The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Global Trade Analysis Project
https://www.gtap.agecon.purdue.edu/

This paper is from the
GTAP Annual Conference on Global Economic Analysis
https://www.gtap.agecon.purdue.edu/events/conferences/default.asp

Rapid urbanization in China and its impact on the world economy

James Xiaohe Zhang
Newcastle Business School, Faculty of Business and Law
University of Newcastle, Australia

Abstract

As the most populous economy in the world, China has experienced an unprecedented pace of urbanization since the start of its economic reforms in the late 1970s. The rapid urbanization was accompanied by large flows of rural to urban migration and a growing demand for a clearer specification of the rural land ownership. Since the 2000s, when the conventional restrictions on rural to urban migration were partially removed, rural to urban migration made dominant contributions to China's urban population growth.

An accelerate urbanization will require for a clearer specification of rural land ownership and free mobility of rural labor force across different sectors and regions, which in turn will have a significant impact on production, employment and international trade patterns in both China and the rest of the world, particularly in agricultural and capital intensive industries. This will result in a large-scale restructuring of the world economy in line with regional specialization and comparative advantage. Specifically, the natural resource based and capital intensive industries benefit and labor intensive industries suffer from China's labor market liberalization, but these impacts will be offset somewhat by the land market reforms.

This paper examines the impact of reforms in both China's rural land and labor markets on the aggregate economic welfare in China and the rest of the world. Propositions derived from a theoretical model include that while the labor market liberalization generates unambiguous gains, the land reform may have some impact on income distribution. When the labor intensive industries gain, the capital intensive industries suffer in China. The impact on the rest of the world varies across different regions.

The hypotheses are tested by running simulations on an applied general equilibrium model (the GTAP Model). Several different modeling scenarios including 1) an accelerated urbanization as a result of free mobility of the rural labor; 2) a de facto privatization of the rural land ownership and 3) a combination of both privatization of the rural land and free mobility of labor are specified for the purpose of separating out the effects of each simulation as well as capturing different market environments. Policy implications are developed based on the simulation results.

Paper prepared for the 16th Annual Conference on Global Economic Analysis "New Challenges for Global Trade in a Rapidly Changing World", Shanghai Institute of Foreign Trade, June 12-14, 2013. Shanghai, China.

Key words: China, land reforms, urbanization, property right, world economy

Rapid urbanization in China and its impact on the world economy

1. Introduction

As the most populous economy in the world, China has experienced an unprecedented pace of urbanization since the start of its economic reforms in the late 1970s. Level of urbanization in China had been risen from 18% in 1978 to 30% in 1995, to 39% in 2002, and to 51% in 2011. By the end of 2012, the mainland China had a total urban population of 712 million or 52.6% of the total population. As urbanization may become a key scheme of economic growth in China's 12th five-year plan, issues on how different modes of urbanization affect production and international trade in China and the world economy deserves more attentions.

One of the issues in China's rapid urbanization is its rapid growth of rural to urban migration, which has been arisen to over 200 million people by the end of the 2000s (Wong 2011). Since the 2000s, when the conventional restrictions on rural to urban migration were partially removed, rural to urban migration made dominant contributions to Chinese urban population growth. However, as Chan and Buckingham (2008) have identified, the cumulative effect of these migration is still present through enforcement of the household registration (*hukou*) system, which has not been abolished but merely released to the local governments. In many cases this actually makes permanent migration of peasants to cities harder than before. At the broader level, the *hukou* system, as a major divide between the rural and urban population, remains potent and intact. Another important input, rural land, was also tightly under the government control. Although under Deng Xiaoping's reform in the 1980s 100% of all the farmers quitted collective farming, the collective ownership of agricultural remained.

Acknowledging the heavy loss in efficiency and detrimental impact on income distribution, the ambiguously defined collective ownership of the rural land and constraints on labor mobility have been widely criticized and reforms aimed at partially privatizing rural land ownership and abolishing the constraints on rural to urban migration have been initiated since the late 1990s (Vendryes, 2010, Mullan, *et al,* 2011). Farmers were allowed to move into cities if they could provide their own staples and were financially capable of running a business. On the supply side, the adoption of the household responsibility system and consistent extensions of contracts for the use of farm land gave rural households the freedom to allocate productive resources, particularly labor between farming and off-farming activities. On the demand side, the development of rural township and village enterprises and urban private and informal sectors increased the demand for rural off-farming labor.

Although China has experienced dramatic changes in its economic structure, the rural land ownership remains an unsolved issue. While still under an ambiguous title of 'collective' ownership, land using rights for rural farmers were extended to 30 years in 1993 which was reaffirmed by two laws in 1998

and 2002 (Vendryes, 2010:90). A recent announcement by the Chinese government in enabling the rural residents a right of releasing their allotted land to others seems indicating a *de facto* privatization of land ownership. This reform, if enacted, will have significant impact on the scale and pace of urbanization, as well as the pattern of production and international trade in China and the rest of the world. Given a fact that assessments on these impacts are still limited, this paper attempts to fill and gap and offers some new insights to the current literature (see, for instance, Zhang, 1992, Hertel and Zhai, 2006**,** Whalley and Zhang, 2007, among others).

