

Labour Market Reform, Rural Migration and Income Inequality in China -- A Dynamic General Equilibrium Analysis

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Abstract:

Notwithstanding the partial modification of the *hukou* system that has occurred since the early 1980s, it is still the largest institutional barrier to rural labour migration in China. The paper will trace the impact of further liberalisation moves. Forecast simulation utilising dynamic CGE modelling will map out quantitative growth paths of macroeconomic variables over the next 20 years under alternative rural labour mobility scenarios. The paper will also inform policymakers of the potential contribution that enhanced labour mobility may render to economic growth and rural-urban income equality.

1. Introduction

Since 1978, rural economic reforms in China have released large amounts of rural labour to move to other more productive sectors such as construction, manufacturing and services. According to the second Agricultural Census China had 130 million rural labour who worked for more than one month outside of their township of residence in 2006. The corresponding data is 74 million in 1997. This large rural migration has proven to be a source of improvement in allocation efficiency and labour productivity. Though migration from rural to urban areas has been increasing rapidly in recent years, underemployment or disguised unemployment remains widespread in rural areas. Labour movement is still restricted by the household registration system (*hukou*) and associated regulations and policies. Notwithstanding the partial modification of the *hukou* system since the early 1980s, it is still the largest institutional barrier to rural labour migration in China. These institutional obstacles inhibit permanent migration of the rural labour force to urban areas. As a result, migration in China is restricted largely to a “floating population”.

The gap between agricultural and industrial labour productivity is very large in China. In 2001, the labour productivity ratio of urban industry, urban services and rural-non-farm to agriculture in China is an astonishing 4-10 times larger than in other countries. More significantly, while the productivity ratios of other countries have generally been stable or falling, in China it has risen substantially over the last 25 years (Kuijs and Wang, 2005).¹ These extremely high ratios as well as their rising trend are symptomatic of the major distortions in the labour markets, especially in its bias against the agricultural sector.

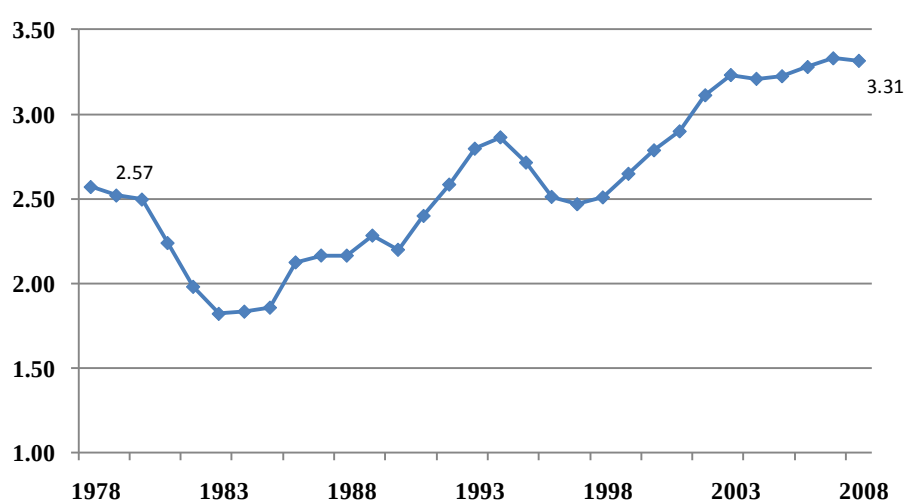
The persistence of the huge labour surplus in rural areas and of the very low productivity in agriculture causes rural incomes to increase at a lower rate than in urban areas. The ratio of urban to rural incomes has increased dramatically from 2.57 in 1978 to 3.31 in 2008 (Figure 1). 3.31 is a very high ratio by international standards. Rural-urban income ratios for other Asian countries fall between 1.3 and 1.8, with the exception of the Philippines. The increasing income inequality has become a source of increasing social unrest and also an impediment to sustained economic growth in China.

