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Agriculture and Agricultural Policies in China and India Post-Uruguay Round

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Agriculture and Agricultural Policies in China and India Post-Uruguay Round

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ABSTRACT

Both India and China, as participants in the Uruguay Round, have had the Agreement on Agriculture (URAA) before them as they continued to reform their agricultural and trade policies over recent years. China did not join the WTO until December 2001, but it has nonetheless been undertaking reforms and has entered into substantial commitments to further reform its farm sector by end-2004, when all other countries' UR commitments are due to be fully implemented. This paper reviews the progress expected to be made over the ten years since 1995 in these two populous developing countries. It summarizes their structural adjustments to production and trade as a consequence of their (and others') economic growth and policy changes, before focusing on the nature and extent of the agricultural and other policy reforms themselves. It concludes by drawing out the implications of these developments for the roles these countries might play in international agricultural markets and in the agricultural negotiations of the Doha Round.

Agricultural policy over much of the 20th century in rich industrial countries (excluding those with a strong agricultural comparative advantage) has been characterized by increasing import protection and other government assistance to farmers relative to other producers. In developing countries, by contrast, newly independent governments from the 1950s sought to provide import protection to manufacturers and often taxed the exports of agricultural products (Sah and Stiglitz 1992; Anderson 1995). The extent of those disincentives facing developing country farmers have been reduced somewhat over the past two decades, however, and in some newly industrializing economies (beginning with Korea and Taiwan from the late 1960s) agricultural protectionism began to emerge (Anderson and Hayami 1986; Lindert 1991). The Cairns Group and other agricultural exporting countries sought to reverse that growth of agricultural protection in advanced and newly industrialized economies during the Uruguay Round of multilateral trade negotiations. But what has the UR Agreement on Agriculture meant for agricultural policies in poorer countries?

This paper focuses on two such countries, namely, China and India. They are important not just because they are the world's most populous countries, comprising 38 per cent of the world's people and more than one-fifth of global agricultural GDP, but also because they have moved away from being rather closed to being increasingly open to international trade (and investment in China's case). That opening up has stimulated rapid industrialization and expanded exports of labour-intensive manufactures from these densely populated countries, but it has also imposed structural adjustment pressures on agriculture. To what extent is this creating pressure on governments to assist farmers, and what role if any are commitments to the World Trade Organization constraining those governments from following the agricultural protection growth trend of earlier industrializers? The paper begins with an

examination of China, because it is the larger economy and changes there have been more dramatic, before comparing its experience with that of India. The final section concludes by summarizing implications for the rest of the world's food-exporting and food-importing countries and for the Doha Round.

China[1]

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.

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 on the eastern seaboard (Table 1). Employment, output and exports of rural township and village enterprises, meanwhile, boomed (Table 2). Despite that migration of farm workers to rural industrial and service activities (not to mention the temporary migration to urban jobs such as in construction), the average farm size and the share of farm

[1] This section draws freely on Anderson, Huang and Ianchovichina (2002).

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, and 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 (Table 5). However, soybean imports grew substantially when the

government (in anticipation of WTO accession) lowered the out-of-quota tariff from 114 per cent to 3 per cent in 2000 and raised the import quota (from 3 to more than 10 mmt per year).

Policy changes affecting agriculture

As in most developing countries, 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).

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 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 constrained 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 competition from private firms in the importing and exporting of farm products, at least within the tariff-rate-quotas.

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 through smuggling.

What all this means for incentives for each industry is difficult to discern precisely, but it provides better information than had previously been available 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 (Anderson et al. 2002, Tables 7 and 8; Kanbur and Zhang 2001).

GTAP modeling

Using Version 5 of the computable general equilibrium model of the global economy known as GTAP,[2] its 1997 data base is projected forward first to 2001 and then to 2007, using World Bank projections of population, income, and factor endowments (see Appendix Table A of Anderson, Huang and Ianchovichina 2002). The initial base case assumes China retains its protection policies as of 1995, but that all other countries fully implement their

[2] 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).

