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# LABOR MARKET DISTORTIONS, RURAL-URBAN INEQUALITY AND THE OPENING OF CHINA'S ECONOMY*

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**Abstract**

This paper evaluates the impact of some key labor market reforms on rural-urban inequality and income distribution, using a household-disaggregated, recursive dynamic computable general equilibrium (CGE) model of China. We also explore how these factor market reforms interact with product market reforms currently underway as part of China's WTO accession process. The simulation results show that the reforms in rural land rental market and *Hukou* system, as well as increasing off-farm labor mobility would reduce the urban-rural income ratio dramatically. Furthermore, the combination of WTO accession and factor market reforms improves both efficiency and equality significantly.

Keywords: Labor market, Income distribution, WTO, Computable general equilibrium, China

JEL Classification Code: C68; J60; D30; F13; O53

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# LABOR MARKET DISTORTIONS, RURAL-URBAN INEQUALITY AND THE OPENING OF CHINA'S ECONOMY

## 1. Introduction

Over the last fifty years, there have been three peaks in regional inequality within China: the Great Famine of the 1950's, the Cultural Revolution of the late 60's and early 70's, and, most recently the period of openness and global integration of the 1990's (Kanbur and Zhang, 2001). The ratio of urban to rural incomes is now approaching three, which is extremely high by international standards (World Bank, 1997). Despite this large income differential between rural and urban households, permanent migration in China has been limited. This is due to a combination of both direct and indirect measures. The most important factor is the system of official registration, whereby households must have a *hukou* in order to legally reside in an urban area. Without this registration, access to urban amenities such as housing and education, is limited and quite expensive. While highly skilled individuals and investors can purchase a "blue stamp hukou" (Chan and Zhang, 1999), this avenue is not available to the vast majority of rural residents. In light of these barriers to moving the entire household to an urban area, rural-urban migration is largely a transitory phenomenon – and one that is occurring on a massive scale. Recent estimates put the number of "floating workers" (excluding commuters) at about 90 million or roughly 19% of the total rural labor force in 2001 (Fan and Qie, 2002).

Concern about this increasing rural-urban disparity has been heightened in light of China's current accession to the World Trade Organization (WTO). Most analyses suggest that accession will exacerbate inequalities, by lowering barriers to grain imports and increasing opportunities for manufacturing exports as well as foreign investment in the urban-based services. (Ianchovichina and Martin, 2002). However, the degree to which this occurs will depend on the

ease of movement of rural workers into the rapidly expanding urban and coastal economies. Higher rates of labor mobility will ensure that the benefits of WTO accession will be shared more widely. But this depends on how well the labor markets function.

In contrast to the more than two decades of product market reform in China, culminating in WTO accession, factor markets have received less attention until recently. In this paper we focus specifically on the labor markets where many barriers prevent a smoothly functioning market. Specifically, we introduce a novel approach to the modeling of rural-urban labor market linkages in China. We support this empirical model by drawing on recent econometric estimates of the relevant transfer elasticities, as well as survey-based estimates of the current extent of the labor market distortion. These estimates are incorporated into a CGE model with highly disaggregated households in both the rural and urban areas, based on newly available data from the National Statistical Bureau of China. With this framework in hand, we are able to shed light on the question of how the further opening up of the Chinese economy is likely to affect rural-urban inequality. We also explore the distributional consequences of lessening some of the existing factor market distortions.

This paper is organized as follows: the next section motivates the paper by discussing recent estimates of the size of the rural-urban wage gap induced by the *hukou* system, as well as limitations in the land market that inhibit off-farm labor mobility. We also examine evidence on the current degree of labor mobility between the agriculture and non-farm sectors. We then turn to the specification of a CGE model that explicitly incorporates these labor market distortions. The baseline scenario to 2007 is developed next. This is the backdrop against which China's labor market distortions and her accession to the WTO will be evaluated. Section 5 assesses the impact of reducing labor market barriers, as well as China's WTO accession, on rural-urban

inequality. The final section offers conclusions and suggestions for future research.

## 2. Modeling the Labor Market Distortions in China

*Empirical Evidence on Rural-Urban Wage Differences:* As noted in the introduction, the presence of the *hukou* system has given rise to a huge floating labor force in China. If workers cannot move permanently to the city with their family, then they must migrate temporarily if they wish to take advantage of the very significant wage differential that exists at present. For example, Yaohui Zhao (1999a) documents an average annual wage gap between rural and urban work of 2,387.6 Yuan for unskilled rural workers of comparable background and ability in Sichuan Province in 1995. She also finds that there is considerable evidence that these temporary migrants would prefer to stay at home – in the rural areas -- and engage in non-farm work, if that were available (Zhao, 1999b). In her econometric analysis, she finds that only about 30% the total rural-urban wage gap can be explained by the direct costs associated with migration (transportation, housing and the cost of obtaining the necessary certificates). The majority of the wage gap is due to social costs associated with migration – including: the disutility of being away from family, poor quality of housing, limited social services for migrants, the danger of being robbed enroute to and from the work location, and the general uncertainty associated with being a non-registered worker in an urban area. While these transactions costs are unobservable, they clearly represent a very significant burden on the migrants and their families.

If there were no barriers to the movement of labor between rural and urban areas, we would expect real wages to be equalized for an individual worker with given characteristics. Shi, Sicular and Zhao (2002) explore the question of rural-urban inequality in greater detail for nine different provinces using the China Health and Nutrition Survey (CHNS). They begin by

breaking the income differential into earnings and non-earnings components. Earnings are then broken into labor and non-labor earnings. The former includes both wage earnings and earnings from self-employment, so the authors estimate a production function from which they are able to derive a shadow wage for labor. This permits them to come up with a comprehensive labor earnings differential between the rural and urban populations. They then control for differences in hours worked, which they find to be an important component of the total urban-rural income gap.

Having isolated the difference in hourly earnings between rural and urban households, Shi, Sicular and Zhao (2002) control for differences in personal characteristics, as well as occupation. Once these differences are controlled for, the unexplained portion of this income gap falls to about 50%. They reason that the remaining 50% of this earnings differential must be either compensation for higher urban living costs, or the consequence of a labor market distortion. Once they have taken into account differences in living costs, the authors conclude that the apparent labor market distortion is about 42% of the rural-urban labor income differential and 48% of the hourly earnings differential. When applied to the average wage differential (2.15 yuan/hour = 3.43 yuan/hour urban – 1.28 yuan/hour rural), this amounts to an *ad valorem* rate of apparent taxation on rural wages of 81% = 100% * (.482 * 2.15) /1.28 .

Clearly there may be other, unobserved factors inducing this rural-urban wage differential, in which case estimation of the labor market distortion via subtraction of known factors is biased in the direction of overstating the *hukou*-related distortion. In fact, rural-urban wage differentials persist in market economies which do not have a household registration system. Therefore, it is useful to consider an alternative approach whereby one estimates the direct impact of household registration status on the observed wage difference among households. Shi (2002) takes this

approach to the problem, using the same CHNS data set. He finds that only 28% of the rural-urban wage difference can be explained directly via the coefficient on the *hukou* registration variable. This is quite a bit less than the 48% left unexplained via the subtraction approach of Shi, Sicular and Zhao (2002). For purposes of our general equilibrium model, we insert the larger (81% *ad valorem*) transaction tax distortion into the initial equilibrium data base. However, when it comes to modeling labor market reform, we only remove the portion of this tax distortion that has been attributed to the *hukou* system directly in Shi's econometric analysis.[1]

*Modeling transactions costs:* We model these transactions costs associated with the unexplained wage differential explicitly as a burden that is assumed by temporary migrants. Of course these migrants are heterogeneous and the extent of the burden varies widely. Those individuals who are single, and live close to the urban area in which they work, are likely to experience minor inconvenience as a result of this temporary migration. We expect them to be the first to migrate (*ceteris paribus)* in response to higher urban wages. On the other hand, some migrants have large families and come from a great distance. Their urban living conditions are often very poor and it is not uncommon for them to be robbed on the train when they are returning home for holidays. For such individuals, the decision to migrate temporarily is likely to be a marginal one – and one which they may not choose to repeat. With this heterogeneous population in mind, we postulate a continuous transactions cost function that is increasing in the proportion of the rural population engaged in temporary work:

[1] It is a difficult to compare these distortions across different studies, even though they use the same data base, so we key on the rural-urban wage differential. The portion of this differential that is not explained by occupation, education and other personal characteristics is 58% in both the Shi (2002) and the Shi, Sicular and Zhao (2002) studies. Shi, Sicular and Zhao (2002) then deduct the cost of living component to reach their 48% estimate of the portion of the wage differential due to labor market distortions. In his regression analysis, Shi (2002) finds that 28% of the overall wage differential can be attributed directly to possession of an urban *hukou.* He does not control for living costs, but if we use the 48% figure from the other study, then we

$$TIndCost = \alpha \cdot \left( \frac{L^{Mig}}{L^{r}} \right)^{\delta} \qquad (1)$$

where *TIndCost* is the *ad valorem* tax equivalent of the indirect transactions costs, $L^{Mig}$ is the migrant rural workers and $L^{r}$ is the laobor force in rural area. $\delta$ and $\alpha$ are elasticity and shift parameters respectively.

