Accounting for Labor Misallocation in China with Provincial Data 1980-2010

Peiwen Bai¹ and Wenli Cheng²

Abstract

This paper develops a simple accounting framework to measure the extent of labor misallocation in Chinese provinces over the period 1980-2010. It also investigates possible factors that influence labor misallocation. The main findings are: (1) the extent of labor misallocation fell substantially in the first half of 1980s. During the 25 years since 1985, labor allocation has improved somewhat but there was no monotonic trend of improvement over time. (2) In 2010, the Eastern region had the lowest level of labor misallocation, followed by the Central region, and the Western region. (3). Wage differentials across primary, secondary and tertiary sectors accounted for a substantial portion of measured overall labor misallocation; the secondary sector’s wage deviations from VMPL also had the effect of raising labor misallocation, whereas the impacts of the primary and tertiary sectors’ wage deviation from VMPL differed over time. (4) A higher level of urbanization, the development of the tertiary sector and the growth of the non-state sector appear to have contributed to a reduction in labor misallocation.

JEL classification: C43, J01

Keywords: accounting of resource misallocation; labor misallocation in China

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1. Introduction

For over three decades since the beginning of the economic reforms in 1979, China has enjoyed rapid economy growth. However it is increasingly recognized that the investment-driven and export-led growth model that has worked so far may not be sustainable and that China needs to focus on achieving smarter and more harmonious development (Woo, 2012). An important element in this “harmonious development” strategy is factor market development, in particular improvements in the functioning of the labor market.

Before 1980, China’s labor market was highly segmented. In urban areas, SOE workers had secured employment with their wages fixed centrally; meanwhile rural residents were prevented by the household registration system (hukou) from seeking work in cities (Meng, 2012). Although successive labor market reforms have gradually removed various barriers to labor movement, significant rigidities in the labor market remain and reforms are still uneven and incomplete (Demurger et al. 2008). As a result, labor misallocation across regions and sectors continues to impede healthy structural changes in the economy, with detrimental effects on productivity growth (Restuccia and Rogerson, 2013).

The purpose of this paper is to study the extent of labor misallocation in China. Specifically we construct a labor misallocation index based on a simple account framework similar to that in Aoki (2012). We calculate the index for all 31 mainland provinces of China over the period 1980-2010 (in 5-year intervals) to study its time and regional patterns. We also decompose the index and conduct a regression analysis in order to gain a deeper understanding of contributing factors to labor misallocation. Our calculation reveals a large allocative efficiency improvement over the first 5 years of the reforms. Progress since then was moderate and uneven over time and cross regions. The decomposition of the overall labor misallocation index identifies cross-sector wage
differential and wage deviation from the value of labor’s marginal product in the secondary sector as the main sources of labor misallocation. Finally our regression analysis suggests that urbanization, the development of the tertiary sector and the growth of the non-state sector all contributed to a reduction in labor misallocation.

The theoretical framework of our paper relates closely to a number of studies that see market frictions as the source of factor misallocation. For instance, Chari et al. (2007) introduce “wedges” that resemble taxes to model market frictions which count for economic fluctuations. Similarly, Aoki (2012) models market frictions in the form of taxes on factor inputs. In our construction of model we also introduce a “wedge” between wage and the value of marginal labor product as one source of labor misallocation in each sector of the economy. What is different about our approach is that we construct an aggregate misallocation index for the economy which also takes into account misallocation due to cross-sector wage differentials. In our decomposition of the aggregate misallocation index, we also have gone further than the standard Blinder (1973) and Oaxaca (1973) method and have identifies six constituent parts of the aggregate misallocation measure.

On the empirical front, some authors have investigated labor misallocation in China, but most focus on the urban-rural divide. For instance, Yang and Zhou (1999) found large productivity gaps between rural and urban sectors, indicating significant labor misallocation. Yang (2004) suggests that rural education may play an important role in speeding up relocation of labor to nonagricultural activities thereby improving allocative efficiency. However to our knowledge, a systematic measure of labor misallocation based on recent data is lacking; and it is hoped that our paper makes a contribution towards filling that gap.

The rest of the paper is organized as follows. Section 2 sets out our theoretic framework for measuring labor misallocation and analyzing some of its contributing factors. Section 3 estimates the extent of labor misallocation in China’s 31 provinces over the period 1980-2010 and investigates a number of factors that may affect the degree of
labor misallocation. Section 4 summarizes the paper’s main findings and discusses their implications.

