will be finally owned by the laborers so that the labor's share of income will increase with the development of proprietors' economy. It can be predicted that proprietors' economy is going to play bigger roles in China. The development of service economy and internet economy will cultivate the prosperity of proprietors' economy which can help to improve the national income distribution pattern in China. Therefore, estimating the impacts of proprietors' economy on the labor's share of income is one research direction can be studied further.

Secondly, economic globalization is the major trend of economic development in the past two decades. Although the factor income distribution is more depended on the demand and supply of domestic labor market, the factors of globalization (international trade and investment) undoubtedly have increasing influence on the income distribution among factors. The phenomenon of decreasing labor's share of income and increasing capital's share of income appears in the industrialized countries. And scholars use Heckscher–Ohlin model to explain the change of factors' share of income caused by economic globalization. However, when applying this theory into emerging economies (e.g., China), the model predicts that trade will increase the labor's share of income and improve the income distribution condition between capital and labor. This contradicts with the indisputable fact that labor's share of income is decreasing and the income inequality is enlarging in China

during the reform and opening up. Meanwhile, the empirical evidences about China show that there is only a weak correlation between trade and the labor's share of income. Therefore, the prediction of neoclassical trade theory contradicts with the reality in China. It is necessary to explore further about the adaptability for current trade theory in China. Or we can construct some theoretical models more consistent with China's reality to understand the impacts of economic globalization on the change of labor's share of income in China.

Thirdly, with regard to the decreasing labor's share of income in China, studies which use firm-level microeconomic data argue that the restructuring reform of SOEs (or simply privatization), capital's bargaining power and technological progress are the main reasons for explaining the decrease of the labor's share of income. However, international studies which mainly aim at developed countries incline to consider the factors of globalization like trade and FDI as the main reasons of decreasing labor's share of income. The economic transition in China is accompanied with opening up, for example, a great number of new-born private firms engage in international trade and the introduction of many foreign-invest firms significantly change the ownership structure in China. Therefore, we shall combine the opening up and economic transition together to explain the determinist factors of the labor's share of income in China in a more integrated framework.

Fourthly, current studies mainly focus on explaining the reasons and mechanisms of decreasing labor's share of income. However, as a microeconomic variable, the size of the labor's share of income directly means labor cost of the firm which is an import indicator for firm's micro-behaviors and decisions. As a macroeconomic variable, the labor's share of income is not only the constraints of the consumption ability of society but also a justice measurement for the social distribution. The increase of labor's share of income represents as the improvement of relationship between distributional factors and boost economy by increasing consumption in society. However, the increase of labor's share of income represents the increase of the firm's labor cost from micro perspective, which will lower the firm productivity and hinder economic growth. However, no matter from which perspective, the change of labor's share of income will pose an important influence on economic growth.¹² Therefore, it is worthwhile to further explore how labor's share of income influences firm's microeconomic efficiency and macroeconomic growth.

Fifthly, the decrease of labor's share of income means the income gap between the owners of the labor and owners of the capital will enlarge, which will cause both imbalances in function income distribution and size income distribution. Previous studies always discuss personal income inequality and labor's share of income separately and ignore the inter-connection between them. To increase the labor income can not only increase labor's share of income but also improve the

¹²Some studies have already begun to analyze the macro effect of the change of labor's share of income (Huang and Wei, 2010). The study shows that the increase of labor's share of income is not only good for the expansion of residential consumption, but also for promoting economic growth.

worsening income inequality in current situation in China. Therefore, exploring the connections between functional income distribution and size income distribution will have important policy implications.