The transactions cost function in (1) has a simple, constant elasticity functional form, which begins at the origin and reaches the observed cost-of-living adjusted indirect tax rate of 81% of rural wages at the current level of temporary migration (about 70 million workers in our baseline scenario). We assume that further increases in temporary migration have only a modest impact on these transactions costs.[2] In addition to these indirect costs, the temporary migrant also incurs direct costs associated with the higher urban cost of living. Based on Shi, Sicular and Zhao (2002), these are estimated to be 10% of the urban-rural wage gap and about 17% of the rural wage rate.

In our subsequent analysis, the direct and indirect transactions costs associated with the temporary migration of unskilled and semi-skilled labor will play an important role.[3] Any labor market reforms that reduce the transactions costs imposed on rural labor will increase the flow of workers to the city, thereby depressing urban wages and increasing rural wages. This will have the effect of reducing inequality. These transactions costs will also play an important role in the case of trade liberalization. Here, increases in the demand for unskilled labor in the urban areas will cause urban wages to rise, thereby drawing in more rural labor. However, this supply of rural labor will come at some cost – both in terms of higher transport and living costs for the

conclude that the *hukou* accounts for .28/.48 = .58 of the apparent labor market distortion.

[2] We assume that a doubling of temporary migration would only increase the marginal cost of migration by 10%.

worker, as well as the indirect transactions costs – since the additional workers are presumably being drawn from a greater distance or from less favorable family/social circumstances.

*Off-farm Labor Mobility:* In developed economies off-farm labor mobility is typically viewed as being a function of the relative wages in the farm and non-farm sectors. However, in China, the off-farm labor supply decision is complicated by institutional factors which have been built into the system in order to keep the agricultural population in place (Zhao, 1999b). During earlier years, the Chinese government sought to make it costly for individuals to leave the rural areas by tying incomes to daily participation in collective work. More recently, the absence of well-defined land tenure has raised the opportunity cost of leaving the farm (Yang, 1997). Households that cease to farm the land may lose the rights to it, so they have a strong incentive to continue some level of agricultural activity, even when profitability is quite low (Zhao, 1999a). With only modest growth in rural, non-farm activities, this seriously limits the ability of households to obtain off-farm work (Zhao, 1999b).[4] Our approach to modeling the off-farm labor supply decision is to treat this as a function of the *average return* to agricultural activity, *inclusive of the return to land*. This has the effect of retaining extra workers in agriculture under our baseline analysis. One of the scenarios that we will consider below is the introduction of a well-functioning land rental market through which rural households seeking work in the city can rent their land to other households, thereby separating their labor migration decision from the return to agricultural land. This has important implications for both our baseline scenario, as well as the WTO accession scenario.

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[3] Skilled workers make up a very small portion of the rural labor force and typically are able to obtain hukou if they choose to move to the urban areas.

[4] However, as noted by Parish, Zhe and Li (1995), the rural labor market is looking more like a market all the time.

## 3. CGE Model

The CGE model of China used in this study has been developed at the Development Research Center of the State Council in Beijing with the explicit objective of modeling inequality and the rural-urban labor market. The model has its intellectual roots in the group of single-country, applied general equilibrium models used over the past two decades to analyze the impact of trade policy reform (Dervis, de Melo and Robinson, 1982; Shoven and Whalley, 1992; de Melo and Tarr, 1992). It began as a prototype CGE model developed for the Trade and Environment Program of the OECD Development Center in the mid-1990s (Beghin, et al., 1994). However, since that time, significant modifications have been made to capture the major features of the tax system in the Chinese economy (Wang and Zhai, 1998), differentiate China's two separate trade regimes (Zhai and Li, 2000), address demographic issues (Zhai and Wang, 2001), as well as disaggregating the coastal economy (Li and Zhai, 2002). A variety of policy issues have been examined using variants of this model, including the economy-wide implications of China's WTO accession and the income distribution consequences of trade and tax reform.[5] The model used in this study represents the latest advance in the evolution of this Chinese CGE model. It is calibrated to the social accounting matrix complied from the most recent I/O table of 1997, incorporates highly disaggregated households based on detailed households survey data and introduces a novel approach to the modeling of rural-urban labor market linkages. A comprehensive algebraic description of the model is provided in the appendix. Here, we focus on the main features of the model -- especially those that are relevant for assessing the rural-urban distributional consequences of labor market distortions and trade liberalization.

***Modeling Household Behavior:*** In order to come to grips with the inequality question, it is critical that that we disaggregate households to the maximum extent possible, subject to the limitations posed by survey sampling, computational constraints, and human capacity for analysis. It is particularly important to disaggregate households along those dimensions that are most important for analysis of labor market impacts. Thus, for example, one would not want to group together rural and urban households since they differ in their *hukou* status. Also, due to the segmentation in the rural labor market between agriculture and non-agriculture, we would like to keep these households separated as well – at least to the maximum extent possible. Therefore we disaggregate households receiving 95% or more of their income from agriculture. In the urban sample, we separate out those households that are specialized in wage and salaried labor, as they will likely be most affected by labor market reforms. We also disaggregate households that rely on transfer payments for 95% of their income. The remaining households are considered "diversified". This gives us the grouping of 100 representative households in Table 1 = 20 vingtiles (income levels) for 2 rural and 3 urban strata, yielding a total of 40 rural and 60 urban household groups.

Households consume goods and services according to a preference structure determined by the Extended Linear Expenditure System (ELES). Through specification of a subsistence quantity of each good or service, this expenditure function generates non-homothetic demands – whereby the larger the relative importance of subsistence consumption (e.g., it would be high for rice, and low for automobiles) the more income-inelastic the household's demand for that good.

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[5] See Development Research Center (1998),and Wang and Zhai, (1998) .

Each household is endowed with three types of labor: skilled, semi-skilled and unskilled. These are distinguished by educational attainment of the worker[6] with semi-skilled workers having a middle- or high school education, and skilled workers having an educational attainment beyond high school[7]. Households are also endowed with profits from family-owned agriculture and non-agriculture enterprises, property income and transfers. Agricultural profits represent returns to family labor, land and capital. However, as noted above, the off-farm labor supply decision is a function of the combined return to labor and land in agriculture, owing to the absence of an effectively functioning land market in many rural areas.

Specification of the value of the off-farm labor supply elasticity draws on the econometric work of Sicular and Zhao (2002). Those authors report results from a household labor supply model estimated using labor survey data from the 1997 CHNS data set for nine central provinces. This survey measures the labor supply of individuals within each household to farm and non-farm activities. Sicular and Zhao estimate the implicit wage for each individual in the sample if they were to work in agriculture or non-agricultural self-employment, and they also estimate the non-agriculture wage that this person could obtain. They then estimate labor supply equations for self-employed agricultural labor, self-employed non-agricultural labor, and wage labor. From these equations, it is possible to calculate elasticities of labor transfer from farm to non-farm activities. They report a variety of elasticities in their paper.[8] We adopt their estimate

[6] We would prefer to base this split on occupation – what they actually do – versus their potential as determined by education. However, the rural household survey does not support this type of labor split.

[7] Since the rural survey only reports the highest educational attainment of the household we do not have endowment by worker. This biases the skill level of rural households upwards. However, since the vast majority of rural households are unskilled, this is less of a problem in practice.

[8] Due to the variety of labor supply elasticities in response to the three different wages in their model, the authors obtain a variety of labor transfer elasticities, depending on the "thought experiment" being conducted. These are asymmetric, with the response to a change in shadow wages differing from the response of labor supply to a change in the market wage. However, this response is treated as symmetric in our model. This makes it difficult to choose the correct parameter for our analysis. We

of 2.67 for use in this work. Thus, a 1% decrease in the return to farming, relative to the market wage, results in a 2.67% increase in off-farm labor supply.

***Modeling Production, Exports and Imports:*** When it comes to modeling trade liberalization, an important characteristic of our CGE model is the explicit treatment of two separate foreign trading regimes. One is the export processing regime, which receives duty-free imports and is therefore extremely open, with considerable foreign-investment. The other sector is the ordinary trade regime. Since the 1990s, processing exports have grown rapidly as a result of their preferential treatment. They now account for more than half of China's total exports. Obviously, any analysis of external trade and the impact of changes in trade policy must have an explicit treatment of this dualistic foreign trading regime in the model.