2. Theoretical framework

2.1 The extent of labor misallocation across sectors

Suppose we are interested in measuring labor misallocation across \(N\) sectors within a region. Let the production function of sector \(i\) \((i = 1, \ldots, N)\) be:

\[ Y_i = A_i K_i^a L_i^b \]  \tag{1}

If there is a wage distortion in sector \(i\) in the form of a divergence between the wage rate and the value of the marginal product of labor (VMPL), we have:

\[ w_i \kappa_i = p_i b_i A_i K_i^{a_i} L_i^{b_i-1} \]  \tag{2}

where \(p_i\) is the output price of sector \(i\); and \(\kappa_i\) indicates the degree of divergence between wage rate and VMPL in sector \(i\).

From (2), we can write the labor share of a given sector \(m\) as:

\[ L_m = \frac{L_m}{L} \frac{b_m Y_m / w_m K_m}{\sum_i b_i Y_i / w_i \kappa_i} L \]  \tag{3}

where \(L = \sum_i L_i\).

Let \(\gamma_i = \frac{Y_i}{Y}; b = \sum_i b_i \frac{Y_i}{Y}; \rho_m = \sum_i \frac{b_i \gamma_i w_m K_m}{b w_i \kappa_i}\), we can rewrite (3) as:

\[ L_m = \frac{b_m \gamma_m}{b \rho_m} \frac{1}{L} \]  \tag{4}
Where $\rho_m^*$ is the sum of differences between sector $m$’s value of marginal product of labor ($w_mK_m$) and that of every other sector ($w_iK_i$), weighted by each sector’s labor income as a share of total labor income ($b_i\gamma_i/b$). If labor allocation across $N$ sectors is efficient, the value of marginal product of labor will be the same for all sectors, which implies $\rho_m^* = 1$. If labor is misallocated, then $\rho_m^*$ will be greater or smaller than 1. Since the degree of labor misallocation for sector $m$ is measured by the absolute deviation of $\rho_m^*$ from 1, we construct the labor misallocation measure for sector $m$ as:

$$
\rho_m = \sum_i b_i\gamma_i \left| \frac{w_mK_m}{w_iK_i} - 1 \right| = \sum_i \rho \left( \frac{w_mK_m}{w_iK_i} \right)
$$

where $\rho = \frac{b_i\gamma_i}{b} \left| \frac{w_mK_m}{w_iK_i} - 1 \right|$.

Clearly, when labor is efficiently allocated, i.e., $w_mK_m = w_iK_i$, for all $i = 1, \ldots, N$, then we have $\rho_m = 0$. When labor is misallocated, i.e., $w_mK_m \neq w_iK_i$, for at least some $i$, then $\rho_m > 0$, and $\rho_m$ increases with the degree of labor misallocation.

Combining labor misallocation for all sectors, we get an aggregate measure of labor misallocation for the economy:

$$H = \sum_m \nu_m \rho_m
$$

where $\nu_m = \frac{w_mL_m}{\sum_i w_iL_i}$ is sector $m$’s share of total labor income.

Since the focus of this paper is to measure labor misallocation across 3 sectors (primary, secondary and tertiary) in each province of China, we construct our labor misallocation index as:
\[ H = \sum_i v_i \rho_i = v_1 \rho_1 \left( \frac{w_1 K_1}{w_2 K_2} \right) + v_2 \rho_2 \left( \frac{w_2 K_2}{w_1 K_1} \right) + v_2 \rho_2 \left( \frac{w_2 K_2}{w_3 K_3} \right) + v_3 \rho_3 \left( \frac{w_3 K_3}{w_2 K_2} \right) \]

where \( w_1, w_2, w_3 \) are wage rates; \( \kappa_1, \kappa_2, \kappa_3 \) indicate the divergences between wage rates and the values of marginal product of labor in the primary, secondary and tertiary sectors, respectively; \( v_1, v_2, v_3 \) are each sector’s share of total labor income.

2.2 Efficiency loss due to labor misallocation

The labor misallocation measure (equation (7)) is an index that informs us about how inefficiently labor is allocated across three sectors. We can further measure the economic loss associated with the inefficiency in labor allocation.