Uruguay Round obligations on schedule by 2005. 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.[3] Here the focus is on just the additional reform commitments to be implemented after 2001. 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.[4] 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: those farm workers would be less than perfect substitutes for those already in non-farm pursuits; urban social welfare benefits such as subsidies to housing, food, education and health care are not available to non-urban people, except by purchasing a residence permit, or *hukou*; and farm workers who permanently cut

[3] 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).

[4] Three non-farm reforms 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

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. The latter two impediments have contributed to the persistence of a one-third gap between farm and non-farm returns to unskilled labour (Shi Xinzeng 2002), which is assumed here to persist even if workers do move off the farm in the initial simulation. The closure adopted here is a long-run one in which, in addition to the above assumptions about farm labour, nonfarm labour is mobile between nonfarm sectors, capital is mobile between sectors, and agricultural land is mobile between industries within the agricultural sector.

With these modifications to the GTAP model, what results emerge from implementing after 2001 the remainder of China's commitments to WTO members? Our analysis begins with the core accession scenario, and then is followed by three variations on that core scenario.

The core WTO accession scenario

To begin with the bottom line of the main scenario before revealing the details, the core empirical results suggest the relative producer prices not only of farm products but also of textiles 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 (Table 7). Relative prices are lower for textiles -- 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

per cent productivity boost to vehicle assembly, following Francois (2002); and liberalization of China's services trade also follows Francois (2002).

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 production.

The lower cost structure in unskilled labour intensive manufacturing 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 0.7 per cent fall in the real wage for unskilled farm labour, and a rise in real wages for unskilled non-farm labour of 1.2 per cent (after adjusting for the change in the aggregate cost of living).[5] Farmers are also made worse off by the lower demand for farm land, the return from which is 5.5 per cent lower in 2007 following WTO accession reforms. Meanwhile, the real wages of skilled labour increase by 0.8 per cent, and the rewards to non-farm capital are 1.3 per cent higher. Together these results suggest the owners of non-farm capital gain almost the same in proportional terms as unskilled labourers in non-farm employment, but the latter do better than skilled workers. Hence on balance income inequality may improve slightly among non-farm households dependent mainly on labour income.[6]

However, income distribution can be expected to worsen as between farm and non-farm households, although the degree depends on the proportion of farm household income earned off the farm. 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

[5] 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. Throughout, real price changes refer to the change in price relative to the consumer price index change, given the consumption bundle of the aggregate household.

[6] Wages of skilled workers might increase more than suggested here as we do not capture the endogenous productivity growth resulting from the substantial liberalization of the service sectors.

with land returns depressed by 5.5 per cent in addition to farm labour returns being 0.7 per cent lower, the gap between farm and non-farm incomes even within rural areas, and certainly between rural and urban areas, looks set to rise slightly unless remedial policy action is forthcoming. For farm households entirely dependent on earnings from agriculture (type A in Table 8), income would fall 1.6 per cent on average. For farm households earning 30 per cent of their income from nonfarm unskilled work, however, that income fall is only half as large (0.8 per cent); and for farm households earning 60 per cent of their income from nonfarm unskilled work, their incomes would not decline at all (types B and C in Table 8 -- see rows 7 and 8).

Sectoral details of the GTAP results are summarized in Table 7. 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 were to be matched by an increase in domestic sales taxation, those price declines may not materialize). They are also lowered for textile products and to a lesser extent clothing. Among the farm products, consumer prices are raised slightly for livestock products, somewhat more for grains, and significantly for cotton (plant-based fibres). Producer prices are down more for farm products than for most other products except autos 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 7 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 7 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), which represents only 1 per cent of total imports.

The above results depend as always on the assumptions in the model. To check the sensitivity of some of those assumptions, three alternative scenarios were run to compare their results with those in the base accession scenario: greater agricultural protection cuts; removing negative agricultural protection; and removing the wedge between farm and non-farm wages.