¹In China, the agriculture sector contributes 12.6 percent to GDP while the share of total employment in agriculture was 44.8 percent in 2005. This is another indicator of the low productivity in the agriculture sector.

There is a strong presumption, supported by some evidence, that rural labourers moving out of agriculture will significantly boost the incomes of those remaining in agriculture. Assuming the off-farm migration translates into rural-urban migration, the resulting expansion of the urban labour force will exert downward pressure on urban wages – particularly for unskilled workers – reducing the income gap and ameliorating the rural-urban inequality (Hertel and Zhai, 2004).

This paper explores the effects of reform of the household registration system in China on the economic growth and rural – urban income equality over the period 2010 to 2020. It addresses the questions whether reform of the household registration (hukou) system and removal of other institutional barriers can accelerate rural labour mobility, and whether the enhanced labour mobility can improve the efficiency of the allocation of labour with the result of increasing labour productivity and reducing rural-urban income inequality.

Figure 1: Widening income gap between urban and rural household



2. Modelling framework and data sources

2.1 SICGE model

The investigation employs a detailed dynamic CGE model of China economy -- SICGE model. SICGE (State-Information Centre General Equilibrium) model was developed by the Centre of Policy Studies, Monash University. The core CGE part of the SICGE model is based on that of ORANI, a static CGE model of the Australian economy (see Dixon et al.,

1982). The dynamic mechanism of SICGE is based on that of the MONASH model of the Australian economy developed at CoPS (see Dixon and Rimmer, 2002).

The version of SICGE model we used in this paper is based on 2002 input-output table of China. It includes 137 sectors. The major features of this model are:

- 1) Three types of dynamic mechanism: capital accumulation, liability accumulation and lagged wage rate adjustment processes.
- 2) A unique labour market module: For the purpose of the analysis of labour market reform and rural migration in China, the SICGE model we used in this paper includes a refined labour market module with categories of rural and urban employment.² This refined labour market module that recognizes important features of China's labour market such as imperfect labour mobility, labour market segmentation and rural labour surplus can capture more succinctly the impacts of labour market reforms.
- 3) A set of household disposable income equations: for the purpose of this paper we have introduced a set of household income equations disaggregated by rural and urban areas into the SICGE model. These equations make it possible to simulate effects of the reform of household registration (*hukou*) system on rural-urban household income inequality.

2.2 Categories of rural and urban employment

In the labour market module of SICGE, there are five categories of employment:

- **AGriculture (AG)**: this category of employment includes those who hold rural residential status, live in rural area and engage in agricultural, forestry and fishing activities;
- **Rural Non-AGriculture (RNAG)**: this category of employment includes those who hold rural residential status, live in rural area and engage in activities in the industrial and services sectors. People employed in township enterprises forms the bulk of this group;
- **Rural-Urban Employment (RUE)**: this category of employment includes those who hold rural residential status, but work in industrial and services sectors in urban areas. This category represents the rural migrant workers;
- **Urban UnSkilled Employment (UUSE)**: this category of employment includes those

² For the details of labour market module please refer to Mai et. al. (2010).

who hold urban residential status and work in unskilled occupations in urban sectors; and

- **Urban Skilled Employment (USE):** this category of employment includes those who hold urban residential status and work in skilled occupations in urban sectors. The skilled labour is defined as employed persons with following educational attainment: College, University, and Graduate and Over (these are categories of educational attainment used in China Labour Statistical Yearbook).