In the absence of labor misallocation, sector \( m \)’s output is \( Y_i^* = A_i K_i^a L_i^b, (i = 1, 2, 3) \) and the total output is \( \sum_i Y_i^* \). With labor misallocation, sector \( m \)’s output is \( Y_i = A_i K_i^a L_i^b \) and the total output is \( \sum_i Y_i \). The efficiency loss due to labor misallocation can thus be measured by the percentage loss in output as follows:

\[ \eta = \frac{\sum Y_i^* - \sum Y_i}{\sum_i Y_i^*} = 1 - \frac{\sum Y_i}{\sum_i Y_i (\frac{L_i^*}{L_i})} \]

2.3 Decomposition of labor misallocation

Once we can quantify the extent of labor misallocation and its associated costs, the next logical step is to investigate possible sources of labor misallocation. The way we have constructed our measure of labor misallocation suggests two main sources of labor misallocation: distortion due to wage differences across sectors, and distortion due to the divergence between wage rate and VMPL in each sector. To gauge the relative contributions of the two distortions, we can decompose every term on the right-hand side.
of equation (7) based on the well-known method pioneered by Blinder (1973) and Oaxaca (1973). For example, $\rho(\frac{W_1K_1}{w_2K_2})$ can be written as:

$$\rho(\frac{W_1K_1}{w_2K_2}) = [\rho(\frac{W_1K_1}{w_2K_2}) - \rho(\frac{K_1}{K_2})] + [\rho(\frac{W_1K_1}{w_2K_2}) - \rho(\frac{W_1}{w_2})] + \rho(\frac{K_1}{K_2}) + \rho(\frac{W_1}{w_2}) - \rho(\frac{W_iK_i}{w_2K_2}) \tag{9}$$

The first term on the right-hand side of (9) measures the effect of the wage difference between sector 1 and sector 2 – it reduces to zero when $w_1 = w_2$. The second term measures the effect of relative divergence of wage from VMPL in the two sectors – it reduces to zero if there is no relative divergences of wage from VMPL in the two sectors (i.e., $\kappa_1 = \kappa_2$). The third term captures the effect of the interaction between wage differential and relative divergence – it reduces to zero if any one of the contributing factors to labor misallocation is absent (i.e., either $w_1 = w_2$ or $\kappa_1 = \kappa_2$).

The second term on the right-hand side of (7) can be further decomposed into:

$$\rho(\frac{W_1K_1}{w_2K_2}) - \rho(\frac{W_1}{w_2}) = [\rho(\frac{W_1K_1}{w_2K_2}) - \rho(\frac{W_1}{w_2})] + [\rho(\frac{W_1K_1}{w_2K_2}) - \rho(\frac{W_1}{w_2})] + \rho(\frac{K_1}{K_2}) + \rho(\frac{W_1}{w_2}) - \rho(\frac{W_iK_i}{w_2K_2}) \tag{10}$$

The first term on the right-hand side of (10) measures the contribution from the divergence between wage and VMPL in sector 1 – it reduces to zero when $\kappa_1 = 0$. The second term measures the same type of contribution from sector 2 – it reduces to zero when $\kappa_2 = 0$. The last term measures the effect of interaction between distortions in the two sectors – it reduces to zero when either $\kappa_1 = 0$ or $\kappa_2 = 0$.

Substituting (10) into (9), we obtain:
\[
\rho\left(\frac{W_1K_1}{w_2K_2}\right) = \left[\rho\left(\frac{W_1K_1}{w_2K_2}\right) - \rho\left(\frac{K_1}{K_2}\right)\right] + \left[\rho\left(\frac{W_2K_2}{w_2K_2}\right) - \rho\left(\frac{W_1}{w_2}\right)\right] + \left[\rho\left(\frac{W_2K_2}{w_2K_2}\right) - \rho\left(\frac{W_1K_1}{w_2K_2}\right)\right] + \left[\rho\left(\frac{K_1}{K_2}\right) + \rho\left(\frac{W_1}{w_2}\right) - \rho\left(\frac{W_1K_1}{w_2K_2}\right)\right]
\]

As shown in (11), \(\rho\left(\frac{W_1K_1}{w_2K_2}\right)\) is decomposed into 5 parts: the contribution from wage differentials between sector 1 and sector 2; contribution from sector 1’s wage divergence from VMPL; contribution from sector 2’s wage divergence from VMPL; the effect of the interaction between two sectors’ wage divergences from VMPL; and the effect of the interaction between relative wage divergence from VMPL and the wage differential cross the two sectors.