Trade is modeled using the Armington assumption for import demand, and a constant elasticity of transformation for export supply. Thus, Chinese products are assumed to be differentiated from foreign products, and exports from China are treated as different products from those sold on the domestic market. The small country assumption is assumed for imports and so world import prices are exogenous in terms of foreign currency. Exports are demanded according to constant-elasticity demand curves, the price-elasticities of which are high but less than infinite. Therefore the terms of trade for China are endogenous in our simulation.

Production in each of the sectors of the economy is modeled using nested constant elasticity of substitution functions, and constant returns to scale is assumed. Sectors differentiate between rural and urban labor that substitute imperfectly between them. This is an indirect means of building into the model a geographic flavor – since some sectors will be located largely in urban

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focus on the transfer of labor from agriculture to market wage employment in response to a change in returns to agriculture, since this transfer accounts for the bulk of the labor flow in our analysis.

areas, while others will be predominantly in rural areas. By limiting the substitutability of rural and urban labor in each sector, we are able to proxy the economic effect of geographically distributed production activity. Thus, if trade liberalization boosts the demand for goods that are predominantly produced in urban areas, then urban wages will rise, relative to rural wages, and migration will be encouraged. Of course we would ideally model the geographic distribution of industrial activity, but unfortunately the data do not exist to support this type of split.

All commodity and non-labor factor markets are assumed to clear at market prices. With the exception of the farm/non-farm labor supply decision, labor is assumed to be mobile across sectors, but rural-urban migration is subjected to the direct and indirect transactions costs discussed above, so the unskilled and semi-skilled rural wages are equated to the comparable urban wages, less transactions costs. Capital is assumed to be partially mobile, reflecting differences in the marketability of capital goods across sector.

In order to look at the impacts of labor mobility over time, the model has a simple recursive dynamic structure. Dynamics in the model originate from accumulation of productive factors and productivity changes. The model is benchmarked on China's 1997 data and is solved for subsequent years from 1998 to 2007. We turn now to the details of the baseline scenario.

## 4. Base Case Projections and Simulation Design

*Base Case Scenario:* Our base case scenario is purposely defined as being without China's WTO accession. This is because we seek to explore separately the impact of labor market distortions and WTO accession, thereafter examining how this recent opening of the economy interacts with existing labor market distortions. In the base case, GDP grows at an average rate of about 7.8%, and life expectancy rises from 70.3 to 74.0 years of age. Urban and rural fertility rates also rise. Both of these factors give rise to a larger population in 2007 (1.34 billion), with a

commensurate increase in the labor force which grows at about 1.2%/year. In contrast, the capital stock grows at a 10% annual rate, leading to substantial capital deepening. Total factor productivity represents the difference between the GDP projections and the growth rate supported by the accumulation of labor and capital. This ranges from 1.74% to 2.87% over the projections period. The baseline scenario also shows a substantial increase in openness of the economy, relative to 1997, with exports' share in GDP rising by four percentage points and imports share in GDP rising by about seven percentage points. The current account surplus declines over the baseline period – to about 40% of its 1997 level.

The baseline scenario also shows a narrowing of the urban/rural income ratio, falling from 3.03 to 2.58 as the urban labor force grows by about 56 million people – or nearly one-third, whereas the rural labor grows by only 25 million, from a base of 460 million in 1997. As a result, the rural share in the overall labor force falls from 71.7% to 67.2%. Of this total rural labor force, the share of agricultural employment also falls – as a result of off-farm migration.

In the absence of WTO accession, it is necessary to make some hypothetical assumptions in constructing the base case scenario. Quota growth rates for those imports subject to quantitative restrictions (grains, cotton, wool, sugar, petroleum and autos) are assumed to be 3%/year[9]. Export quotas on textiles and apparel are assumed to growth at annual rates of 5.7% and 6.0%, respectively.[10] All tax rates are held constant over the baseline.

*Experimental Design:* Against this back drop we consider a sequence of alternative scenarios in order to explore the relationship between ongoing economic growth, labor market

[9] This assumption keeps the self-sufficiency ratio of grain constant at base year level over the baseline.

[10] In order to facilitate our analysis of the interaction between labor market reforms and WTO accession, we endeavor to have a

distortions, further opening of the economy to world trade, and rural-urban inequality. With one exception, these scenarios are treated in a cumulative fashion, so that the second scenario includes the first as well as the second modification, the third includes one, two and three, and so on. As a consequence, we will need to distinguish between *incremental* and *cumulative* effects. The first three modifications which we consider relate to the functioning of the labor market, while the fourth incremental scenario pertains to the impact of further opening China's economy to trade. In order to assess the interactions between labor market and product market reforms, we also conduct a fifth (non-cumulative) experiment in which WTO accession is implemented in the absence of labor market reforms.

In the first scenario, we examine the impact of a relaxation of the *hukou* system such that the *ad valorem* tax equivalent of the indirect transactions costs are reduced from 81% to 34% -- at current levels of migration. As noted previously, this is the portion of the observed differential in wages that has been directly attributed to possession of a *hukou* (Shi).[11] We label this scenario: TRANS and focus on the difference between rural-urban inequality, and a variety of other variables of interest, in 2007 with and without the reduced transactions costs.

In the second scenario (LAND), we consider the impact of relaxing one of the important barriers to off-farm labor mobility – the absence of well-defined property rights for agricultural land. As noted above, this leads to the retention of additional labor in the farm sector in the baseline scenario. Specifically, we consider the implications of introducing land reform in 2003, such that farm households evaluate the difference between the marginal value product of their

common accession experiment both with, and without labor market reforms. Therefore, the path of quota rents observed in the absence of labor market reforms is imposed on the various labor market reform scenarios.

[11] As noted previously, the full size of the differential is obtained by controlling for observed differences between rural and urban wages, but this may well be due to other factors.

labor in agriculture and non-farm rural wages in deciding where to work. This contrasts with the baseline scenario in which farm households include the returns to land in their decision to work on- or off-farm, since leaving the farm means losing the land.

The third labor market scenario (MOBIL) appeals to the potential for increasing inter-sectoral mobility of the farm population. There is some preliminary evidence that increased education increases the off-farm supply elasticity of labor (unpublished results based on the work of Shi, Sicular and Zhao, 2002). In order to explore the importance of this parameter in determining rural-urban inequality in China, we implement a revised baseline in which we double the off-farm supply elasticity. This has the effect of increasing the outflow of labor from agriculture, thereby lifting on-farm wages. When combined with the first two labor market reforms, we expect this to have a substantial impact on rural-urban inequality.

Finally, we add the further opening of China's economy to world trade through WTO accession. Here, import tariffs are reduced gradually over the simulation period.[12] Quota growth rates for rice, wheat, corn, cotton, wool, vegetable oil and sugar are accelerated. Textile and clothing quotas on exports to North America and European markets are phased out completely by 2007. Following Francois (2002), we model the impact of service sector liberalization as halving the barriers to services trade. We also introduce a 20% productivity boost for the automobile sector to reflect the efficiency gain from industrial restructuring and realization of economic scale in this sector after China WTO accession (Francois, 2002). As noted above, we implement this accession scenario in two different ways: first, in conjunction with labor market

[12] The sectoral reduction rates are aggregated from Harmonized Commodity Description and Coding System (HS) tariff schedules for the period of 2002-2007 and weighted by 1997 ordinary trade data.

reforms (WTO-L) and secondly, in their absence (WTO). By comparing these two outcomes we are able to assess the potential interaction between labor and product market reforms in China.

## 5. Simulation Results

### Labor Market Reforms

***Aggregate results:*** The aggregate results from these simulations are reported in Table 4. We begin by focusing on the labor market reforms. Here, we are interested in the extent to which these reforms have comparable qualitative effects on key macro-economic variables. To the extent that these effects are the same, then we explore the relative size of each of their incremental impacts, as a means of assessing the relative importance of each of these labor market distortions.

At the top of Table 4, we see labor migration, reported in both percentage change terms and in millions of individuals. It is evident that all three labor market reforms serve to increase migration from the relatively low productivity, agricultural sector, to the higher productivity, urban sector. In the case of land reform, 13.8 million additional workers leave agriculture when they are permitted to rent their land out, as opposed to simply leaving it behind (LAND scenario in Table 4). These individuals migrate to the off-farm rural labor market, which in turn precipitates an additional 10.95 million temporary migrants to the urban sector in order to equalize rural and urban wages, net of transactions costs. The high ratio of rural-urban to off-farm migration indicates that the rural non-farm economy has a limited capacity to absorb these additional workers. The release of these workers from agriculture tends to depress wages in the rural, non-farm economy, where wages fall by 10.59% in the case of land reform. (All price changes are relative to the numeraire, which is foreign exchange.) This wage drop plays a role in dampening out-migration from agriculture.

Urban unskilled wages are linked to rural wages via the equilibrium condition that rural wages plus transactions costs must equal the urban wages. Recall that our specification of transactions costs is increasing in total migration – under the hypothesis that the new migrants had not previously looked for work in the city due to an excess of costs over expected benefits. Therefore, their migration results in higher indirect transactions costs at the margin. However, with rural wages falling, the transactions costs rise, relative to rural wages, as reported in Table 4. So the decline in urban wages is smaller than that for rural wages.

