APRIL 14, 2008

ECONOMIC AND POVERTY IMPACTS OF AGRICULTURAL PRICE DISTORTIONS IN CHINA*

Fan Zhai and Thomas Hertel

(Asian Development Bank) (Center for Global Trade Analysis, Purdue University)

Abstract:

Capitalizing on the most recent estimates of agricultural border protection in China and in other countries, this paper assesses the economic and poverty impact of global trade reform in China. It also examines the interplay between the trade reforms and factor market reforms aimed at improving the allocation of labor within the Chinese economy. The results suggest that trade reforms in the rest of the world, land reform and *hukou* reform all serve to reduce poverty, while unilateral tarde reforms result in a small poverty increase. Agricultural distortions are important factors in determining the distributional and poverty effects of trade reform packages, although their impacts on aggregate trade and welfare are small. A comprehensive reform package which bundle the reforms in commodity and factor markets together may benefit all broad household groups in China.

1. Introduction

As the most populous nation in the world, China plays a critical role in the determination of the global poverty headcount. Indeed a considerable portion of the reduction in the latter can be attributable to the remarkable reduction in poverty incidence in China over the past two decades. Ravallion and Chen (2004) find that, in 1981, 65% of the population in China was in extreme ($1/day) poverty, whereas by 2001, this figure had fallen to nearly 12%. These authors show that much of this poverty reduction was driven by reforms in the agricultural sector. These advances

* The views expressed in the paper are those of the authors and should not be attributed to their affiliated

notwithstanding, rural poverty continues to dominate the national poverty headcount in China, and the headcount is highest among households which are specialized in farming. Furthermore, there is evidence that, despite rapid economic growth, the rural-urban wage gap is widening (Sicular et al., 2007). Therefore, the agricultural sector continues to play an important role in the determination of national poverty in China. In this paper, we focus on the impact of agricultural and rural policy reforms – both at home and abroad -- on poverty and inequality in China.

The impact of trade reforms on poverty and inequality in China has been a topic of intense research over the past decade, culminating in a number of studies focusing on the impact of China's accession to the WTO on poverty (e.g., see Bhattasali, Li and Martin, 2004). Chen and Ravallion (2004) examine these impacts at a highly disaggregate level using earnings and price estimates from another study, and estimate that WTO accession will benefit urban households – particularly the poor urban households. However, their prediction of the impact of accession on rural households is quite different. Here, they find that falling rural wages and increases in consumer prices for these households are likely to hurt the rural poor. In a companion study, Zhai, Hertel and Wang (2004) aggregate households to a greater degree, but incorporate them directly into their CGE model of China. They, too, conclude that WTO accession would be relatively more favorable for urban households. However, they argue that whether or not rural households will lose from these reforms depends critically on the degree of off-farm labor mobility. At low (or zero) mobility, as assumed by Chen and Ravallion, the poorest rural households lose from reform. These authors find that, as the off-farm labor supply elasticity rises, the potential for farm households to gain increases.

In closely related work, Hertel and Zhai (2006) contrast the impacts of commodity market

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institution.

reforms, such as those initiated under China's WTO accession, with factor market reforms aimed at facilitating an improved flow of labor out of agriculture and between the rural and urban markets. They find that the latter can result in significant gains for rural households. Specifically, those authors explore the implications of (a) reforming agricultural land markets to permit arms-length land rental in all rural areas, thereby facilitating the permanent movement of labor out of farming, (b) enhancing off-farm labor mobility, and (c) abolishing the *hukou* system, thereby reducing the transaction costs imposed on rural–urban migrants. When combined, these reforms reduce the estimated 2007 urban-rural income ratio from 2.58 (in the absence of WTO accession) to 2.09. When WTO accession is additionally added to this mix of policy reforms, the 2007 urban-rural income ratio is still reduced – but not quite as much -- to 2.12. Given the importance of the labor market distortions for poverty and inequality in China, we pay special attention to their presence in this study as well.

In this paper we capitalize on the most recent estimates of agricultural border protection in China – as well as in other developing countries, in order to make an assessment of the impact of global trade reform on poverty and inequality in China. We seek to decompose these impacts in two ways: first by region (China vs. rest of the world), and secondly by sector (agriculture vs. non-agriculture). We also examine the interplay between these commodity market reforms and factor market reforms aimed at improving the allocation of labor within the Chinese economy.

This paper is organized as follows: the next section describes the specification of the CGE model used in this study. We then assess the impact of eliminating agricultural distortions in rest of the world, as well as reducing China's own distortions in commodity and factor markets, on macro-economy, agricultural production and poverty. The final section offers conclusions.

2. The Model and Data

The Chinese model used in this study is an updated version of the household-disaggregated CGE model which we used to study the economic and poverty effects of WTO accession and Doha round trade liberalization on China (Hertel, Zhai, and Wang 2004; Hertel and Zhai, 2006; Zhai and Hertel, 2006). 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; de Melo, 1988; Shoven and Whalley, 1992). The updated version in this paper has a more recent benchmark dataset based on 2002 Chinese I/O table and a very detailed sectoral disaggregation for agriculture and food. In this section we describe the main features of the model.

Household Behavior: Following our previous work, we disaggregate rural and urban households into 40 rural and 60 urban representative households according to their primary source of income and relative income level. According to the available survey data, we stratify the rural households by agriculture-specialized (more than 95% of household income from farming) and diversified (all other), and the urban households by three strata: transfer-specialized, labor-specialized and diversified. Within each stratum, we order households from poorest to richest, based on per capita income, and then group them into 20 vingtiles, each containing 5% of the stratum population.

Household income derives from labor income, profits from family-owned agriculture and non-agriculture enterprises, property income and transfers. 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.

The other important dimension of household behavior is the supply of labor to off-farm activities. 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, among which the rural land tenure system is one of most widely-known (Zhao, 1999b). The absence of well-defined land tenure has serve to raise 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).[1] Although an active land rental market has emerged in some regions in recent years, the overall level of land rental transactions is still low, with around 10%-15% of rural households renting land in/out (Deininger and Jin, 2005; 2007; Wang et al, 2007). Empirical studies have found that the transaction costs associated with land rental are significant and the absence of an efficient land rental market remains a significant factor barrier to the facilitation of off-farm participation of rural labors (Deininger and Jin, 2005; Wang et al, 2007).

In our model we employ a constant elasticity of transformation function to constrain the off-farm labor supply of rural households. The labor allocation between farm and off-farm jobs is determined by the ratio of the shadow value of labor in agriculture, relative to the off-farm wage rate, and the elasticity of transformation[2], which reflects imperfect labor mobility. There are

[1] However, as noted by Parish, Zhe and Li (1995), the rural labor market is looking more like a market all the time.
[2] See Hertel and Zhai (2004) for the details of the off-farm labor supply behavior in the model.

many reasons for this imperfect mobility of labor, including education, experience, and simple geography, which can serve to isolate farm households from the non-farm labor market. Owing to the absence of an effectively functioning land market, the shadow value of labor in agriculture in this function takes into account the potential impact which reducing agricultural employment will have on the household's claim to farm land. This incremental factor is calculated as the marginal value product of land, multiplied by the probability that the household will lose its land as a result of off-farm migration. In order to make this amenable to use in a model of the representative farm household, with continuously variable labor and land use, we specify this probability as the elasticity of land income with respect to on-farm labor is 0.5, i.e. a ten percent reduction in on-farm work results in a 5 percent loss of land income. However, for purposes of sensitivity analysis we also report results from two extreme simulations. In the first, the elasticity of land income with respect to off-farm work is zero. This is the case of a perfectly functioning land rental market -- with no chance of land loss. In the second sensitivity analysis, the elasticity is set equal to one. such that the farmer leaving his farm to work in the city is virtually guaranteed of losing his land. By comparing these two extremes, we gain an appreciation for how important land market reform might be for inequality.

Specification of the values of the off-farm labor supply elasticity draws on the econometric work of Sicular and Zhao (2004) and Zhang, Huang and Rozelle (2002). Sicular and Zhao report results from a household labor supply model estimated using labor survey data from the 1997 CHNS data set for nine central provinces. From their labor supply equations for self-employed agricultural labor, self-employed non-agricultural labor, it is possible to calculate elasticities of labor transfer from farm to non-farm activities. They report a variety of elasticities in their

paper.[3] We adopt their estimate of 2.67 for use in this work as the overall farm/off-farm transformation elasticity for total rural labor force.

To obtain separate estimates of the farm/off-farm transformation elasticity for unskilled and semi-skilled labor, we utilized the rate at which increased schooling attainment enhances the transformation elasticity, based on the study by Zhang, Huang and Rozelle (2002). These authors explored the labor-supply behavior of a panel of 310 individuals in 109 families observed in four villages of Jiangsu province in the years 1988, 1992, and 1996. They found that for every additional year of education, farmers had a 14% greater chance of finding an off-farm job in 1996, ceteris paribus. Using the base year ratio of the shadow value of labor in agriculture relative to the off-farm wage rate, as well as the total farm and off-farm labor supplies, this increasing opportunity to access to off-farm job associated with higher educational attainment translates into an increment of 0.58 in the farm/non-farm transformation elasticity for each additional year of schooling. This is used to calculate the transformation elasticities by skill level, according to the average schooling year of each skill level of rural labor forces. The resulting values for this elasticity are 0.68 for unskilled labor and 4.01 for semi-skilled labor[4].

Rural-urban Migration: Migration is a key part of the rural economy in China. According to rural household survey data collected in 2003 and compiled by Liu, Park and Zhao (2006), 19.4% of all rural workers participated in migratory work in that year, and more than 40% of all households had at least one member who was a migrant in 2003. More than half of the migrants left their province, and most of these migrated to the coastal provinces where manufacturing

[3] 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 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.

activity and exports have been booming. The 2000 census estimated that the total number of migrants in China was 131 million, of which nearly two-thirds were non-*hukou* migrants. (Households without the *hukou* urban registration face limited access to many of the amenities, including housing and education, is limited and quite expensive.) Rural-urban migration was the largest form of migration and amounted to more than 50 million in the 2000 census (Cai, Park and Zhao). This massive migration is a rational response to the enormous rural-urban wage gap that exists in China, which Sicular et al. (2007) have recently placed at 2.27 (the ratio of urban to rural per capita disposable income in 2002) after adjusting for housing subsidies and spatial price differences. Remarkably, they find no evidence of this gap declining. Indeed, if anything, the ratio of urban to rural incomes appears to have risen slightly between 1997 and 2002. This is hardly the outcome that a standard, general equilibrium model would predict! Clearly there are some important barriers to labor movement in China that need to be considered if one hopes to accurately assess the impact of commodity market reforms on rural and urban employment, wages and household income.

While the rural-urban per capita income gap is an indication of a potential labor market distortion, what we really want to know is the hourly wage differential for workers of comparable skill and ability. 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). The authors conclude that the apparent labor market distortion is about 42% of the rural-urban

[4] Given the very small number of skilled farm workers in China, this segment is ignored in our analysis.

labor income differential and 48% of the hourly earnings differential.[5] When applied to their estimated average wage differential, this amounts to an *ad valorem* rate of apparent transactions "tax" on rural wages of 81%.[6]

We model these transactions costs as real costs that are assumed by the 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 are working 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 after their work. 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 transactions cost function that is increasing in the proportion of the rural population engaged in temporary work. This transactions cost function has a simple, constant elasticity functional form, which begins at the origin and reaches the observed wage gap (adjusted for transport and living costs) at the current level of temporary migration (about 70 million workers). We assume that further increases in temporary migration have only a modest impact on these transactions costs.[7] Finally, it is important to note that only a portion of these observed transactions costs can be attributed to the government's formal policy

[5] There are likely 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. Therefore, it is useful to also estimate 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).

[6] See Hertel and Zhai (2004) for a detailed description of how this *ad valorem* distortion is obtained.

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

of migration restriction – the *hukou* system. Indeed, Shi (2002) finds that only 28% of the rural-urban wage difference can be explained directly via the coefficient on the *hukou* registration variable. We will take this into account later in our paper, when we investigate the implications of the Chinese government undertaking labor market reforms prior to the implementation of trade reforms.

Production and Income Distribution: Production in each of the sectors of the economy is modeled using nested constant elasticity of substitution (CES) functions, and constant returns to scale is assumed. In the top level of the nest, value-added and a composite of intermediate inputs produce outputs. Then a further CES function disaggregates the value-added into capital-labor composite and agricultural land. Capital-labor composite is further split into the capital-skilled labor composite and the aggregated less-skilled labor. The capital-skilled labor composite consists of capital and skilled labor, while aggregated less-skilled labor is composed of semi-skilled labor and unskilled labor. A low substitution elasticity of 0.3 between capital and skilled labor is assumed here to introduce the capital-skill complementarity. The elasticity of substitution between semi-skilled labor and unskilled labor is set to 1.5, based on estimates for the U.S. by Katz and Murphy (1992) and Heckman and Lochner (1998).

Each type of labor comprises rural and urban labor that substitute imperfectly. This is an indirect means of building into the model a geographic flavor – since some sectors will be located largely in urban 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 activity. Ideally we would model the geographic distribution of industrial activity, but unfortunately the data do not exist to support this split.