Alternative scenario 1: greater agricultural protection cuts. What if the grain, sugar and cotton NRPs were to drop to the in-quota tariff levels shown in Table 6, for example? 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 0.9 instead of 0.7 per cent and rewards to farm land would fall 6.4 instead of 5.5 per cent on the one hand, while on the other non-farm wages would rise 1.4 instead of 1.2 per cent for the unskilled and 1.0 instead of 0.8 per cent for skilled workers (Table 8). These changes would attract only another million workers from farms, given the assumed impediments of off-farm migration. But while agricultural incomes would be lower, farm household income would not fall if at least 60 per cent of its income came from wages of non-farm unskilled labour (see row 8 of Table 8). Domestic production of grains, sugar and cotton would be less though, and domestic consumption greater, so self-sufficiency in those products would be slightly lower. Even so, net imports of all food and agricultural products would be greater by only $1.5 billion per year by 2007 ($5.43 instead of $3.96 billion). Such an import increase 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). National economic welfare would be only very slightly greater in this case as compared with the core scenario (see bottom row of Table 8).

Alternative scenario 2: removing negative agricultural protection. 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 to those in the previous alternative scenario (less inequality between farm and non-farm households). The changes are not great though, even though these products account for nearly 40 per cent of the value of food and agricultural output in China. As can be seen by comparing columns 1, 2 and 3 of Table 8, they would involve about as much improvement in income distribution as the previous alternative scenario would worsen it. This case involves a 3 per cent larger national economic welfare gain than the core case (bottom row of Table 8).

Alternative scenario 3: removing the wedge between farm and non-farm wages. 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. Rerunning the model without that assumed wedge has significant impacts on the estimated number of farm workers moving to non-farm employment and on the industry composition of China's economy. Approximately 28 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 of removing that labour market distortion is

substantial. WTO accession will have a much stronger positive impact on China's manufacturing and service sectors if the *hukou* system is abolished. This will allow more production of metals, automobiles and electronic equipment, and more services. That is possible in this scenario because factor use in farming and hence agricultural output are less, which also means more imports of food and agricultural products are needed ($10.2 billion by 2007 instead of the $3.96 in the core scenario). The consequences for income distribution are dramatic. Table 8 shows that this greater off-farm migration of workers would cause earnings of farm workers (mostly self-employed farmers) to rise because of WTO accession by 16.8 per cent, instead of falling by 0.7 per cent as in the core accession scenario. Even though the reduced demand for land would cause its rental value to fall more (9.7 instead of 5.5 per cent), the farmers' overall earnings from agriculture would be 6.8 per cent greater in this scenario – in stark contrast to the core scenario where they fall. True, the earnings of all other factor owners fall in this scenario, particularly unskilled nonfarm labour (by 3.8 per cent). However, given that farmers are among the country's poorest households, this scenario suggests that WTO accession would reduce income inequality and poverty if the labour market distortion associated with the *hukou* system were to be reformed. It also suggests that the boost to national economic welfare in aggregate could be greater if WTO accession were to be accompanied by labour market reform: $11 billion per year instead of just the $9.6 billion in the core accession scenario.

India

How do China's recent and prospective developments compare with India's? India too began to reform its economy in the 1980s, at least tentatively, but the growth it generated was

largely a result of building up external debt that was unsustainable. A balance of payments crisis in 1991 was followed by a more concerted effort at opening up of the economy, and one that caused the growth of GDP to accelerate to 6.7 per cent per year between 1992-93 and 1996-97. Then implementation of reforms slowed down, and the binding constraints became inflexible labour markets and inadequate infrastructure. Hence so did the GDP growth rate, to 5.4 per cent over the subsequent five years, due to a halving in both the agricultural and industrial growth rates (Table 9).