This paper examines the impact of reforms in both China's rural labor and land markets on the aggregate economic welfare in both China and the rest of the world. Propositions derived from a theoretical model include that while the labor market liberalization generates unambiguous welfare gains, the land reform may have some impact on income distribution. When the labor intensive industries gain, the capital intensive industries and land intensive sector suffer in China. These theoretical propositions are examined with some empirical statistics and simulation results from a CGE model in which several different policy scenarios are considered.

The rest of the paper is organized as follows: the next section provides a simple theoretical framework for analyzing the issue. This is followed by some statistical evidences to underpin the theoretical propositions in Section 3. Methodology is briefly discussed in Section 4 before the simulation results are reported and analyzed in Section 5. Policy implications and conclusions are generated in the final section.

2. A theoretical framework

According to the surplus labor theory (Lewis 1954, Ranis and Fei 1961 and Sen 1984), the dualism between a capital intensive industrial sector and labor surplus agricultural sector implies a misallocation of resources since more could have been produced through additional investment in agriculture and the use of less capital intensive industrial technologies in the industrial sector. However, if labor were mobile, the urban sector would absorb surplus labor from the rural sector until the marginal products were equalized in the two sectors. The dualism would have ended and the entire economy would allocate labor and other resources in such a way that their respective marginal products were equalized across sectors. This would lead to industrialization and the corresponding urbanization, a key stage of development in all less developed countries.

The economic impact of this kind of industrialization and urbanization can be described by a simple two-sector model. We assume that a standard dual economy produces two goods and allocates its labor between the two sectors. Manufactures are produced in the urban sector using labor and capital (but not land), while agricultural goods are produced in the rural sector using land and labor (but not capital). Labor is therefore the only mobile factor and the other two factors of production (land and capital) are

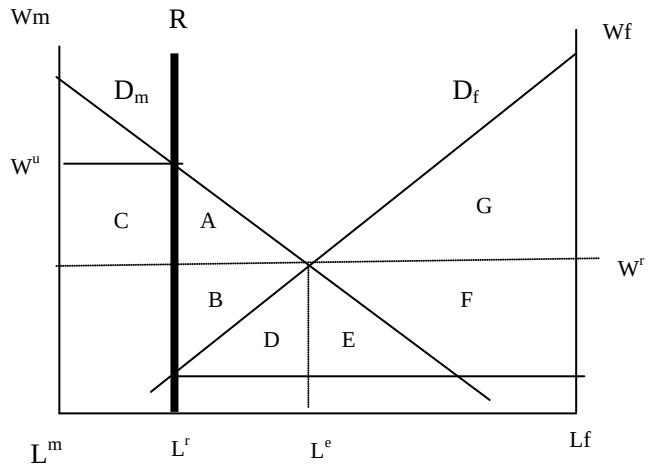
assumed to be specific to food and manufacturing goods respectively. If there were no restrictions to labor mobility, labor would move between sectors until the value of the marginal product of labor in each sector was equal to the equilibrium wage rate.

This model is described by using the beaker-shaped diagram in Figure 1. The two vertical axes indicate the wage rates in the urban manufacturing sector and rural agricultural sector respectively. The total labor force is represented on the horizontal axis. While manufacturing employment is measured from left to right, rural agricultural employment is measured from right to left. The two negatively sloped demand curves for the labor in the two sectors, D_m and D_f, are determined by the marginal productivity of the labor employed in the two sectors respectively. The equilibrium wage rate and employment (L^e and W^e respectively) will be reached when the marginal productivities of labor in the two sectors (D_m and D_f) are equalized.

Assuming now that the Chinese government implements a restriction on labor mobility, a vertical line of R is thus erected on the left hand side of the equilibrium. This will create a gap in the wage rate between the two sectors (W^m and W^a), as well as a contraction in the urban manufacturing employment (from L^mL^e to L^mL^R) and an expansion in the rural employment in the rural agricultural sector (from L^fL^e to L^fL^R).

Labor market liberalization in China, characterized by removing the migration restriction between the rural agricultural sector and the urban manufacturing sector, will restore the initial equilibrium (L^e and W^e in Figure 1), and lead to an increase in employment in the urban manufacturing sector, a fall in employment in the rural agricultural sector, and a convergence in wage rates between the two sectors.

Figure 1 The Impact of Free Labor Mobility and Urbanization



A more realistic dual economic model of the Lewis-type may incorporate the concept of surplus labor. In this case, the initial equilibrium is reached when the marginal productivity of labor in the urban manufacturing sector and the

average productivity of rural labor in the rural agricultural good sector are equalized. This setting of the labor market is based on a well observed fact in developing countries that when a capitalist marketing mechanism dominates the production and employment pattern in the modern sector, the rural sector remains as a traditional community where income is shared among all of the members. Because the supply of labor in the rural traditional society is virtually unlimited, when some of the surplus labor is removed from the rural sector, the output in the sector does not fall at all. In fact, when the surplus labor migrates from the rural agricultural sector into the urban manufacturing sector, the overall productivity of labor could even increase. It is hypothesized that this is exactly what has happened in the China since the late 1980s.

Applying the model into China's practice, the following propositions can be derived:

1) When the migration restriction between the two sectors is removed, urban manufacturing production, employment and exports will increase. This will result in an absolute expansion in the labor intensive manufacturing activities, and a contraction in the land intensive agricultural production. The country as a whole benefits from a net welfare gain as indicated by the areas of A and B.