Off-farm, semi-skilled wages fall by a lesser amount than their unskilled counterparts. While the agricultural labor force accounts for two-thirds of the total unskilled labor force in China, it accounts for less than half of the semi-skilled labor force. So the additional release of workers from farming has less of an impact on wages for this category of worker. As a result, semi-skilled labor shows the largest absolute as well as percentage increases in migration. Skilled wages actually rise, as there is almost no skilled labor employed in the agricultural sector, and the ensuing increase in non-agricultural activity, relative to the baseline, boosts the demand for skilled worker, who are also not subject to binding *Hukou* restrictions.

The qualitative impact of a doubling of the off-farm supply elasticity for labor (MOBIL scenario in Table 4) is quite similar to that for the land reform scenario. Here, the increased off-farm migration by 2007 is equal to 12.43 million, precipitating an increase of 10 million in temporary rural-urban migration. Once again, the largest percentage decline in wages is for the unskilled workers, followed by semi-skilled and finally skilled labor. And, as with the land reform scenario, the strongest migration response occurs for the semi-skilled labor category.

While the LAND and MOBIL labor market scenarios focus on the barriers to off-farm mobility of labor, the TRANS scenario focuses on rural-urban migration. When the transactions

costs associated with temporary migration are reduced, due to elimination of the *hukou* system, rural-urban migration expands by 27.45 million workers. Since the transactions costs associated with temporary rural-urban migration operate like a tax on rural labor, the first effect of their reduction is to increase the supply of rural labor to the urban economy, thereby boosting rural wages and depressing urban wages. This represents a direct redistribution of the rents associated with the *hukou* system from urban to rural households. In addition, by raising rural wages, this *hukou* reform scenario also draws some additional labor out of agriculture, although this aspect of migration (3.78 million workers) is much more modest than under the other two scenarios.

Since the LAND and MOBIL scenarios both involve the exit of a substantial amount of labor from agriculture, the value marginal product of land falls, as do land rents. In both cases, land rents fall by more than 6%, whereas the decline in land rents for the transactions cost scenario is only 0.66%.

Consistent with the empirical evidence (e.g., Wang and Kalirajan, 2002), our simulation results suggest that economic efficiency could be improved through the institutional reform in factor markets to improve the rural-urban labor mobility. Aggregate GDP, as well as economic welfare, measured by the sum of the Equivalent Variations for all households, rise in all three labor reform scenarios. This is due to the fact that each of these reforms results in the movement of labor from relatively low productivity sectors (agriculture, and rural non-farm employment), into higher productivity activities (rural non-farm work, and urban employment, respectively). This tends to boost all of the macro-economic aggregates, with the exception of consumption in the LAND and MOBIL scenarios. In these cases, the higher agricultural and food prices result in higher composite consumption price, relative to that of investment goods, thereby leading to a decline in real aggregate consumption.

The question of income distribution is central to our paper – and there are several measures of inequality in China reported in Table 4. First, consider the urban-rural income ratio. This declines in all three scenarios, as income is redistributed from urban to rural households. The most dramatic declines are for the two scenarios that operate on the *Hukou* system and land market: TRANS and LAND. In the case of the transactions cost scenario, for example, this ratio declines from 2.58 to 2.41, which amounts to 0.172 points (see Table 4). The decline for LAND is comparable (0.167 points), whereas the decline for MOBIL scenario is slightly lower (0.15 points). When combined, these measures result in a very substantial decline in rural-urban inequality in China, bringing the projected 2007 urban-rural income ratio down from 2.58 to 2.09.

Table 4 also reports the absolute change in several Gini coefficients. Since rural households benefit relative to urban households, and rural households are much poorer than their urban counterparts, it is hardly surprising that the national Gini coefficient for China also falls under the three labor reform scenarios. On the other hand, the Gini coefficients *within* the urban and rural populations show a slight increase in inequality. This is most pronounced in the urban areas, where the low-income, unskilled labor dependent urban households are hurt most by labor market reforms. In order to better understand what is driving these changes in urban and rural inequality, we turn to Table 5, which reports the change in welfare for representative households across the income spectrum in each of the five strata.

***Disaggregate results:*** The first set of results in Table 5 reports the impact of *hukou* reform (reduced transactions costs) on disaggregated household groups in urban and rural China. It is clear from this table that the largest benefits accrue to the diversified rural households. These are the households supplying temporary migrant labor to urban areas. They bear the direct burden of

the associated transactions costs. When the *Hukou* system is reformed, they are the ones who benefit most directly. The agriculture specialized households also benefit from the rise in rural wages – although their welfare gains are somewhat less, as these wages gains are incompletely transmitted from the non-farm to farm sectors. While the benefits from *hukou* reform are spread relatively evenly across income levels within each of the rural strata, the higher income households – both within the diversified and agricultural strata -- tend to experience larger proportionate gains, thereby contributing to the increase in the Gini coefficient within the rural sector.

Turning to the urban households in Table 5, we see welfare losses for all but the richest labor-specialized households. They suffer from the influx of additional unskilled and semi-skilled rural migrants. The impacts on the transfer specialized households is quite small and of mixed signs. Overall, the urban index of income inequality worsens somewhat. However, the increases in the within sector Gini indexes for the rural and urban sectors is overwhelmed by the reduction in rural-urban inequality, so that the national Gini index for China falls by 0.0142. This is a substantial movement in an index which tends to change very slowly.

The next set of results in Table 5 report the disaggregated household impacts of land reform. In contrast to the previous experiment, we now see the largest gains accruing to the agriculture-specialized, rural households. These are the households that are currently constrained to remain active on the farm if they wish to retain rights to their land. By permitting some of these households to rent the land and migrate to the city if they wish to do so, land market reform raises the shadow value of the labor remaining in agriculture very substantially across all income levels. The diversified rural households also gain, with some of the highest gains coming at the lowest income levels, where households are more heavily reliant on income from agriculture.

Overall, the rural Gini index is hardly changed (Table 4).

Urban household welfare falls across the board in this experiment and it falls most for the poorest households. This is due to the large boost to rural-urban migration of unskilled and semi-skilled labor (recall Table 4) as well as the increase in food prices following the reduction in agricultural labor force. As a consequence the urban Gini index rises. However, from the point of view of overall inequality in China, the main consequence of this experiment is to redistribute income from urban to rural households and this lowers the Gini index by 0.012.

The final experiment reported in Table 4 is qualitatively quite similar to land reform. By increasing the elasticity of off-farm labor mobility, this scenario boosts on-farm wages and therefore agricultural incomes. The resulting increase in rural-urban migration once again depresses urban wages, relative to the baseline scenario. Consequently, while urban inequality rises, the national Gini index falls. In quantitative terms, these results are slightly smaller than those associated with land reform.

***Cumulative effects of labor market reforms:*** The cumulative impact of all three labor market reform scenarios on the macro-economic performance of the Chinese economy in 2007 is also reported in Table 4. From these results, it is clear that such reforms could be potentially quite significant. Overall GDP is 3.74 % higher and aggregate welfare, measured by the summation of household Equivalent Variations is 3.22% greater in 2007. Most striking is the impact on unskilled wages and relative rural and urban incomes. Urban unskilled wages are 23.6% lower as a consequence of these labor market reforms, while the 2007 ratio of urban to rural incomes drops from 2.58 in the baseline to 2.09 in the labor market reform scenario.

Figures 1 and 2 show the cumulative effect of labor market reform on disaggregate urban and rural household welfare. Here, the potential redistribution of welfare is quite striking. The

equivalent variation for agriculture-specialized rural households is between 17 and 27% of initial income. Other rural households also benefit significantly from these reforms. In contrast, urban household welfare falls by as much as 16% of initial income for the poorest urban households (apart from those reliant on transfer payments, who are somewhat insulated from these reforms). It is clear that the main impact of the restrictive labor market policies has been to boost urban household welfare at the expense of rural household welfare – particularly those employed in agriculture.

**Impacts of WTO Accession and Interactions with Labor Market Reforms**

We now turn to issue of product market reform – more specifically China's accession to the WTO which is currently underway. In order to assess the way in which labor market reforms might interact with WTO accession, we perform two experiments. The first of these involves WTO accession in the absence of labor market reforms (experiment WTO), while the second evaluates the impact in the presence of labor market reforms (WTO-L). The macro-economic results from this experiment are reported in Table 4 as well – in terms of deviations from the baseline simulation in the year 2007 when China's WTO accession is complete.