Other elements in our labor misallocation measure, \(\rho\left(\frac{W_2K_2}{w_1K_1}\right), \rho\left(\frac{W_2K_2}{w_1K_3}\right), \rho\left(\frac{W_1K_3}{w_1K_1}\right)\),

\(\rho\left(\frac{W_2K_2}{w_1K_1}\right)\) and \(\rho\left(\frac{W_2K_2}{w_1K_3}\right)\) can be similarly decomposed. Aggregating these decomposition results, we can rewrite the measure of labor misallocation across primary, secondary and tertiary sectors (equation (7)) into:

\[
H = H_w + H_{L1} + H_{L2} + H_{L3} + H_L + H_{WL}
\]

In equation (12), \(H_w\) is the contribution of wage differences across three sectors weighted by each sector’s share of labor income.

\[
H_w = v_1\left[\rho\left(\frac{W_1K_1}{w_2K_2}\right) - \rho\left(\frac{K_1}{K_2}\right)\right] + v_2\left[\rho\left(\frac{W_2K_2}{w_1K_1}\right) - \rho\left(\frac{K_2}{K_1}\right)\right] + v_3\left[\rho\left(\frac{W_2K_2}{w_1K_3}\right) - \rho\left(\frac{K_2}{K_3}\right)\right] + v_4\left[\rho\left(\frac{W_3K_3}{w_1K_1}\right) - \rho\left(\frac{K_3}{K_1}\right)\right] + v_5\left[\rho\left(\frac{W_3K_3}{w_2K_2}\right) - \rho\left(\frac{K_3}{K_2}\right)\right]
\]
$H_{L1}$, $H_{L2}$, and $H_{L3}$ are, respectively, the contributions to labor misallocation from the divergence of wage from VMPL in the primary, secondary and tertiary sectors.

\[
H_{L1} = v_1\left[\rho\left(\frac{W_1 K_1}{w_1 k_2}\right) - \rho\left(\frac{W_1}{w_1}\right)\right] + v_2\left[\rho\left(\frac{w_2 k_3}{w_1 k_i}\right) - \rho\left(\frac{W_2}{w_1}\right)\right] + v_3\left[\rho\left(\frac{W_3 K_2}{w_1 k_i}\right) - \rho\left(\frac{W_3}{w_1}\right)\right]
\]

\[
H_{L2} = v_1\left[\rho\left(\frac{W_1 K_1}{w_2 k_2}\right) - \rho\left(\frac{W_1}{w_2}\right)\right] + v_2\left[\rho\left(\frac{W_2 K_2}{w_2 k_3}\right) - \rho\left(\frac{W_2}{w_2}\right)\right] + v_3\left[\rho\left(\frac{W_3 K_3}{w_2 k_2}\right) - \rho\left(\frac{W_3}{w_2}\right)\right]
\]

\[
H_{L3} = v_1\left[\rho\left(\frac{W_1 K_1}{w_3 k_3}\right) - \rho\left(\frac{W_1}{w_3}\right)\right] + v_2\left[\rho\left(\frac{W_2 K_2}{w_3 k_3}\right) - \rho\left(\frac{W_2}{w_3}\right)\right] + v_3\left[\rho\left(\frac{W_3 K_3}{w_3 k_3}\right) - \rho\left(\frac{W_3}{w_3}\right)\right]
\]

$H_L$ measures the effect of the interaction between wage divergences from VMPL in the three sectors:

\[
H_L = v_1\left[\rho\left(\frac{W_1}{w_2 k_2}\right) + \rho\left(\frac{W_1 K_1}{w_2 k_2}\right) - \rho\left(\frac{W_1}{w_2}\right) - \rho\left(\frac{W_1 K_1}{w_2}\right)\right] + v_2\left[\rho\left(\frac{W_2}{w_3 k_3}\right) + \rho\left(\frac{W_2 K_2}{w_2 k_3}\right) - \rho\left(\frac{W_2}{w_3}\right) - \rho\left(\frac{W_2 K_2}{w_2}\right)\right] + v_3\left[\rho\left(\frac{W_3}{w_3 k_3}\right) + \rho\left(\frac{W_3 K_3}{w_3 k_3}\right) - \rho\left(\frac{W_3}{w_3}\right) - \rho\left(\frac{W_3 K_3}{w_3}\right)\right]
\]

