Impact of China's WTO Accession on Rural-Urban Income Inequality

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Abstract

Many fear China's accession to WTO will impoverish its rural people, via greater import competition in its agricultural markets. We explore that possibility bearing in mind that, even if prices of some (land-intensive) farm products fall, other (labour-intensive) farm products could become more exportable. Also, the removal of restrictions on exports of textiles and clothing will boost town and village enterprises, so demand for non-farm workers in rural areas may grow even if demand for farm labour in aggregate falls. New estimates of the likely changes in agricultural prices as a result of WTO accession are drawn on to examine the factor reward implication of China's WTO accession empirically using the global, economy-wide numerical simulation model known as GTAP. The results suggest farm-nonfarm and Western-Eastern income inequality may well rise but rural-urban income inequality need not. The paper concludes with some policy suggestions for alleviating any pockets of rural poverty that may emerge as a result of WTO accession.

Key words: WTO accession, China's economic reform, rural-urban income inequality

JEL codes: O19, O53, P31

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Kym Anderson, Jikun Huang and Elena Ianchovichina

After fifteen years of negotiations, China acceded to the WTO at the end of 2001. During those negotiations, China was continually opening up its economy. However, substantial economic policy reform is still needed before the transition from plan to market is complete. Some of those remaining reforms will be introduced over the next few years to fulfil the legal obligations China has committed to in its WTO Protocol of Accession.

Keeping the momentum of growth-enhancing trade reform going requires convincing sceptics that there will not be significant losers. Yet such reforms necessarily involve structural adjustments by households, firms and bureaucracies. While the economy as a whole can gain substantially from those adjustments, losses and even hardship can result for some unless complementary domestic policies are in place to facilitate adjustment and/or compensate losers. That underscores the importance of first analysing the likely distributional consequences of the reforms themselves, and then considering what complementary policies are needed to provide adequate safety nets for potential losers. Of particular concern in many quarters is that farm incomes may fall, exacerbating rural-urban and inter-provincial (especially Western-Eastern) income inequality and possibly adding to rural poverty.

The policy changes still to be made to fulfil WTO obligations will affect all areas of China's economy. Numerous commentators predict a dramatic effect on agriculture and hence rural areas, because the reforms in China over much of the past 23 years largely ignored the country's trade policies for key farm products. China was required by its trading partners to commit to major changes in those farm trade policies by 2005 – commitments that appear far greater, and faster, than any other developing country committed to in the Uruguay Round Agreement on Agriculture.

Meeting the commitments in agriculture will directly affect China's farm sector plus its food, feed and fibre processors, as well as consumers of food and beverages. Imports of numerous land-intensive farm products may increase, and most observers presume that will put downward pressure on prices received by China's farmers. However, reduced protectionism may boost output and exports of some labour-intensive farm products in which China still has a comparative advantage. [1] In addition, farm households will be affected indirectly by many of the other commitments China has made in its WTO Accession Protocol. Especially important will be the arrangements for phasing out the 'voluntary' export restraints on China's textile and clothing trade, and the reductions in protection of the motor vehicles and parts industry. So too will be the myriad commitments affecting the services sector, including state trading enterprises. Those changes, together with the promised increase in a wide range of agricultural imports, will allow China to exploit more fully its strong comparative advantage in unskilled labour-intensive products – both farm and non-farm (Anderson 1990, 1992; Huang et al. 2000).

[1] The difficulties China has had in exporting food products to, for example, Japan, Korea and the United Kingdom in the past year or so because of those countries' quarantine/SPS measures should ease following WTO accession, or at least be challengeable under WTO Dispute Settlement provisions. They are ignored in the empirical analysis below.

To assess the impact on farmer incomes and on rural areas of the remaining reforms required to meet China's commitments to the WTO membership, it is necessary to see those changes in the context of on-going economic growth and structural change. This paper therefore begins with a brief summary of rural developments since the initial reforms began in the late 1970s, of recent policies affecting rural households, and of pertinent reforms still to be delivered as part of China's WTO commitments. With that background, the paper then provides some indication of the likely effects on the welfare of different factor markets and hence different types of households of the reforms to be implemented between 2002 and 2007. Even the direction, let alone the magnitude, of some of the effects cannot be discerned from theory (Winters 2000; McCulloch, Winters and Cirera 2001), so we use the numerical simulation model known as GTAP to address these issues. The paper concludes by drawing out implications for Chinese policy makers should they be interested in pre-empting any increases in food insecurity or rural poverty.

The setting

Rural developments since the late 1970s

The unilateral decision in December 1978 to open up the Chinese economy was a major stimulus to economic growth: the pre-reform rate of per capita GDP growth of 3.1 per cent per year more than doubled, and has remained above 7 per cent for the past two decades (final row of Table 1). Rapid economic growth is normally accompanied by a relative decline in the farm sector, but in China that was initially tempered by the introduction of the farm household responsibility system (which led to the replacement of collective farms with individually managed holdings), and by the raising of prices received by farmers. So began the process of moving away from the taxing of agriculture relative to other sectors – a process followed by most of the advanced economies in the early stages of their industrialization (Anderson and Hayami 1986; Lindert 1991).