Let us begin with the changes in factor prices, we see that skilled wages rise more than semi-skilled wages, which in turn rise more than unskilled wages – the latter actually fall, relative to the numeraire price of foreign exchange. The relatively greater increase in skilled wages is fueled by the tendency for manufacturing and services sectors to expand at the expense of agriculture. The former sectors are relatively intensive in the use of skilled and semi-skilled labor, thereby boosting wages for these factors, relative to unskilled wages. The decline in agricultural profitability and the accompanying expansion of urban activity gives rise to additional out-migration from agriculture, along with increased temporary migration of 1.46

million workers (experiment WTO) so that the rural wage is once again equated to the urban wage, less the direct and indirect costs associated with migration. In the case of WTO-L, the migration response is greater (2.32 million workers), due to the lesser transactions costs and the higher degree of labor mobility out of agriculture.

Now turn to the real GDP and welfare effects of WTO accession. In the absence of labor market reform, these both increase by 0.65% and 0.73% respectively, while consumption increases by more, and investment by less than this amount. The reduction in trade barriers gives a substantial boost to trade in China, with both exports and imports rising by 15%. Contrasting these macroeconomic outcomes with the incremental effect of WTO accession in the presence of labor market reforms (WTO-L), we see that the GDP and welfare gains are smaller (0.63 and 0.68 respectively) than under the WTO scenario. This, despite the fact that the functioning of the labor markets is improved and the ensuing impact on labor migration – both off-farm and rural-urban – is greater, under the WTO-L scenario. The smaller aggregate impacts under WTO-L are due to the fact that the labor market reforms reduce the productivity differentials between the farm, non-farm rural and urban sectors. As a result, when WTO accession stimulates migration out of agriculture and from the rural to urban sectors, the ensuing gain in overall productivity is smaller under the WTO-L scenario.

WTO accession in the presence of labor market reforms (WTO-L) also has a sharper negative impact on agricultural land rents (see Table 4), as farmers no longer stay active in agriculture simply to avoid losing their land. With 0.76 million more people leaving agriculture, and wage rates rising more under the WTO-L scenario, land rents fall by 6.8% as opposed to 3.5% under the WTO scenario in the absence of labor market reforms.

Table 6 reports the disaggregated household impacts of the two WTO accession scenarios.

These results show that the incremental effects of WTO accession in the presence of labor market reforms tend to benefit the urban households more, and the rural households somewhat less, than WTO accession in the absence of such reforms. However, such interaction effects are overwhelmed by the direct effect of labor market reforms on rural-urban inequality. This can be seen in the final column of Table 4, which reports the cumulative effect of WTO accession and labor market reforms together, relative to the baseline in 2007. In spite of the modest boost to the urban/rural income ratio following WTO accession, this measure of inequality drops dramatically when combined with labor market reforms.

## 6. Conclusions

This paper has utilized a household-disaggregated, recursively dynamic CGE model of the Chinese economy to evaluate the impact of several key labor market distortions in China on rural-urban inequality and income distribution. The labor market imperfections considered include: (a) the *hukou* system of rural and urban household registration that has supported significant differences in rural and urban wages and has contributed to the existence of nearly 100 million temporary migrant workers in China, (b) the absence of a fully functioning land market which would permit existing land owners to rent their land to others and migrate to the city if they found wages there to be more attractive, and (c) the relatively low elasticity of off-farm labor supply which inhibits the transmission of wage signals between the farm and non-farm economies. We also explore how these factor market reforms interact with product market reforms currently underway as part of China's WTO accession process.

The reform associated with the land rental market has a significant impact on rural-urban inequality. Introduction of a fully functioning market for agricultural land permits agricultural

households to focus solely on the differential between farm and non-farm returns to labor in determining whether to work on- or off-farm. This gives rise to an additional 14 million people moving out of agriculture by 2007 and it lends a significant boost to the incomes of those remaining in agriculture. This off-farm migration also contributes to a significant rise in rural-urban migration, thereby lowering urban wages – particularly for unskilled workers. As a consequence, rural-urban inequality declines significantly as does China's national Gini coefficient. The experiment whereby we increase off-farm labor mobility has a very similar effect on China's economy, boosting GDP by moving more labor out of agriculture and reducing rural-urban inequality.

Of the three factor market distortions, we find the *Hukou* reform to be most significant, both in terms of its macro-economic impact, as well as its impact on income distribution. We model this as a reduction in the indirect transactions costs currently incurred by temporary migrants. Whereas the other two labor market reforms primarily benefit the agricultural households, this reform benefits most the rural households currently sending temporary migrants to the city. By reducing the implicit tax on temporary migrants, *Hukou* reform boosts their welfare and contributes to increased rural-urban migration. The combined effect of all three factor market reforms is to reduce the urban-rural income ratio dramatically, from 2.58 in 2007 under our baseline scenario to 2.09.

Finally, we offer some insight into the potential interactions between labor market reforms and WTO accession. A significant portion of the aggregate gains under WTO accession come about by moving labor out of agriculture and into relatively higher productivity activities in the manufacturing and service sectors. By reducing this productivity differential across sectors, labor market reforms dilute the gains under WTO accession. When viewed as a

combined policy package, however, the value of these reforms is much greater than those available only under WTO accession. Furthermore, rather than increasing inequality in China, the combined impact of WTO accession and labor market reforms reduces rural-urban income inequality quite significantly.

## References


Beghin, John, Sébastien Dessus, David Roland-Holst and Dominique van der Mensbrugghe, 1994. Prototype CGE model for the trade and the environment programme-technical specification. OECD Development Centre, Paris.

Chan, Kam Wing and Li Zhang, 1999. The hukou system and rural-urban migration in China: Processes and changes. *China Quarterly* 160, 818-55.

Dervis, K., J. de Melo, and Sherman Robinson, 1982. *General Equilibrium Models for Development Policy*. Cambridge, Cambridge University Press. U.K.

Development Research Center, 1998. *The Global and Domestic Impact of China Joining the World Trade Organization*. Research Paper, Development Research Center of the State Council, PRC, Beijing.

Fan, Xiaoyu and Qie, Shufen, 2002. The situation and features of rural labor migration. *China's Statistics,* No.7 (in Chinese)

Francois, J., 2002. The motor vehicle sector in China and WTO accession. Paper prepared for the conference *WTO Accession, Policy Reform and Poverty Reduction*, Beijing, June 28-29.

Ianchovichina, Elena, R. McDougall and T. Hertel, 1999. China 2005 revisited: the implications of international capital mobility. mimeo, Global Trade Analysis Project, Purdue University.

Kanbur, R and Zhang, Xiaobo, 2001. Fifty years of regional inequality in China: A journey through revolution, reform and openness. Working Paper 2001-04, Dept. of Applied Economics and Management, Cornell University.

Li, Shantong and Fan Zhai, 2002. China's WTO Accession and Implications for its Regional Economies. *Economie Internationale*, 92, pp. 67-102

de Melo, J. and David Tarr, 1992. *A General Equilibrium Analysis of US Foreign Trade Policy.*

Cambridge: The MIT Press.

Rozelle, Scott, Guo Li, Minggao Shen, Amelia Hughart, John Giles, 1999. Leaving China's farms: Survey results of new paths and remaining hurdles to rural migration. *China Quarterly* 158, pp. 367-393.

Shi, Xinzheng, 2002. Empirical research on urban-rural income differentials: The case of China. unpublished manuscript, CCER, Beijing University.

Shi, Xinzheng, Terry Sicular, and Yaohui Zhao, 2002. Analyzing urban-rural income inequality in China. Paper presented at the International Symposium on Equity and Social Justice in Transitional China, Beijing, July 11-12.

Shoven J.B. and J. Whalley, 1992. *Applied General Equilibrium Analysis.* Cambridge: Cambridge University Press.

Sicular Terry and Yaohui Zhao, 2002. Employment, earnings and the rural poverty impacts of China's WTO accession. Paper presented at the DRC/World Bank Workshop on WTO Accession and Poverty, Beijing, May.

Parish, W.L., X. Zhe and F. Li, 1995. Nonfarm work and marketization of the Chinese countryside. *China Quarterly* 143, 697-730.

Wang, Xiaolu and Kalirajan, K. P. 2002, On Explaining China's Rural Sectors' Productivity Growth, *Economic Modelling*, 19(2), pp. 261-75

Wang, Zhi and Zhai, Fan, 1998. Tariff reduction, tax replacement and implication for income distribution in China. *Journal of Comparative Economics* 26, 358-387.

World Bank, 1997. Sharing Rising Incomes: Disparities in China. A World Bank Country Study, The World Bank, Washington, DC.

Yang, Dennis T., 1997. China's land arrangements and rural labor mobility. *China Economic Review* 8(2), 101-116.

Zhai, Fan and Li, Shantong, 2000. The Implications of Accession to WTO on China's Economy. Third Annual Conference on Global Economic Analysis, Melbourne, Australia, June 27-30.