2) There will be some income redistribution effects generated from this labor market liberalization reform. When the wage rates between the two sectors converge, the owners of capital in the urban sector gain while the workers lose, as indicated by the area C in the graph. In the rural sector, the income redistribution effect is shown by the three areas of D, E and F. While the D E and F indicate wage increases of the rural workers, they are also the losses of the owners of land. However, this income distribution effect would not be too large if the owners of labor and land in the rural sector are the same individuals (i.e., the farmers), provided that the agricultural land ownership is clearly defined.

3) If labor intensive manufacturing production represents a source of comparative advantage in China, the labor market liberalization, along with a clear specification of the rural land ownership or privatization of land, will shift the demand curve for the urban manufacturing labor to the right. This will result in a higher equilibrium wage rate, and a greater increase in urban employment (urbanization), and a further contraction of the rural land rental income (area G).

4) If the rural land reform occurs concurrently with a free Labor mobility, when the rural wage increases, the rental income falls so there is a redistribution effect between the rural migrants and farmers remaining in the farmland, if the migrants have to give up their land ownership as a prerequisite for permanent migration. While the migrants gain a wage increase, the urban dwellers may also gain from their investment in capital and housing.

3 Evidences

To test the theoretical propositions, statistical data from official sources are collected and processed. The following evidences are used to underpin the theoretical propositions derived from theoretical model of the last section.

3.1 Structural changes

Table 1 displays China's sectoral annual growth rate for selected years between 1986 and 2010. It is clearly shown in the table that while the average annual growth of GDP for the country as a whole is about 11.3% between 1986 and 2010, the growth rate for agriculture, manufacture and service sectors are 6.3%, 13.1% and 12.1% respectively. There is also a structural change in the three sectors. While the share of agricultural sector fell from 25% to about 10%, the shares of manufacturing sector and service sector increased from 42% and 34% to over 47% and 41% respectively.

Table 1 Sectoral growth of GDP in China

	GDP growth rate (%)			
Year	Total	agriculture	manufacture	Service
1986	13.8	8.7	16.0	15.2
1990	9.7	18.7	6.0	7.6
1995	10.9	5.0	13.9	9.8
2000	8.4	2.4	9.4	9.7
2005	10.4	5.2	11.7	9.8
2010	10.4	4.3	12.4	9.6
AVERAGE	11.3	6.3	13.1	12.1
	Sector share in total GDP (%)			
Year	Total	agriculture	manufacture	Service
1986	100	24.5	41.8	33.7
1990	100	20.0	47.2	32.9
1995	100	15.1	45.9	39.0
2000	100	12.1	47.4	40.5
2005	100	11.1	48.0	40.9
2010	100	12.1	47.4	40.5

Source: NBSC *China Statistical Yearbook*, many issues. See http://www.stats.gov.cn/tjsj/ndsj/2011/indexee.htm

3.2 Urban-rural income gaps

Table 2 shows per capita annual disposable incomes in Chinese currency (*yuan*) in urban and rural sectors, in contrast to income generated from wage or salary. Although the income gap between the two sectors enlarged, the gaps in wage income, after reasonable adjustment, converged over time. When the gap in disposable income enlarged from 2.2 in 1990 to 3.2 in 2010, the gap in wage rate between the two sectors narrowed from more than 8 folds larger of urban to rural sector in 1990 to about 5.6 folds larger over the last two decades. During the same period, the gap in the return of property income enlarged by 6 folds over the same period.

Table 2 Per capita income and wage gaps

Year	Urban income	Rural income	Urban-rural ratio	Urban wage	Rural wage	Urban-rural ratio
	(yuan)	(yuan)		(yuan)	(yuan)	
1990	1510	686	2.20	1150	139	8.28
1995	4283	1578	2.71	3392	354	9.59
2000	6280	2253	2.79	4481	702	6.38
2008	15781	4761	3.31	11299	1854	6.10
2009	17175	5153	3.33	12382	2061	6.01
2010	19109	5919	3.23	13708	2431	5.64

Source: NBSC *China Statistical Yearbook*, many issues.

3.3 Changes in employment

Table 3 shows the growth and structural change in employment over the last two decades. A general trend is that when the urban employment increased substantially, the rural employment declined in both the number of employees and their shares in total employment.

With a continued decline in the numbers of agricultural employment by 20% and a dramatic increase in urban labor force by 35% during the decade of the 2000s, the real wage rate was increased substantially with an annual growth rate of 12.5%, which is higher than the growth rate of GDP of about 10% over the same period.

3.4 Changes in the composition of income

Despite still accounting for a significant share of total disposable income, other sources of incomes, namely income from household operation, income from properties and income from transfers, enlarged in urban China but contracted in rural China. It is observed that while the share of wage income on total income increased substantially from 20% in 1990 to 41% in 2010 in the rural sector, the same item of wage income fell from more than 76% to

less than 72% in the urban sector over the same time period (see Table 4). The change of incomes from household operation and properties also moved in opposite directions between the two sectors. While the share of these incomes on total income increased from 2% in 1990 to over 10% in 2010 in the urban sector, it fell from 86% to 70% in the rural sector over the same time period (see Table 4).

