

# 05 The impact of WTO accession on China's agricultural sector

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Agriculture is still very important in China, not only because it provides the major source of food for the people but also because it is still the major source of income for half of the 1.26 billion people in China. In the past half a century, from 1952 to 2000, China experienced rapid industrialisation, and the share of agriculture in GDP fell from 51 per cent to 16 per cent. However, the differentiation of the population changed far more slowly. During the same period, the proportion of rural people in the total population only declined from 85 per cent to 64 per cent, and the proportion of agricultural workers in China's total employment fell from 84 per cent to 50 per cent. The decline in the share of agricultural workers was faster than the decline in the share of the rural population due to rapid rural industrialisation (that is, the development of the Township and Village Enterprises sector) during the past two decades. Still, there were 334 million workers in the agricultural sector in the year 2000.<sup>1</sup>

From the large disparity between the agricultural share in GDP and the share of agricultural workers in total employment, one can see how low the labour productivity of the agricultural sector is compared with other sectors. In year 2000, rural per capita net income was only 2253 yuan (or US\$272), which was equivalent to only 36 per cent of the average urban per capita disposable income.<sup>2</sup> Of the total rural per capita net income, agricultural income was 1136 yuan, of which 868 yuan was from farming,

that is, 50 per cent and 39 per cent of rural net income, respectively. Thanks to the rapid development of the rural non-agricultural sectors over the past 20 years, non-agricultural activities provided 44 per cent of farmers' incomes (off-farm wage income plus income from non-agricultural household businesses).

### **Grain outputs, yields and inputs**

Farming remains the main agricultural activity. In 2000, farming accounted for 56 per cent of the gross value of agricultural output. Grain production has been the most important component of farming. A rough calculation using output and average prices of major grain products shows that in gross value terms total grain output accounted for 65 per cent of farming and 38 per cent of agricultural output in 1998. China is the largest grain producer in the world with output ranging in recent years between 460 and 510 million tonnes (unprocessed grain). This output accounted for over one-fifth of total world grain output (see Table A5.1).

Grain output has increased significantly since the beginning of agricultural reform in 1978. It was 300 million tonnes in 1978, and reached its highest level to date of 512 million tonnes in 1998 (grain output declined to 462 million tonnes in 2000). The large increase in grain output can be mainly attributed to four effects: the market-oriented reforms and the adoption of the household responsibility system in the early 1980s; increases in domestic grain prices; technical progress (for example, development of hybrid rice); and continued increases in inputs.<sup>3</sup>

Grain output growth was due entirely to increases in yields, as arable land area has been slowly declining. The institutional reforms and technical progress made the major contributions to increases in yields up until the mid 1980s, and then these effects gradually diminished. Inputs such as fertilisers, insecticides and irrigation grew faster than output growth during the pre reform period, but rose more slowly than output during the reform period (Wang 2000a). Still, the intensity of material inputs has reached a high level relative to other major grain producers (see Table A5.2). The average grain yields for China as a whole reached 4.95 tonnes per hectare (measured by sown areas) in 1998-99, which is significantly higher than in most developing countries and is close to that of industrialised countries.<sup>4</sup>

Yield would be much higher measured in terms of cultivated area, because the average multiple-cropping ratio is usually 1.5 to 1.6. The level of labour intensity has been one of the highest among the world's major grain producers (see Table A5.2). Due to the rapid increases in marginal costs, further increases in yields, although possible, are not likely to increase farmers' incomes.

Agricultural labour intensity in China, measured by the number of agricultural workers per hectare of arable land, is 59 per cent higher than the world average, twice as high as for Japan, 20 times higher than the UK, Germany, and France, 50 times higher than the US, and 100 times higher than Australia and Canada (Table A5.2). The cultivated land area in China was only 0.39 hectares per farmer in year 2000. Because of the limitation of land area, the marginal product of labour diminished rapidly. The low labour productivity of the agricultural sector is mainly the result of natural limitations in the arable land areas and the huge agricultural population.

### **Transfer of the agricultural labour force**

A major challenge to China's agricultural sector is how to shift a substantial part of its huge labour force to non agricultural sectors. Because of rapid rural industrialisation, led by the market-oriented reforms of the past 20 years, 100 million rural labourers moved from the agricultural sector to the township and village enterprise (TVE) sector. Total TVE employment was 128 million in 2000. Rural-urban migration was strictly restricted during the pre reform and early reform periods, but has increased rapidly since the late 1980s, partly as a result of the relaxation of the policy and partly as a result of employment pressures due to the slower growth of TVEs. Most rural workers migrating to urban areas have done so without officially changing their household registration status to urban residents. The number of these people, so-called 'floating labour', is statistically unavailable. Based on data from surveys, however, the author estimates that they were 14 million in 1990 and they totalled around 47 million in year 2000.<sup>5</sup>