Zhan, Fan and Zhi Wang, 2002. WTO accession, rural labor migration and urban unemployment in China. *Urban Studies* 39(12), 2199-2217

Zhao, Yaohui, 1999a. Labor migration and earnings differences: The case of rural China.

*Economic Development and Cultural Change* 47(4), 767-782.

Zhao, Yaohui, 1999b. Leaving the countryside: Rural-to-urban migration decisions in China. *American Economic Review* 89, 281-286.

**Table 1. Per capita income, by Location, Stratum and Vingtile (Yuan, 1997)**

| Vingtile | Rural Households | | | Urban Households | | | |
|---|---|---|---|---|---|---|---|
| (poorest =1) | Agr | Diverse | Total | Transfer | Labor | Diverse | Total |
| 1 | 845 | 889 | 874 | 2903 | 2135 | 2454 | 2351 |
| 2 | 1049 | 998 | 1006 | 3995 | 3151 | 3054 | 3212 |
| 3 | 1156 | 1162 | 1161 | 4674 | 3790 | 3703 | 3827 |
| 4 | 1303 | 1301 | 1301 | 5273 | 3987 | 4250 | 4216 |
| 5 | 1433 | 1432 | 1432 | 5595 | 4513 | 4452 | 4608 |
| 6 | 1755 | 1551 | 1568 | 6280 | 4763 | 4528 | 4769 |
| 7 | 1675 | 1679 | 1678 | 6594 | 5237 | 4884 | 5155 |
| 8 | 1822 | 1811 | 1812 | 7794 | 5692 | 5370 | 5588 |
| 9 | 1947 | 1944 | 1944 | 8643 | 6096 | 5786 | 6045 |
| 10 | 2099 | 2095 | 2096 | 8142 | 6694 | 6334 | 6564 |
| 11 | 2240 | 2252 | 2251 | 8220 | 6866 | 6482 | 6718 |
| 12 | 2415 | 2411 | 2411 | 8946 | 7420 | 6901 | 7192 |
| 13 | 2602 | 2595 | 2595 | 10807 | 7686 | 7532 | 7671 |
| 14 | 2835 | 2818 | 2819 | 12973 | 8432 | 7974 | 8303 |
| 15 | 3031 | 3069 | 3066 | 10601 | 9120 | 8526 | 8799 |
| 16 | 3344 | 3353 | 3352 | 12925 | 9709 | 8727 | 9130 |
| 17 | 3708 | 3717 | 3717 | | 11152 | 9659 | 10240 |
| 18 | 4306 | 4258 | 4261 | 18821 | 12749 | 10985 | 11796 |
| 19 | 5171 | 5162 | 5163 | 15190 | 15134 | 13403 | 14125 |
| 20 | 9712 | 8345 | 8485 | | 21997 | 19659 | 20522 |
| Share of Population (%) | 7.35 | 62.73 | 70.08 | 1.44 | 12.01 | 16.47 | 29.92 |

Source: NBS Rural and Urban Household Surveys, 2000.

**Table 2. Average Educational Attainment, by Location, Stratum and Vingtile**

| Vingtile | Rural Households | | | Urban Households | | | |
|---|---|---|---|---|---|---|---|
| (poorest =1) | Agr | Diverse | Total | Transfer | Labor | Diverse | Total |
| 1 | 2.17 | 2.38 | 2.31 | 3.50 | 3.26 | 3.19 | 3.24 |
| 2 | 2.49 | 2.47 | 2.48 | 3.00 | 3.47 | 3.44 | 3.46 |
| 3 | 2.41 | 2.44 | 2.43 | 5.00 | 3.87 | 3.62 | 3.74 |
| 4 | 2.62 | 2.50 | 2.52 | | 3.54 | 3.51 | 3.53 |
| 5 | 2.55 | 2.48 | 2.49 | 4.00 | 3.81 | 3.85 | 3.83 |
| 6 | 2.50 | 2.54 | 2.54 | 3.00 | 3.96 | 3.58 | 3.77 |
| 7 | 2.49 | 2.59 | 2.59 | 5.00 | 3.88 | 3.83 | 3.86 |
| 8 | 2.59 | 2.64 | 2.64 | | 3.83 | 3.94 | 3.89 |
| 9 | 2.55 | 2.61 | 2.60 | | 4.13 | 3.92 | 4.01 |
| 10 | 2.60 | 2.68 | 2.67 | | 4.07 | 4.00 | 4.03 |
| 11 | 2.75 | 2.69 | 2.69 | | 4.05 | 4.08 | 4.06 |
| 12 | 2.60 | 2.68 | 2.67 | | 4.14 | 3.98 | 4.06 |
| 13 | 2.63 | 2.70 | 2.69 | | 4.30 | 4.06 | 4.17 |
| 14 | 2.73 | 2.66 | 2.66 | | 4.20 | 4.20 | 4.20 |
| 15 | 2.61 | 2.71 | 2.70 | | 4.24 | 4.14 | 4.18 |
| 16 | 2.67 | 2.76 | 2.76 | 3.00 | 4.34 | 4.14 | 4.21 |
| 17 | 2.66 | 2.78 | 2.77 | | 4.13 | 4.34 | 4.24 |
| 18 | 2.67 | 2.79 | 2.78 | | 4.36 | 4.35 | 4.36 |
| 19 | 2.72 | 2.83 | 2.82 | | 4.42 | 4.31 | 4.36 |
| 20 | 2.70 | 2.88 | 2.87 | | 4.62 | 4.28 | 4.42 |
| Overall average | 2.52 | 2.65 | 2.63 | 3.67 | 4.05 | 3.99 | 4.01 |

Source: NBS Rural and Urban Household Surveys, 2000.

Footnote: We calculated the education attainment by assigning the number 1 to illiterate, or semi-literate, 2 = primary school, 3 = middle school, 4 = high school and 5 = higher educational attainment.

**Table 3. Summary of Baseline Calibration**

| | 1997 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|
| **Exogenous specified variables** | | | | | | | | | |
| GDP Growth Rate (%) | | 8.1 | 7.3 | 7.6 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |
| Life expectancy | 70.3 | 71.8 | 72.0 | 72.2 | 73.2 | 73.4 | 73.6 | 73.8 | 74.0 |
| Total fertility Rate | | | | | | | | | |
| Urban | 1.40 | 1.45 | 1.48 | 1.5 | 1.52 | 1.55 | 1.57 | 1.59 | 1.62 |
| Rural | 2.01 | 1.95 | 1.97 | 1.99 | 2.01 | 2.02 | 2.04 | 2.06 | 2.07 |
| **Calibrated results:** | | | | | | | | | |
| **Macroeconomic trends** | | | | | | | | | |
| *Growth rate ( percent)* | | | | | | | | | |
| Total absorption | | 11.02 | 8.53 | 8.29 | 8.45 | 8.39 | 8.34 | 8.29 | 8.25 |
| Labor force | | 1.23 | 1.21 | 1.17 | 1.15 | 1.17 | 1.16 | 1.15 | 1.15 |
| Capital stock | | 10.08 | 10.51 | 10.45 | 10.28 | 10.18 | 10.08 | 9.98 | 9.88 |
| TFP | | 2.87 | 1.74 | 2.16 | 2.43 | 2.44 | 2.49 | 2.53 | 2.56 |
| *Ratio to GDP ( percent)* | | | | | | | | | |
| Private consumption | 44.3 | 47.0 | 47.3 | 47.4 | 47.4 | 47.4 | 47.5 | 47.6 | 47.6 |
| Investment | 32.7 | 34.1 | 35.2 | 35.9 | 36.7 | 37.4 | 38.1 | 38.8 | 39.4 |
| Export | 21.7 | 25.5 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.6 | 25.6 |
| Import | 16.3 | 22.9 | 23.5 | 23.7 | 23.8 | 24.0 | 24.1 | 24.2 | 24.2 |
| Urban/rural per capital income ratio | 3.03 | 2.77 | 2.74 | 2.71 | 2.68 | 2.65 | 2.63 | 2.60 | 2.58 |
| **Population and labor force** | | | | | | | | | |
| Population (Million) | 1236.3 | 1269.9 | 1280.5 | 1290.8 | 1301.0 | 1311.5 | 1321.9 | 1332.4 | 1343.0 |
| Urban | 369.9 | 397.5 | 407.2 | 416.9 | 426.6 | 436.5 | 446.4 | 456.4 | 466.5 |
| Rural | 866.4 | 872.4 | 873.3 | 873.9 | 874.3 | 875.0 | 875.5 | 876.0 | 876.4 |
| Labor force (Million) | 640.7 | 665.6 | 673.6 | 681.5 | 689.4 | 697.4 | 705.5 | 713.6 | 721.8 |
| Urban | 181.1 | 196.9 | 202.5 | 208.2 | 213.8 | 219.5 | 225.3 | 231.2 | 237.2 |
| Rural | 459.6 | 468.7 | 471.1 | 473.4 | 475.6 | 477.9 | 480.2 | 482.4 | 484.6 |
| Grain self-sufficiency rate (%) | 99.5 | 98.5 | 98.4 | 98.4 | 98.3 | 98.2 | 98.1 | 98.0 | 98.0 |
| Share of rural labor force (%) | 71.7 | 70.4 | 69.9 | 69.5 | 69.0 | 68.5 | 68.1 | 67.6 | 67.2 |
| Share of agricultural employment in total rural labor force (%) | 72.0 | 71.9 | 71.6 | 71.6 | 71.2 | 71.0 | 70.9 | 70.7 | 70.7 |

Data source: Author's calculation.