$H_{wz}$ measures the effect of the interaction between wage divergences from VMPL and wage differences cross the three sectors.
\[
H_{wl} = v_1 \left[ \rho \left( \frac{K_1}{\kappa_2} \right) + \rho \left( \frac{w_1}{w_2} \right) - \rho \left( \frac{w_1}{w_2} K_2 \right) \right] + v_2 \left[ \rho \left( \frac{K_2}{\kappa_3} \right) + \rho \left( \frac{w_2}{w_3} \right) - \rho \left( \frac{w_2}{w_3} K_3 \right) \right] \\
+ v_3 \left[ \rho \left( \frac{K_3}{\kappa_1} \right) + \rho \left( \frac{w_3}{w_1} \right) - \rho \left( \frac{w_3}{w_1} K_1 \right) \right] + v_4 \left[ \rho \left( \frac{K_4}{\kappa_1} \right) + \rho \left( \frac{w_4}{w_2} \right) - \rho \left( \frac{w_4}{w_2} K_2 \right) \right]
\]

### 2.4 An empirical model of contributing factors to labor misallocation

The decomposition of the labor misallocation measure informs us the relative importance of different sources of misallocation (sectoral wage differential and the divergences between wage and VMPL coming from different sectors of the economy. To gain an understanding about possible drivers behind the sources of misallocation, we also conduct an analysis of possible contributing factors to labor misallocation at the provincial level.

Conceptually labor misallocation is closely related to the level of market development – the more developed markets are, the more likely market forces tend to direct labor to their most valuable uses. The efficiency of labor allocation is also affected by the speed at which market signals are transmitted and responded to, which is in turn affected by the information communication technology. Thus we have obtained data on variables that capture the level of market development and information technology in China and test how they affect labor misallocation. Specifically we estimate the following model:

\[
H_j = \beta_0 + \beta_1 \text{MAR}_j + \beta_2 \text{TRD} + \beta_3 \text{STR} + \beta_4 \text{URB}_j + \beta_5 \text{IFM} + u_j + \lambda T + \epsilon_j \quad (13)
\]

where \( H \) is the measure of labor misallocation; \( \text{MAR} \) measures the non-state sector’s share in total industrial output; \( \text{TRD} \) is the degree of trade openness; \( \text{STR} \) is the share of the tertiary sector in GDP; \( \text{URB} \) is the degree of urbanization; \( \text{IFM} \) measures the effectiveness of information communication; \( u \) is province fixed effects; \( T \) is time trend; \( \epsilon \) is the error term; and \( j \) and \( t \) are province and time subscripts, respectively.
Non-state sectors’ share in the market (MAR) is used to indicate the extent to which the market is free to operate outside state influences. Trade openness (TRD) is intended to measure the extent of the market. The more freedom the market has to respond to changing conditions and the larger the market is, the more likely resources including labor tend to be allocated to higher value uses, thus we expect a negative relationship between labor misallocation (H) on the one hand and MAR and TRD on the other.

The share of the tertiary sector in GDP (STR) and urbanization (URB) are used to describe the degree of economic development. Historical experience suggests that as an economy develops, the share of the primary sector tends to fall, while the share of secondary and tertiary sector tend to rise. The increase in importance of the tertiary sector in particular is considered to be an indicator of an economy entering into a more advanced developmental stage. Similarly, urbanization has historically accompanied the process of economic development. Since labor allocation is typically more efficient in more advanced economies, we expect both STR and URB to have a negative impact on H.

The effectiveness of information communication (INF) is measured by the growth of telephone penetration rate. The more effective information communication is, the faster people can respond to new information in the market and move to more profitable areas of labor use. Thus we expect INF to have a negative impact on H.

3. Empirical analysis

3.1 Compiling the dataset

Our dataset cover all 31 provinces of mainland China over the period 1980-2010 (at 5-year intervals). The main variables used in our analysis and their sources are summarized in Table 1.

To estimate the labor misallocation index H, we need to obtain provincial data on average labor compensation by sector (w_i ), and each sector’s share in total labor income
We also need to estimate each sector’s labor elasticity of output \( (b_i) \) and wage deviations from VMPL in each sector \( (\kappa_i) \).