Income generated from production is distributed to enterprises, households and government. Enterprises earnings equal a fixed share of gross capital revenue minus corporate income tax. A part of enterprise earnings is allocated to households as transfers, which are fixed in real terms (indexed via the CPI) in our simulations. The other part of enterprise earnings is retained earnings, i.e., corporate savings for new investment and capital depreciation replacement. The government derives revenues from the corporate income tax, the household income tax, import tariffs, VAT and other production tax which is levied on gross output. Production and export subsidies as well as VAT rebate for exports enter as negative receipts in government's account. The government revenue is allocated into purchase for public goods, transfer to households and government saving.

All commodity and non-labor factor markets are assumed to clear through prices. With the exception of the farm/non-farm labor supply decision, labor is assumed to be perfectly mobile across sectors, but rural labor can only be imperfectly transformed into urban labor. Capital is assumed to be partially mobile, reflecting differences in the marketability of capital goods across sectors.

Exports and Imports: Import demand is modeled using the Armington assumption, i.e. domestic products are assumed to be differentiated from foreign products. On the export side, it is assumed that the firms treat domestic market and export markets indifferently. Thus the law of one price holds, i.e. the export price is identical to that of domestic supply. 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. Therefore the terms of trade for China are endogenous in the simulations. The value of export demand and

Armington elasticities are based on the elasticities used in the global CGE model LINKAGE (van der Mensbrugghe, 2005).

The Benchmark Data: A Chinese social accounting matrix (SAM) is estimated for the year of 2002 to serve as the benchmark data set for model calibration. The SAM contains 48 sectors of production and 100 representative households, based on the 2000 household survey data for three provinces (Guangdong, Sichuan, and Liaoning) and the most recent 2002 Input-Output table. Since the 2002 Input-Output table has only one crops sector and one livestock sector, respectively, we disaggregate these two sectors to eight crops sectors and four livestock sectors according to the corresponding GTAP sector classification. The information about the structure of production, demand, inputs and trade from GTAP database version 7.0 are used for the sectoral disaggregation and we employ the cross-entropy method to balance the SAM (see Robinson, Cattaneo, and El-Said, 2001).

The base year trade interventions are reported Table 1. Tariff rates and export subsidies for lightly processed food and agricultural products are obtained from Huang, Rozelle and Martin (2007) and from the GTAP database, version 7.0. For other primary goods and manufacturing products, tariffs are estimated based on statutory tariff rates, collected revenue of import tariffs and base year imports by commodities. As shown in Table 1, China's tariff structure provides more protection for food and agricultural products than non-food manufacturing goods. Moreover, the import tariff rates show considerable cross-sector variation within agriculture: vegetables and fruits, oil seeds and sugar cane and beet have high tariff rates of around 15%, while plant-based fibers appear to be effectively subsidized.

4. Simulations

Simulation Design

To explore the implications of agricultural distortions – both at home and abroad -- for the Chinese economy, we consider six policy reform scenarios which aim to eliminate various distortions in global trade and in China's domestic commodity and factor markets. These scenarios are summarized in Table 2. The first two scenarios examine the effects of trade liberalization in the Rest of the World. *ROW-Ag*, considers the impact of agricultural liberalization in the form of elimination of import tariffs and export subsidies, as well as subsidies for domestic production, in agriculture and lightly processed food sectors in rest of the world. The second scenario involving Rest of World policies (*ROW*) looks at a broad-based commodity trade liberalization. It combines the removal of policy distortions in agricultural and lightly processed sectors in Scenario 1 with tariff elimination for non-agricultural goods in rest of the world.

We incorporate the impacts of trade reforms in the rest of the world in the Chinese CGE model through exogenous changes in import prices and export demands. The sizes of these exogenous trade shocks are obtained from the global CGE model *Linkage*, omitting China's reforms in the process. Table 3 lists the external shocks imposed in the *ROW* and *ROW-Ag* scenarios.[8] It shows there are some enormous percentage increases in China's agricultural and food export volumes generated by the elimination of very high rates of protection elsewhere in Asia. Rice, other grain, vegetable and fruits, and refined sugar all show very large proportionate increases. Of course the associated volume changes are often quite modest, as China is not a large exporter of most of these products. China's export volume declines in most livestock

[8] Annex Table A.1 provides the mapping between 48 sectors in Chinese CGE model and 23 sectors in *Linkage* model.

sectors, reflecting relatively smaller ROW barriers faced by its exporters in these sectors. China's average export price increases by 2.4% while average import price increase by just 0.6% (both relative to the price of OECD manufacturing exports) in the case of a broad-based trade reform, indicating a gain in its terms of trade when other countries liberalize and China does not. However, if liberalization is confined to the agricultural sectors, the term of trade improvement diminishes, with a 0.6% increase in average export price and 0.4% increase in average import price. The increase in sector export prices range from 1.8% to 4.5% in the case of broad-based trade liberalization and from 0.3% to 2.0% in the case of agricultural liberalization only, with food and agricultural prices rising relative to non-food prices. The changes in China's import prices show much greater sector variation. The import prices of most food and agricultural products rise more than non-food products, reflecting the elimination of agricultural subsidies in OECD countries. However, the world price of China's oilseed imports declines by 2.8% and 2.3%, respectively, in these two scenarios, largely due to the elimination of the very high export taxes for soybean exports from Argentina which becomes a dominant source for oilseed imports into China in the wake of their elimination.

The next two scenarios focus on the impacts of China's own trade liberalization. Scenario 3 (*TRA-Ag*) eliminates the import tariffs and export taxes and subsidies for China's agricultural goods and lightly-processed foods. In Scenario 4, *TRA*, the tariff elimination is extended to non-agricultural sectors. The last two scenarios are intended to show the effects of distortions in China's factor markets. Scenario 5 (*TRANS*) examines the impact of a relaxation of the *hukou* system such that the ad valorem tax equivalent of the indirect transaction costs are reduced from 81% to 34% (when evaluated at current levels of migration). As noted above, this is the portion of the observed differential in wages that has been directly attributed to possession of a *hukou*

certificate. In scenario 6 (*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 previously, this leads to the retention of additional labor in the farm sector. The reason for this is that farm households presently tend to include the returns to communal land in their decision to work on- or off-farm, since leaving the farm means potentially forgoing rights to the farm land. This scenario introduces a land reform such that farm households migrating to the city can keep full land returns by renting their land out, and thereby only need consider the ratio of by marginal value products of their labor in agriculture and non-farm rural wages in deciding where to work.

In all six scenarios, government real spending and real saving (deflated by GDP deflator) are fixed at their base year levels. Thus the policy reforms are assumed to be revenue neutral, with a unified, endogenous factor income tax designed to replace lost government tariff revenue. Foreign saving is also fixed in foreign currency term and the real exchange rate adjusts endogenously in order to maintain current account balance.

Macroeconomic Effects

The macro-economic results from these simulations are reported in Table 4. We begin by focusing on the two scenarios of broad-based commodity trade liberalization (*ROW* and *TRA* – reported in the first two columns). As shown in the first two columns of results in Table 4, the elimination of trade distortions in all commodity sectors gives a substantial boost to trade in China, with both exports and imports rising by more than 5% in the unilateral liberalization scenario and 2-4% in the scenario of trade liberalization in rest of the world. Investment increases in both scenarios, but private consumption declines by 0.2% in the case of across-the-board unilateral liberalization (*TRA*), because of falling real household income. The changes in

factor prices following China's unilateral trade liberalization, which favor capital over labor and agricultural land, along the with imposition of a tariff revenue replacement income tax, leads to the contraction of household income.

Aggregate welfare, which we proxy by the summation of equivalent variation (EV) of individual households and the representative firm[9], would increase by 0.5% of GDP in the case of trade liberalization in rest of the world, due to improved terms of trade. However, in the scenario of unilateral liberalization, China experiences a welfare loss of 0.1% of its GDP, mainly due to the deterioration in her terms of trade. This reflects China's relatively low import protection in the wake of WTO accession, as well as her growing influence in world export markets where trade expansion tends to depress prices.

With fixed labor endowments and capital stocks, and assuming full employment and no productivity changes, real GDP is little changed under both trade liberalization scenarios. The small decrease under *ROW* is driven by the ensuing labor reallocation from nonagriculture to agriculture. The stronger demand in China's agricultural exports following elimination of trade barriers in the rest of the world diverts the labor force from high productivity, manufacturing sectors to lower productivity, agricultural sectors. (In reality, this is likely to be evidenced in the form of slower rates of outmigration from agriculture.) As a consequence, real GDP slightly declines. This contrasts with China's unilateral trade liberalization. There, the elimination of the relatively higher import protection in agricultural sectors encourages the movement of labor forces from rural, agricultural sectors to urban, non-agricultural activities, leading to an increase in the GDP. As the bottom section of Table 4 indicates, temporary migration from the rural to

[9] The EV of the representative firm is calculated based on its utility derived from the part of investment financed by firm's retained earning.

urban sectors slows down as a result of the trade liberalization in rest of the world. Under *ROW,* there are about 5.9 million fewer rural-urban migrants under than in base year. The larger rural labor force is largely due to the retention of additional on-farm labor (increased by 6.4 million) under the ROW scenario. In contrast, China's unilateral trade liberalization accelerates off-farm migration with about 1.5-1.6 million workers leaving agriculture and migrating to the urban areas.

Table 4 also reports changes in factor prices from which it is clear that trade liberalization in rest of the world favors unskilled and semi-skilled labor over skilled labor, and rural labor over urban. Agricultural profitability in China is also boosted by the trade reforms in rest of the world, as reflected in the rise in returns to agricultural land under ROW. Both returns to capital and skilled wages increase less than CPI, which rises by 2.9% under ROW. This pattern of changes in factor prices contrasts sharply with that obtained under China's unilateral liberalization, wherein returns to capital and skilled wages increase most relative to the CPI, while returns to agricultural land decreases most.

Next turn to the third and fourth columns of macro-economic results reported in Table 4 – namely those stemming from the liberalization of agriculture and lightly processed food sectors only. Here, we see that agricultural liberalization has only modest impacts on aggregate exports and imports, reflecting the minor role of agricultural and food sectors played in China's total trade. Consequently, China's welfare gains from agricultural liberalization are trivial, ranging from 0.01% to 0.04% of its GDP. In contrast to unilateral trade liberalization in all sectors, China's unilateral agricultural liberalization leads to an aggregate EV gain of 0.01% of GDP, mainly due to much smaller losses in terms of trade.. The changes in factor prices induced by agricultural liberalization show similar patterns to those of broad-based commodity trade

liberalization, i.e. agricultural liberalization in rest of the world would favor unskilled and semi-skilled labor as well as agricultural land in China, while China's unilateral agricultural reforms would favor capital and skilled labor. The changes in off-farm employment and rural-urban migration under the two agricultural liberalization scenarios are comparable to their corresponding broad-based trade liberalization scenarios, indicating the important role played by distortions in agricultural sectors in determining the mobility of rural labor forces in China.

Compared with the reduction of China's trade distortions, the labor market reforms investigated in scenarios *TRANS* and *LAND* generally have larger impacts on welfare, GDP and other macro-economic aggregates. This reflects the large, and persistent, rural-urban distortions in China's labor markets. It is evident from the last two columns of Table 4 that both of the factor market reforms serve to increase migration out of 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, 13.2 million additional workers leave agriculture when they are assured of retaining land ownership in the wake of migration, as opposed to losing 50% of them in the base case (*LAND* scenario, final column, row Farm Labor, in Table 4). These individuals migrate to the off-farm rural labor market, which in turn releases an additional 12.1 million temporary rural migrants to the urban sector in order to restore equalizity in rural and urban wages, net of transactions costs. The release of workers from agriculture tends to depress wages in the rural, non-farm economy, where wages fall by 3.9% in the case of land reform. This wage drop plays a role in dampening out-migration from agriculture.

While the *LAND* reform scenario focuses 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 35.7 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 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 27.9 million additional workers out of agriculture.

Poverty and Inequality Impacts

Since poverty and income distribution are central to our paper, we provide several related measures of inequality and poverty in Table 5. The first column in this table simply reports the initial *level* of each indicator in our data base. (Subsequent columns report changes, or percentage changes in these indicators.) The initial urban/rural income ratio, at 3.5, is higher than in some of the household survey-based studies cited previously. This is largely due to our inability to adjust for spatial price variation, which, if fully taken into account, would reduce this ratio considerably. The initial Gini coefficient in our model is 0.442 – a level of inequality that is heavily influenced by the rural-urban income disparity.

Using the $2/day poverty lines and 1993 PPP exchange rate, the World Bank estimates that 58.11% of the rural population in China was in poverty and 2.51% of the urban population was in poverty in 2004[10]. Applying these figures to our benchmark data for year 2002, we obtain the poverty line of 3520 Yuan/person for urban and 2591 Yuan/person for rural areas. By assuming a uniform distribution of the population within each of the income vingtiles in our source data from NBS, we are able to estimate the poverty headcounts in each stratum. This information is also reported in Table 5. As can be seen there, the national poverty picture in China is largely

driven by rural poverty, with 455 million poor residing in rural areas. The poverty headcount rate is highest in the agriculture-dependent household group, where nearly two thirds (63.7%) of the population is poor.