Table 1: Categories of Labour Supply

Categories	Description
AG	Agriculture employment
RNAG	Rural non-agricultural employment
RUE	Rural-urban employment
UUSE	Urban unskilled employment
USE	Urban skilled employment
RAGU	Rural agricultural unemployment
RUU	Rural-urban unemployment
UU	Urban unemployment
NRUR	New entrants rural
NURB	New entrants urban

There are also three types of unemployment and two types of new entrants to the labour markets:

- **Rural AGricultural Unemployment (RAGU) or rural surplus labour:** In the SICGE1 model with 1997 base year, this category contains rural redundant labour – those who hold rural residential status in 1997, live in rural area, in-name employed but is redundant in the production of agricultural, forestry and fishing products. SICGE with 1997 database is designed to address the question when rural redundancy will be exhausted. In this version of the model, two people employed half-day each is counted as one person-day of labour input in all the sectors including agriculture, forestry and fishing.
- **Rural-Urban Unemployment (RUU):** this category contains those who are temporarily out of job from the RUE category.
- **Urban Unemployment (UU):** this category contains those who are unemployed from

the urban employment categories, UUSE and USE.

- **New entrants RURal (NRUR):** this category contains new entrants to labour market with rural residential status.
- **New entrants URBen (NURB):** this category contains new entrants to labour market with urban residential status.

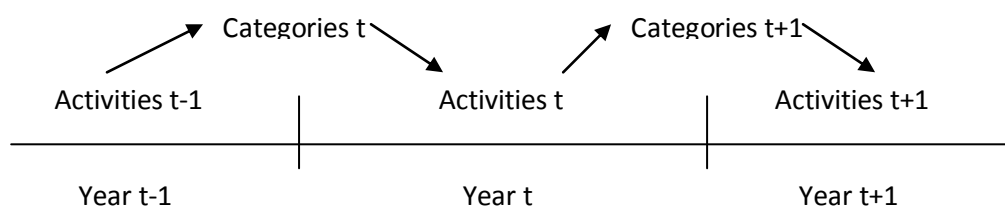
The five employment, three unemployment and two new entrant categories form the categories of labour supply (Table 1). The five types of employment and the three types of unemployment form the types of activities (Table 2).

Table 2: Activities

Categories	Description
AG	Agriculture employment
RNAG	Rural non-agricultural employment
RUE	Rural-urban employment
UUSE	Urban unskilled employment
USE	Urban skilled employment
RAGU	Rural agricultural unemployment
RUU	Rural-urban unemployment
UU	Urban unemployment

Activities are what people do during the year. Categories of labour supply at the beginning of the year are determined by what activities people engaged in last year. If someone was employed in activity AG last year, then at the beginning of this year the person is in the AG category of labour supply. If an urban person was unemployed (or in activity UU) last year, then, at the beginning of this year, the person is in the UU category of labour supply (Figure 1).

Figure 1: Labour market dynamics



Different categories of labour supply are subject to different constraints to their offers to labour market (Table 3):

- the rural categories of labour supply (AG, RNAG, RUE, RAGU, RUU, and NRUR) can only make offers to rural categories of employment³ (AG, RNAG, and RUE) with the exception of rural new entrants;
- the rural new entrant category (NRUR) can make offers to rural as well as urban categories of employment. This is based on the assumption that some urban enterprises may recruit new entrants from rural areas and grant them urban residential status. Rural new entrants with university degrees may acquire a job in a skilled occupation in city and obtain urban residential status;
- the urban categories of labour supply (UUSE, USE, UU, and NURB) can only make offers to urban categories of employment (UUSE and USE).
- in contrast to labour supply modules in our Australian and United-States models, we assume no categories of labour supply offers to be unemployed in China.

The number of person employed in a category of activity in the current year is determined by the demand for and supply to that category of activity (refer to Mai, et al., 2009 for details about labour demand and supply equations). Those who made an offer to an employment activity but did not get a job will be forced into the relevant unemployed activity. They will make offer from the unemployed activity at the beginning of next year.

³ A change in the residential status of rural migrant workers can be simulated as a policy change that shifts the workers exogenously from the RUE category to an urban employment category (for example, UUSE). However, when someone is in the RUE category, he or she cannot make labour market offers to urban categories of employment.