Agriculture grew nearly as rapidly as industry from 1979 to 1984. However, the one-off efficiency effects of moving to the household responsibility system and raising relative prices for farm products were mostly reaped by the mid-1980s, after which agriculture grew at only one-third the pace of industry and less than half that of the service sector as industrialization boomed with the development of Special Economic Zones on the eastern seaboard (Table 1). Employment, output and exports of rural township and village enterprises, meanwhile, have boomed (Table 2). Despite that migration of farm workers to rural industrial and service activities (not to mention the unorthorised migration to urban jobs such as in construction), the average farm size and the share of farm household income from farming have fallen steadily since the late 1970s (final two columns of Table 2). Table 3 shows the slowdown in the decline in agriculture's shares of GDP and employment in the 1980s, and its subsequent acceleration in the 1990s.

Income growth has boosted the demand for foods that are high in protein and nutrients relative to those high in carbohydrates, which has stimulated major structural changes within agriculture as farmers responded to changes in domestic demand. For example, livestock and fish increased their share of agricultural output from less that one-fifth in the late 1970s to two-fifths by the late 1990s (Table 3), while within the crop sub-sector, fruit and vegetable production grew two to three times as fast as grain output (Table 1). The prices and marketing of grain and oilseed products have continued to be highly regulated, whereas markets for horticultural, livestock and fish products have been greatly liberalized. This has accentuated the growth in output of the latter group relative to grain and oilseed output since the mid-1980s (Table 1). Meanwhile, the direct consumption of grain by rural as well as urban households has virtually ceased growing (Table 4) -- a consequence not only of incomes rising but also of population growth slowing to less than 1 percent per year and of cuts in the implicit consumption subsidy for foodgrains.

The use of grain for animal feeds continues to grow. To date that has been supplied almost completely by rising domestic production, such that the trend level of grain self sufficiency has remained close to 100 per cent. Table 5 shows that there are nonetheless considerable changes from year to year in grain exports and imports. It also shows that, overall, China has remained a net exporter of food and feed, with meat, fish, fruit and vegetables providing most of the growth in net export earnings. Soybean imports grew substantially when the government (in anticipation of WTO accession) lowered their tariff from 114 per cent to 3 per cent in 2000 and phased out the import quota, however (from 3 to more than 10 mmt per year).

Recent and prospective policies affecting rural areas

As in most developing countries,[2] agriculture in China was squeezed at early stages of industrialization with gross fiscal contributions to the sector being more than outweighed by implicit taxation in the form of depressed prices for farm products, neglect of public infrastructure in rural relative to urban areas, and capital outflows via the financial system (Huang and Ma 1998). Then price and other market reforms associated with China's policy shift from a socialist to a market-oriented economy began to be introduced, starting with non-strategic commodities such as vegetables, fruit, fish, livestock, and oil and sugar crops. The aims of the early reforms were to raise farm level prices and gradually deregulate the market. As the right to private trading was extended to include surplus output of all categories of agricultural products after contractual obligations to the state were fulfilled, the foundations of the state marketing system began to be undermined (Rozelle et al. 1997). Despite periodic stop-go cycles in the reform process, the proportion of retail commodities sold at market prices has kept rising. According to Lardy (2001), the share for agriculture was just 6 per cent in 1978 but had risen to 40 per cent by 1985, 79 per cent by 1995 and 83 per cent by 1999.

What have these policies meant for nominal rates of agricultural protection in China (the percentage by which domestic prices exceed prices at the country's border)? Table 6 shows new estimates based on quota and negotiated procurement prices and on wholesale market prices for key agricultural commodities for some recent years. It suggests rice, meat, fish and fruit and vegetables have been priced at less than border prices while other grains, oilseeds, sugar, cotton and milk have been priced at one-fifth to two-fifths above border prices. Maize and cotton also enjoyed export subsidies in 2001 (amounting to one-third and one-tenth of f.o.b. prices, respectively).

Table 6 also shows what China has committed to in its WTO Protocol of Accession: tariff rate quota will apply to grains, sugar and cotton for which out-of-quota tariffs are quite high, but otherwise, after the phase-in period, the tariffs range between just 1 and 15 per cent – representing substantial liberalizations over 2001 levels. As well, producers of major crops may continue to be affected by commodity-specific policies of government procurement of a portion of the crop at lower than market prices (as in the past – see Sicular 1988) or at higher than market prices (as in 1998 – see Huang 1998 and Lu 1999).

[2] See Sah and Stiglitz (1992) and Anderson (1995).

What will those reforms mean for agricultural trade? Many analysts have been expecting China to become ever-more dependent on agricultural imports in the course of the economy's rapid industrialization over the past two-plus decades. Some extremists (e.g., Brown 1995) have even suggested China could seriously deprive other developing countries of food. Yet as reported above, net food import growth has not yet happened, at least not in a sustained way, and China has continued to be a net exporter of meat, fish, fruit and vegetables. Indeed on occasions in the latter 1990s, China also was a net exporter of grain and cotton (Table 5). How much of that is due to government policies that constrain domestic demand, including occasional export subsidies, is a moot point.