Turning to the reform scenarios, the two scenarios that do not reduce the rural-urban income disparity are *TRA* and *TRA-Ag:* China's unilateral liberalization, as rural households generally lose from declining agricultural factor returns. Although the magnitude of the change in rural-urban income ratio is very small in the cases of trade liberalization, it is very substantial in the factor market reform scenarios. In the case where the *hukou* registration system is abolished *(TRANS),* for example, this ratio declines from 3.54 to 3.23. The decline for land reform scenario (*LAND)* is also large (0.17 points)

Table 5 also reports the absolute changes in several Gini coefficients. As income inequality in China is dominated by urban-rural inequality, the narrowed urban-rural income gaps under scenarios of trade liberalization in rest of the world and reforms in factor markets are reflected in an improvement in overall inequality, as measured by the national Gini coefficient. There are no discernible changes in inequality within the urban and rural areas under the scenarios of unilateral liberalization. However, under the two factor market reform scenarios, the Gini coefficients show a slight increase in inequality within urban areas and a slight decline within rural areas, because the low-income, unskilled labor dependent urban households are hurt most by labor market reforms, and low-income, diversified rural households gain more than those at high income levels.

[10] The World Bank's poverty estimates are available at http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp

Next we turn to the changes in poverty as a consequence of the reform scenarios. In the scenario of broad-based trade liberalization in rest of the world (*ROW)*, the monetary poverty line increases by 2.9%, following the change in CPI (Table 4). Nevertheless, higher factor earnings mean that the poverty headcount ratio declines for all household groups with significant poverty. Urban poverty decreases by 0.3 million (bottom panel reports poverty change in millions), while rural households enjoy a 1.9 percentage point reduction in poverty headcount (middle panel reports percentage point change in poverty). Given the large population base in rural China, this translates into a rural poverty reduction of 14.6 million. In the case of agricultural liberalization in rest of the world, the poverty reduction is smaller, but still significant, with rural poverty headcount declining by 10.8 million.

Given the adverse impacts of China's unilateral liberalization on agricultural sectors, rural poverty increases slightly, by 3.5 million, in the *TRA* scenario and 2.4 million in the scenario of *TRA-Ag*. Given the predominance of rural poverty in China, these rises in rural poverty, in turn, translate into comparable changes in total poverty. On the other hand, labor market reforms would significantly reduce rural poverty, but slightly increase urban poverty. The rural poverty headcount ratio declines from 58.1% in the base year to 51.0% in the *TRANS* scenario and 56.2% in the *LAND* scenario, while the urban headcount ratio rises slightly from 2.5% to 2.8%-3.2%. Overall, the impoverished share of the national population falls quite sharply in the case of *hukou* reforms -- from 36.4% of the total population to 32.3% under the *TRANS* scenario (*hukou* reforms), and to 35.4% under the *LAND* reform scenario. When combined, these two scenarios together generate a poverty reduction of 65.5 million. Thus it is clear that, if poverty reduction and greater income equality are the objectives of the next round of reforms in China, then factor market reforms will need to be part of the package.

Household Impacts

It is important to dig down below the aggregate indicators of poverty and inequality, and consider the disaggregated, household incidence curves reported in Figures 1a - 1f. These report the percentage change in welfare (EV as a percentage of initial income), by stratum, across the income-vingtile spectrum. The largest increases in welfare following both trade and agricultural liberalization in ROW (on the order to 2%) accrue to the agriculture-specialized households (Figure 1a and Figure 1b). These households benefit from the fact that returns to agricultural land increase relative to other factor prices. Real income rises less for rural diversified households due to the dominance of non-farm wage earnings in their income portfolio. Amongst the urban households, the largest welfare increases in Figure 1a are associated with labor-specialized households, followed by urban diversified households. This is consistent with the larger increases in wage rates than in returns to capital. Urban transfer specialized households tend to lose from the trade liberalization in rest of the world, except for at very high income levels. Because the transfers are held constant in real terms, and transfers make up most of their income, the real income of the transfer group is little affected by the agricultural reform. However, as households at low income levels tend to have larger proportion of food consumption in their total expenditure, the relative increase of food prices leads to a higher household-specific CPI for these low income households relative to the national average CPI, causing the modest welfare losses of the lowest income transfer groups.

With the exception of urban transfer specialized households, China's unilateral trade liberalization hurts all households, as shown in Figure 1c, although the magnitude of their welfare losses is small. Rural agriculture-specialized households experience the largest welfare losses, followed by rural diversified households, as they suffer from depressed returns to

agricultural activity. The welfare losses of urban households are very small, amounting to only around 0.1-0.2% of household income for both diversified households and labor-specialized households. The increased income tax rate to replace tariff revenue loss is the major factor contributing to the welfare losses of urban households. In the case of China's unilateral agricultural liberalization, rural households are still the major losers, but all urban households gain slightly because of the smaller tax replacement effects associated with lower loss in tariff revenue (Figure 1d).

Recall from the preceding discussion that the largest poverty and inequality impacts stem from *hukou* reform. Figure 1e shows why this is true. The population stratum with the highest poverty headcount, the agriculture specialized households, is also the one to reap the largest proportionate gains under this labor market reform scenario. They benefit from the significant increase in agricultural wages. The diversified rural households also benefit from the rise in rural wages – although their welfare gains are somewhat less. These households supply less of the temporary migrant labor to urban areas. And it is these migrants who bear the direct burden of the heightened transactions costs owing to the *hukou* system. When this is eliminated, they are the ones who benefit most directly from their absence. While the benefits from hukou reform are spread relatively evenly across income levels within each of the rural strata, the higher income households within the diversified strata – which have more capital earnings in their income - tend to experience smaller proportionate gains, thereby contributing to the decrease in the Gini coefficient within the rural sector. Most urban households suffer from the influx of additional unskilled and semi-skilled rural migrants, the presence of which drags down the wage rates in the urban areas. Almost all urban households experience welfare losses, with the minor exception of the richest transfer specialized households. Overall, the urban index of income

inequality worsens slightly. However, this is overwhelmed by the reduction in between-sector, rural-urban inequality, and, when coupled with the decline in rural inequality, this leads to a decline in the national Gini inequality index of 0.021 – from 0.442 to 0.421. This is a substantial movement in an index which is generally quite robust to policy reforms.

Similar to the *hukou* reform, the largest gains from land reform accrue to the agriculture-specialized, rural households (Figure 1f). 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. 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 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 0.008.

Sector Impacts

The effects of the investigated policy reforms on six aggregated sectors' output, exports and imports are reported in Table 6. The first row of Table 6 shows that the highly processed food products are the major gainers from the elimination of market distortions in rest of the world, with an average output expansion of 5.4%. The production of agriculture and lightly processed food sector expands by 1.7%. Strong increases in exports are the key drivers of the expansion of

China's food and agricultural sectors, flowing from the strong increase in international demand. Exports of China's agricultural products, lightly processed food and highly processed food increase by 71.5%, 31.2% and 64.8%, respectively, under the scenario *ROW*. Despite the absence of any cut in protection for agriculture under the *ROW* scenario, China's agricultural and food imports increase by around 10% following the agricultural liberalization in rest of the world, because of the decline in the world prices of some of China's major agricultural importing goods such as oil seeds and vegetable oils. In addition, there is a real appreciation in China which tends to boost the demand for imports across the board.

If ROW liberalization is confined to the agriculture and lightly-processed food sectors, they are the only two aggregate sectors with expanding exports and output. All the other aggregate sectors experience declining output and exports. The impact of agricultural liberalization in rest of the world on China's imports is modest in comparison with the broad-based trade liberalization, as the decline in total exports, and a depreciation of real exchange rate, both serve to dampen the expansion of imports in this ROW-Agr scenario.

The sectoral impacts of China's own reforms suggest that the current distortions arising from China's tariff protection and the labor market barriers generally support the size of agriculture relative to other industries. Under all the four scenarios of China's own reforms, agriculture experiences output losses while both the non-food manufacturing sector and services expand. The impacts of reducing China's distortions in commodity and factor markets on highly processed food sectors are mixed. This sector benefits from the elimination of import tariffs but loses from reforms in factor markets.

Figures 2a though 2e report a subset of the disaggregated changes in sector output, in

ascending order, omitting the changes that are less than 2%. In the two scenarios involving liberalization in the rest of the world, the pattern of sectoral output changes generally follows that of changes in export demand -- the sectors with larger increases (decreases) in export demand and higher export dependence, such as prepared fish products, sugar, textiles, and apparel and leather, experience relatively large increases (decreases) in output. But imports also play a role in determining sectoral output changes, as is evident in the oil seeds sector, where output shrinks by 7.4% in the *ROW* scenario as a result of the 2.8% decline in import prices spurs the growth of its imports.

Under the scenario of China's unilateral trade liberalization (*TRA*), instruments, electronics, textiles, apparel and leather are major manufacturing sectors with rapid output expansion. As the most export oriented sectors, they benefit from the real depreciation of Chinese currency in the wake of China's unilateral trade liberalization. At the other end of the spectrum, the most heavily protected sectors, with sizable trade exposure, experience declining output, including: oil seeds, sugar, transportation equipment, other grains and vegetable oil. In the case of China's unilateral agricultural liberalization, there are large output contractions in the agricultural sectors with high levels of protection.

In the scenarios of *hukou* reform (reduced transactions costs) and land reform, agricultural output falls sharply, as the the farm labor force is diverted to off-farm rural activities as well as urban-based manufacturing sectors. Within manufactures, the consumption good sectors experience declining output but most capital goods sectors expands, because the changes in final demand favor investment over consumption in these two scenarios.

Disaggregated trade volume changes associated with each of the experiments are reported in

Table 7. Here we focus our discussion on the two broad-based trade liberalization scenarios. With the exception of the other grains sector for which the elimination of an export subsidy plays a role, export volumes increase for all goods sectors in the wake of China's unilateral liberalization. A large portion of food and agricultural sectors experience double digit export expansion, with the largest increases for lightly processed food such as sugar, grain milling and vegetable oils, fueled by the lower costs of intermediate inputs and the depreciation of real exchange rate. In the non-food manufacturing sectors, export expansions are more modest, ranging from 4.0% (building materials) to 9.3% (transportation equipment). Import volumes for most products also increase, especially for heavily protected food and agricultural sectors such as sugar, beverages, vegetable oil, forage, and vegetables and fruits. A few sectors with low import protection, or even import subsidies in the case of plant-based fibers, other livestock, some mining products, and apparel and leather, experience reductions in import volumes.

In the case of trade liberalization in the rest of the world, the changes in exports are much more significant. Export volumes grow by 60-80% in most of the crops and food sectors because of the increased world demand for these products. Crops sectors, processed food, as well as textile and apparel show major increases in exports. However, there are also quite a few manufacturing sectors that would experience losses in their exports. Without cutting China's own import protection, the changes in import volumes are generally smaller than that under China's unilateral liberalization. The increase in agricultural imports is mainly due to the import expansion of oil seeds, which account for 85% of the agricultural import increase. Vegetable oils, prepared fish products, and other processed food are key sectors contributing to increased food imports. On the other hand, import volumes decline slightly in the three agricultural sectors with the largest increases in import prices (other grains, plant-based fibers and cattle/sheep).

Sensitivity to the Assumption about Land Rental Market

As noted previously, China's rural land markets have been undergoing reform and a nascent market for land is emerging in many areas. In principle, this should facilitate off-farm migration, as migrants may no longer risk losing control of this asset when they leave the farm. However, to date, these reforms have been restricted to certain regions, and it is not clear how efficiently this market is functioning in those cases. Therefore, in our base case results, we assumed that the transfer of rural labor from farm to off-farm activities would diminish earnings from land rents by 50%, on average – e.g., on average, there is a 50% probability that migrants will lose control of their land. However, this parameter choice is somewhat arbitrary. Therefore, for purposes of sensitivity analysis, we contrast the base case results with those from the two extreme assumptions about the functioning of rural land rental market – one in which there is zero loss in land returns following off-farm employment, and the other in which there is no land rental market (100% loss in land returns if farmers switch to off-farm jobs), thereupon repeating the two trade liberalization scenarios, *ROW* and *TRA*, respectively. Thus we are examining the potential *interaction between* the imperfections in the land market and the trade reform scenarios. The key simulation results are presented in Table 8. (Since the macro aggregate results are essentially unchanged from our base line results, only revised results on factor prices and labor migration are reported.)

Comparing the results in Table 8, between the two groups of columns, it is clear that, while incomplete land markets serve to retain excess labor in agriculture, when viewed on their own. The same is not always the case when viewed at the margin, in the context of trade reforms. Consider first the case of trade reforms in the rest of the world (*ROW*). Here, both the returns to land and wage rates in agriculture rise. Furthermore, the rise in land returns is greater than the

rise in wages. Therefore, households that had hitherto been considering leaving agriculture due to depressed factor returns, have an even stronger incentive to continue do devote their labor to agriculture, than do those who, at the margin, had been indifferent to the wage differential between the farm and non-farm sectors (fully functioning land market). Thus the movement of labor into agriculture in the *ROW* scenario is greater when the land market is not functioning, than when it is – provided there is no change in the underlying structure of the land market. The same situation applies, but in reverse, in the case of unilateral trade reforms. Here, by including returns to land in the off-farm migration decision, the incentive to work off-farm is accentuated in the absence of a functioning land market. Of course, as we saw above, introducing a fully functioning land market generates a much larger flow of workers from agriculture to the rest of the economy (more than 13 million), and a significant poverty reduction. So we are not concluding that a poorly functioning land market is good for poverty reduction. However, this sensitivity analysis does show that our predictions about the impact of trade reforms on intersectoral labor mobility depend importantly on the extent to which farmers are able to lease their land when migrating to the city for work.