References

- Acemoglu D (2003) Labor- and capital-augmenting technical change [J]. *J Eur Econ Assoc* 1(1): 1–37
- Bai C (2010) Industry monopoly is the key for decreasing labor income share [N], *People's Daily*, 1st June 2010
- Bai C, Qian Z (2009a) Factor income share in China: the story behind the statistics [J]. *Econ Res J* 3:27–41
- Bai C, Qian Z (2009b) On the increase in the Chinese aggregate capital income share: an investigation from provincial perspective [J]. *J Tsinghua Univ (Philos Soc Sci)* 24(4):137–147
- Bai C, Qian Z (2009c) Who has eroded residents' incomes? An analysis of China's national income distribution patterns [J]. *Soc Sci China* 5:99–115
- Bai C, Qian Z, Wu K (2008) Determinants of factor shares in China's industrial sector [J]. *Econ Res J* 8:16–28
- Beck JW (1958) An Interindustry analysis of labor's Share. *Ind Labor Relat Rev* 11(2):231–246
- Bentolila S, Saint-Paul G (2003) Explaining movements in labor income share [J]. *Contrib Macroecon* 3(1):1103–1136
- Bernanke BS, Gurkaynak RS (2001) Is growth exogenous? Taking Mankiw, Romer, and Weil seriously [J]. *NBER Macroecon Annu* 16:11–57
- Blanchard O, Nordhaus WD, Phelps ES (1997) The medium run [J]. *Brook Pap Econ Act* 2:89–158
- Close FA, Shulenburg DE (1971) Labor's share by sector and industry, 1948–1965 [J]. *Ind Lab Relat Rev* 24(4):588–602
- Cobb CW, Douglas PH (1928) A theory of production [J]. *Am Econ Rev* 18(Supplement):139–165
- Daudey E, Garcia-Penalosa C (2007) The personal and the factor distributions of income in a cross-section of countries [J]. *J Dev Stud* 43(5):812–829
- Decreuse B, Maarek P (2008) FDI and the labor share in developing countries: a theory and some evidence [EB/OL], Working Paper, GREQAM, University of Aix-Marseilles, 2008
- Diwan I (2000) Labor income shares and globalization [EB/OL]. World Bank Working Paper, Washington, 2000
- Diwan I (2001) Debt as sweat: labor, financial crises, and the globalization of capital [EB/OL]. World Bank Working Paper, Washington, 2001
- Economists, A Workers' Manifesto for China: How Workers Are Losing Out in China, and Why It Matters to the Rest of the World [EB/OL], Economists (2007)
- Feenstra RC, Hanson GH (2001) Global production sharing and rising inequality: a survey of trade and wages [EB/OL], NBER Working Papers No. 8372, Cambridge, 2001
- Fosfuri A, Motta M, Ronde T (2001) FDI and spillovers through workers' mobility [J]. *J Int Econ* 53(1):205–222
- Gollin D (2002) Getting income shares right [J]. *J Polit Econ* 110(2):458–475
- Gomme P, Rupert P (2004) Measuring labor's share of income [EB/OL], policy discussion papers, Federal Reserve Bank of Cleveland, 2004
- Gong G, Yang G (2010a) Analysis of China's unequal distribution of income from the perspective of functional income distribution [J]. *Soc Sci China* 2:54–68
- Gong G, Yang G (2010b) The evolution of the share of wage income in national income [J]. *Manag World* 5:45–55