Table 3: Offers to labour market by categories of Labour Supply

	AG	RNAG	RUE	UUSE	USE	RAGU	RUU	UU
AG	*	*	*					
RNAG	*	*	*					
RUE	*	*	*					
UUSE				*	*			
USE				*	*			
RAGU	*	*	*					
RUU	*	*	*					
UU				*	*			
NRUR	*	*	*	*	*			
NURB				*	*			

Note: * indicates where offers to labour market are made. *indicates that most people prefer to offer to the category in which they were employed last year.

2.3 Household income and data sources

For the purpose of this paper we introduced a set of household income equations disaggregated by rural and urban areas into the SICGE model. Rural households' incomes come from the returns to three input factors: labour, capital and land, plus the transfer income from government. The share of rural household land income is assumed to be 85 percent of total land rental in 22 agricultural sectors. The rest goes to State owned farms. For the capital income we assume 5 percent of capital rentals from all 137 sectors go to rural households. After subtracting tax on labour, capital and land income from total household income, we get rural household net income. Form 2002 IO table, we find out that approximately 78 percent of rural household income is from labour input. Capital input only contributes 17 percent to

rural household income and only 2.5 percent of income from land. The government transfer to rural household is very small, only 2.5 percent. However, for urban household 22 percent of their income comes from government transfer. Labour input is the main income source for urban household which account for three quarters of their total income. We assume no land income for urban households and 20 percent of capital rentals from all 137 sectors go to urban households. After subtracting tax, we get urban household disposable income.⁴

Table 4: Share of rural household income from 2002 IO table

	Rural	Urban
Land	2.5%	0
Labour	78%	75%
Capital	17%	3%
Transfer	2.5%	22%

3. The effects of *hukou* system reform

In this section we discuss the effects of the *hukou* system reform on rural labour movement and rural urban household income. In the simulation, we assume that the policy is implemented for five years starting from 2008.

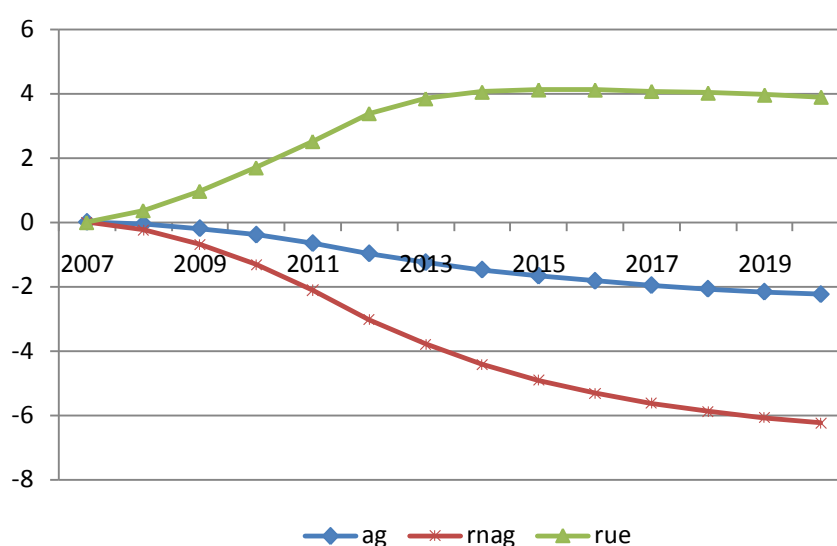
We assume Chinese government removes some institutional barriers and labour movement from rural to urban becomes easier than before. The reduction in institutional barriers is simulated by increasing the variable $Bt(c;o)$, for $c = AG, RNAG$ and RUE , and for $o = RUE$ in (6). This increases the enthusiasm of the agricultural (AG) and rural non-agricultural (RNAG) workers to offer to work as rural-urban workers (RUE) and for existing RUE workers to stay as RUE workers. The increase in the relevant $Bt(c;o)$ variables was calibrated so that the gap between the wages of RUE and AG workers is reduced by about 28 per cent at the end of the policy implementation period. Shi (2002) found that approximately 28 per cent of the rural-urban wage difference can be explained directly by the coefficient on the institutional barriers to rural-urban labour flow.