6. Conclusions and Policy Implications

Absolute poverty in China is now largely a rural problem. And within the rural sector, the intensity of poverty is greatest on the farm. Thus policy reforms that either boost returns to farming, or enhance off-farm opportunities for those presently working in agriculture offer the best prospects for reducing poverty and inequality in China. Of the reforms considered, trade reforms in the rest of the world, land reform and *hukou* reform all serve to reduce poverty, while unilateral tarde reforms result in a small poverty increase. Domestic agricultural distortions are

important factors in determining the distributional and poverty effects of trade reform packages, although their impacts on aggregate trade and welfare are small. Furthermore, the ROW trade reforms, as well as the land and *hukou* reforms tend to favor rural over urban households, while the opposite is true of the unilateral tariff reforms. So it would seem quite natural to bundle these reforms together in such a way that all of these broad household groups might stand to benefit from the reform package. For example, by combining the ROW and domestic trade reforms, a policy package is obtained that would be both poverty and inequality-reducing, while benefitting all the household groups in our study.

Turning to domestic policies, both the land reform and the *hukou* reform scenarios benefit the rural areas much more strongly than the urban ones, and indeed, in the case of land reform, these may well hurt the lower income urban households who currently benefit from the artificial restriction of rural-urban labor mobility. Therefore, these reforms should be phased in over time. Taken in the context of continued rapid economic growth in the urban and coastal regions, the urban losses are likely to be more than offset by ongoing income growth. Indeed, this is what appears to be happening in many regions of China, where restrictions on labor mobility are being eroded and land markets are emerging. This paper suggests that such labor and land market reforms are particularly appealing in their potential for reducing inequality and rural poverty in China, as well as their scope for allowing China to better realize the potential of her vast rural labor force.

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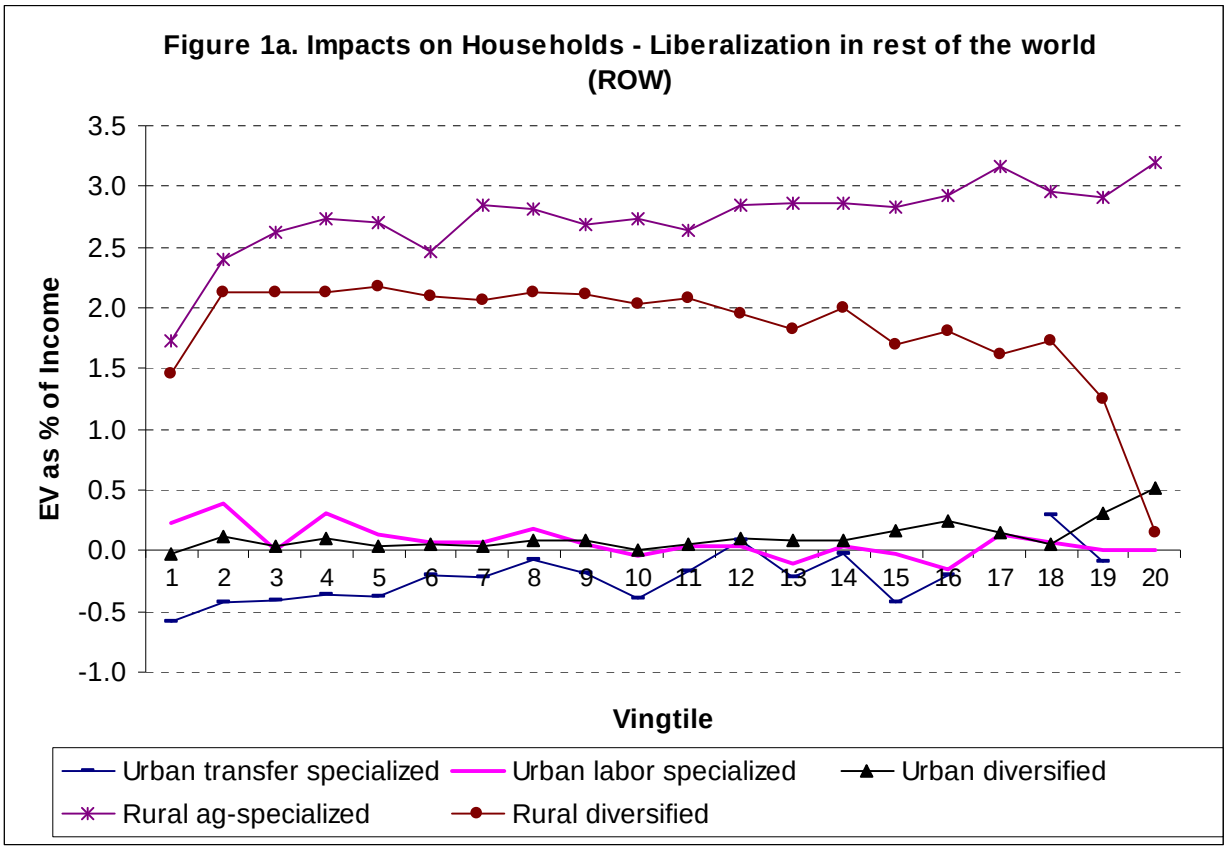


Figure 1a. Impacts on Households - Liberalization in rest of the world (ROW)
EV as % of Income
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Vingtile
Urban transfer specialized
Urban labor specialized
Urban diversified
Rural ag-specialized
Rural diversified

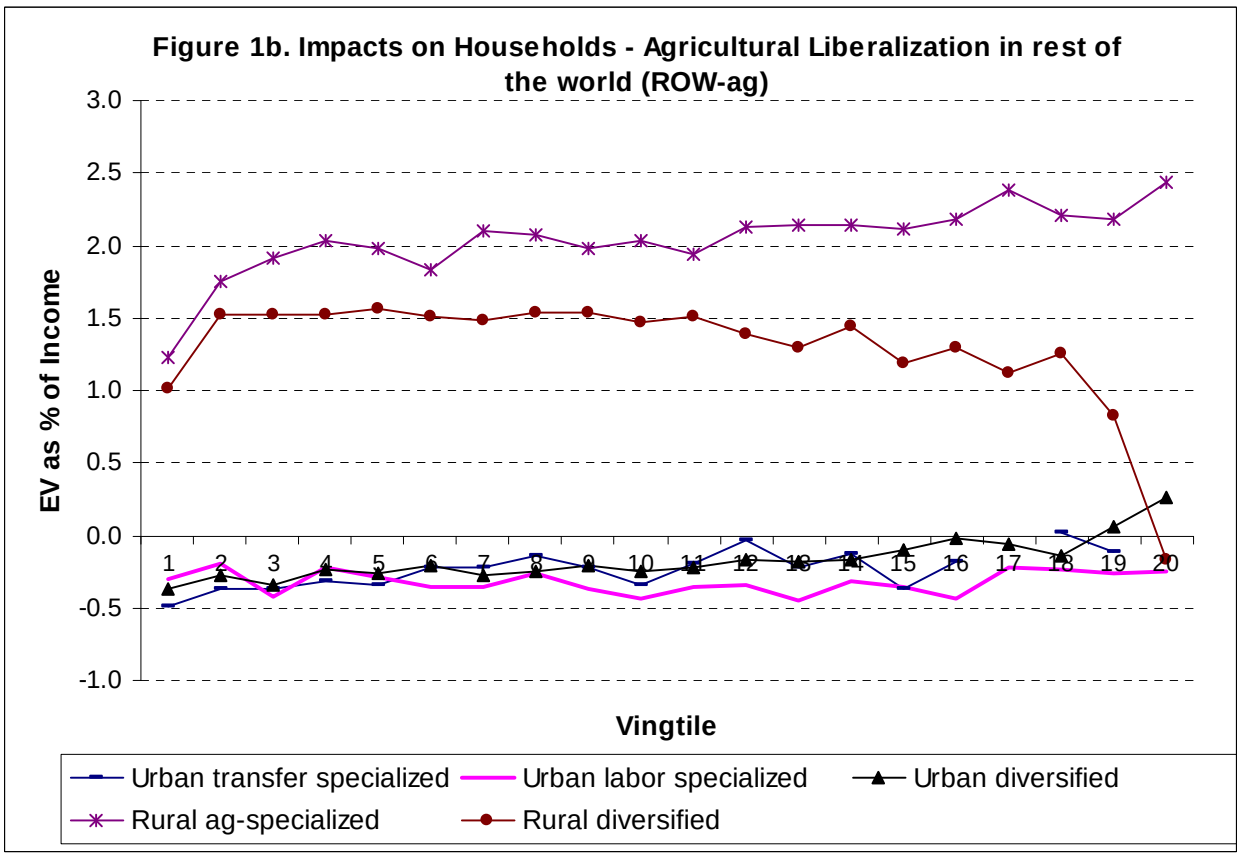


Figure 1b. Impacts on Households - Agricultural Liberalization in rest of the world (ROW-ag)
EV as % of Income
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Vingtile
Urban transfer specialized
Urban labor specialized
Urban diversified
Rural ag-specialized
Rural diversified

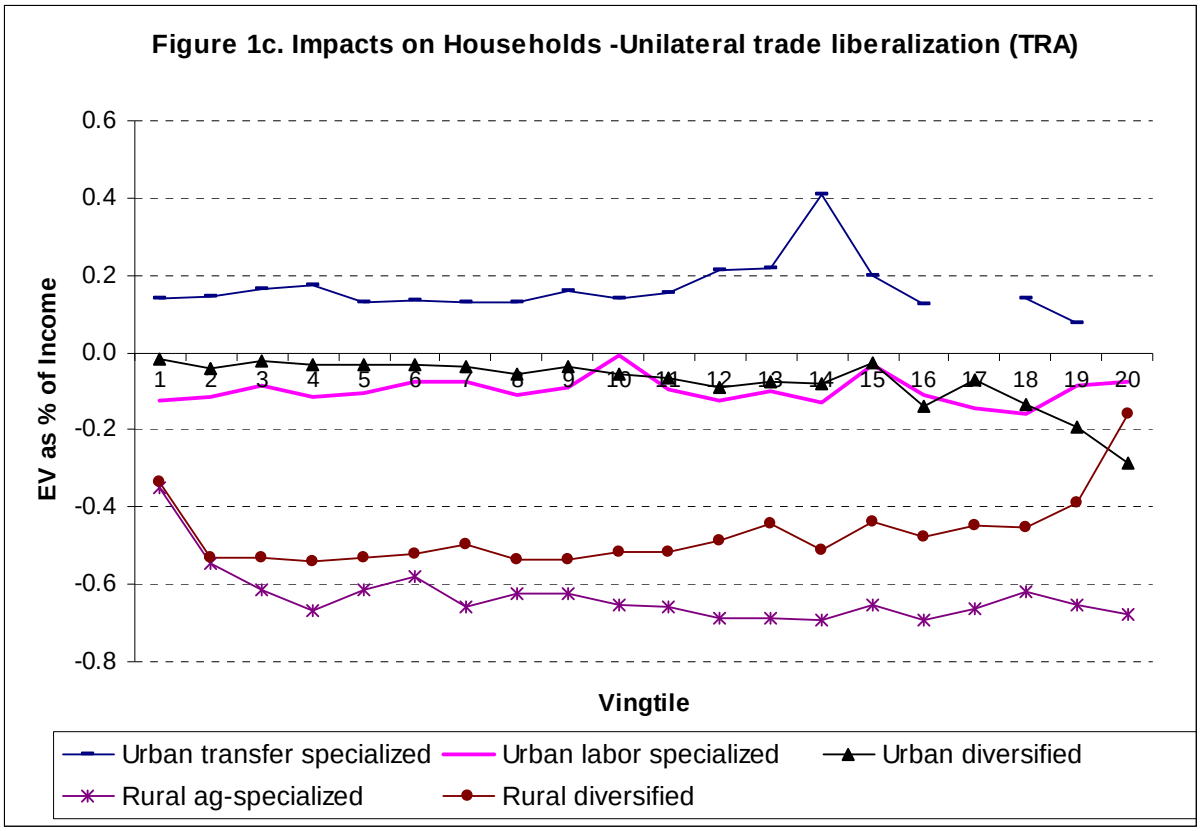


Figure 1c. Impacts on Households -Unilateral trade liberalization (TRA)
EV as % of Income
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Vingtile
Urban transfer specialized
Urban labor specialized
Urban diversified
Rural ag-specialized
Rural diversified