While much lower than China's, India's GDP growth rate has been well above that for other low-income countries, and even more so on a per capita basis. Agricultural GDP growth in India in the 1990s was nearly as fast as in China (3.4 compared with 4.3 per cent p.a.), and China remains nearly as agrarian as India in terms of the rural sector's share of population and agriculture's share of employment, even though China is now classified as a lower middle-income country. However, India has not had the dramatic decline in the share of GDP from agriculture that China has seen in the 1990s (Table 10), indicating the slower pace of industrialization in India.

India's export growth has been only 60 per cent as fast as China's since 1990, and its share of GDP that is exported is barely half that of China's now. India also is still attracting only a small fraction (3 per cent) of its investment from foreign sources, in contrast to China's 13 per cent. And as recently as 1999, trade duties comprised as much as 28 per cent of total tax revenue in India, compared with just 7 per cent in China (Table 11).

Policy changes affecting agriculture[7]

The past decade of policy reforms in India that are altering incentives for farmers are more those affecting other parts of the economy than those directly affecting agriculture. For example, the switch from a fixed to a flexible exchange rate regime in 1993 enabled the abolition of import licensing on capital and intermediate goods. The government was reluctant to remove quantitative restrictions on imports of final consumer goods, because those measures protected many small producers, but they too were abolished in 2001 following a WTO dispute settlement case brought by the United States. Also, the long list of industries reserved solely for production by the public sector has been reduced to just three, and industrial licensing has been all but abolished. Even the list of items (some 800) reserved for production by the small-scale sector has begun to shrink: in 2001 and 2002, 64 of them were removed from the list, including such crucial ones as garments, shoes, toys and motor vehicle parts. In addition, tariffs on imports have been coming down. The weighted average import duty declined from 72 per cent in 1991-92 to 25 per cent by 1996-97. That average then rose in the latter 1990s to 36 per cent, but in February 2002 the government signalled further cuts and so it will be back to 29 per cent in 2002-03 and potentially 15 per cent by 2004-05. That is still high by the standards of many other developing countries, including China whose commitment is to be down to 9 per cent by 2005. Nonetheless, it reflects a significant reduction in protection provided to the industrial sector, the flipside of which is a reduction in the disincentive to farming.

[7] This section draws on numerous papers nicluding Ahluwalia (2002) and Gulati and Mullen (2003).

According to Ahluwalia (2002), the domestic index of agricultural prices relative to those of manufactures increased by almost 30 per cent in the past ten years. To what extent have agricultural policy reforms themselves contributed to that increase?

Ostensibly for the sake of food security, exports of farm products from India had been restricted by numerous controls such as bans, licences, quotas, marketing controls and minimum export prices. The reform of those export measures began with the opening up of rice exports in 1994, but the process of reform is far from complete. For example, export licenses are generally still required for such products as cattle, milk, cereals, edible oils and pulses. And yet export subsidies also have been provided from time to time. For example, the fall in cereal prices in 1999 coincided with increases in support prices for wheat and rice that led to rapid growth in India's food grain stocks. A decision was made in November 2000 to subsidize wheat exports, and the following year to do the same for rice. As a result, grain exports rose to 2 MMT in 2000-01, to 6MMT in 2001-02, and even more in the current year. (The Government justified them under Article 9.4 of the URAA.)

On the import side, the Uruguay Round Agreement on Agriculture commitments made by India had little liberalizing effect, as those commitments involved ceiling bindings of 100 per cent for primary commodities, 150 per cent for processed products and 300 per cent for edible oils, or an average bound rate of 115 per cent. This is well above applied rates, which in April 2002 averaged just 35 per cent, according to Gulati and Mullen (2003). The removal of quantitative restrictions led to little initial growth in imports because international food prices were at historical highs in the mid-1990s. However, as international food prices fell from 1999,

imports began to rise for wheat, maize, pulses, edible oils and milk. The government responded by reversing earlier tariff cuts, as it was able to do given its very high ceiling bindings.