Table 3 Changes in employment (10 thousands)

Year	Total	Urban	Rural	Urban share (%)	Rural share (%)
1990	64749	17041	47708	26.32	73.68
1995	68065	19040	49025	27.97	72.03
2000	72085	23151	48934	32.12	67.88
2001	72797	24123	48674	33.14	66.86
2002	73280	25159	48121	34.33	65.67
2003	73736	26230	47506	35.57	64.43
2004	74264	27293	46971	36.75	63.25
2005	74647	28389	46258	38.03	61.97
2006	74978	29630	45348	39.52	60.48
2007	75321	30953	44368	41.09	58.91
2008	75564	32103	43461	42.48	57.52
2009	75828	33322	42506	43.94	56.06
2010	76105	34687	41418	45.58	54.42

Source: NBSC *China Statistical Yearbook*, many issues.

Table 4 Changes in the composition of income

Urban	Wage	business	property	Transfer
1990	76.13	1.49	1.03	21.75
1995	79.16	1.70	2.11	16.95
2000	71.35	3.92	2.04	22.94
2008	71.60	9.21	2.45	24.89
2009	71.10	8.90	2.51	26.29
2010	71.73	8.97	2.72	26.65
Rural	Wage	farming	property	Transfer
1990	14.01	82.37	3.61	-
1995	15.12	80.30	1.75	2.81
2000	22.32	71.56	1.43	4.69
2008	27.66	64.20	2.21	5.92
2009	28.97	61.89	2.35	6.79
2010	29.94	60.81	2.49	6.76

Source: NBSC *China Statistical Yearbook*, many issues.

Although the liberalizations in China's factor markets are still far from perfect, evidences in China's experience over the last two decades seem to support most of our theoretical propositions we derived in Section 2. The results increase our confidence in using more rigorous applied economic models such as the computable general equilibrium (CGE) models to stimulate some policy consequences and forecast some future changes with greater details, based on the fundamental theoretical framework. The task is done in next section.

4. Methodology

A key question of China's urbanization is how and to what extent the reforms in labor and land markets affect regional specialization and comparative advantage, not only in China but also in the rest of the world. Specifically, when China benefits from its factor market liberalizations, how will this benefits distributed across different industries and sectors? How and to what extent will the rest of the world be affected? These questions cannot be answered without some quantitative assessment, in the basis of simulation results of applied computable general equilibrium (CGE) models.

With the help of CGE models, all these gains and losses can be quantitatively assessed. For instance, using a household-disaggregated national CGE model, Hertel and Fan (2006) find that a combination of WTO accession and factor market reforms significantly improves both efficiency and equality in China. In their model, the labor market liberalization is a relaxation of the *hukou* system in such a way that the ad valorem tax equivalent of the indirect transaction costs are reduced from 81% to 34%—at current levels of migration. This is the portion of the observed differential in wages that has been directly attributed to possession of a *hukou*.

Hertel and Fan (2006)'s simulation results show that the labor and land market reforms add about 1.4% and 0.6 to China's GDP respectively, a reduction of urban-rural income ratio by 0.169 and 0.150 respectively, and a reduction of the Gini ratio by -0.014 and -0.011, respectively. They also show that both factor market reforms serve to increase migration from the relatively low productivity agricultural sector, to the higher productivity non-agricultural sectors, and from the rural to the urban economies. In the case of land reform, 10.7 million additional workers leave agriculture when they are permitted to rent their land out, as opposed to simply leaving it behind.

From their results, it is clear that such reforms could be potentially quite significant. Overall GDP is 2.1% higher and aggregate welfare, measured by the summation of household Equivalent Variations (EV) is 1.8% greater in 2007. Most striking is the impact on relative rural and urban incomes. In 2007, the ratio of urban to rural incomes drops from 2.59 in the baseline to 2.27 in the labor market reform scenario.

By using a similar approach, Whalley and Zhang (2007) discover that when the migration restrictions are removed, all wage and most income inequality

disappears. The impacts of *hukou* elimination imply that the per capita income differential falls from 2:1 to 7:10 between the urban and rural sectors, and approximately 48% of the work force and 45% of the population move from rural to urban areas after *hukou* removal. Only around 17% of the population remains in rural areas. They become richer because their average income (GDP per capita) being 1.42 times higher than the urban residents. Total output increases by about 13%, GDP per capita and income per worker both increase.

Using a similar methodology but switching the focus from domestic income distribution to its worldwide impact on production and international trade, this paper incorporates both the labor and land reforms in China into the model. Given the fact that China is already the second largest economy, and the largest exporter in the world, any significant change in its domestic economy will affect the rest of the world. Since the real world situation is more complex than what a theoretical model can predict, the net impact of the Chinese factor market liberalizations on the world economy cannot be identified without a quantitative assessment underpinned by a multi-national and multi-sector general equilibrium framework. To carry out such an analysis, a well-known computable general equilibrium model, the Global Trade Analysis Project (GTAP) model, is used in this study.

The GTAP is a global general equilibrium project of the Purdue University in the USA. Version 8 of the GTAP dataset which is based on 2007 data of the world economy is used for the simulations. The world economy is disaggregated into ten regions and ten sectors to capture the regional and sectoral impact of the change. The method of the disaggregation is detailed in the Appendix.

Five policy scenarios are simulated. The first scenario assumes that there is a net increase of 10% in unskilled labor endowment in five of the ten sectors in China, as a result of removing the *hukou* system and a consequential increase in labor supply in these industries. These five sectors, namely textiles and clothing, food processing, construction, light manufactures and other services, are considered conventionally as labor intensive (Leamer, 1984, Zhang,1994, Song, 1996). A 10% increase in labor force in these industries is assumed to be the rural surplus labor that migrated into the urban areas.[i] In the GTAP model, it is treated as 'primary factor augmenting technical change'.