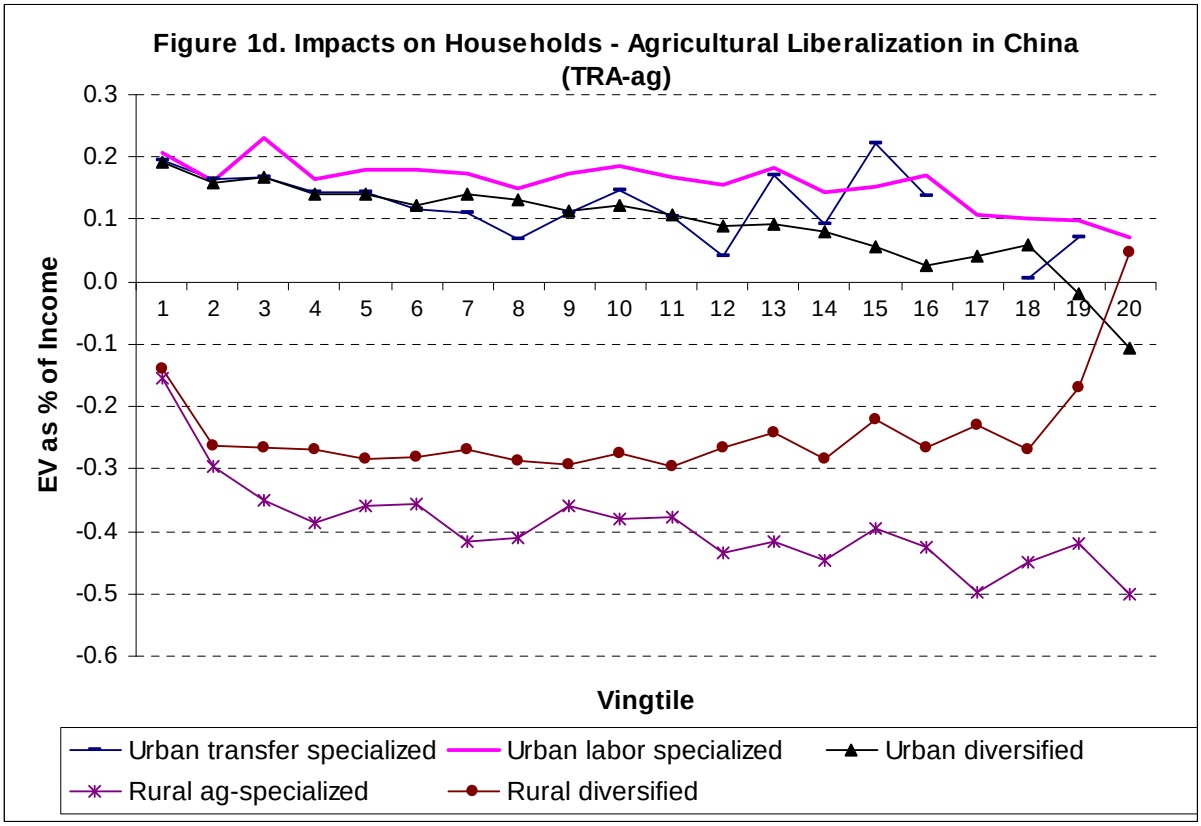


Figure 1d. Impacts on Households - Agricultural Liberalization in China (TRA-ag)
EV as % of Income
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Vingtile
Urban transfer specialized
Urban labor specialized
Urban diversified
Rural ag-specialized
Rural diversified

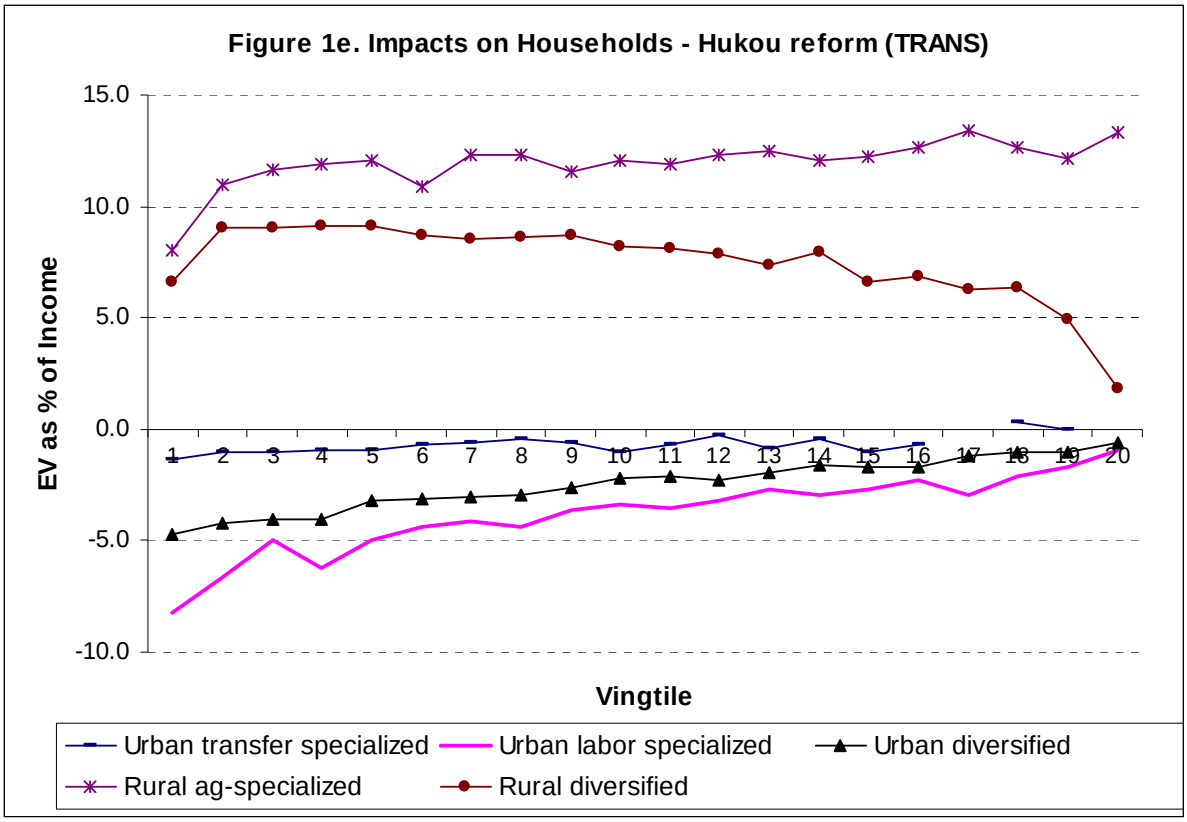


Figure 1e. Impacts on Households - Hukou reform (TRANS)
15.0
10.0
5.0
0.0
-5.0
-10.0
EV as % of Income
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Vingtile
Urban transfer specialized
Urban labor specialized
Urban diversified
Rural ag-specialized
Rural diversified

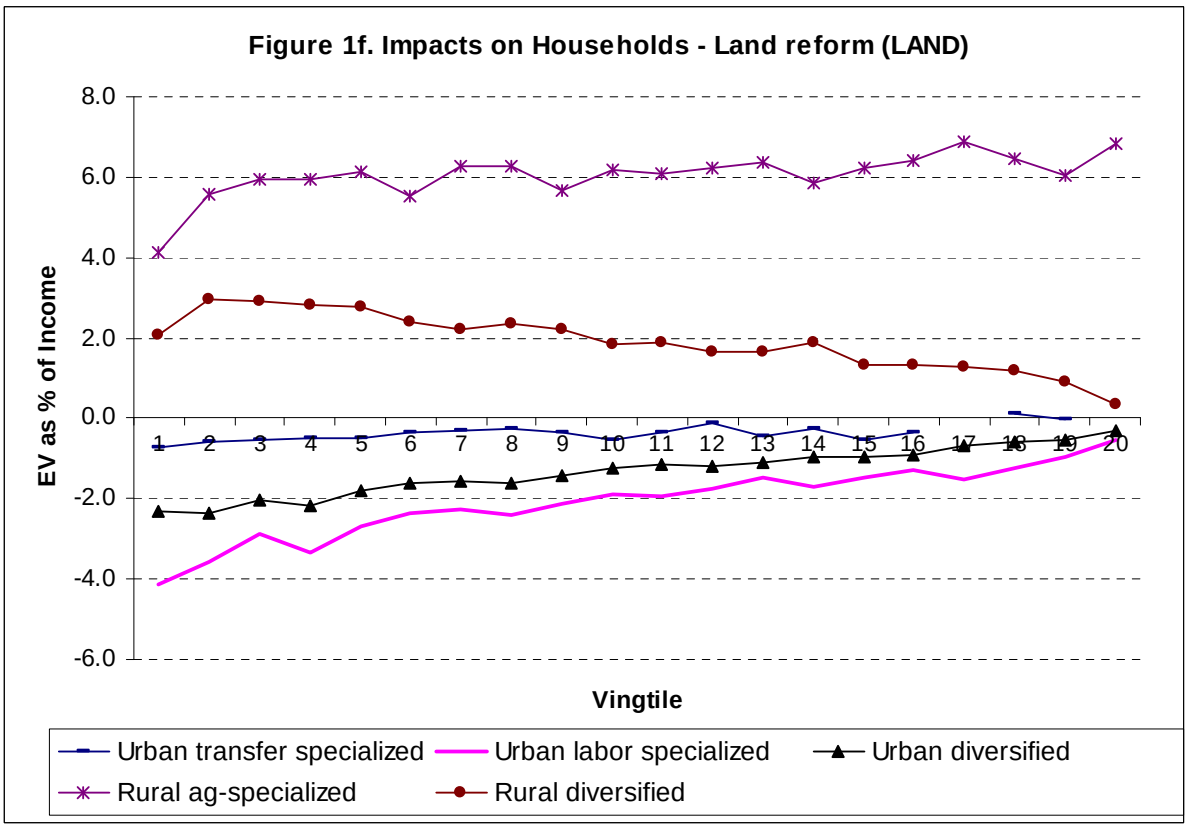


Figure 1f. Impacts on Households - Land reform (LAND)
8.0
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
EV as % of Income
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Vingtile
Urban transfer specialized
Urban labor specialized
Urban diversified
Rural ag-specialized
Rural diversified

Figure 2a. Change in sector output - *ROW*

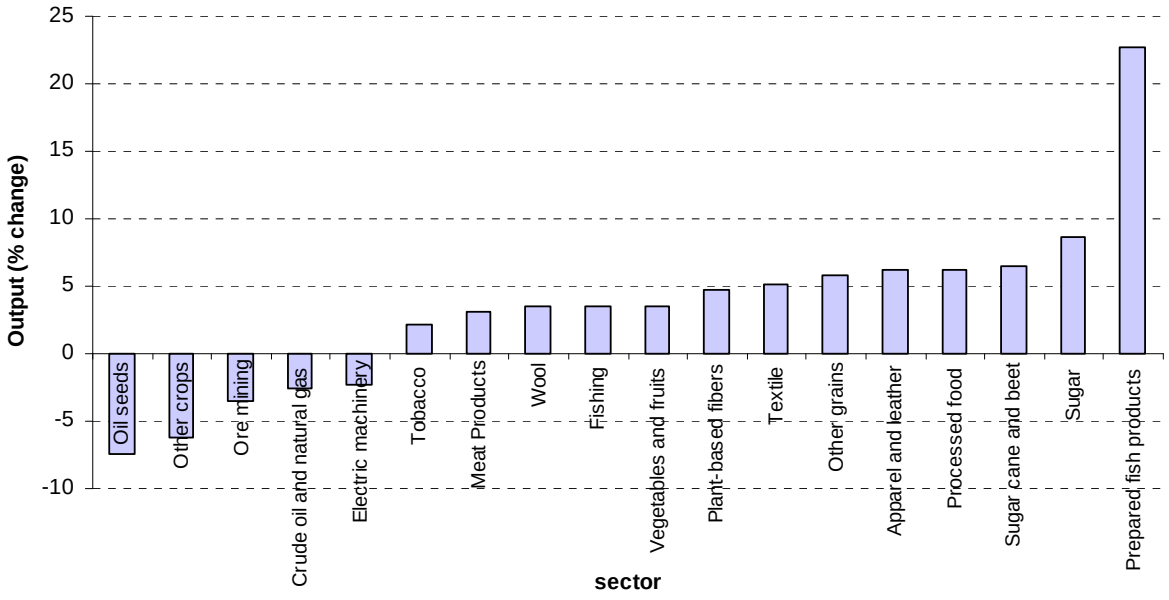
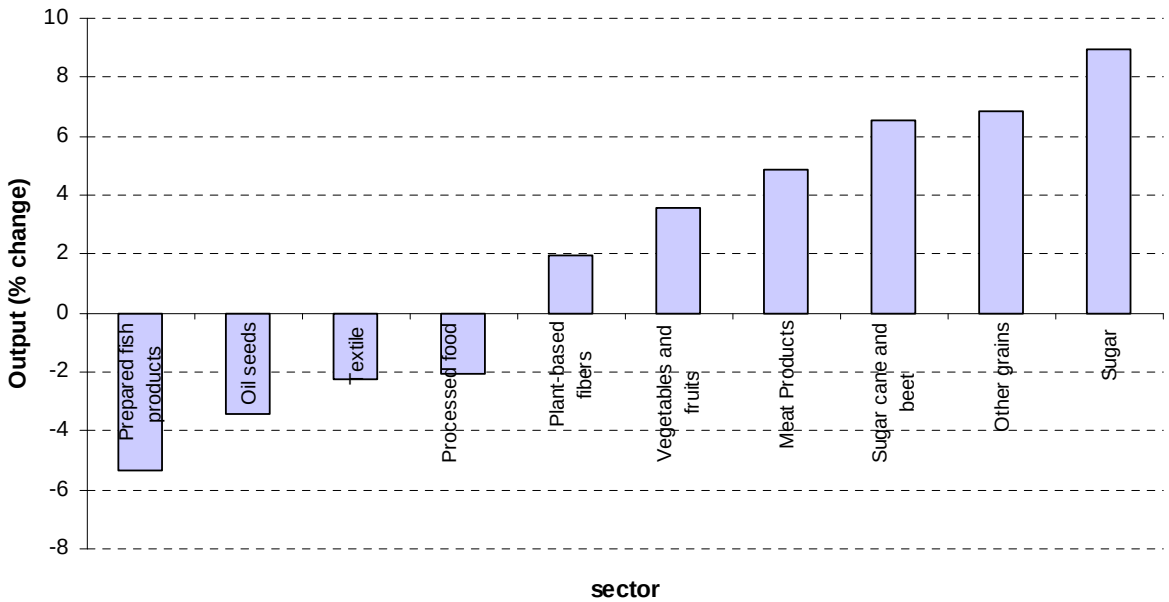