For example, the government lowered the import duties on edible oils from 65 per cent in 1994 to 30, then 20 and then 15 per cent by end-1999. Then when the international price fell in the late 1990s, imports surged to 4 or 5 MMT in each of 1999, 2000 and 2001, causing India's self-sufficiency to plummet from 97 per cent in 1993 to 55 per cent by 2001. In response the Government raised the tariff to 25 and then 75 per cent before lowering it in October 2001 to 65 per cent (Gulati and Murren 2003).

In the case of rice, the lifting of the export ban in 1994 caused India's rice exports to soar from less than 1 MMT to around 5 MMT, but when international prices fell in the late 1999s exports more than halved and some rice was imported. Wheat exports were allowed in 1995, but as domestic prices rose the government banned their export again in 1996. More than that, it allowed wheat to be imported duty free. The fall in international prices then caused imports to jump, despite the bumper domestic crop, thereby contributing to the surge in stocks that had to be disposed of with an export subsidy.

Bearing all this in mind, and the fact that farmers still enjoy subsidies for fertilizer and underpricing of water and electricity,[8] Gulati and Mullen (2003) conclude that Indian agriculture may have had on average a small positive producer subsidy equivalent during the past three years, but that prior to that the PSE was negative. The net effect of that decrease in disincentives to farm on agricultural output and exports was positive. Production grew

rapidly, particularly in the early years of the reform (Table 9), and India's share of world agricultural exports rose from 0.8 to 1.2 percent over the 1990s. Table 11 shows that the importance of farm products in India's exports has fallen, but by much less than for China. Indeed that share has fallen less than agriculture's share in global exports, such that India's index of revealed comparative advantage in farm products rose slightly over the period from 1990 to 2001 – whereas for China that index halved over those years, from 1.32 to 0.68 (Table 11).

Further reforms to 2005 are scheduled for India, but they are not driven by Uruguay Round commitments to WTO members. Rather, they continue to be in response to domestic pressures for unilateral market liberalization, both domestically and at the country's border, and to be constrained by traditional protectionist forces. The nature of politics in India seems to make it inevitable that government interventions are going to continue to gyrate as markets fluctuate.

Implications for agriculture in the rest of the world and for the Doha Round

The assumption in GTAP that all households are identical in their consumption patterns is of course a fiction. They differ as between urban and rural areas, between farm and non-farm households within rural areas, and within each of those groupings according to region and income level. Post-simulation analysis at that level of detail is provided in Hertel, Zhao and Wang (2002) and Chen and Ravallion (2002). But even without that detail, it is

[8] According to Vyas (2003), those input subsidies amounted in the first half of the 1990s to 9 per cent of the value of agricultural GDP.

possible to draw some broad conclusions about the implications of WTO accession for agriculture and for income distribution.

Our initial analysis assuming no reform of the *hukou* system affecting labour market suggests rural non-farm incomes will rise on average absolutely and possibly even relative to urban incomes in the case of households depending just on labour income (assuming urban labourers are more skilled). However, some farm households facing increased import competition may be worse off in this case, ceteris paribus, if they are:

- unable to send household members to jobs in expanding industrial and service industries;
- are too poorly served with infrastructure to attract such activities to their own region;
- are unable to diversify into producing farm goods whose relative price has risen; and/or
- do not have relatives able to repatriate non-farm earnings to them.

Thus in the core scenario the incidence of rural non-farm poverty will fall mainly because of the growth in wages for unskilled workers in rural non-farm activities, while 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 expanding activities as textiles and clothing.

The first alternative scenario shows that this situation would be exacerbated slightly if the TRQ-protected items (grains, sugar and cotton) were to become even less protected than we initially assumed. By way of contrast, the second alternative scenario suggests the

situation could be made slightly less extreme by removing the negative protection affecting rice, meats, vegetables and fruits. But both of these alternatives only involve small changes to the magnitudes of effects, rather than altering the sign of those effects, and both add only a small amount to the aggregate gains from trade liberalization.