- Goodwin R (1967) A growth cycle. In Feistein CH (eds) *Socialism, Capitalism and Economic Growth*. Cambridge University Press, Cambridge
- Gujarati D (1969) Labor's share in manufacturing industries: 1949–1964 [J]. *Ind Lab Relat Rev* 23 (1):65–77
- Guo Q, Lv B (2011) The influence of tax on factor income distribution [J]. *Econ Res J* 6:16–30
- Guscina A (2006) Effects of globalization on labor's share in national income [EB/OL], IMF Working Paper, 6 (294), Washington, 2006
- Harrison AE (2002) Has globalization eroded labor's share? Some Cross-country evidence [EB/OL], mimeo, University of California at Berkeley and NBER, 2002
- Heckscher EF (1991) The effect of foreign trade on the distribution of income [A]. 1919, *Economisk Tidskrift*. In: Heckscher EF, Ohlin B *Heckscher-Ohlin trade theory* [M]. The MIT Press, Cambridge (translated, edited and introduced by Harry Flam and M. June Flanders)
- Hicks J (1932) *The theory of wages* [M]. McMillan, London
- Huang Q, Wei X (2010) Macroeconomic effects of decreasing share of labor incomes in China: empirical analysis based on provincial panel data [J]. *Financ Trade Econ* 4:121–127
- Huang X, Xu S (2009) Reasons for the decline of labor share: from the angle of labor-saving technical progress [J]. *Econ Res J* 7:34–44
- Jaumotte F, Tytell I (2007) Globalization of labor [EB/OL], IMF World Economic Outlook 2007, Chapter 5, 2007
- Jayadev A (2007) Capital account openness and the labor share of income [J]. *Camb J Econ* 31 (3):423–443
- Jiang L (2008) Trend and influential factors of labor share in China: an analysis based on China's Provincial Panel Data [J]. *Mod Econ Sci* 30(4):7–12
- Johnson DG (1954) The functional distribution of income in the United States, 1850–1952 [J]. *Rev Econ Stat* 36(2):175–182
- Kaldor N (1961) Capital accumulation and economic growth [A]. In: Lutz FA, Hague DC (eds) *The theory of capital* [C]. St. Martin Press, New York
- Kaldor N (1955) Alternative theories of distribution [J]. *Rev Econ Stud* 23(2):83–100
- Kalecki M (1938) The determinants of distribution of the national income [J]. *Econometrica* 6 (2):97–112
- Kalecki M (1954) *Theory of economic dynamics* [M]. George Allen, London
- Kalleberg AL, Wallace M, Raffalovich LE (1984) Accounting for labor's share: class and income distribution in the printing industry [J]. *Ind Lab Relat Rev* 37(3):386–402
- Keynes JM (1939) Relative movements of real wages and output [J]. *Econ J* 49:34–49
- Kohli U (1991) Technology, duality, and foreign trade: the GNP function approach to modeling imports and exports [M]. University of Michigan Press, Ann Arbor
- Kravis IB (1959) Relative income shares in fact and theory [J]. *Am Econ Rev* 49(5):917–949
- Krueger AB (1999) Measuring labor's share. *Am Econ Rev* [J] 89(2):45–51
- Krusell P, Ohanian LE, Rios-Rull JV, Giovanni LV (2000) Capital-skill complementarity and inequality: a macroeconomic analysis [J]. *Econometrica* 68(5):1029–1053
- Kuijjs L (2006) How will China's saving-investment balance evolve? World bank china office [EB/OL]. Research Working Paper, No. 5, 2006
- Lee K, Jayadev A (2005) The effects of capital account liberalization on growth and the labor share of income: reviewing and extending the cross-country evidence [A]. In: Epstein G (ed) *Capital flight and capital controls in developing countries* [C]. Edward Elgar, Cheltenham
- Lewis WA (1954) Economic development with unlimited supplies of labour [J]. *Manch Sch Econ Soc Stud* 22(2):139–191
- Li Z (eds) (1994) *Dictionary of world economics* [M]. Economic Science Press, Beijing
- Li Y, Yin J (2007) Anatomy of high saving rate of china: analysis based upon flow of funds account of china from 1992 to 2003 [J]. *Econ Res J* 6:14–26
- Li D, Liu L, Wang H (2009) Changes in the labor's share of income of GDP: a u-shaped curve [J]. *Econ Res J* 1:70–82
- Lu M (2008) Decreasing labor's share of income: why and how to do? [N]. Shanghai Securities News, 9 September 2008