Figure 2b. Change in sector output - R*OW-Ag*



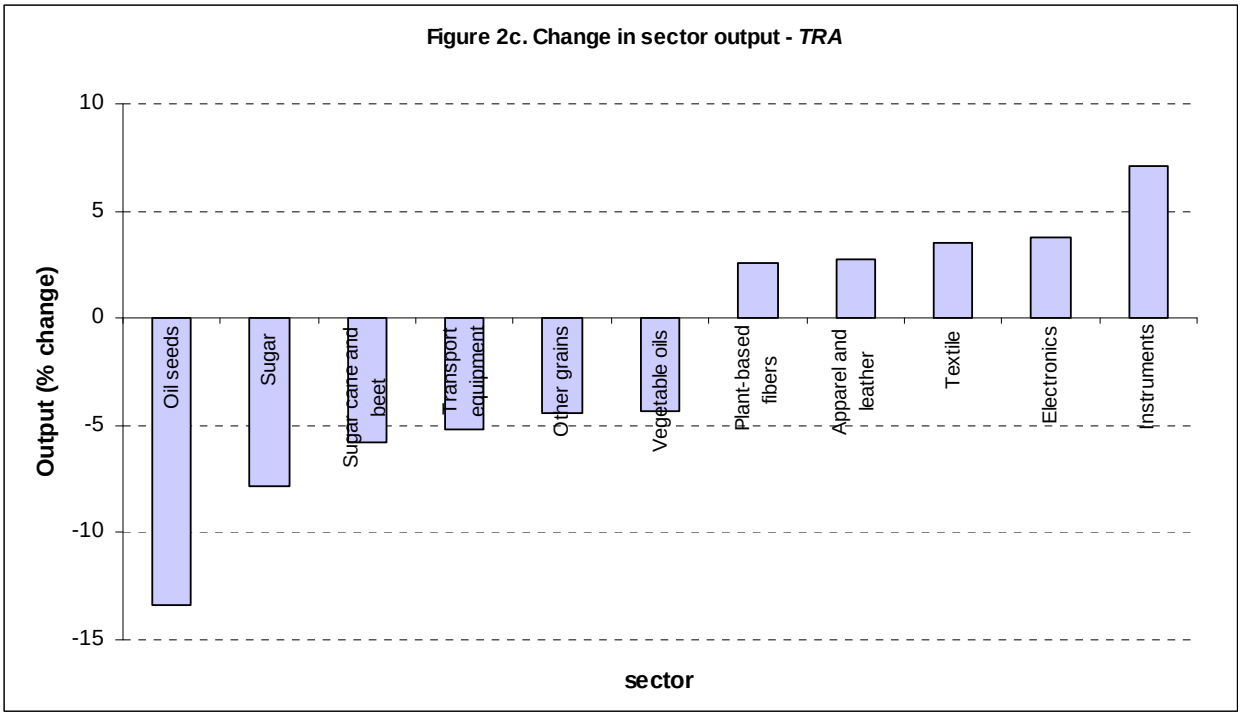


Figure 2c. Change in sector output - TRA
10
5
0
-5
-10
-15
Output (% change)
Oil seeds
Sugar
Sugar cane and beet
Transport equipment
Other grains
Vegetable oils
Plant-based fibers
Apparel and leather
Textile
Electronics
Instruments
sector

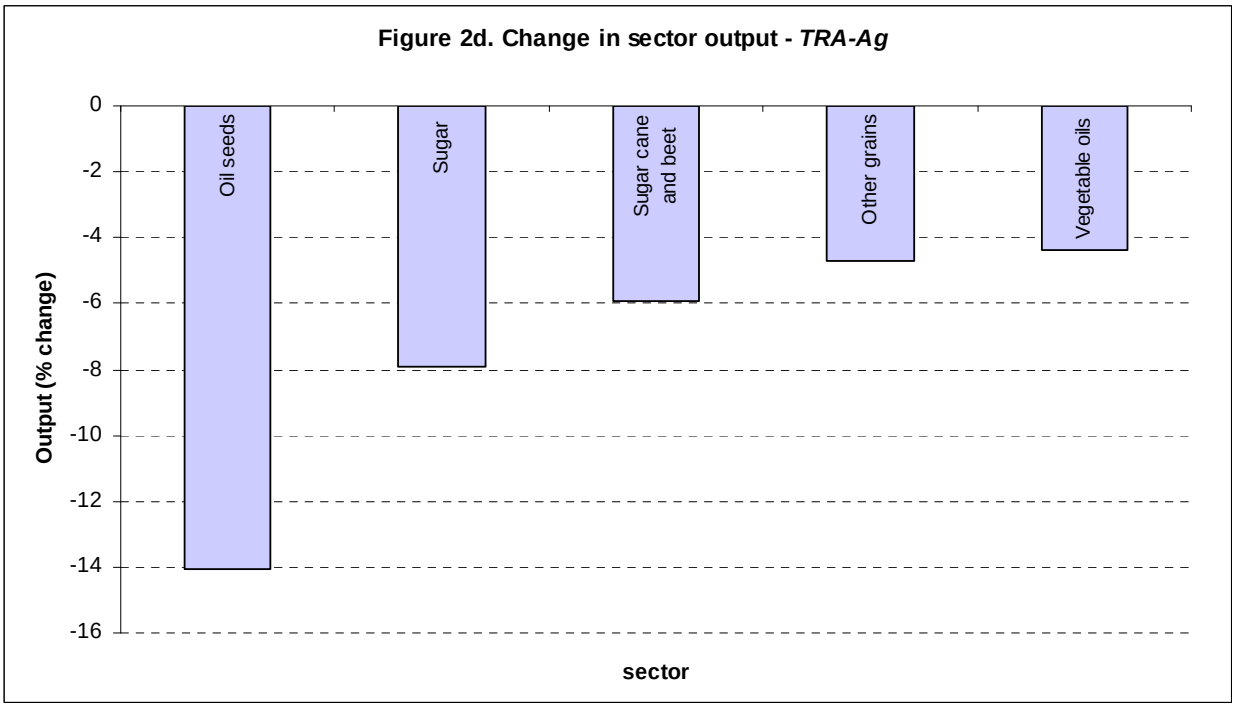


Figure 2d. Change in sector output - TRA-Ag
0
-2
-4
-6
-8
-10
-12
-14
-16
Output (% change)
Oil seeds
Sugar
Sugar cane and beet
Other grains
Vegetable oils
sector

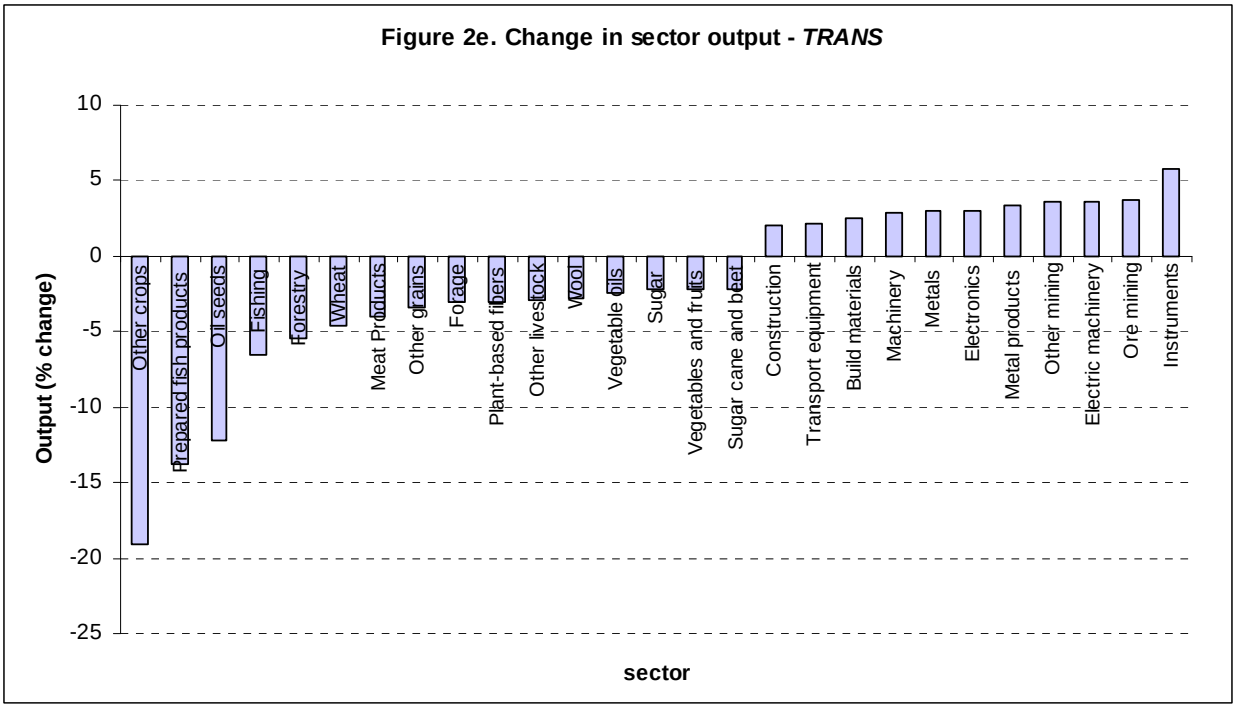


Figure 2e. Change in sector output - *TRANS*
Output (% change)
10
5
0
-5
-10
-15
-20
-25
Other crops
Prepared fish products
Oil seeds
Fishing
Forestry
Wheat
Meat Products
Other grains
Forage
Plant-based fibers
Other livestock
Wool
Vegetable oils
Sugar
Vegetables and fruits
Sugar cane and beet
Construction
Transport equipment
Build materials
Machinery
Metals
Electronics
Metal products
Other mining
Electric machinery
Ore mining
Instruments
sector

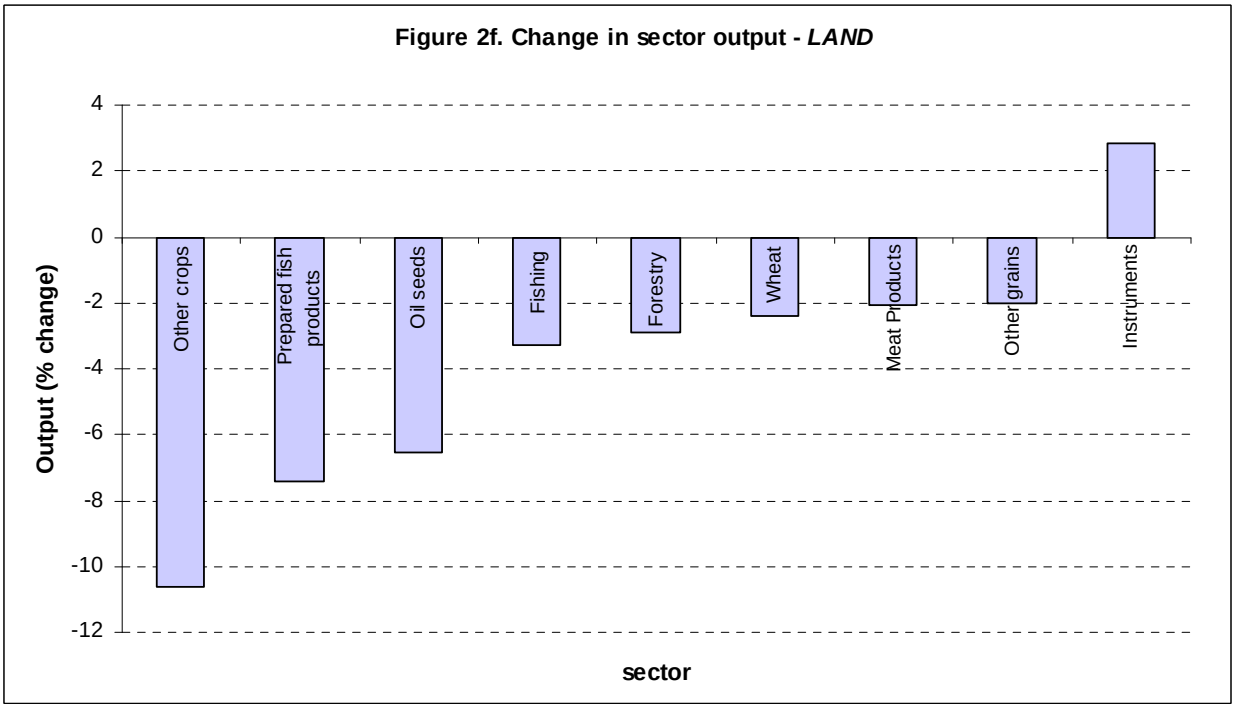


Figure 2f. Change in sector output - *LAND*
Output (% change)
4
2
0
-2
-4
-6
-8
-10
-12
Other crops
Prepared fish products
Oil seeds
Fishing
Forestry
Wheat
Meat Products
Other grains
Instruments
sector