Provincial average labor compensation by sector \( (w_{ij}) \) for 1980-2004 are available from various sources as shown in Table 1. Data for 2005 and 2010 are estimated as follows: (1) Total labor compensation in province \( j \) for sector \( i \) \( (i = 1, 2) \) in year \( t \) = (sector \( i \)'s share of labor compensation in 2004 in province \( j \) / share of labor compensation at the national level in 2004) \( \times \) (share of labor compensation at national level in year \( t \)) \( \times \) (sector \( i \)'s output in year \( t \) in province \( i \)). Total labor compensation in province \( i \) for the tertiary sector is calculated as the difference between total provincial labor compensation and the sum of labor compensation in the primary and secondary sectors. (2) Provincial average labor compensation by sector = provincial total labor compensation by sector / sectoral employment.

Each sector’s share of total labor income \( (v_i) \) is calculated based on total sectoral labor compensation data.

To estimate the sectoral labor misallocation indicator \( (\rho_i) \) and wage deviations from VMPL in each sector \( (\kappa_i) \), we first estimate the production function (equation (1)) for each sector using cross-provincial data. That is, we regress sectoral GDP \( (Y_i) \) on sectoral employment \( (L_i) \) and sectoral capital stock \( (K_i) \). Capital stock data before 2005 are from Xu (2007). Data for 2005 and 2010 are estimated using the perpetual inventory method. The rate of depreciation is 9.6\% as in Zhang et al. (2004). From the estimated production function, we obtain estimates for VMPL in each sector, and calculate \( \kappa_i \) using equation (2). We also obtain, from the estimated production function, each sector’s labor elasticity of output \( (b_i) \), which together with \( \kappa_i \) enable us to estimate \( \rho_i \). The national averages of the estimated VMPL and \( \kappa_i \), as well as the average sectoral wage levels are presented in Table 2. Notably, the secondary sector had the highest wage rates over the data period of 1980-2010, but its wage rates were lower than VMPL. Wage rates in tertiary sector were higher than those in the primary sector; but the relationship between
wage rates and VMPL were mixed in both sectors over time with wage rates higher than VMPL in some years, and lower in other years. In 2010, wage rates in both sectors were higher than VMPL.

To calculate efficiency loss we need to estimate the optimal labor allocation ($L_i^*$). This is done using equation (4) and assuming that VMPL is the same in all sectors, $\rho_m^* = 1$.

To study the contributing factors to labor misallocation, we use data for the following variables: the non-state sector’s share in total industrial output ($MAR$), trade openness ($TRD$), the tertiary sector’s share in GDP ($SRT$), urbanization ($URB$) and effectiveness of information communication ($INF$). $TRD$ is measured by the ratio of international trade to GDP; $URB$ is measured by the share of urban population in total population, and $INF$ is measured by the growth rate of number of phones per 100 persons. Data for all these variables are from China Compendium of Statistics 1949-2008 and various issues of China Statistical Yearbook.

### 3.2 Estimates of labor misallocation index and efficiency loss

Based on the dataset we have compiled, we calculate the index of labor misallocation ($H$) and efficiency loss due to labor misallocation using the methodology outlined in subsections 2.1 and 2.2. The results are presented in Table 3 and Table 4.

As shown in Table 3 and Table 4, between the beginning and the end of our data period, labor allocation improved in all but two provinces (Heilongjian and Jilin), and efficiency loss fell in all provinces. Those provinces that made the largest improvement tended to be located in the Eastern region. In fact, 8 of the top 10 best performers (with the lowest labor misallocation index and percentage efficiency loss) were in the Eastern region. Also notable is that the three heavy-industry Northeastern provinces (Jilin, Helongjiang, and Laoning) dropped their rankings (in labor misallocation index) substantially from holding the top 3 places in 1980 to rank number 21, 25 and 18 in 2010 respectively.
Time trends and regional differences in labor misallocation can be seen from Figure 1 and Figure 2. The national average of labor misallocation index fell substantially between 1980 and 1985 in all regions. Since 1985, the index displayed a wavy pattern: going up between 1985 and 1990, going down between 1990 and 1995; up between 1995 and 2000; down between 2000 and 2005; up again between 2005 and 2010, with the 2010 level slightly lower than of 1985. The estimated mean efficiency losses display a similar wavy pattern between 1980 and 2000. Since 2000, mean efficiency loss has fallen.

Over the period 1980 to 2010, the Eastern region had the lowest level of labor misallocation and efficiency loss, followed by the Central region and the West region. Notably the regional differences in labor misallocation index has widened during the data period.