What the third alternative scenario makes clear, by way of contrast, is that the sign of the effects could be switched to favour the poorer farm households – albeit at the expense of the richer non-farm ones – if the remaining WTO accession were to be accompanied by reform of the *hukou* system that allowed some members of those households to obtain higher-paying non-farm employment and repatriate earnings back to their farm family.[9] And this case would involve a national economic welfare gain that is one-sixth above that in the core scenario without labour market reform.

National self-sufficiency in food, feed and fibre will fall somewhat, particularly as demand for livestock products grows with income gains from trade reform and as production of natural fibre-based textiles and clothing expand. But overall, most of these self-sufficiency effects of the remaining reforms that are required following WTO accession are relatively very small in magnitude.[10] They would be largest in the third alternative case where labour market distortions are also removed. That is not to say food security would fall in that case though. It is changes in incomes of the poor, and hence in their capacity to purchase food,

[9] These alternative results are not inconsistent with the findings of Chen and Ravallion (2002), so much as supplementary. What they underscore is that whether a particular group gains or loses from a shock such as WTO accession depends heavily on their sources of household income and their capacity to adapt to the changed economic circumstances.

[10] They are especially small when compared with the changes that are taking place in the course of normal economic growth, as shown retrospectively in Tables 1-5 above and prospectively in earlier analyses by Anderson et al. (1997a, b).

that affect food security, and in that third alternative scenario the poorest aggregate group (farm households that had been heavily dependent on agriculture) would gain most.

What else should be done if the labour market were not to be reformed? If in that case some farmers' incomes are to worsen relative to those of non-farm households, and if there is concern about the fall in agricultural self-sufficiency, it does not follow that trade reform should be abandoned. Rather, first-best ways of dealing with those concerns should be sought (and with any transitory unemployment that might follow reform). The most efficient policy responses are likely to involve investments in rural human capital, rural infrastructure and R&D (Fan, Zhang and Zhang 2002), improvements in the land tenure system and rural financial markets, reductions in informal taxes/levies on farmers by local governments, and changes in grain marketing.

First, the government might consider further investments in basic rural education and health services to reduce the adverse effect of trade reform on poverty incidence and perceived food security. Better education and health for farmers' children not only boosts their farm productivity should they choose to stay on the farm after finishing school; it also increases their capacity to find more-lucrative off-farm work and to adjust to non-agricultural employment and living (Schultz 1975). In addition to those longer-term benefits, there could also be an immediate poverty alleviating effect if the government were to cut basic school fees and make up the shortfall with a bigger direct grant to rural primary and middle schools.

Second, improvements in rural infrastructure such as roads and rail mean that a larger share of the price eventually received at the end of the marketing chain for farm products can

be passed back to farmers. Such improvements also lower the barrier for off-farm work by members of farm households, making it easier for them to take advantage of expanding employment opportunities in rural townships.

Third, agricultural R&D can ease both urban and rural poverty (see Fan, Fang and Zhang 2001; Hazell and Haddad 2001). A boost in agricultural productivity could significantly offset the 2-8 per cent drop in agricultural production that is estimated in the core scenario to result from WTO accession. An important policy issue here is whether China should 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 simply because of fears of otherwise being denied access into food markets abroad (Anderson and Yao 2002).

Fourth, improvements in the land tenure system would not only increase the incentive to invest more in land but would also enhance the collateral of farm households. If accompanied by improvements in rural financial markets, investments by farmers back into agriculture would rise. They would rise further if returns were increased via reductions in informal taxes/levies on farmers by local governments.

And fifth, the government might reduce its regulation of grain marketing and in particular cease compulsory procurement from farmers at less than market prices and reduce the provision of grain to urban consumers at less than market prices. De-empahsising the Governors' grain responsibility system (provincial self-sufficiency) would allow more exploitation of comparative advantage within China too.