**Table 4. Implications of China's Reforms in 2007 (% change relative to baseline)**

| | Incremental Effects | | | | | Cumulative | Cumulative |
|---|---|---|---|---|---|---|---|
| | Labor Market Reforms | | | WTO reforms | | Labor | Labor & |
| | TRANS | LAND | MOBIL | WTO | WTO-L | Market Reforms | WTO Reforms |
| Macroeconomic Variables | | | | | | | |
| Welfare(EV) | 1.46 | 0.99 | 0.73 | 0.73 | 0.68 | 3.22 | 3.92 |
| GDP | 1.55 | 1.18 | 0.97 | 0.65 | 0.63 | 3.74 | 4.39 |
| Consumption | 1.79 | -0.25 | -0.23 | 1.02 | 1.03 | 1.30 | 2.35 |
| Investment | 2.86 | 2.77 | 2.20 | 0.46 | 0.36 | 8.04 | 8.42 |
| Exports | 1.87 | 1.91 | 1.90 | 14.98 | 15.40 | 5.79 | 22.08 |
| Imports | 1.72 | 1.61 | 1.57 | 14.23 | 14.60 | 4.98 | 20.31 |
| Factor Prices | | | | | | | |
| Returns to agr land | -0.66 | -6.43 | -6.55 | -3.54 | -6.80 | -13.14 | -19.05 |
| Capital returns | -0.37 | 0.00 | -0.85 | -0.56 | -0.37 | -1.21 | -1.58 |
| Unskilled wages | | | | | | | |
| Urban | -9.36 | -9.93 | -6.37 | -0.30 | -0.75 | -23.56 | -24.13 |
| Rural non-agri | 12.88 | -10.59 | -6.88 | -0.34 | -0.75 | -6.01 | -6.72 |
| Agricultural | 3.30 | -14.06 | 13.90 | -0.76 | -1.06 | 1.11 | 0.04 |
| without land return | 4.41 | 17.44 | 13.90 | 0.13 | -1.06 | 39.67 | 38.19 |
| Semi-skilled wages | | | | | | | |
| Urban | -4.77 | -3.51 | -3.65 | 0.37 | 0.15 | -11.47 | -11.34 |
| Rural non-agri | 18.10 | -4.07 | -4.20 | 0.26 | 0.14 | 8.54 | 8.69 |
| Agricultural | 7.01 | -8.38 | 18.78 | -0.28 | -0.28 | 16.46 | 16.13 |
| without land return | 9.21 | 19.57 | 18.78 | 0.66 | -0.28 | 55.10 | 54.66 |
| Skilled wages | | | | | | | |
| Urban | 3.44 | 1.94 | 1.71 | 1.11 | 1.09 | 7.24 | 8.41 |
| Rural non-agri | 3.44 | 1.94 | 1.70 | 1.11 | 1.09 | 7.24 | 8.41 |
| Agricultural | 3.61 | -0.97 | 15.90 | 0.42 | 0.56 | 18.92 | 19.58 |
| without land return | 4.24 | 17.56 | 15.90 | 1.10 | 0.56 | 42.02 | 42.82 |
| Inequality measurement* | | | | | | | |
| Urban/rural income ratio | -0.1724 | -0.1672 | -0.1509 | 0.0107 | 0.0261 | -0.4905 | -0.4645 |
| Gini | -0.0142 | -0.0120 | -0.0113 | 0.0013 | 0.0025 | -0.0375 | -0.0350 |
| Urban | 0.0055 | 0.0061 | 0.0059 | 0.0004 | 0.0001 | 0.0174 | 0.0176 |
| Rural | 0.0023 | 0.0000 | 0.0003 | 0.0001 | -0.0001 | 0.0027 | 0.0025 |
| Transactions costs | | | | | | | |
| Unskilled | -47.05 | -8.16 | -5.19 | -0.15 | -0.46 | -53.90 | -54.11 |
| Semi-skill | -43.75 | -1.97 | -2.24 | 0.63 | 0.42 | -46.09 | -45.87 |
| Labor Migration (millions) | | | | | | | |
| Agr-Nonagr | 3.78 | 13.80 | 12.43 | 1.89 | 2.65 | 30.01 | 32.67 |
| Rural-Urban | 27.45 | 10.95 | 10.00 | 1.46 | 2.32 | 48.39 | 50.71 |
| Unskilled | 9.03 | 3.45 | 2.46 | 0.35 | 0.62 | 14.93 | 15.56 |
| Semi-skill | 18.44 | 7.20 | 7.26 | 1.03 | 1.59 | 32.89 | 34.48 |
| Skilled | -0.02 | 0.30 | 0.28 | 0.07 | 0.11 | 0.56 | 0.67 |
| Labor Migration (%) | | | | | | | |
| Agr-Nonagr | 4.84 | 16.85 | 12.99 | 2.42 | 2.45 | 38.42 | 41.82 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rural-Urban | 38.54 | 11.10 | 9.12 | 2.05 | 1.94 | 67.96 | 71.22 |
| Unskilled | 30.78 | 8.99 | 5.88 | 1.20 | 1.41 | 50.92 | 53.05 |
| Semi-skill | 51.05 | 13.19 | 11.76 | 2.86 | 2.30 | 91.09 | 95.48 |
| Skilled | -0.30 | 5.22 | 4.64 | 1.28 | 1.75 | 9.78 | 11.69 |

*Change of original value, not % change.

**Data Source**: Simulation results.

**Table 5. Incremental Household Impacts of Labor Market Reforms in China (EV as % of households income, 2007)**

| Vingtile | ***Urban*** | | | ***Rural*** | |
|---|---|---|---|---|---|
| (poorest =1) | Transfer specialized | Labor specialized | Diversified | Ag-specialized | Diversified |
| *Scenario: TRANS* | | | | | |
| 1 | -0.937 | -5.422 | -4.775 | 2.992 | 5.119 |
| 2 | -0.555 | -4.650 | -4.138 | 3.391 | 5.483 |
| 3 | -0.546 | -3.099 | -3.670 | 3.628 | 5.597 |
| 4 | -0.512 | -4.372 | -3.928 | 3.802 | 5.633 |
| 5 | -0.507 | -3.562 | -3.061 | 3.791 | 5.764 |
| 6 | -0.394 | -2.775 | -3.644 | 3.929 | 6.039 |
| 7 | -0.232 | -2.682 | -2.871 | 4.093 | 5.963 |
| 8 | -0.211 | -3.064 | -2.797 | 3.893 | 6.197 |
| 9 | -0.387 | -2.083 | -2.554 | 3.826 | 6.276 |
| 10 | -0.485 | -1.860 | -2.170 | 3.796 | 6.673 |
| 11 | -0.370 | -2.057 | -2.086 | 3.840 | 6.653 |
| 12 | -0.182 | -1.793 | -2.091 | 4.074 | 6.658 |
| 13 | -0.435 | -1.165 | -2.042 | 3.994 | 6.481 |
| 14 | -0.239 | -1.830 | -1.572 | 4.327 | 6.628 |
| 15 | -0.433 | -1.439 | -1.565 | 3.864 | 6.863 |
| 16 | -0.531 | -0.821 | -1.895 | 4.131 | 6.755 |
| 17 | | -1.831 | -1.197 | 4.440 | 7.290 |
| 18 | 0.116 | -0.963 | -0.775 | 4.243 | 6.977 |
| 19 | -0.162 | -0.612 | -1.282 | 4.126 | 6.911 |
| 20 | 0.000 | 0.226 | -0.702 | 4.387 | 6.760 |
| *Scenario: LAND* | | | | | |
| 1 | -2.391 | -6.589 | -5.957 | 6.997 | 2.481 |
| 2 | -2.396 | -5.636 | -5.182 | 7.906 | 2.738 |
| 3 | -2.224 | -4.442 | -4.969 | 8.320 | 2.971 |
| 4 | -2.245 | -5.418 | -5.084 | 8.924 | 2.687 |
| 5 | -2.358 | -4.709 | -4.253 | 8.728 | 2.779 |
| 6 | -2.072 | -4.086 | -4.790 | 8.973 | 2.329 |
| 7 | -1.996 | -3.951 | -4.160 | 9.566 | 2.090 |
| 8 | -1.233 | -4.156 | -3.999 | 9.167 | 2.179 |
| 9 | -1.836 | -3.404 | -3.846 | 8.994 | 2.126 |
| 10 | -2.009 | -3.365 | -3.479 | 8.840 | 1.352 |
| 11 | -1.830 | -3.363 | -3.348 | 8.994 | 1.542 |
| 12 | -1.418 | -3.096 | -3.357 | 9.537 | 1.192 |
| 13 | -1.736 | -2.699 | -3.182 | 9.402 | 1.609 |
| 14 | -1.503 | -3.045 | -2.787 | 10.275 | 1.854 |
| 15 | -1.545 | -2.788 | -2.709 | 8.822 | 1.104 |
| 16 | -1.455 | -2.378 | -2.795 | 9.606 | 1.380 |
| 17 | | -2.898 | -2.278 | 10.564 | 1.169 |
| 18 | -0.154 | -2.099 | -1.969 | 9.840 | 1.166 |
| 19 | -0.883 | -1.885 | -2.043 | 9.374 | 1.793 |
| 20 | 0.000 | -1.083 | -0.922 | 10.376 | 3.543 |
| *Scenario: MOBIL* | | | | | |
| 1 | -2.681 | -6.161 | -5.649 | 6.229 | 2.134 |
| 2 | -2.908 | -5.460 | -5.139 | 6.994 | 2.392 |
| 3 | -2.672 | -4.479 | -4.816 | 7.411 | 2.643 |