However, during the period between 1980 and 2000, the total rural labour force increased from 318 to 499 million (they were re-estimated by the author as 347 million and 519 million for 1980 and 2000, respectively),<sup>6</sup> as a result of natural population growth. Therefore, in spite of the rapid

rural industrialisation and continued urbanisation in the past two decades, the agricultural labour force has increased from 291 million to 334 million (the author's estimations are 317 million and 344 million for the two years, respectively). The growth rate of rural labour has decreased significantly due to the family planning policy and urbanisation, although it still remained positive at 0.9 per cent in the 1990s.<sup>7</sup> The author predicts that the rural labour force will grow at a low rate of 0.2 per cent per year, to reach a total of 530 million in 2010.

While the natural growth of rural labour is slowing, rural industrialisation has also stagnated since the mid 1990s. Total employment in the TVE sector grew at an annual rate of 12 per cent in the 1980s, but at only 3 per cent in the 1990s. TVE employment reached its highest level of 135 million in 1996, fell in 1996 and 1997, and slightly recovered to 128 million in 2000. There seems no reason to believe that employment growth in the TVE sector will recover in the medium term. We therefore assume an average 1.5 per cent growth rate of TVE employment from 2001 to 2010, to reach a total of 149 million by 2010.

Rural-urban migration is unlikely to grow faster in the near future, due to the weaker demand for, and oversupply of, unskilled labour in urban areas in recent years. In particular, a large number of urban workers in the state-owned enterprise sector have been laid off (SOE employment fell by 30 million from 1996 to 2000), and growth of export and domestic production has slowed.

After the deduction of those who have been employed by TVEs and those who migrated to urban areas, nearly all the remaining rural labourers are in the agricultural sector. This is because they are entitled to a small parcel of arable land under the current 'household responsibility system', which provides them with a form of minimum insurance. Therefore China's agricultural sector is in reality an enormous reservoir of underemployed labour.

Table 5.1 shows the growth of the rural labour force, TVE employment and the estimated rural-urban migration during the 1980s and 1990s, and the expected growth of these variables in the 2000s. If we assume that the speed of the net transfer of agricultural labour to the urban sector between 2001 and 2010 will be slightly slower than in the 1990s, that is, 3 million per year instead of 3.3 million per year, then the agricultural

labour force in 2010 will be 304 million, a 40 million reduction from the 344 million in year 2000. In this case, and without further reduction in crop land, the labour intensity in the agricultural sector will fall by 12 per cent. This will mean only a minor improvement in labour productivity and in per capita farming incomes.

More optimistically, if urbanisation can be significantly accelerated, with the rural-urban migrants doubling from 2001 to 2010, that is, an increase from 3.0 to 6.0 million per year, the agricultural labour force will be reduced to 274 million by 2010. Labour intensity in agriculture will decline by 20 per cent—still only a minor improvement in labour productivity.

Table 5.1 Rural labour, TVE employment and rural-urban migration, 1980-2010 (million persons)

Year	Rural labour (statistics)	Rural labour (adjusted)	TVE employment	Rural-urban migration	Agricultural labour
1980	318	347	30	0	317
1990	473	473	93	14	366
2000	499	519	128	47	344
2010 (assumption 1)		530	149	77	304
2010 (assumption 2)		530	149	107	274

**Note:** Figures in the third column are adjusted from the labour statistics according to the information from the 1962, 1984 and 1990 national census. See Wang (2000b) Agricultural labour is calculated as the balance of total rural labour minus TVE employment minus rural-urban migration.

The number of rural-urban migrants was estimated by the author on the basis of survey by Ministry of Labour and Social Security and the National Bureau of Statistics (1999). In the first assumption for 2001-2010, the growth rates assumed for rural labour and TVE employment are 0.2 per cent and 1.5 per cent, respectively, and rural-urban migration is assumed be 3.0 million per year. In the second assumption, rural-urban migration is 6.0 million per year, while the other assumptions remain the same.

**Sources:** Department of Training and Employment of the Ministry of Labour and Social Security, PRC, and Rural Social and Economic Survey Team of the National Statistical Bureau, 1999. The situation of rural labourers' employment and flow in China, 1997-1998, printed report, Beijing; National Bureau of Statistics, 1999 and 2001. *Statistical Yearbook of China*, China Statistics Press, Beijing; Wang, Xiaolu, 2000b. 'Sustainability of China's economic growth and institutional changes', in Wang, Xiaolu and Fan, Gang (eds), *The Sustainability of China's Economic Growth*, Economic Science Press, Beijing; author's estimations.