The second scenario assumes that there is an increase in the natural endowment of rural land in the food sector, also by 10%, as a result of fully commercialization of the rural agricultural land ownership. This specification is based China's past experience that when the collective production brigades were dismissed, factor productivities increased dramatically. As a result, the output of agricultural production in the rural sector is expected to increase.[ii]

To capture the combined policy impact of reforms in both the labor and the land markets in China, the third scenarios simply combine the first two scenarios.

The fourth scenario releases the rather controversial assumption of the existence of surplus labor, and it is assumed that when the five labor intensive industries expends, the labor inputs in the land intensive food sector contracts, for the sake of simplicity, also by 10%. This is indicated as a labor switching strategy where the increase in the urban labor force must be full offset by a fall of labor force in the food sector.

The last scenario is simply a combination of the second scenario and the fourth scenario to create a policy package where the labor is relocated from rural food sector to urban manufacturing sector, and reform in land increases in land productivity. This scenario represents a conservative formation of the factor market reforms in China because controversial assumption of surplus labor is released.

It must be noticed that all the scenarios are actually counter-factual because they are based on a 2007 dataset which is the lasted data available for GTAP users. Therefore the results of simulation describes what would have had happened in the Chinese economy and the rest of the world, if the reforms in labor and land market were fully implemented in 2007. This cold help to understand the prospect for some future changes if these reforms, for example, an abortion of the *hukou* system and a genuine privatization of the rural land ownership are indeed implemented in the near future.

5 The results

The simulation results concerning the key economic variables for the five scenarios are summarized in the following tables. The detailed changes of each simulation at sector levels for each region are also available upon request.

5.1 Changes in Regional GDP

The changes in GDP in the ten regions are clearly shown in Table 5 that when GDP increases significantly in China, it has no impact or even declines for some of the other regions with the only exception of Australia and New Zealand (ANZ) for the first scenario. In the third scenario, when China, Africa and rest of the world (ROW) gain, GDP for all other seven regions falls with a varied range in magnitude somewhere between 0.01% and 0.24%.

With the assumption of the existence of surplus labor, the combination of land and labor reform scenarios generates the largest GDP gain for China, and this is followed by the labor mobility scenario and land reform scenario. The results seem to indicate that while labor mobility reforms dominantly generating economic gains for China, the land reform may also benefit some other countries such as Japan and the US.[iii] These gains, nevertheless, are discounted by more than half for China if the assumption of surplus labor is released. With the exceptions of ANZ and Africa, all other major economies

especially those in South Asia are more likely to be adversely affected by China's factor market liberalization.

Table 5 Changes in Value of Regional GDP (%)

Region	*Scenario 1*	*Scenario 2*	*Scenario 3*	*Scenario 4*	*Scenario 5*
	Free labor mobility	*Land reform*	*Land & labor reform*	*Labor switching alone*	*Labor switching with land reform*
ANZ	*0.02*	*-0.02*	-0.01	0.11	0.05
China	*1.92*	*0.05*	1.02	0.31	0.54
Japan	*-0.05*	*0.01*	-0.01	-0.04	-0.01
East & SE Asia	*-0.05*	*0.00*	-0.01	-0.03	-0.01
South Asia	*-0.05*	*0.00*	-0.24	-0.09	-0.15
North America	*-0.04*	*0.01*	-0.10	-0.02	-0.05
South America	*-0.05*	*-0.01*	-0.07	0.03	-0.01
EU_25	*-0.11*	*-0.01*	-0.07	-0.05	-0.05
Africa	*-0.04*	*0.00*	0.07	0.07	0.07
Rest of world	*-0.01*	*0.00*	0.03	0.02	0.03

5.2 Changes in international trade

The international trade effects in the 10 regions for the five scenarios are shown in Table 6 which is comparable to the changes in GDP. While China, ANZ, Africa, along with other Asian economies with the exception of South Asia gain an increase in their exports in the scenarios, the exports in South America and EU-25 contract, though the negative effect is quite modest. When all the five scenarios are considered, the results seem to suggest that while labor mobility effect encourages exports for China, ANZ and African countries, land reform may help creating trade in all other regions except for China and ANZ.

Table 6 Changes in Regional Exports and Imports (%)

Region	*Scenario 1*	*Scenario 2*	*Scenario 3*	*Scenario 4*	*Scenario 5*
	Free labor mobility	*Land reform*	*Land & labor reform*	*Labor switching alone*	*Labor switching with land reform*
Exports					
ANZ	0.01	-0.01	0.01	0.04	0.03
China	1.72	-0.39	1.34	1.61	1.23
Japan	-0.01	0.12	0.11	-0.08	0.04
East & SE Asia	0.05	0.06	0.11	0.02	0.08
South Asia	-0.05	0.02	-0.02	-0.05	-0.02
North America	-0.05	0.07	0.02	-0.07	0.00
South America	-0.05	0.02	-0.03	-0.03	-0.01
EU_25	-0.08	0.05	-0.04	-0.08	-0.04
Africa	0.02	0.04	0.06	0.00	0.04
Rest of world	0.00	0.04	0.04	-0.02	0.03
Imports					
ANZ	0.15	-0.07	0.08	0.19	0.13
China	1.34	0.01	1.35	1.04	1.04
Japan	0.15	0.07	0.22	0.08	0.15
East & SE Asia	0.1	0.07	0.16	0.05	0.12
South Asia	-0.07	-0.01	-0.08	-0.04	-0.05
North America	0.04	-0.02	0.02	0.06	0.04
South America	0.02	-0.03	-0.01	0.06	0.03
EU_25	-0.03	0.02	-0.01	-0.02	0.00
Africa	0.08	0.01	0.10	0.07	0.09
Rest of world	0.03	0.03	0.05	0.02	0.04

5.3 Output change at industry level

To further explore the effect of factor market reforms, changes in production in different industries and in different regions are reported in Table 7 for China and Table 8 for several major regional economies. The regional economy is divided into ten sectors, in addition to a capital good sector.