3.1 The effects on rural and urban employment and economic growth

⁴ Please refer to appendix one for the comparison of share of household income from China's Statistical Year book and IO table.

The reduction of the institutional barriers will increase labour movement from rural to urban areas. Figure 1 shows that the rural urban employment (RUE) will be 10 percent larger than the baseline scenario in 2020 while the employment in agricultural sector (AG) and rural non-agricultural sectors (RNAG) will be 2.2 percent and 4 percent smaller than the baseline scenario.

Figure 2: Effects on agricultural, rural non-agricultural and rural urban employment
(Percentage deviation from baseline scenario)



The increased labour movement is expected to boost all macroeconomic variables. For example, real GDP in 2020 will be 0.55 percent higher than in the baseline scenario. There are two reasons for the higher growth of GDP. First, the increased movement of labour from the relatively low productivity agricultural sector into higher productivity urban sector boosts economic growth directly. Even though the total labour supply is fixed at the level of the baseline scenario, the change in the employment composition of the labour force contributes to growth of GDP. The shift from low productivity agricultural activity into higher productivity urban sector increases the effective labour force. As a result, the total employment measured by wage bill weights increases. As Table 5 shows by year 2020, employment measured in wage bill weights is 0.44 percent higher than in the baseline scenario, while the employment of persons is only 0.11 percent higher.

Secondly, the relatively faster growth in the RUE activity driven by the labour shift from agricultural and rural non-agricultural activity creates more demand for capital, which stimulates the growth of capital stock. By the end of 2020, the capital stock in the policy

scenario is 0.61 percent higher than base case. Relative faster growth of capital also contributes to the growth of GDP. Consumer goods becoming relatively more expensive than investment goods is another reason for the higher growth of capital stock.⁵

Table 5: Macro results – cumulative deviations from baseline scenario in 2020 (%)

	Simulation results
Real GDP	0.55
Employment in number of persons	0.11
Employment by wage bill weights	0.44
Capital stock	0.61
Investment	0.9
Consumption	0.38
Export	0.53
Import	0.77
Real wage rate	-0.49
Terms of trade	-0.14
Output of agricultural sectors	-1.7
Output of industry sectors	0.79
Output of service sectors	0.85
Consumer Price Index	0.96

Source: policy simulation results

Due to the strong increase in capital stock, aggregate investment increases strongly relative to its baseline path. By the end of 2020, Investment growth will be 0.9 percent higher than baseline scenario (Table 5).

While, in the long-run, moving people from rural to urban activities lowers labour costs for the export sectors and increase China's export (export will be 0.53 percent higher than in the baseline scenario in 2020, Table 5 in the short- to medium-run when capital stock is being accumulated, export performance is damped by real appreciation associated with an increased level of investment activities (Table 5).

⁵ Please refer to Mai et. al (2010) for the details explanation of higher increase in the capital stock.

The increased labour movement also improves households' living standards measured by real consumption. As Table 5 shows, the real consumption is approximately 0.38 percent higher than in the baseline scenario. We notice that the increase of consumption is lower than that of real GDP. One reason is the deterioration of China's terms of trade associated with the expansion of her exports. In 2020 the terms of trade are 0.14 percent lower than in the baseline scenario (Table 5). The second reason is faster growth of the price of the agricultural products. The shift of labour from rural activities to urban activities causes the agricultural wage rate to increase, raising the price of agricultural products (the wage rates change will be discussed in section 3.2). The contraction of agricultural output as a result of increased moving out from agricultural to urban sectors also drives the food price to increase (agricultural output will be 1.7 percent lower than in the baseline scenario in 2020 while output in industry and service sectors will be 0.79 and 0.85 percent higher, respectively (Table 5)). Since the food consumption represents nearly 40 percent of households' income, the higher price of agricultural products slows down the improvement of households' living standards.