In its WTO Protocol of Accession, China has agreed to have no agricultural export subsidies, and to limit its domestic support to farmers to 8.5% of the value of production (compared with 10% for other developing countries). The import market access commitments China has made to WTO members look substantial on paper. Tariff rate quotas will be retained only on wheat, rice, maize, edible oils, sugar, cotton and wool, domestic production of which in aggregate comprises only about one-sixth of China's agricultural GDP. The quota volumes are to grow over the next three years at annual rates ranging from 5 to 19 per cent. A further commitment by China is that state trading monopolies will disappear (except for tobacco): even though some state trading enterprises will continue to operate, there will be an increasing degree of competition from private firms in the importing and exporting of farm products from now on.

Farmers and the rural sector more broadly will be affected also by China's commitment to provide improved and WTO-bound market access for industrial products. Mineral and manufacturing tariffs will be bound and generally reduced on a broad basis, with many tariffs falling to 10% or less. Tariffs will be cut on accession and further cuts will be phased in by 2005 (with just a few exceptions). Furthermore, for industrial products, China will reduce significantly its non-tariff measures and eliminate all quotas, tendering and import licensing on non-farm merchandise by no later than 2005. Quotas on Chinese imports of automobiles and parts will grow by 15% annually from a level of around US$6 billion in 2000, and these quotas will be eliminated by 2005. For textiles and clothing, however, the current 'voluntary' export restraints will not be completely phased out until the end of 2008. Substantial commitments to open up services markets in China also have been made.

Over the 1990s the average scheduled tariff rates for manufacturing initially exceeded but fell more than for agriculture, and by 2005 the manufacturing average will be well below that for agriculture (a simple average of 7 per cent, versus 17 per cent for agriculture). That does not give a true indication of the extent of change in protection that is taking place, though, because in the 1990s many manufactures have been entering China at reduced or zero tariffs via duty drawbacks, to encourage foreign investment in processing of imported intermediate goods for subsequent export. Some agricultural products also have entered at less than the scheduled rate, including though smuggling.

What all this means for incentives for each industry is difficult to discern precisely, but it provides better information than has been available to date for analysing empirically the economic effects of the reforms associated with China's WTO accession, including the impact on factor rewards and prices from which inferences about income distributional effects can be made. We do this bearing in mind the marked differences in per capita incomes between eastern, central and western provinces, and between urban and rural areas (as shown in Tables 7 and 8, and in Kanbur and Zhang 2001).

Applying the GTAP model

Version 5 of the computable general equilibrium model of the global economy known as GTAP is used here. [3] Being an economy-wide model, GTAP describes both the vertical and horizontal linkages between all product markets within the model's individual countries and regions as well as between countries and regions via their bilateral trade flows. For present purposes the 1997 data base is aggregated to 25 sectors and 20 regions and projected forward first to 2001 and then to 2007, using World Bank projections of population, income, and factor endowments (see Appendix Table A). The initial base case assumes China retains its protection policies as of 1995, but that all other countries fully implement their Uruguay Round obligations on schedule before 2005 and Taiwan implements the commitments in its WTO Protocol of Accession. China's trade policy changes between 1995 and 2001 are assumed to have been in anticipation of the requirements of, and hence part of, China's WTO accession. These are analysed in detail in Ianchovichina and Martin (2002), together with the effects of implementing over the next few years the remainder of China's commitments as recorded in its WTO Protocol of Accession.[4] In this paper we focus on just the additional commitments to be implemented between 2002 and 2007 (relative to the revised base case in which China's reforms only up to 2001 are in place). For key agricultural import policies these remaining reform commitments are assumed to shift nominal rates of protection (NRPs) from column 3 to column 6 of Table 6. As well, the export subsidies in place in 2001 (34 per cent for maize, 10 per cent for cotton) are to be eliminated, and we assume no new farm production subsidies are introduced (even though China's WTO Protocol of Accession allows it to provide up to an aggregate level of support of 8.5 per cent).[5] The choices of new agricultural NRPs fall into three categories: no change if they were negative in 2001 (rice, meats, vegetables and fruits), a move to part-way between the in-quota and out-of-quota tariffs if the TRQs bite (wheat, coarse grains, cotton), and otherwise a move to the new in-quota tariffs (oilseeds, sugar, milk).

If this reform were to require a movement of unskilled labour out of farm activities, three impediments need to be kept in mind. One is that those farm workers would be less than perfect substitutes for those already in non-farm pursuits. Econometric work by Sicular and Zhao (2002) suggests that restraint on mobility could be modelled via a CET function with an elasticity of transformation of 1.3. We have therefore incorporated that in the GTAP model for China. Another impediment to off-farm migration is that urban social welfare benefits such as subsidies to housing, food, education and health case are not available to non-urban people, except by purchasing a residence permit (or *hukou*). And the third impediment is that farm workers who permanently cut their ties with the rural sector may lose entitlement to returns from their family's land, and even the direct support and assistance of family members (Hussain 2001). These latter two impediments have contributed to the persistence of a very large gap in farm versus non-farm returns to unskilled labour. Even after adjusting for differences in work effort, Sicular and Zhao estimate that gap to be one-third of the urban unskilled wage. We have thus assumed that gap will persist even if workers do move off the farm.

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[3] The GTAP (Global Trade Analysis Project) model is a multi-regional, static, applied general equilibrium model based on neo-classical microeconomic theory including full employment of all factors of production, constant returns to scale and perfect competition. See Hertel (1997) for comprehensive documentation. The Version 5 data base is described at **www.gtap.org**. The model is solved with GEMPACK software, described in Harrison and Pearson (1996).