The results shown in Table 7 reveal a significant increase in output in all industries for the two labor mobility scenarios and the two combined scenarios in China. Food production and processing will be adversely affected when surplus labor is absent in Scenarios 4 and 5, and extraction and heavy industries fall moderately with the land reform scenario. This appears to indicate again when the labor market reform definitely generates production gains, the land reform would have some offset impact on income distribution.

Table 7 Changes in Production in China (%)

Sectors	*Scenario 1*	*Scenario 2*	*Scenario 3*	*Scenario 4*	*Scenario 5*
	Free labor mobility	*Land reform*	*Land & labor reform*	*Labor switching alone*	*Labor switching with land reform*
Food	1.02	2.43	3.44	-1.34	1.09
Extraction	0.31	-0.24	0.06	0.23	-0.02
Processing Food	1.14	1.47	2.6	-0.42	1.05
Textiles	4.83	1.06	5.89	3.35	4.4
Light manufactures	3.07	0.07	3.14	2.50	2.57
Heavy manufactures	1.09	-0.53	0.56	1.00	0.47
Dwelling	1.36	0.35	1.71	0.68	1.03
Utilities construction	1.14	0.37	1.51	0.52	0.88
Transportations	1.37	0.11	1.48	0.84	0.95
Other services	2.32	0.03	2.35	1.83	1.85
Capital goods	0.92	0.52	1.45	0.23	0.76

Scenario 5 of the reform package where surplus labor is assumed to be absent, is reported in Table 8 for six of the ten regions. While labor intensive sectors of food processing, textiles and light manufactures suffer, all other sectors gain some moderate growth in almost all regions.

Table 8 Changes in Production in World of the 5th Scenario (%)

	ANZ	*Japan*	*North America*	*East&SE Asia*	*South Asia*	*EU-25*
Food	0.06	0.02	0.07	0.02	0.01	0.02
Extraction	0.19	0.14	0.14	0.15	0.25	0.17
Processing Food	-0.09	-0.02	0.00	-0.07	0.03	0.00
Textiles	-1.78	-1.18	-0.82	-1.73	-0.97	-1.13
Light manufactures	-0.24	-0.30	-0.18	-0.36	-0.05	-0.18
Heavy manufactures	-0.09	0.14	0.09	0.22	0.11	0.15
Dwelling	0.03	0.01	0.00	0.01	-0.02	0.00
Utilities construction	0.07	0.05	0.03	0.02	-0.03	0.03
Transportations	0.01	0.02	0.01	0.06	0.00	0.03
Other services	0.00	0.00	0.00	-0.02	0.05	0.00
Capital goods	0.10	0.07	1.45	0.23	-0.05	0.05

5.4 Changes in income distribution

Table 9 shows the impact of the 5th scenarios in real factor prices, which can be considered as a change in income distribution among the five primary factors of production, namely land, unskilled labor, skilled labor, capital and natural resources. While unskilled labor is rewarded the largest gain, the owner of land suffers a heavy lose in China. But this adverse impact in income distribution is more likely to be offset in China, given the special characteristics of its rural economy. However, when owners of capital gain but owners of skilled labor suffer, it is inconclusive to see whether the overall income distribution pattern would improve or not.

Table 9 Change in real factor price of the 5th Scenarios

Region	*Land*	*Unskilled labor*	*Skilled labor*	*Capital*	*Natural Resource*
ANZ	0.23	0.00	0.00	0.03	1.26
China	-14.56	2.71	-0.08	0.58	1.69
Japan	0.08	0.00	0.01	0.01	1.01
East & SE Asia	0.11	-0.02	-0.01	-0.01	1.04
South Asia	-0.01	-0.06	-0.01	-0.05	1.54
North America	0.24	-0.01	0.00	0.00	1.01
South America	0.14	-0.02	-0.01	0.00	1.23
EU_25	0.04	-0.01	0.00	0.00	1.12
Africa	0.09	0.00	0.02	0.03	0.83
Rest of world	0.08	-0.01	0.02	0.00	0.82

For all other regions, it appears that the while the owners of natural resources gain overwhelmingly around the world, the unskilled labor force, with the only exceptions of China and Japan, all loses. For the skilled labor, with ANZ, Japan, Africa, EU25 and ROW gain, the other regions including China lose.

5.5 The overall welfare impact

The overall welfare impact of China's factor market reforms, usually represented by the so called equivalent variation (EV), is displayed in Table 10. While China gains the largest welfare for all the five scenarios, all other regions except for South Asia and EU-25 also benefit. South Asian countries lose in all five scenarios, and the EU-25, loses in three of the five scenarios.