| | | | | | |
|---|---|---|---|---|---|
| 4 | -2.735 | -5.261 | -5.028 | 7.989 | 2.385 |
| 5 | -2.911 | -4.563 | -4.251 | 7.830 | 2.487 |
| 6 | -2.621 | -3.974 | -4.671 | 8.126 | 2.056 |
| 7 | -2.543 | -3.857 | -4.081 | 8.658 | 1.855 |
| 8 | -1.605 | -4.062 | -3.977 | 8.276 | 1.906 |
| 9 | -2.279 | -3.481 | -3.850 | 8.095 | 1.899 |
| 10 | -2.445 | -3.309 | -3.508 | 7.961 | 1.106 |
| 11 | -2.281 | -3.301 | -3.372 | 8.127 | 1.293 |
| 12 | -1.908 | -3.038 | -3.334 | 8.670 | 0.974 |
| 13 | -2.040 | -2.672 | -3.250 | 8.532 | 1.390 |
| 14 | -1.961 | -3.012 | -2.912 | 9.404 | 1.613 |
| 15 | -1.773 | -2.712 | -2.808 | 7.972 | 0.856 |
| 16 | -1.687 | -2.377 | -2.882 | 8.765 | 1.164 |
| 17 | | -2.793 | -2.471 | 9.714 | 0.868 |
| 18 | -0.442 | -2.127 | -2.131 | 9.013 | 0.945 |
| 19 | -1.222 | -1.878 | -2.218 | 8.565 | 1.535 |
| 20 | 0.000 | -1.186 | -1.431 | 9.559 | 3.072 |

**Data Source**: Simulation results.

**Table 6. Incremental Household Impacts of WTO Accession in the Absence of and in the Presence of Labor Market Reforms in China (EV as % of households income, 2007)**

| Vingtile | ***Urban*** | | | ***Rural*** | |
|---|---|---|---|---|---|
| (poorest =1) | Transfer specialized | Labor specialized | Diversified | Ag-specialized | Diversified |
| *Scenario: WTO-L* | | | | | |
| 1 | 0.121 | 1.542 | 1.381 | 0.151 | 0.355 |
| 2 | 0.003 | 1.691 | 1.568 | 0.079 | 0.359 |
| 3 | 0.035 | 1.877 | 1.614 | -0.056 | 0.377 |
| 4 | -0.018 | 1.791 | 1.442 | -0.143 | 0.369 |
| 5 | -0.006 | 1.775 | 1.592 | -0.066 | 0.368 |
| 6 | 0.046 | 1.898 | 1.385 | -0.089 | 0.410 |
| 7 | 0.126 | 1.954 | 1.656 | -0.172 | 0.449 |
| 8 | 0.021 | 1.915 | 1.726 | 0.046 | 0.406 |
| 9 | 0.056 | 2.031 | 1.637 | -0.086 | 0.376 |
| 10 | -0.079 | 2.166 | 1.664 | -0.022 | 0.452 |
| 11 | -0.011 | 2.024 | 1.614 | -0.134 | 0.415 |
| 12 | -0.015 | 2.043 | 1.610 | -0.116 | 0.435 |
| 13 | 0.005 | 2.087 | 1.604 | -0.151 | 0.400 |
| 14 | 0.554 | 2.027 | 1.564 | -0.123 | 0.433 |
| 15 | 0.048 | 2.131 | 1.660 | -0.144 | 0.456 |
| 16 | 0.075 | 2.092 | 1.517 | 0.195 | 0.423 |
| 17 | | 1.917 | 1.438 | 0.210 | 0.506 |
| 18 | 0.143 | 1.970 | 1.568 | 0.058 | 0.379 |
| 19 | -0.094 | 2.069 | 1.314 | -0.127 | 0.342 |
| 20 | 0.000 | 2.042 | 0.798 | -0.133 | 0.304 |
| *Scenario: WTO* | | | | | |
| 1 | -0.274 | 1.217 | 1.044 | 0.446 | 0.534 |
| 2 | -0.548 | 1.395 | 1.247 | 0.426 | 0.571 |
| 3 | -0.450 | 1.533 | 1.279 | 0.343 | 0.606 |
| 4 | -0.534 | 1.477 | 1.103 | 0.295 | 0.591 |
| 5 | -0.584 | 1.451 | 1.252 | 0.366 | 0.609 |
| 6 | -0.464 | 1.571 | 1.048 | 0.355 | 0.636 |
| 7 | -0.397 | 1.631 | 1.315 | 0.320 | 0.658 |
| 8 | -0.287 | 1.607 | 1.395 | 0.522 | 0.636 |
| 9 | -0.381 | 1.706 | 1.295 | 0.370 | 0.623 |
| 10 | -0.550 | 1.844 | 1.308 | 0.409 | 0.671 |
| 11 | -0.457 | 1.709 | 1.269 | 0.316 | 0.650 |
| 12 | -0.397 | 1.731 | 1.271 | 0.367 | 0.648 |
| 13 | -0.356 | 1.766 | 1.267 | 0.345 | 0.635 |
| 14 | 0.263 | 1.719 | 1.224 | 0.421 | 0.683 |
| 15 | -0.270 | 1.826 | 1.339 | 0.329 | 0.678 |
| 16 | -0.190 | 1.768 | 1.204 | 0.654 | 0.664 |
| 17 | | 1.631 | 1.102 | 0.782 | 0.749 |
| 18 | 0.052 | 1.682 | 1.230 | 0.629 | 0.642 |
| 19 | -0.354 | 1.774 | 1.006 | 0.391 | 0.618 |
| 20 | 0.000 | 1.743 | 0.506 | 0.469 | 0.619 |

**Data Source**: Simulation results.

Figure 1. Cumulative Impact of Labor Market Reforms on Urban Households

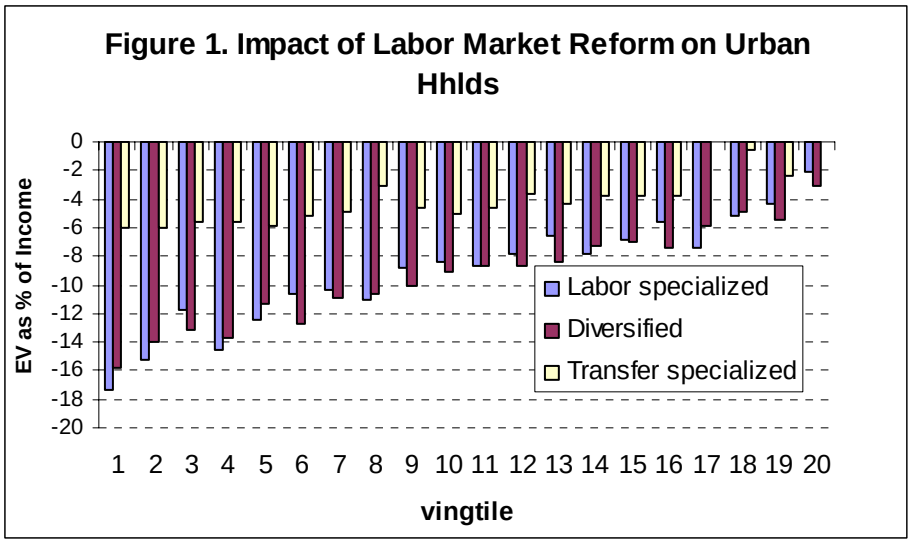


Figure 2. Cumulative Impact of Labor Market Reforms on Rurual Households.