Table 1. Base Year Rates of Tariff and Export Subsidy in China (%)

	Tariff	Export subsidy*
Paddy rice	0.0	-1.0
Wheat	4.0	0.0
Other grains	3.4	13.0
Vegetables and fruits	14.8	0.0
Oil seeds	15.9	0.0
Sugar cane and beet	15.3	0.0
Plant-based fibers	-5.3	0.0
Other crops	9.4	0.0
Cattle sheep etc	3.9	0.0
Other livestock	0.0	0.0
Raw milk	0.0	0.0
Wool	7.0	0.0
Forestry	2.8	0.0
Fishing	5.2	0.0
Coal mining	3.1	0.0
Crude oil and natural gas	0.9	0.0
Ore mining	0.0	0.0
Other mining	0.5	0.0
Meat Products	10.5	0.0
Vegetable oils	12.5	0.0
Grain mill	0.0	-1.0
Sugar	17.3	0.0
Forage	11.5	0.0
Prepared fish products	0.9	0.0
Other processed food	9.4	0.0
Beverage	12.7	0.0
Tobacco	8.9	0.0
Textiles	0.2	0.0
Apparel and leather	0.2	0.0
Sawmills and furniture	1.9	0.0
Paper, printing & social articles	3.0	0.0
Petroleum refining	3.6	0.0
Chemicals	3.3	0.0
Build materials	2.7	0.0
Metals	1.7	0.0
Metal products	2.1	0.0
Machinery	3.3	0.0
Transport equipment	16.4	0.0
Electric machinery	2.9	0.0
Electronics	1.4	0.0
Instruments	2.1	0.0
Other manufacturing goods	0.7	0.0

*Negative figures indicate an export tax.
Source: Huang, Rozelle and Martin (2007); GTAP database v7.0;

Table 2. Summary of Scenarios

Scenario	*Description*
ROW-Ag	Agricultural liberalization in rest of the world - Elimination of production taxes and subsidies in agricultural and lightly processed food sectors - Elimination of export taxes and subsidies in agricultural and lightly processed food sectors - Elimination of tariff in agricultural and lightly processed food sector sectors
ROW	Agricultural and trade liberalization in rest of the world - Elimination of production taxes and subsidies in agricultural and lightly processed food sectors - Elimination of export taxes and subsidies in agricultural and lightly processed food sectors - Elimination of tariff in all sectors
TRA-Ag	Agricultural liberalization in China - Elimination of export taxes and subsidies in agricultural and lightly processed food sectors - Elimination of tariff in agricultural and lightly processed food sectors
TRA	Agricultural and Trade liberalization in China - Elimination of export taxes and subsidies in agricultural and lightly processed food sector - Elimination of tariff in all sectors
TRANS	Relaxation of the *hukou* system: - Cut the indirect transactions costs from 81% to 34% of non-farm rural wage
LAND	Introducing land reform - Farm households do not include the returns to land in their temporal migration decision

Table 3. Exogenous Shocks due to Liberalization in the Rest of the World (% change)

	Elimination of all distortions			Elimination of agricultural distortions		
	Export demand	Export price	Import price	Export demand	Export price	Import price
Agriculture						
Paddy rice	94.9	4.2	..	123.6	1.8	
Wheat	15.5	3.5	2.8	45.8	1.4	3.6
Other grains	105.1	3.9	6.5	157.7	1.6	6.5
Vegetables and fruits	185.5	4.2	1.9	232.9	1.8	1.6
Oil seeds	10.3	4.0	-2.8	42.9	1.7	-2.3
Sugar cane and beet	..	..	..	..	..	..
Plant-based fibers	30.0	3.3	10.0	51.4	1.3	11.5
Other crops	-12.7	4.5	1.3	8.4	2.0	1.5
Cattle sheep etc	-18.6	4.4	6.5	-3.1	1.9	6.6
Other livestock	-20.8	3.8	0.7	-0.2	1.6	1.6
Raw milk	-48.3	4.1	-1.8	-31.7	1.7	-0.7
Wool	-13.1	3.8	4.9	10.1	1.6	4.9
Other primary products	-7.8	2.7	0.5	2.0	0.6	1.1
Lightly processed food						
Meat products	29.2	3.5	4.9	56.3	1.3	5.6
Vegetable oils	-6.4	1.8	-0.2	5.7	0.3	-0.9
Grain mill	148.8	3.0	4.2	192.1	0.9	3.4
Sugar	410.2	3.0	1.4	560.4	0.8	2.0
Highly processed food	67.3	2.9	0.8	-14.1	0.8	-0.2
Non-food manufacturing						
Textiles; apparel and leather	13.7	2.6	-0.2	-2.1	0.8	0.4
Other manufacturing sectors	-3.3	2.2	0.7	-1.6	0.5	0.3
Services	-10.5	2.5	0.1	-0.9	0.5	0.2
Total	2.2	2.4	0.6	-0.3	0.6	0.4

Source: Linkage model simulations

Table 4. Aggregated Results (% change)

	ROW	*TRA*	*ROW-Ag*	*TRA-Ag*	*TRANS*	*LAND*
Macroeconomic Variables						
Welfare(EV)	0.5	-0.1	0.04	0.01	1.0	0.1
Real GDP	-0.1	0.2	-0.2	0.1	0.8	0.3
Consumption	0.7	-0.2	0.3	0.0	0.6	-0.3
Investment	0.5	0.1	-0.2	0.1	2.1	0.6
Exports	1.9	5.8	-0.3	0.7	1.6	0.6
Imports	4.3	5.5	0.1	0.7	1.4	0.6
Terms of trade	1.8	-0.8	0.3	-0.1	-0.3	-0.1
CPI	2.9	-0.9	1.0	-0.3	1.4	0.7
Factor Prices						
Returns to agr land	16.3	-3.5	13.5	-3.1	-7.3	-2.5
Capital	2.2	-0.8	0.0	0.0	1.5	0.6
Unskilled wages						
Urban	3.7	-1.1	1.2	-0.3	-17.7	-3.1
Rural non-agri	3.9	-1.3	1.3	-0.4	6.9	-3.9
Agricultural	4.4	-1.8	1.3	-0.4	23.7	8.8
Semi-skilled wages						
Urban	3.9	-1.2	1.3	-0.3	-5.4	-3.1
Rural non-agri	4.9	-1.1	2.2	-0.4	25.5	-4.5
Agricultural	2.7	-1.1	0.0	0.0	20.1	11.7
Skilled wages						
Urban	1.9	-0.9	0.0	0.0	0.9	0.3
Rural non-agri	1.9	-1.0	-0.1	0.0	0.9	0.2
Labor force (millions)						
Farm labor	6.4	-1.6	5.7	-1.5	-27.9	-13.2
Unskilled	0.7	-0.2	0.6	-0.2	-15.6	-1.8
Semi-skill	5.7	-1.4	5.1	-1.3	-12.3	-11.3
Rural-urban temp migration	-5.9	1.5	-5.3	1.4	35.7	12.1
Unskilled	-0.6	0.1	-0.5	0.1	18.2	1.5
Semi-skill	-5.3	1.3	-4.8	1.3	17.6	10.6
Skilled	0.0	0.0	0.0	0.0	0.0	0.0
Labor force (%)						
Farm labor	1.7	-0.4	1.6	-0.4	-7.6	-3.6
Unskilled	0.4	-0.1	0.4	-0.1	-9.8	-1.2
Semi-skill	2.7	-0.7	2.4	-0.6	-5.9	-5.4
Rural-urban temp migration	-6.0	1.5	-5.4	1.4	36.5	12.3
Unskilled	-1.5	0.4	-1.4	0.4	46.7	3.9
Semi-skill	-10.4	2.6	-9.3	2.5	34.3	20.6
Skilled	0.0	0.0	0.0	0.0	0.0	0.0

Data Source: Chinese CGE model simulation results.

Table 5. Effects on Inequality and Poverty

	Base	*ROW*	*TRA*	*ROW-Ag*	*TRA-Ag*	*TRANS*	*LAND*
Inequality							
Urban/rural income ratio	3.538	-0.052	0.009	-0.042	0.010	-0.303	-0.167
Gini	0.442	-0.005	0.001	-0.004	0.001	-0.021	-0.008
Urban	0.259	0.000	0.000	0.001	0.000	0.006	0.003
Rural	0.315	-0.002	0.000	-0.002	0.000	-0.008	-0.003
Poverty headcount ($2/day)							
	(ratio,%)			Changes (percentage point)			
Total	36.4	-1.2	0.3	-0.8	0.2	-4.1	-1.0
Urban	2.5	-0.1	0.0	0.0	0.0	0.7	0.3
Transfer specialized	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Labor specialized	4.0	-0.1	0.0	0.0	0.0	0.9	0.4
Diversified	1.6	0.0	0.0	0.0	0.0	0.6	0.3
Rural	58.1	-1.9	0.5	-1.4	0.3	-7.1	-1.9
Ag-specialized	63.6	-1.8	0.4	-1.4	0.3	-6.8	-3.5
Diversified	57.5	-1.9	0.5	-1.4	0.3	-7.1	-1.7
	(mn. person)			Changes (mn. person)			
Total	467.3	-14.9	3.6	-10.8	2.3	-52.1	-13.4
Urban	12.6	-0.3	0.1	0.0	0.0	3.3	1.6
Transfer specialized	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Labor specialized	8.1	-0.2	0.1	0.0	0.0	1.7	0.9
Diversified	4.4	-0.1	0.0	0.0	0.0	1.6	0.8
Rural	454.7	-14.6	3.5	-10.8	2.4	-55.5	-15.0
Ag-specialized	52.2	-1.5	0.4	-1.1	0.3	-5.6	-2.9
Diversified	402.5	-13.1	3.2	-9.7	2.1	-49.9	-12.1

Data Source: Chinese CGE model simulation results.

Table 6. Impacts on Sectoral Output and Trade (%)

	ROW	*TRA*	*ROW-Ag*	*TRA-Ag*	*TRANS*	*LAND*
Output						
Agriculture	1.7	-0.3	1.6	-0.4	-2.9	-1.3
Other primary goods	-0.8	-0.1	-0.2	0.1	-0.8	-0.5
Lightly processed food	1.7	-2.0	1.7	-2.2	-2.6	-1.1
Highly processed food	5.4	0.03	-1.6	0.44	-2.3	-1.1
Non-food manufacturing	-0.5	0.4	-0.9	0.3	2.0	0.9
Services	-0.4	0.2	-0.2	0.1	1.3	0.5
Exports						
Agriculture	71.5	5.7	100.2	3.0	-39.2	-23.6
Other primary goods	-6.0	5.6	1.7	0.6	3.7	1.3
Lightly processed food	31.2	11.0	58.3	7.7	-25.0	-14.4
Highly processed food	64.8	7.0	-14.8	2.8	-17.4	-9.6
Non-food manufacturing	1.6	6.4	-2.1	0.7	3.0	1.4
Services	-10.2	2.7	-1.2	0.3	2.1	1.1
Imports						
Agriculture	11.6	21.0	1.2	22.1	18.6	9.8
Other primary goods	5.5	1.2	-2.4	-0.1	6.9	3.0
Lightly processed food	8.8	46.4	-0.1	48.6	10.3	5.8
Highly processed food	8.8	16.3	3.5	-0.9	8.0	4.3
Non-food manufacturing	3.9	5.7	0.2	0.0	0.5	0.1
Services	4.8	-1.2	0.3	-0.1	0.4	0.1

Data Source: Chinese CGE model simulation results.