In terms of value ranking for the welfare impact, the result reveals that regardless if there is surplus labor or not, a combination of reforms can always generate a larger welfare than partial reform not only for China, but also for the rest of the world. This is consistent with what the theoretical model and the evidences.

Table 10 Changes in equivalent variation (EV in US$m)

Region	*Scenario 1*	*Scenario 2*	*Scenario 3*	*Scenario 4*	*Scenario 5*
	Free labor mobility	*Land reform*	*Land & labor reform*	*Labor switching alone*	*Labor switching with land reform*
ANZ	482.82	-60.18	422.64	444.53	384.36
China	53036.08	10834.65	63870.73	30106.48	40941.13
Japan	269.23	454.01	723.24	-154.05	299.96
East & SE Asia	238.12	717.07	955.2	-497.89	219.18
South Asia	-496.92	-155.93	-652.85	-323.55	-479.48
North America	984.02	-671.39	312.63	1309.63	638.24
South America	730.84	-125.9	604.94	681.64	555.74
EU_25	-76.07	347.04	270.98	-364.06	-17.02
Africa	1229.7	285.98	1515.68	777.46	1063.45
Rest of world	2705.32	812.07	3517.39	1579.32	2391.39
Total	59103.14	12437.42	71540.58	33559.51	45996.95

5. Conclusion

Based on a brief review of the distortions and reforms in China's labor and land markets, this paper examines the economic impact of a free migration of rural labor force and reforms in rural land ownership in China, and their impact on the production and international trade in the world economy. By running simulations on five general equilibrium experiments based on different assumptions of the Chinese factor markets, the theoretical projection of gains in economic welfare and impact in redistribution of national income are conditionally confirmed. Specifically, it reveals that while the labor market liberalization generates unambiguous and overwhelming economic gains, the land reform may have some adverse impact on income distribution. As a result, when the labor intensive industries, and unskilled labor gain in China, the capital intensive heavy industries and owners of land may suffer from these reforms. In spite of this, as long as economic welfare is concerned, a comprehensive reform or combination of reforms can always generate larger economic welfare than that of partial and incomplete reforms.

The international impact to the rest of the world varies across different regions and sectors. While modest welfare gains in production and trade are possible in most of the regions, South Asian countries lose heavily not only in their GDP growth, but also in their economic welfare. The world as a whole in general, and the Chinese economy in particular, gain tremendously and unambiguously.

While the labor market reform and land reform usually have opposite impact on other economies in the rest of the world, it is the natural resource intensive and capital intensive sectors that may benefit the most from China's factor market liberalizations. This seems to suggest that the reforms in China's factor market would have a similar impact approximating to the free trade agreements, because the comparative advantage of the regions are better exploited as a result.

Although still very tentative, the findings of this paper have some important policy implications for both China and the rest of the world. Firstly, since the net impact of economic reforms in the Chinese factor markets is unambiguous positive for China, these reforms should be continued, broadened and deepened. Secondly, the governments in the rest of the world may need to pay some special attentions to the factor market reforms in China because these reforms will impact their economies in a way that is approximate to those of free trade agreements during a process of globalization. While labor intensive industries could suffer somewhat, the natural resource and capital intensive sectors are more likely to benefit from these changes. Some corresponding policies may need to be prepared well before these effects come to realize in a near future.

References

Bhattacharyya A. and E. Parker (1999), “Labor productivity and migration in Chinese agriculture: a stochastic frontier approach”. *China Economic Review*. 10:1, 59-74.

Carter Colin A. Carter and Andrew J. Estrin 2005. “Opening of China's Trade, Labor Market Reform and Impact on Rural Wages” *World Economy*, Volume 28 Issue 6 Page 823 .

Chan Kam Wing and Will Buckingham (2008). “Is China Abolishing the Hukou System?***”*** . *The China Quarterly*, September 2008, Vol. 195, pp. 582-606

Cook. S. (1990).”Surplus Labor and productivity in Chinese agriculture: evidence and household survey date”. *Journal of Development Studies*, 35:3, 16-44.

Deng, Kent, G. 2011, *China’s Political Economy in Modern Times,* Routledge, New York, London.

Fleisher, B. M. R. Fearn and Z. Ye, “The Lewis model applied to China: Editorial introduction to the symposium”, *China Economic Review* , 22 (2) 535–541.

Golley, Jane and Xin Meng, 2010, “Has China run out of surplus Labor?”, *China Economic Review* , 22 (2) 555–572

Ge, S. and D.T. Yang, 2011 “Labor market developments in China: A neoclassical view”, China Economic Review 22 (2011) 611–625

Hertel T.**, and** F. Zhai**, 2006. ‘**Labor market distortions, rural–urban inequality and the opening of China's economy’, *Economic Modelling*, Volume 23, Issue 1, January 2006, Pages 76-109.

Leamer, E.E. 1984, *Source of International Comparative Advantage; Theory and Evidence*, Cambridge, Mass, MIT Press.

Lewis W. A. (1954) ‘Economic development with unlimited supplies of labor’, *The Manchester School*, May, pp.139-91.

Lin, J. Y. 1992, ‘Rural Reforms and Agricultural Growth in China’, *American Economic Review,* 82 (1), pp. 34–51.

Mullan, K., P. Grosjean and A. Kontoleon, 2011. ‘Land tenure arrangement and rural-urban migration in China’, *World Development*, 39(1):121-133.