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 farm 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).

Finally, now that 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 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] That proposition was tested recently by Yu and Frandsen (2002), also using the GTAP model. They find that reductions in barriers to agricultural imports and in domestic support to farmers in OECD countries reduces the extent to which China's farm output would fall with WTO accession and in some cases leads to outputs expanding instead

[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.

of contracting. As a consequence, China's agricultural imports are reduced slightly and its agricultural exports are greater. These changes are reflected in Table 11: it shows that not only would China's food self-sufficiency be higher with than without agricultural protection in the EU, US and Japan, but that the difference is in most cases more than enough to offset the fall in self sufficiency that is estimated to result from China's WTO accession. Such reform in the OECD would clearly benefit farm households in China, providing a further pro-poor consequence of trade reform.

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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 Oliz	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 Oliz	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 Oliz	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: Sectoral volume effects of China's WTO accession reforms (core case), 2002 to 2007

(per cent and 1997 US$million)

	Output	Household consumption	Exports	Imports	Trade Balance ($m)	Producer Prices	Consumer prices
Rice	-2.1	-0.1	6.1	-7.1	64	-0.9	0.9
Wheat	-2.0	0.0	18.9	-10.1	174	-1.7	0.4
Feedgrains	-2.3	-0.1	-77.8	-2.4	-596	-1.9	1.9
Vegetables and fruits	-3.4	0.1	14.6	-6.3	214	-1.9	-0.1
Oilseeds	-7.9	0.9	29.8	20.9	-789	-2.8	-4.7
Sugar	-6.5	0.6	13.9	24.1	-73	-1.9	-3.1
Plant based fibres	15.8	-0.6	-51.8	7.7	-189	0.1	3.1
Livestock & meat	1.3	0.0	15.5	-8.9	837	-1.6	0.2
Dairy	-2.0	0.0	13.5	23.8	-143	-1.5	0.2
Other food	-5.9	0.4	11.4	62.6	-3460	-1.7	-1.8
Beverages & tobacco	-33.0	1.5	9.7	112.4	-14222	-1.8	-6.9
Extractive industries	-1.0	-0.2	7.5	-4.4	2088	-0.7	1.2
Textiles	15.6	0.7	32.7	38.5	-10366	-1.7	-3.2
Apparel	57.3	0.5	105.8	30.9	49690	-0.6	-1.9
Light manufacturing	3.7	0.0	5.9	6.8	1786	-0.9	0.0
Petrochemical industry	-2.3	-0.2	3.1	11.8	-8810	-0.7	0.8
Metals	-2.1	-0.3	3.7	6.8	-1893	-0.4	1.3
Autos	1.4	1.0	27.7	24.0	516	-3.9	-4.2
Electronics	0.6	0.5	6.7	6.8	453	-1.3	-1.7
Other manufactures	-2.1	-0.2	4.1	18.9	-11291	-0.5	0.8
Trade and transport	0.0	-0.3	0.8	-0.4	493	-0.2	1.6
Construction	0.9	-0.4	2.7	17.5	-436	-0.2	1.7
Communication	-0.5	-0.4	-0.5	10.9	-56	0.1	1.9
Commercial services	-2.0	-0.5	-0.4	35.4	-1749	0.2	1.9
Other services	-1.7	-0.3	1.4	33.6	-1525	-0.1	1.6

Source: Authors' GTAP results.