Table 7. Impacts on Sectoral Export and Import Volume(%)

	ROW	*TRA*	*ROW-Ag*	*TRA-Ag*	*TRANS*	*LAND*
Exports						
Paddy rice	74.8	19.4	103.0	15.2	-47.9	-29.7
Wheat	7.2	14.3	32.7	7.4	-40.9	-24.6
Other grains	73.5	-70.0	113.2	-71.3	-43.7	-26.3
Vegetables and fruits	151.8	8.2	191.3	5.2	-41.7	-25.8
Oil seeds	14.4	41.7	37.2	37.9	-39.9	-23.8
Sugar cane and beet	-	-	-	-	-	-
Plant-based fibers	19.7	6.3	41.9	2.4	-27.2	-15.7
Other crops	-10.8	7.4	-0.1	6.0	-32.6	-18.4
Cattle sheep etc	-9.2	5.9	1.3	1.0	-61.6	-38.9
Other livestock	-27.4	10.2	-12.0	8.2	-46.8	-28.9
Raw milk	-26.5	11.2	-7.5	8.2	-37.4	-22.4
Wool	-53.5	9.9	-38.0	7.0	-45.1	-26.8
Forestry	-21.9	12.0	2.6	10.6	-38.2	-22.8
Fishing	-13.5	6.8	0.5	1.5	-49.8	-29.8
Coal mining	-6.8	5.4	1.2	0.7	11.9	5.6
Crude oil and natural gas	-3.0	4.7	3.0	0.1	-0.2	0.2
Ore mining	-4.3	5.7	2.0	0.5	7.1	3.6
Other mining	-6.0	6.1	1.5	0.6	12.8	6.1
Meat Products	116.4	18.3	156.2	14.1	-32.5	-19.3
Vegetable oils	54.4	7.3	-20.3	3.4	-23.1	-13.3
Grain mill	-17.6	15.4	-5.2	12.1	-17.4	-9.8
Sugar	390.7	26.0	511.9	20.1	-21.8	-12.5
Forage	22.9	9.3	48.5	6.1	-26.2	-15.2
Prepared fish products	65.3	5.7	-13.0	1.3	-28.1	-15.5
Other processed food	63.5	8.8	-16.7	4.6	-10.5	-5.9
Beverage	65.2	6.5	-15.9	2.4	-7.5	-4.3
Tobacco	70.7	4.3	-12.8	0.8	-5.6	-2.8
Textiles	12.8	5.7	-3.4	1.3	-0.2	-0.4
Apparel and leather	14.1	5.7	-2.3	1.6	1.4	0.4
Sawmills and furniture	-4.5	4.9	-2.3	0.5	-4.2	-2.2
Paper, printing & social articles	-4.6	5.2	-2.6	0.6	4.0	1.9
Petroleum refining	-0.6	5.4	-2.6	0.2	2.2	1.2
Chemicals	-3.4	5.9	-2.1	0.5	1.3	0.6
Build materials	-4.3	4.0	-2.3	0.4	7.1	3.4
Metals	-3.5	4.3	-2.2	0.4	5.9	2.9
Metal products	-3.6	5.2	-2.1	0.4	6.8	3.3
Machinery	-3.2	4.8	-1.9	0.3	5.1	2.5
Transport equipment	-3.1	9.3	-1.8	0.3	4.6	2.3
Electric machinery	-2.9	7.0	-1.9	0.4	5.8	2.9
Electronics	0.2	8.3	-1.1	0.3	3.5	1.8
Instruments	-1.7	7.6	-1.7	0.4	5.9	2.9
Other manufacturing goods	-5.2	4.4	-2.4	0.7	-2.5	-1.2
Imports						
Paddy rice	-	-	-	-	-	-
Wheat	7.5	16.5	-7.2	19.9	24.6	12.7
Other grains	-1.4	7.2	-11.3	9.4	31.4	15.5

Vegetables and fruits	16.9	65.4	7.0	67.8	29.1	16.0
Oil seeds	22.2	37.9	14.7	38.9	15.3	8.2
Sugar cane and beet	48.8	92.7	31.7	97.6	41.5	22.0
Plant-based fibers	-14.6	-19.6	-28.0	-19.4	13.5	7.2
Other crops	10.6	27.8	4.1	28.2	16.4	8.4
Cattle sheep etc	9.2	8.4	-2.2	-0.3	52.8	24.4
Other livestock	-0.4	11.1	-11.9	11.8	35.2	17.7
Raw milk	17.1	-5.0	3.6	-3.5	22.8	11.9
Wool	35.7	-4.1	14.8	-3.3	33.2	16.8
Forestry	5.1	24.1	-9.0	22.5	23.6	12.1
Fishing	18.0	20.7	-2.8	-0.5	32.4	15.7
Coal mining	8.7	11.0	-2.3	-0.3	-3.9	-2.0
Crude oil and natural gas	4.5	0.6	-2.4	0.0	0.5	0.1
Ore mining	4.3	-2.5	-2.6	0.0	0.2	-0.1
Other mining	7.5	-0.5	-2.3	-0.2	-3.3	-1.9
Meat Products	2.5	-3.8	-4.9	-2.0	20.0	11.0
Vegetable oils	13.9	48.6	7.9	-1.3	10.5	5.7
Grain mill	14.4	40.7	8.2	42.7	7.6	4.5
Sugar	14.3	108.2	-3.2	113.2	10.8	6.2
Forage	-1.7	39.5	-12.7	41.2	14.5	7.8
Prepared fish products	8.1	0.7	2.4	-0.4	10.5	5.3
Other processed food	10.3	35.3	5.2	-1.9	4.7	2.9
Beverage	9.3	54.6	5.0	-1.1	4.6	2.7
Tobacco	7.8	35.5	3.3	-0.3	3.2	1.9
Textiles	14.3	0.4	0.6	0.1	0.5	0.3
Apparel and leather	12.2	-1.4	1.3	-0.5	-0.5	-0.2
Sawmills and furniture	5.4	4.2	0.7	-0.2	2.8	1.3
Paper, printing & social articles	5.0	7.2	0.6	-0.2	-0.7	-0.4
Petroleum refining	4.5	11.8	1.0	-0.1	-0.4	-0.4
Chemicals	4.2	6.8	0.4	-0.1	0.6	0.2
Build materials	5.0	5.9	0.6	-0.1	-1.4	-0.9
Metals	3.5	2.7	0.2	0.0	0.1	-0.2
Metal products	5.0	4.9	0.5	-0.1	-0.9	-0.7
Machinery	3.1	5.0	0.2	0.0	0.1	-0.3
Transport equipment	3.4	36.6	0.3	-0.1	-0.2	-0.3
Electric machinery	4.0	6.7	0.3	-0.1	-0.1	-0.2
Electronics	2.1	3.2	-0.2	0.1	1.2	0.5
Instruments	-0.1	0.6	-0.3	0.1	1.7	0.7
Other manufacturing goods	6.6	0.6	0.7	-0.2	2.6	1.1

Data Source: Chinese CGE model simulation results.

Table 8. Sensitivity Analysis (% change)

	No land rental market		*Fully functioning land market*	
	ROW	*TRA*	*ROW*	*TRA*
Factor Prices				
Returns to agr land	16.8	-3.6	15.8	-3.4
Capital	2.1	-0.7	2.2	-0.8
Unskilled wages				
Urban	4.0	-1.1	3.4	-1.0
Rural non-agri	4.3	-1.3	3.5	-1.3
Agricultural	3.5	-1.3	5.3	-1.8
Semi-skilled wages				
Urban	4.4	-1.3	3.5	-1.1
Rural non-agri	5.6	-1.1	4.1	-1.1
Agricultural	1.5	-0.8	4.2	-1.5
Skilled wages				
Urban	1.8	-0.9	1.9	-0.9
Rural non-agri	1.7	-1.0	1.9	-1.0
Labor force (millions)				
Farm labor	8.0	-1.9	4.7	-1.3
Unskilled	0.8	-0.2	0.5	-0.1
Semi-skill	7.2	-1.7	4.2	-1.1
Rural-urban temp migration	-7.4	1.7	-4.4	1.2
Unskilled	-0.7	0.2	-0.4	0.1
Semi-skill	-6.7	1.6	-4.0	1.1
Skilled	0.0	0.0	0.0	0.0

Data Source: Chinese CGE model simulation results.

Annex:

Table A.1 Sectoral Mapping between Chinese CGE model and Linkage Model

Chinese model	Linkage model
Agriculture	
Paddy rice	Paddy rice
Wheat	Wheat
Other grains	Other grains
Vegetables and fruits	Vegetables and fruits
Oil seeds	Oil seeds
Sugar cane and beet	Sugar cane and beet
Plant-based fibers	Plant-based fibers
Other crops	Other crops
Cattle sheep etc	Cattle sheep etc
Other livestock	Other livestock
Raw milk	Raw milk
Wool	Wool
Lightly processed food	
Meat Products	Beef and sheep meat; Other meat products
Vegetable oils	Vegetable oils and fats
Grain mill	Processed rice
Sugar	Refined sugar
Highly processed food	
Forage; Prepared fish products; Other processed food; Beverage; Tobacco	Dairy products; Other food, beverages and tobacco
Other primary products	
Forestry; Fishing; Coal mining; Crude oil and natural gas; Ore mining; Other mining	Other primary products
Non-food manufacturing	
Textiles, Apparel and leather	Textiles and wearing apparel
Sawmills and furniture; Paper, printing & social articles; Petroleum refining; Chemicals; Build materials; Metals; Metal products; Machinery; Transport equipment; Electric machinery; Electronics; Instruments; Other manufacturing goods	Other manufacturing
Services	
Utility; Construction; Transportation & communication; Commerce; Finance; Other services	Services

Table A.2 Impacts on Sectoral Output: Percentage deviation from baseline

	ROW	*TRA*	*ROW-Ag*	*TRA-Ag*	*TRANS*	*LAND*
Paddy rice	1.3	0.4	0.1	0.4	-1.5	-0.7
Wheat	-0.1	-0.7	0.8	-1.1	-4.6	-2.4
Other grains	5.8	-4.4	6.8	-4.7	-3.4	-2.0
Vegetables and fruits	3.5	0.1	3.6	0.0	-2.2	-0.6
Oil seeds	-7.4	-13.4	-3.4	-14.1	-12.2	-6.5
Sugar cane and beet	6.5	-5.8	6.5	-5.9	-2.2	-0.7
Plant-based fibers	4.7	2.6	2.0	1.0	-3.0	-1.5
Other crops	-6.2	0.8	-0.8	0.0	-19.1	-10.6
Cattle sheep etc	-1.5	-0.9	-0.1	0.2	-5.5	-2.9
Other livestock	1.8	0.3	0.1	0.0	-1.3	-0.7
Raw milk	-0.3	0.3	-0.3	0.4	-2.9	-1.5
Wool	1.4	0.5	-0.8	0.3	-0.9	-0.5
Forestry	3.5	0.6	-0.4	-1.2	-2.8	-1.5
Fishing	3.5	0.3	-1.1	0.2	-6.6	-3.3
Coal mining	-0.9	0.1	-0.2	0.1	1.9	0.8
Crude oil and natural gas	-2.5	-0.7	0.5	0.1	0.4	0.2
Ore mining	-3.5	0.3	-0.2	0.2	3.7	1.6
Other mining	-1.8	0.7	0.0	0.2	3.6	1.5
Meat Products	1.1	0.1	0.2	0.2	-1.5	-0.3
Vegetable oils	0.7	0.2	-0.4	0.4	-3.1	-1.6
Grain mill	-1.1	-4.3	-2.0	-4.4	-2.4	-0.9
Sugar	8.7	-7.8	8.9	-7.9	-2.2	-0.8
Forage	3.2	-0.5	4.9	-1.1	-4.0	-2.1
Prepared fish products	22.6	1.9	-5.3	0.6	-13.8	-7.4
Other processed food	6.2	0.0	-2.1	0.8	-1.8	-0.8
Beverage	1.7	-0.3	-0.7	0.2	0.3	0.3
Tobacco	2.2	-0.7	-0.6	0.1	0.1	0.3
Textiles	5.1	3.5	-2.2	0.9	0.2	-0.1
Apparel and leather	6.2	2.8	-1.3	0.9	0.7	0.2
Sawmills and furniture	-1.4	1.0	-0.8	0.2	-0.2	-0.3
Paper, printing & social articles	-1.5	0.4	-0.9	0.2	1.6	0.8
Petroleum refining	-0.5	-0.5	-0.4	0.0	0.8	0.3
Chemicals	-1.3	-0.5	-0.7	0.2	1.2	0.6
Build materials	-0.5	0.4	-0.5	0.1	2.6	1.0
Metals	-1.7	-0.5	-0.8	0.2	3.0	1.3
Metal products	-1.6	0.7	-0.9	0.2	3.3	1.5
Machinery	-1.4	-1.2	-0.7	0.1	2.9	1.2
Transport equipment	-0.9	-5.2	-0.5	0.1	2.2	0.9
Electric machinery	-2.3	0.9	-1.0	0.2	3.6	1.7
Electronics	-1.5	3.8	-0.9	0.2	3.0	1.5
Instruments	-1.8	7.1	-1.6	0.4	5.8	2.8
Other manufacturing goods	-1.5	0.6	-0.8	0.2	0.7	0.2
Utility	-0.6	0.1	-0.3	0.1	1.3	0.5
Construction	0.4	0.1	-0.2	0.1	2.1	0.6
Transportation & communication	-1.0	0.3	-0.4	0.1	1.5	0.7
Commerce	-0.9	0.3	-0.5	0.1	1.3	0.6
Finance	-0.3	0.1	-0.1	0.0	0.6	0.3
Other services	-0.3	0.1	0.0	0.0	0.7	0.4

Data Source: Chinese CGE model simulation results.