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[4] A particularly important feature of their analysis is the inclusion of China's duty exemptions in the base scenario, because otherwise the model would overstate the gains from tariff reductions. Tariff cuts are from 2001 applied rates to post-accession bound rates (or zero if the latter exceed the former). In this application the aggregate trade balance and government tax revenue are both assumed to remain a fixed share of GDP. The 2001 trade data are from COMTRADE, and the 2001 applied tariffs for China are from CDS Consulting Co. (2002).

[5] Three non-farm reform of importance are worthy of mention. The 'voluntary' export restraint on China's textile and clothing exports to the U.S. and EU, expressed in the base scenario as taxes on those exports, are removed; restructuring of the motor vehicles and parts industry following WTO accession is modelled as a 20 per cent productivity boost to vehicle assembly, following Francois (2002); and liberalization of China's services trade also follows Francois (2002).

With these modifications to the GTAP model, what results emerge from implementing from 2002 the remainder of China's commitments to WTO members? Here we focus on comparing farm versus non-farm results. This is not quite the same as rural versus urban, given the large and growing amount of non-farm rural activities, but it is the best we can do with the GTAP model which does not distinguish activities by location within a country.

What results can we anticipate?

In a recent paper, Carter and Estrin (2001) develop a model with two sectors, agriculture and non-agriculture, that assumes capital is sector-specific and labour is intersectorally mobile. They assume the trade reform from China's WTO accession will lower the relative price of non-farm goods (larger tariff cuts for non-farm than farm products). If the economy started from equilibrium in the labour market, that price change would lower labour's wage in terms of farm goods and would cause labour to migrate from non-farm to farm activities. If, however, the economy starts from a situation in which farm workers face impediments to migrating to non-farm employment, the wage in the non-farm sector would have exceeded that in agriculture. In that case, a fall in the relative price of non-farm products would lower the non-farm wage without changing the low farm wage (if both are again measured in terms of agricultural goods). There would then be an additional gain from trade reform, namely from reducing the distortion in the labour market. If the government were to simultaneously remove the barrier to out-migration of farm labour, yet another welfare gain would accrue to the overall economy. Farm workers would benefit from trade reform alone in so far as they consume non-farm products whose price is lower after that policy change. They would benefit even more if the restraint on their migration were to be lifted. Non-farm workers, however, would suffer wage cuts in terms of farm products from each of those two policy changes, cuts that may more or less than offset the fall in the price of non-farm products they consume. Carter and Estrin therefore conclude that China's rural-urban income inequality (at least for labourers) would be reduced from further trade liberalization and more so if the current policies that inhibit off-farm migration were relaxed.

Neat though the Carter/Estrin analysis is, it ignores the differences between skilled, unskilled non-farm and unskilled farm workers. Also, its assumption that the incentive to produce non-farm relative to farm products will fall following WTO accession needs to be tested, since there will be some positive and some negative changes to the price of both sets of tradables. Furthermore, the demand for nontradables will rise following the income gains from trade reform, and their cost of production will change. Does the Carter and Estrin conclusion, that WTO accession will reduce rural-urban income inequality, hold up when account is taken of these facts in a detailed empirical model such as GTAP?

What do the results show?

To begin with the bottom line before revealing the details, the empirical results suggest the opposite conclusion to Carter and Estrin's. The main reason for the difference is that the GTAP model suggests the relative prices not only of farm products but also of (unskilled labour-intensive) textiles and clothing will be lower rather than higher in 2007 following the completion of WTO accession reforms, compared with what they would be without those remaining reforms. Relative prices are lower for textiles and clothing -- despite the removal of the 'voluntary' export restraint on sales of those products to the U.S. and European Union – for three reasons: because the demand for labour on farms is lower which lowers the cost of unskilled labour in manufacturing, because import taxes on the intermediate inputs used in those manufacturing activities are lower due to the accession process, and because the real exchange rate effect of the tariff reductions lowers the cost of nontraded goods and other factors used as inputs in manufacturing (and in other sectors).

The lower cost structure in textiles and clothing and other activities by 2007 causes the quantity of unskilled non-farm labour demanded to be greater (by 0.8 per cent); but lower farm product prices mean the quantity of unskilled farm labour demanded is less (by 1.7 per cent). A consequence of the reform is a 1.5 per cent fall in the real wage for unskilled farm labour, which more than offsets the rise in real wages for unskilled non-farm labour of only 0.4 per cent, such that the aggregate impact on unskilled wages is –0.1 per cent in real terms (after adjusting for the change in the aggregate cost of living).[6] Farmers are also made worse off by the lower demand for farm land, the return from which is 6.3 per cent lower in 2007 following WTO accession reforms. Meanwhile, the real wages of skilled labour are virtually unchanged, and the rewards to non-farm capital are 0.5 per cent higher. Together these results suggest the owners of non-farm capital gain only slightly more in proportional terms than unskilled labourers in non-farm employment, but the latter do better than skilled workers. Hence on balance income inequality may improve among non-farm households. However, it can be expected to worsen as between farm and non-farm households. With only 1.7 per cent of (or about 6 million) unskilled farm workers leaving agriculture for non-farm work (because of the assumed impediments to out-migration), and with land returns depressed by 6.3 per cent in addition to farm labour returns being 1.5 per cent lower, the gap between farm and non-farm incomes looks set to rise unless remedial action is forthcoming.