- Liu W, Cai Z (2010) Structure problems in domestic aggregate demand and uneven national income distribution [J]. *Xinhua Dig* 19:44–48
- Liu M, Xu L, Liu L (2004) Wage-related labor standards and FDI in China: some survey findings from Guangdong Province [J]. *Pac Econ Rev* 9(3):225–243
- Lüker M (2007) Labor shares [EB/OL], technical brief No.01, International Labor Office, Geneva, 2007
- Luo C (2008) Rethinking the Kardo “Stylized Facts”: the share of labor income revisited [J]. *J World Econ* 1:86–96
- Luo C, Zhang J (2009a) The economic explanation of decrease of labor income share: empirical evidence from China’s provincial data [J]. *Manag World* 5:25–35
- Luo C, Zhang J (2009b) Labor income share in economic development: empirical evidence from China’s industrial data [J]. *Soc Sci China* 1:65–79
- Lv B, Guo Q (2012) Calculation on china’s functional income distribution and redistribution [J]. *Econ Res J* 10: 27–40
- Marx C (1972) (translated by Guo, D. and Wang, Y.) *Das kapital* [M], vol 1–3. People’s Publishing House, Beijing
- Mincer JA (1974) *Schooling, experience, and earnings* [M]. Columbia University Press, New York
- National Bureau of Statistics of China (2003) *China’s national accounting system 2002* [M]. China Statistics Press, Beijing
- Ohlin B (1933) *Interregional and international trade* [M]. Harvard University Press, Cambridge
- Pasinetti LL (1962) Rate of Profit and Income Distribution in Relation to the Rate of Economic Growth Source [J]. *The Review of Economic Studies* 29(4):267–279
- Poterba JM (1998) The rate of return to corporate capital and factor shares: new estimates using revisited national income accounts and capital stock data [J]. *Carnegie-Rochester conference series on public policy*, vol 48. pp. 211–246
- Ricardo D (1981) (translated by Guo, D. and Wang, Y.) *On the principles of political economy and taxation* [M]. Commercial Press, Beijing
- Ruiz CG (2005) Are factor shares constant: an empirical assessment from a new perspective, Working Paper, Carlos III Macroeconomics Workshop, 2005
- Shao M, Huang J (2010) FDI and China’s regional labor share: empirical evidence from industry [J]. *China Economic Quarterly* 9(4):1189–1210
- Solow RM (1958) A skeptical note on the constancy of relative shares [J]. *Am Econ Rev* 48 (4):618–631
- Song D, Wang L, Dong Z (2010) Does skill-biased technological progress exist: evidences from China’s empirical evidences [J]. *Econ Res J* 5:68–81
- Stolper W, Samuelson P (1941) Protection and real wages [J]. *Rev Econ Stud* 9(1):58–73
- Subramanian A (2008) What is China doing to its workers? [EB/OL]. Business Standard, New Delhi
- United Nations Economic and Social Commission for Western Asia, *Annual Review of Developments in Globalization and Regional Integration in the Countries of the ESCWA Region* [EB/OL], 2002
- Wang Y, Sheng D (2010) Factor accumulation, skill-biased technological progress and labor’s share of income [J]. *World Economic Papers* 4:33–50
- Wen J, Zhou L (2010) Variations in the labor income share in China’s Industry during 1997–2008 [J]. *Chin J Popul Sci* 4:31–45
- Xiao G (2004) *People’s Republic of China’s Round Tripping FDI: Scale, Causes and Implications* [EB/OL], Asia Development Bank Institute Discussion Paper No. 24, 2004
- Young AT (2006) One of the things we know that ain’t so: why US labor’s share is not relatively stable [EB/OL], Mimeo, University of Mississippi
- Young AT, Zuleta H (2008) Re-measuring labor’s share [EB/OL], Working Paper of University of De Rosario, 2008
- Zeira J (1998) Workers, machines and economic growth. *Q J Econ* 113(4):1091–1118
- Zhao Y (2001) Foreign direct investment and relative wages: the cases of China. *China Econ Rev J* 12(1):40–57

- Zhao Y (2002) Earnings differentials between state and non-state enterprises in Urban China [J]. *Pac Econ Rev* 7(1):181–197
- Zhou M, Xiao W, Yao X (2010) Decreasing China's labor's share: research development of measurement and explanation [J]. *World Econ Pap* 6:92–105
- Zuleta H (2008) Factor saving innovations and factor income shares [J]. *Rev Econ Dyn* 11(4):836–851
- Zuleta H (2009) If factor shares are not constant then we have a measurement problem. Can we solve it? Universidad del Rosario, Serie de Documentos de Trabajo, 2009
- Zuleta H, Young AT (2007) Labor's shares aggregate and industry: accounting for both in a model of unbalanced growth with induced innovation. Working Paper, Universidad del Rosario and University of Mississippi, 2007

Labor's Share of Income

Another Key to Understand China's Income Inequality

Zhou, M.

2016, XIX, 218 p. 25 illus. in color., Hardcover

ISBN: 978-981-10-0172-7