3.2 Decomposing labor misallocation estimates

Using the methodology described in sections 2.3, we can decompose the labor misallocation index into 6 components: distortion from wage differences across sectors ($H_w$); distortions due to wage deviation from VMPL in the primary, secondary and tertiary sectors ($H_{L1}$, $H_{L2}$, and $H_{L3}$); the effect from the interaction between wage deviations in the three sectors ($H_L$); and the effect from the interaction between cross-sector wage differential and wage deviations from VMPL ($H_{WL}$). The decomposition results are reported in Table 5.

From Table 5, it is clear that cross-sector wage differential contributes substantially to labor misallocation. Wage deviations from VMPL in each sector have different effects on overall distortion. As noted earlier (and shown in Table 2), in the secondary sector, the VMPL is the highest which implies a labor allocation below the efficient level; however, the wage rate is lower than its VMPL which further discourages labor movement to the secondary sector. Thus wage deviation from VMPL exacerbates the effects from the cross-sector differential, contributing positively to the aggregate labor misallocation index. In the primary sector, the VMPL is the lowest, which implies a
labor allocation above the efficient level; if its wage rate is lower than its VMPL, then labor will be induced to leave the sector, correcting some of the distortion due to cross-sector wage differentials, thus showing a negative contribution to the total distortion. If its wage rate is higher than its VMPL, then the wage deviation from VMPL will contribute positively to the total distortion. In the tertiary sector, the situation is more complicated. Since VMPL in the tertiary sector is greater than that in the primary sector, but less than that in the secondary sector, efficiency requires it to move labor towards the secondary industry but draw labor from the primary industry. When its wage is smaller than its VMPL, the deviation of wage from VMPL contributes positively to total labor misallocation relative to the primary sector, but negatively relative to the secondary sector. The net effect depends on the relative magnitudes. Our calculation indicates that on average wage deviation from VMPL in the primary sector contributed positively to total labor misallocation in 3 out of 7 years; whereas wage deviation from VMPL in the tertiary sector contributed positively to total labor misallocation in 2 out of 7 years.

3.3 Regression analysis: contributing factors to labor misallocation

Equation (13) can be estimated using a fixed-effect model or a random-effects model. The Hausman test indicates that a fixed-effect model is more appropriate. We therefore report in Table 6 the estimation results obtained from a fixed-effect model controlling for province-fixed effects (model 1), and from a fixed-effect model controlling for both time and province fixed effects (model 2). Given the indication of a significant time trend, Model 2 is the preferred model.

Model 2 shows that as expected, a larger share of the tertiary sector in total value added (STR), and a higher urbanization level (URB) have a significant effect of lowering labor misallocation at the 5% level. Non-state sectors’ share in the market (MAR) has a significant negative effect on labor misallocation at the 10% level. While the other two variables, namely, trade openness (TRD) and effectiveness of information communication (INF), also have negative signs as expected, their estimated marginal effects on labor misallocation are not significantly different from zero.
4. Conclusion

In this paper, we have constructed an index based on a simple accounting framework to measure the extent of labor misallocation in Chinese provinces over the period 1980-2010. It also investigates possible factors that influence labor misallocation.

We have found that: (1) the extent of labor misallocation fell substantially in the first half of 1980s. During the 25 years since 1985, labor allocation has improved somewhat but there was no monotonic trend of improvement over time. (2) The Eastern region has the lowest level of labor misallocation, followed by the Central region, and the Western region. (3) Wage differentials cross primary, secondary and tertiary sectors account for a substantial portion of measured overall labor misallocation; the secondary sector’s wage deviations from VMPL also contribute positively to overall labor misallocation, whereas the impact of the primary and tertiary sectors’ wage deviation from VMPL have different effects at different times. (4) A higher level of urbanization, the development of the tertiary sector and the growth of the non-state sector appear to contribute to a reduction in labor misallocation.

Our analysis suggests that while labor allocation improved substantially during early 1980s, subsequent improvement in labor allocation appears to have been limited. The level of labor misallocation remained high in 2010. Labor misallocation manifests in the fact that the secondary sector has not been able absorb sufficient amount of labor from the primary sector where they have a lower marginal product. Our analysis also points to some policy directions for improving labor allocation efficiency. In particular, policies that foster non-state sector growth, policies that facilitate urbanization and the development of the tertiary sector are likely to help reduce misallocation of labor.

References