Sectoral details of the GTAP results are summarized in Table 9. Real consumer prices are lowered most by WTO accession for motor vehicles, oilseeds and sugar (and for beverages and tobacco, although if China was using import taxes on those items as a form of consumption tax and their decline is matched by an increase in domestic sales taxation, those price declines may never materialize). As already mentioned, they are also lowered for textile products and to a lesser extent clothing. Among the farm products, consumer prices for livestock products are raised slightly. Producer prices are down more for farm products than for most other products though, and farm output is down for all but cotton and meat. Moreover, feedgrain exports shrink by three-quarters and cotton exports by half with the abolition of export subsidies. The difference in the effects on production and consumption shown in Table 9 reveal that China's food, feed and fibre self-sufficiency will be reduced at least slightly by these reforms. But the extent is really quite minor: the trade balance column in Table 9 suggests that for all agricultural and food products, net imports would be greater because of the remaining accession reforms by only $3.96 billion per year by 2007 (in 1997 US dollars).

Some qualifications

The above results depend as always on the assumptions in the model. What if the grain, sugar and cotton NRPs were to drop to the in-quota tariff levels shown in Table 6, for example? An additional GTAP simulation was run and the differences for factor rewards are not huge in aggregate but they would be in the direction of worsening income inequality: unskilled farm wages would fall 1.7 instead of 1.5 per cent and rewards to farm land would fall 7.2 instead of 6.3 per cent on the one hand, while on the other non-farm wages would rise 0.6 instead of 0.4 per cent for the unskilled and 0.2 instead of 0.0 per cent for skilled workers. These changes would attract only another million workers from farms, given the assumed impediments of off-farm migration. Domestic production of grains, sugar and cotton would be up to 5 percentage points less though, and domestic consumption up to 2 percentage points greater, so self-sufficiency in those products would be as much as 6 or 7 percentage points lower. Even so, net imports of all food and agricultural products would be greater

[6] The present version of the GTAP model has only one aggregate household, so it cannot distinguish between the different consumption bundles and factor endowments of different types of households.

by $1.5 billion per year by 2007 ($5.43 instead of $3.96 billion). Such an import surge would be within the tariff rate quotas for those items with the possible exception of maize (depending on the extent to which other feedgrains that are not TRQ-restricted, such as barley, are substitutable for maize).

On the other hand, if the negative NRPs for rice, meats, vegetables and fruits were to be raised to zero, the income distributional effects would go in the opposite direction (less inequality between farm and non-farm households). Also, net exports for those three agricultural sub-sectors would be greater (although there would be a lower trade balance for wheat and feedgrains).

If one expected all off-farm migrants to go to *rural* rather than urban non-farm jobs, and if those migrants were just as adept at such non-farm work (e.g., because they are young or even just school-leavers and hence no different from other new entrants to unskilled rural non-farm work), the assumption above of a one-third wedge between farm and non-farm wages for the unskilled could be dropped.[7] Rerunning the model without that assumed wedge has a significant impact on the estimated number of farm workers moving to non-farm employment and on the industry composition of China's economy. Approximately 35 million people would leave their farm jobs as a result of accession if that barrier to farm out-migration was removed, compared with the estimated 6 or 7 million people mentioned above when the *hukou* system remains in place. The impact on industry composition is also substantial. WTO accession will have a much stronger positive impact on China's manufacturing sectors if the *hukou* system is abolished. This will allow not only textile and clothing production to expand more but also metals, automobiles, electronic equipment, other manufactures and construction. Those expansions are made possible because agricultural output is less, but that means more imports of food and agricultural products are needed ($10.2 billion by 2007 instead of the $3.96 or $5.43 billion mentioned in the previous two paragraphs).

The assumption in GTAP that all households are identical is of course a fiction. In the next version we hope to distinguish several different types of households: a number of different farm households, unskilled workers in non-farm occupations, skilled workers, and non-farm capitalists, all earning different shares of their income from the various productive factors and all having different consumption bundles and net government transfers or taxes. The NBS household survey data (Chen Shaohua 2001) can be used to infer the effects of WTO accession on the distribution on income within rural areas and between rural and urban areas in aggregate, and in particular on the incidence of rural (and urban) poverty.[8]

The final task is then to analyse the consequences, including for poverty and food self-sufficiency (and thereby food security), of additional policy changes the government might introduce. Some options are discussed below.

Conclusions and policy implications

Our analysis suggests rural non-farm incomes will rise on average absolutely and possibly even relative to urban incomes. However, some farm households facing increased import competition

[7] Evidence of increased flexibility in China's labour markets in recent times is presented in Lohmar (2001).