3.2 The effects on rural and urban income inequality

The increased labour movement from rural to urban sectors help to boost the growth of rural household income. Table 6 shows that rural household disposable income will be 1.05 percent higher than the baseline scenario while urban household disposable income will be 0.26 percent higher than the baseline scenario. The faster growth of rural household income will narrow rural and urban income gap and reduce rural urban income inequality.

Increased labour movement from rural to urban areas has imposed mixed effects on the increase of rural household income.

- First, the reduction of the institutional barriers increases the labour supply for the RUE activity, As a result of excess labour supply, the real wage for RUE labour decreases relative to the baseline scenario. Real wage of RUE workers will be 13.6 percent lower than the baseline scenario by the end of 2020 (Table 6). The increased

labour movement to urban sectors has negative effect on the reduction of rural urban income gap.

- Second, with more rural labour moving out agricultural and rural non-agricultural sectors, there will be excess labour demand in AG and RNAG sector. As a result, the real wage for AG and RNAG workers will increase. Real wage of AG and RNAG workers will be 6.2 and 5.2 percent higher than the baseline scenario by the end of 2020 (Table 6). The increase of the real wage for AG and RNAG workers will help accelerate the growth of rural household income. But on the other hand the faster increase of real wage in AG sectors will increase the food price and slow down the improvement of household living standard. Furthermore, the increased moving out of rural workers will reduce the agricultural output given the constant productivity in the agricultural sectors and cause the price of agricultural output further increase.

For the urban household, the increased rural labour movement makes the urban labour market more competitive. The demand for urban workers will be reduced and excess labour supply will decrease the real wage for urban workers therefore slow down the improvement of urban household income. By the end of 2020, the real wages for urban unskilled and skilled labour will be 0.77 and 0.68 lower than the baseline scenario.

The faster growth of rural household income combining with the slower growth of urban household income will narrow the rural urban income gap.

Table 6: Household income and real wages – cumulative deviations from baseline scenario in 2020 (%)

	Simulation results
Rural household disposable income	1.05
Rural land income	2.5
Rural labour income	1.18
Rural capital income	0.48
Rural transfer income	1.0
Urban household disposable income	0.26
Urban labour income	0.33
Urban capital income	0.48
Urban transfer income	1.0
Real wage of agricultural sector	6.24
Real wage rate of non-agricultural sector	5.2
Real wage of rural urban workers	-13.56
Real wage of urban unskilled labour	-0.77
Real wage of urban skilled labour	-0.68

Source: policy simulation results

4. Conclusion

Using a dynamic CGE model of China economy, this paper explores the effects of reform of the household registration system in China on the economic growth and rural – urban income inequality over the period 2008 to 2020. We found out that the reduction of institutional barriers will enhance the movement of labour from agricultural and rural non-agricultural sectors to urban sectors. The increased labour movement will

- Boost China's economic growth and increase GDP by 0.55 percent
- increase consumption (combined public and private) by 0.38 per cent; and
- Increase the real wages of agricultural and rural non-agricultural workers by about 5 per cent while reducing the real wages of rural-urban workers by about 15 per cent. Even with these wage changes, rural-urban workers stay considerably better paid than agricultural and rural non-agricultural workers.
- accelerate the growth of rural household income by increasing the growth of labour income and slowing down the growth of urban household income

- Narrow the rural urban household income gap and reduce rural-urban income inequality.

The basic policy message of the simulation exercise is that the Chinese government should undertake effective action to complete the reform of its *hukou* system and to remove other institutional barriers that restrict the flexibility of labour markets. Integration of the national labour market will reduce the systematic gap between rural and urban labour market outcomes. It will help rural migrants to enjoy employment opportunities, wage payments, public services and social security protection that are increasingly comparable to those experienced by urban residents.

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