NBSC (National Bureau of Statistics of China), *China Statistical Yearbook*, many issues, particularly 2011. Online version accessed on 16 August 2012. See http://www.stats.gov.cn/tjsj/ndsj/2011/indexee.htm

Ranis G. and J. C. H. Fei, 1961, 'A theory of economic development', *American Economic Review*, 51(4), September, pp533-65.

Ranis G. and J. C. H. Fei (1961) 'A theory of economic development', *American Economic Review*, 51(4), September, pp533-65.

Rozelle, S., Guo, L., Shen, M., Hughart, A., & Giles, J. (2009). Leaving China's farms: survey results of new paths and remaining hurdles to rural migration. China
Quarterly, 158, 367–393.

Sachs J. and Woo, W.T., 1994. "Structural factors in the economic reforms of China, Eastern Europe and the former Soviet Union". *Economic Policy*, (9(1):101-45.

Selden, M. ,1993. *The Political Economy of Chinese Development*. M. E. Sharpe, Armont, New York.

Selden, Mark and You Laiyin, 1997. "The reform of social welfare in China". *World Development*, 25(10):1657-68.

Sen. A. K. (1984). "peasants and dualism with or without surplus Labor". In A.K. Sen *Resources, Values and Development*, Oxford:Blackwell.

Song, L. 1996, *Changing Global Comparative Advantage*, Adasion and Wesley.

Vendryes, T., 2010. 'Land rights in rural China since 1978', *Land Use Policy*. 27(4):87-99.

Wang, X. J. Huang, L. Zhang and S. Rozelle, 2011. "The rise of migration and the fall of self employment in rural China's Labor market", *China Economic Review*, 22 (4), 573–584.

Whalley John and Shunming Zhang, 2007, "A numerical simulation analysis of (Hukou) Labor mobility restrictions in China", Journal of Development Economics 83 (2) 392–410.

Wong Linda, Chinese Migrant Workers: Rights Attainment Deficits, Rights Consciousness and Personal Strategies", The China Quarterly, December 2011, Vol. 208, pp. 870-892.

Zhang, X. 1992, **'**Urban-rural isolation and its impact on China's production and trade pattern', *China Economic Review*, 3(1): 85-105.

Zhang, X. 1994, **'**Classification and the dualism of China's industries in the 1980s', *Industry and Development*, United Nations Industry and Development Organisation, 34, pp.61-91.

Zhang, X. 2000 'The tale of two sectors: a comparison between state-owned and non-state-owned enterprises in China', *Asian Thought and Society: An International Review*, 25(74):200-18.

Appendix: The Aggregation of Regions and Sectors

Table A1, The aggregation of the ten regions

No.	Region code	Comprising economies	Description
1	ANZ	Australia, New Zealand	Australia and New Zealand, xoc
2	China	China	China
3	Japan	Japan	Japan
4	EastnSEAsia	East & SE Asia	All other countries in Asia except those in South Asia
5	South Asia	South Asia	India, Pakistan, Bangladesh, Nepal, lka xsa
6	North America	US&Canada	US & Canada
7	South America	South America	All countries in America except US and Canada
8	EU-25	European Union	The 25 EU countries in 2007
9	Africa	Africa	All countries in Africa
10	ROW	Rest of the World	All other countries that are not included in the 9 groups

Table A2. The aggregation of the ten sectors

No.	Sector Code	Comprising industries	Description
1	Food	Paddy rice, wheat, cereal grain, vegetable, fruits, nuts, oil seed, beet, crops, cattle, sheep, goat, horses, animal product, fishing, meat, dairy product, plant-based fibbers, wool, silk-worm cocoons, forestry, sugar cane,	Primary production, land and resource intensive goods
2	Extraction	Mining and Extraction Coal oil gas fsh omn,	land and resource intensive
3	Processing food	sugar, milk, beverage and tobacco,	Labor intensive
4	Textiles	Textiles and apparel	Labor intensive
5	Light manufacture	lea lum ppp fmp mvh otn omf	Labor intensive
6	Heavy manufacture	p_c crp nmm i_s nfm ele ome	Capital intensive
7	Dwelling	Dwelling	Capital intensive
8	Construction	Electricity, gas distribution, water, construction	Labor intensive
9	TransportCommunication	trd otp wtp atp cmn	Capital intensive
10	Other service	ofi isr obs ros osg	Labor intensive

Endnotes

[i] Bhattacharyya and Parker (1999) estimated that in 1995, between 35 and 40 percent of the agricultural labour force was redundant in China. Cook (1999) also found that the marginal productivity of farm labour is very low in China. Although there are some debate on the diminishing of rural surplus labour in China recent (see Fleisher *et al* 2011 for details) , Golley and Meng (2011) argue that China still has abundant under-employed workers with very low income in the rural sector. Under alternative institutional settings, the migrant stock could easily be doubled from the current 150 million to 300 million by increasing either the average length of migrant stay, or the migrant inflow, or both.

[ii] Deng (2011, p.147) shows that labour productivity increased 50% and land yield increased 200–300% after the old institutional arrangement of the collective people commune was replaced by the lease-holding contracts. Other researchers (e.g., Lin 1992) also indicated that lease-holding of land contributed 87% to the revitalizing of China's agricultural productivity; and the ending of the scissors pricing, about 20%.

[iii] These results are consistent with the findings of Hertel and Fan (2006) and Whalley and Zhang (2007).