[8] That method (see Hertel 2001; Hertel et al. 2000; and Friedman 2000) holds constant the shares of household income from different sources and the household's expenditure shares, thereby providing an upper limit on any detrimental effect of reform and a lower limit on its benefits. That method also does not take into account regional differences in price changes, but rather simply assumes the national average price change for each product applies throughout the country. Also needed would be the shares of each GTAP sector's output that is located in rural areas. That too would have to be assumed constant in the transition, again underestimating the changes that in fact would take place.

may be worse off, ceteris paribus, because they are located in areas that are too distant from expanding industrial and service activities to benefit directly from that expansion in non-farm output and are too poorly served with infrastructure to attract such activities to their own region or to diversify into producing farm goods whose relative price has risen, or because they do not have relatives able to repatriate non-farm earnings to them. The incidence of rural non-farm poverty will fall mainly because of the growth in wages for unskilled workers in rural non-farm activities, but poverty may well increase in agriculturally based hinterland provinces a long way from markets and in regions poorly served with the necessary infrastructure to attract investment in such activities as textiles and clothing. National self-sufficiency in food, feed and fibre will fall somewhat, particularly as the demand for livestock products grows with income gains from trade reform and as exports of meat products and of textiles and clothing expand. But overall, most of these effects of the remaining reforms that are required following WTO accession are relatively small in magnitude.[9]

If some farmers' incomes are to worsen relative to those of non-farm households, and if there is a fall in agricultural self-sufficiency, two of the most obvious policy implications have to do with rural human capital/R&D/infrastructure investments and grain marketing. First, the government might consider further investments in agricultural research and in basic rural education and health services and rural infrastructure to reduce the adverse effect of trade reform on poverty incidence and perceived food security.[10] Second, the government might reduce its regulation of grain marketing and in particular cease compulsory procurement at less than market prices and reduce the provision of grain to urban consumers at less than market prices. It might also look to ways to free the mobility of farm labour, at least to rural town and smaller cities, to make it easier for those in depressed rural areas to find more-lucrative off-farm work (see Johnson 2001).

If all that was considered insufficient support for incomes of the poorest farm households, short-term adjustment assistance via infra-marginal (and hence not output-inducing) producer price subsidies could be provided so as to boost their incomes without boosting farm output (in an equal but opposite way to that used to tax farmers in earlier decades –see Sicular 1988). Such an intervention could well be deemed WTO-consistent because of its decoupled nature, and in any case if it was just targeted to poor farmers it is unlikely to ever exceed 8.5 per cent of the value of China's output of the product concerned (its de minimis exemption limit for product-specific support under Article 6.4 of the WTO's Agreement on Agriculture).

As well, now China is in the WTO it has the opportunity to take part in new rounds of multilateral trade negotiations whereby it can seek increased market access for its exports of farm (and other) products abroad. While not taken into account in the present paper, if WTO membership enhances China's chances of expanding its access to agricultural more than other markets abroad in the future, that would be a positive benefit of WTO accession for China's farmers and rural areas. Martin (2002) points out that Chinese farm exports face particularly high barriers abroad, so this

[9] They are especially small when compared with the changes that are taking place in the course of normal economic growth, as shown in earlier analyses by Anderson et al. (1997a, b).

[10] Agricultural R&D can ease both urban and rural poverty (see Fan, Fang and Zhang 2001; Hazell and Haddad 2001). Also, an important policy issue is whether China chooses to deny itself the use of GMOs in food production. Since our results suggest China would be exporting less food post-WTO accession and beyond, there is less sense in banning food GMOs in China if such a ban were to be imposed because of fears of otherwise being denied access into food markets abroad (see Anderson and Yao 2001).

potential benefit is non-trivial in principle (although in practice it may be difficult to secure, especially if the main barriers are SPS measures).[11]

[11] There is also the question of how China's membership will alter the relative strengths of liberal versus protectionist forces in the next WTO rounds of multilateral farm trade negotiations. Mathews (2002) argues that China's accession is likely to affect both sides, so the net effect is difficult to discern a priori.

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Table 1: Growth rates of China's economy, 1970 to 2000

(per cent per year)

	Pre-reform	Reform period		
	1970-78	1979-84	1985-95	1996-00
Gross domestic product	**4.9**	**8.5**	**9.7**	**8.2**
Agriculture	2.7	7.1	4.0	3.4
Industry	6.8	8.2	12.8	9.6
Service	na	11.6	9.7	8.2
Food production volume				
Grain	2.8	4.7	1.7	0.03
Oilseed crops	2.1	14.9	4.4	5.6
Fruit	6.6	7.2	12.7	8.6
Red meat	4.4	9.1	8.8	6.5
Fish	5.0	7.9	13.7	10.2
Value of output of non-farm rural enterprises	na	**12.3**	**24.1**	**14.0**
Population	1.80	1.40	1.37	0.90
Per capita GDP	**3.1**	**7.1**	**8.3**	**7.1**

Note: Figures for GDP in 1970-78 are the growth rate of national income in real terms. Growth rates are computed using the regression method. Growth rates of individual and groups of commodities are based on volume of production data, while sectoral growth rates refer to value added in real terms.

Source: SSB, *Statistical Yearbook of China*, various issues; MOA, *Agricultural Yearbook of China*, various issues.