Table 8: Change in China's real factor prices and national economic welfare due to WTO accession, 2001 to 2007

(per cent, welfare in 1997 US$ billions)

	Core accession case	Alternative 1: greater agricultural protection cuts	Alternative 2: core case plus also removing negative agric protection	Alternative 3: core case plus also removing labour market distortion
Farm unskilled wages	-0.7	-0.9	-0.5	16.8
Rental price of land	-5.5	-6.4	-4.7	-9.7
Nonfarm unskilled wages	1.2	1.4	1.1	-3.8
Skilled labor wages	0.8	1.0	1.5	-1.7
Rental price of capital	1.3	1.5	1.5	-1.4
Farm household[a] income-A	-1.6	-1.9	-1.3	6.8
Farm household[a] income-B	-0.8	-0.9	-0.6	3.6
Farm household[a] income-C	0.1	0.1	0.1	0.4
National economic welfare ($ billion increase)	9.56	9.57	9.87	11.05

[a] Farm income from agriculture is made up of 57% from unskilled labour, 26% from land and 17% from capital, according to the GTAP database. In 1999 on average 51% of rural household income in China was earned outside agriculture, mostly from unskilled labour. Therefore, to illustrate the importance of those off-farm earnings, three types of farm households are shown in this table: it is assumed nonfarm unskilled labour contributes 0% of farm household income for type A, 30% for type B, and 60% for type C.

Source: Authors' GTAP results.

Table 9: GDP growth rates, India, 1970-71 to 2001-02

(per cent p.a.)

	TOTAL	Agriculture	Industry	Services
1970-71 to 1980-81	3.2	2.0	4.0	7.2
1981-82 to 1990-91	5.7	3.8	7.0	6.7
1992-93 to 1996-97	6.7	4.6	8.0	7.6
1997-98 to 2001-02	5.4	2.3	4.5	7.8

Source: Ahluwalia (2002).

Table 10: Basic economic indicators, India and China

	India	China	All low-income countries	All middle-income countries
GDP, 1999 (US$ billion)	447	989	1033	5519
Population, 1999 (million)	998	1,254	2147	2665
GDP per capita, 1999 (US $)	450	790	480	2070
GDP growth, real (% p.a)				
1980-90	5.8	10.1	4.7	3.3
1990-99	6.0	10.7	3.2	3.5
GDP per capita growth, real (% p.a)				
1980-90	3.7	8.7	2.7	1.7
1990-99	4.1	9.5	1.1	2.2
Agricultural GDP growth (% p.a)				
1980-90	3.1	5.9	3.0	3.6
1990-99	3.4	4.3	2.5	2.0
GDP in agric. as % of total				
1990	31	27	29	13
1999	28	18	26	10
Employment in agric. as % of total				
1980	70	69	66	54
1998	na	47	na	40
Rural population as % of total				
1970	80	83	80	66
1999	72	68	69	54
Life expectancy, 1999 (years)	63	70	59	69
Adult literacy, 1999 (%)	56	83	61	85
Land per capita, total, 1999 (ha)	0.30	0.75	1.37	2.50
Land per capita, arable, 1999 (ha)	0.17	0.10	0.18	0.23

Source: World Bank (2001).

Table 11: Basic trade indicators, India and China

	India	China
Exports of goods & services, 1999 (US $billion)	54	219
Imports of goods & services, 1999 (US $billion)	67	197
Growth of merchandise exports, 1990-2001 (% p.a.)	8	14
Exports/GDP, 1999 (%)	12	22
Imports/GDP, 1999 (%)	15	19
Inward foreign investment stock, 1998 (% of GDP)	3	28
Foreign direct investment flow, 1998 (% of gross capital formation)	3	13
Trade duties as % of total tax revenue, 1999	28	7
Agriculture's share of merchandise exports, %		
1990	20	16
2001	15	6
Textile/clothing share of merch. exports, %		
1990	26	27
2001	28	20
Revealed comparative advantage in agriculture[a]		
1990	1.60	1.32
2001	1.66	0.68
Agricultural net export index[b]		
1990	0.34	0.12
2001	0.31	-0.09

[a] Agriculture's share of the country's exports relative to agriculture's share of global merchandise exports.
[b] Agricultural exports minus imports as a ratio of agricultural exports plus imports.

Source: World Bank (2001), UNCTAD (2001), and WTO (2002).

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