Table 2: Farm and rural enterprise (RE) developments in China, 1980 to 1999

	RE's share in rural labour (%)	RE's share in total GDP (%)	RE's share in total export (%)	Farm land size (ha/farm)	Non-farm income share (%)
1980	9	4	0	0.56	17
1985	19	9	15	0.51	25
1990	23	14	43	0.43	26
1995	34	25	48	0.41	37
1999	35	30	48	0.40	47

Source: SSB, *Statistical Yearbook of China*, and *China's TVE's Yearbook*, various issues.

Table 3: The changing structure of China's economy, 1970 to 2000

(per cent, based on current prices)

	1970	1980	1985	1990	1995	2000
Share of GDP						
Agriculture	40	30	28	27	20	16
Industry	46	49	43	42	49	51
Services	13	21	29	31	31	33
Share of employment						
Agriculture	81	69	62	60	52	50
Industry	10	18	21	21	23	23
Services	9	13	17	19	25	27
Share of agricultural output						
Crops	82	76	69	65	58	56
Livestock	14	18	22	26	30	30
Fish	2	2	3	5	8	10
Forestry	2	4	5	4	3	4
Share of population that is rural	83	81	76	72	71	64

Source: State Statistical Bureau, *China Statistical Yearbook*, various issues; and *China Rural Statistical Yearbook*, various issues.

Table 4: China's grain production, consumption and trade, 1980 to 1998

(million tons)

	1980-89	1990-94	1995-98
Production	332	396	442
Net imports	8	-1	6
Change in stocks	1	11	45
Consumption	**339**	**384**	**403**
Food – urban	*35*	*42*	*44*
Food -- rural	*177*	*190*	*191*
Feed	*64*	*86*	*98*
Other (seed, industrial use, waste)	*63*	*66*	*70*

Source: Huang (2001), based on SSB publications and the CCAP database.

Table 5: Structure of China's food and feed trade (US$ million), 1980 to 1999

	SITC	**1980**	**1985**	**1990**	**1995**	**1999**
EXPORTS:						
Live animals	00	384	304	430	473	374
Meat	01	361	448	791	1,349	1,054
Dairy products	02	71	57	55	61	71
Fish	03	380	283	1,370	2,875	2,969
Grains	04	423	1,065	614	281	1,273
Fruit and veg.	05	746	825	1,759	3,399	3,150
Sugar	06	221	79	317	321	214
Coffee and tea	07	328	435	534	523	561
Animal feeds	08	58	241	623	351	239
Other foods	09	49	66	107	290	541
Oilseeds	22	na	na	na	522	373
Vegetable oils	4	na	na	na	454	132
TOTAL FOOD		**3,021**	**3,803**	**6,600**	**10,899**	**10,951**
IMPORTS:						
Live animals	00	5	18	14	18	22
Meat	01	1	6	54	97	503
Dairy products	02	5	31	81	60	160
Fish	03	13	44	102	609	890
Grains	04	2,458	982	2,353	3,631	574
Fruit and veg.	05	48	52	83	185	384
Sugar	06	316	274	390	935	183
Coffee and tea	07	56	40	30	74	72
Animal feeds	08	14	83	182	423	620
Other foods	09	2	23	46	92	182
Oilseeds	22	na	na	na	110	1,531
Vegetable oils	4	na	na	na	2,596	1,352
TOTAL FOOD		**2,918**	**1,553**	**3,335**	**8,828**	**6,474**
NET EXPORTS:						
Live animals	00	379	286	416	455	352
Meat	01	360	442	737	1,252	551
Dairy products	02	66	26	-26	1	-89
Fish	03	367	239	1,268	2,266	2,079
Grains	04	-2,035	83	-1,939	-3,350	663
Fruit and veg.	05	698	773	1,676	3,214	2,766
Sugar	06	-95	-195	-73	-614	31
Coffee and tea	07	272	395	504	449	489
Animal feeds	08	44	158	441	-72	-381
Other foods	09	47	43	61	198	359
Oilseeds	22	na	na	na	412	-1,158
Vegetable oils	4	na	na	na	-2,142	-1,220
TOTAL FOOD		**103**	**2,250**	**3,265**	**2,071**	**4,477**

Source: Mathews (2002), based on UN COMTRADE statistics.

Table 6: Nominal rates of protection (tariff or tariff equivalent), agricultural products, China, 1978 to 2000

(per cent)

	1995	**1997**	**2001**	**2007 in-quota tariff**	**2007 out-of-quota tariff**	**Assumed NRP in 2007**
Rice	-5	-5	-3	1	65	-3
Wheat	25	17	12	1	65	12
Coarse grains	20	28	20	1	65	32
Vegetables & fruits	-10	-8	-4	11	11	-4
Oilseeds	30	28	32	3	3	3
Sugar	44	42	40	15	50	20
Cotton	20	17	17	1	40	20
Meats	-20	-19	-15	12	12	-15
Milk	30	30	30	11	11	11

Source: Based on research subsequently reported in summary form in Huang and Rozelle (2002).

Table 7: Income and employment differences across regions of China, 1998

	Income per capita (Yuan)	% of population that is rural	% of labour force that is in agriculture
Eastern Provinces	9,690	71	45
Central Provinces	5,280	75	55
Western Provinces	4,090	81	64

Source: Carter and Estrin (2001).

Table 8: Income and its distribution, rural and urban China, 1980 to 1999

	Real per capita income index			Real per capita net income (in 1999 yuan)		
Year	Rural	Poorest 20%	Gini coefficient	Rural	Urban	Urban/rural ratio
1980	100	100	0.24	616	2062	3.4
1985	189	165	0.26	1193	2605	2.2
1990	218	177	0.31	1380	3217	2.3
1995	272	193	0.33	1702	4713	2.8
1999	349	252	0.35	2210	5854	2.7

Note: The exchange rate was 8.28 yuan/US$ in 1999.

Source: SSB, 1989-2000, and rural household income and expenditure surveys.

Table 9: Sectoral volume effects of China's WTO accession reforms, 2002 to 2007

(per cent and 1997 US$million)

	Producer price (%)	**Consumer price (%)**	**Production (%)**	**Household consumption (%)**	**Exports (%)**	**Imp**
Rice	-1.7	1.0	-2.1	-0.1	6	
Wheat	-2.5	0.4	-2.1	0.0	19	
Feedgrains	-2.7	1.9	-2.2	-0.1	-78	
Vegetables and fruits	-2.7	-0.1	-3.4	0.1	15	
Oilseeds	-3.6	-4.6	-7.8	0.9	30	
Sugar	-2.7	-3.1	-6.5	0.6	14	
Plant-based fibres	-0.7	3.1	15.8	-0.6	-52	
Livestock and meat	-2.5	0.2	1.3	0.0	15	
Dairy products	-2.3	0.2	-2.1	0.0	14	
Other food products	-2.5	-1.8	-5.8	0.4	11	
Beverages and tobacco	-2.7	-6.9	-33.1	1.5	10	
Forestry, fishing and mining	-1.5	1.2	-0.9	-0.2	8	
Textiles	-2.5	-3.1	15.7	0.7	33	
Wearing apparel	-1.3	-1.9	57.2	0.5	106	
Leather products	-1.6	0.0	3.8	0.0	6	
Petrochemical products	-1.4	0.9	-2.4	-0.2	3	
Metals and metal products	-1.1	1.3	-2.1	-0.3	4	
Motor vehicles and parts	-4.7	-4.2	1.5	1.0	28	
Electronic equipment	-2.1	-1.7	0.7	0.5	7	
Other manufactures	-1.4	0.9	-2.2	-0.2	4	
Trade and transport	-0.9	1.7	0.0	-0.3	1	
Construction	-0.9	1.7	0.9	-0.4	3	
Communications	-0.7	1.9	-0.6	-0.4	0	
Commercial services	-0.6	1.9	-2.0	-0.5	0	
Other services	-0.9	1.6	-1.7	-0.3	2	

Source: Author's GTAP results.

Appendix Table A: Cumulative (and annual) percentage growth rates over the period 1997-2007

Regions	Population	Unskilled Labor	Skilled Labor	Capital	Manufacturing TFP*
North America	11	11	12	49	High
	(1.05)	(1.08)	(1.11)	(4.07)	
Western Europe	0	-1	1	30	High
	(0.03)	(-0.08)	(0.07)	(2.69)	
Australia/New Zealand	10	12	10	55	High
	(0.98)	(1.14)	(0.99)	(4.45)	
Japan	1	-2	-7	35	Medium
	(0.06)	(-0.19)	(-0.71)	(3.02)	
China	8	13	50	174	High
	(0.81)	(1.26)	(4.15)	(10.62)	
Taiwan, China	9	11	14	96	High
	(0.86)	(1.05)	(1.36)	(6.97)	
Other NICs	10	-1	55	88	Medium
	(0.93)	(-0.10)	(4.47)	(6.53)	
Indonesia	16	17	123	25	Low
	(1.50)	(1.59)	(8.36)	(2.27)	
Vietnam	15	32	36	111	Medium
	(1.40)	(2.79)	(3.10)	(7.78)	
Other Southeast Asia	18	22	134	60	Low
	(1.70)	(2.04)	(8.87)	(4.83)	
India	18	23	78	88	Medium
	(1.67)	(2.10)	(5.92)	(6.54)	
Other South Asia	25	30	80	72	Medium
	(2.22)	(2.69)	(6.06)	(5.55)	
Brazil	14	19	72	31	Medium
	(1.31)	(1.77)	(5.60)	(2.75)	
Other Latin America	18	6	90	54	Low
	(1.68)	(0.57)	(6.65)	(4.42)	
Turkey	16	19	107	55	Low
	(1.47)	(1.75)	(7.55)	(4.46)	
Other Middle East & North Africa	24	37	67	28	Low
	(2.16)	(3.23)	(5.24)	(2.50)	
Economies in Transition	-1	6	9	33	High
	(-0.11)	(0.56)	(0.90)	(2.88)	
South African Customs Union	15	31	47	34	Low
	(1.39)	(2.76)	(3.92)	(2.94)	
Other Sub-Saharan Africa	30	40	54	38	Medium
	(2.65)	(3.42)	(4.42)	(3.26)	
Rest of World	18	23	35	68	Low
	(1.63)	(2.10)	(3.05)	(5.32)	

*The low, medium, and high growth assumptions for total factor productivity (TFP) in manufacturing correspond to annual growth rates of 0.1%, 1.0%, and above 2.0% (between 2% and 4%), respectively.

Source: Ianchovichina and Martin (2002)