## Imports, exports and prices of grain

### Grain trade

In the 20 years from 1981 to 2000, there were net grain imports in 11 years and net exports in nine years. Total net imports were small compared to total output. From 1995 to 2000, average annual imports were 4.82 million tonnes but net imports were only 0.79 million tonnes per year. Annual grain imports have never reached the WTO tariff quota of 22.2 million tonnes during the past half century. Only in 1995 were imports close to the quota (20.8 million tonnes), although as discussed below this level of imports caused a serious oversupply of grain. Table A5.3 lists total imports and exports of grains and of some major grain products.

### Grain prices

Before comparing domestic grain prices with those in world markets, a brief review of the structure of the domestic market and changes in the setting of domestic prices since 1985 is in order.

At the beginning of this period, domestic prices of grain (farm gate prices) took three forms: the state quota price, the state above-quota price, and the rural market price. The state purchase prices, especially the quota prices, were 7 per cent to 25 per cent lower than the rural market prices in 1985 and 19 per cent to 53 per cent lower in 1993 because the nominal state purchase prices increased more slowly than market prices (see Tables A5.4-A5.7). The state quota price in real terms, as a weighted average, decreased by 20.3 per cent from 1985 to 1993 (Table 5.2). Due to supply shortages, the state progressively increased its quota or above-quota prices from 1994 to 1996. Market prices also increased in 1994 and 1995 because market supplies were squeezed by the increased state purchases and increased state grain stocks. The highest domestic prices in real terms, as a combination of the state and market prices, were reached in 1996. According to an internal report, major grain prices exceeded world market prices by 38 per cent to 45 per cent at that time, except for rice which was 8 per cent lower.

Table 5.2 Real price changes: state and market, 1985-2000  
(1985 price=1.00)

Year	State	Market	Average
1985	1.000	1.000	1.000
1990	0.784	1.158	0.909
1993	0.797	0.965	0.853
1994	0.929	1.140	1.000
1995	0.969	1.399	1.112
1996	1.090	1.290	1.157
1997	1.202	1.028	1.144
1998	1.140	0.964	1.081
1999	1.001	0.912	0.971
2000	0.975	0.802	0.917

**Note:** Both the state and market price indexes are derived as a weighted average of the price index of rice, wheat, corn and soybean. The year 2000 shares in the sum of their output are used as the weights. The rural consumer price index is used as the deflator. For the average index, the weights are two-thirds and one-third for the state and market, respectively.

**Source:** Calculated from Tables 5.A4-A7 in Appendix.

In 1997, quota prices increased further even though market prices had started declining in 1996. This led to quota prices exceeding market prices in 1997 and 1998. In 1997, real quota prices were 50.8 per cent higher than in 1993, and 20.2 per cent higher than in 1985. However, real market prices declined from a level 29 per cent higher than the 1985 prices to only 3 per cent higher than the 1985 prices between 1996 and 1997 (Table 5.2).

The increases in grain prices over the 1994-97 period resulted in historically high output levels above 500 million tonnes between 1996 and 1999. Together with the large grain imports in 1995 and 1996 (20.8 and 12.2 million tonnes, respectively), this resulted in large domestic surpluses. As a result, the state purchase prices fell by 19 per cent from their highest levels in 1997 to the recent low of 2000, and the market price dropped by 43 per cent from its highest level in 1995 to a 15-year low in 2000.

Table 5.3 shows that in 2000 the real grain price, expressed as a weighted index of the state purchase prices and market prices, was 8 per cent lower than the 1985 level. By 2000 domestic prices of major grains had fallen to levels similar to, or even significantly lower than, world market prices.

Since 1998, the state quota and above-quota prices have been combined to form a support price, which was higher than market prices at the beginning but by 2000 was similar to market prices. This was because the decision making about support prices has been decentralised to the provincial or lower-level governments, and these governments cannot afford to subsidise grain prices.

Detailed discussion on the reasons for such large fluctuations in domestic market prices can be seen in Wang (2001). Table 5.3 provides a comparison of prices of major grains in rural markets between 1994 and 2000. It shows that the real price of rice and wheat in 2000 were at levels equal to only 70 per cent and 66 per cent, respectively, of their 1994 levels. The 1994 prices were low compared with those in 1995 and 1996.

There was a recovery in domestic grain prices in 2001. Up to September 2001, grain prices were 7.5 per cent above the levels of September 2000, and 5.7 per cent above the levels at the end of 2000 (Center for News

Table 5.3 Comparison of real grain prices in rural markets between 2000 and 1994 (yuan per tonne)

Items	1994	1996	1998	2000	2000/1994 (per cent)
Rice	2,057	2,818	2,175	1,721	70.0
Wheat	1,141	1,741	1,298	944	66.2
Corn	1,009	1,487	1,579	1,225	97.2
Soybean	2,451	3,212	2,928	2,534	82.7
RCPI (per cent)	100	102.7	104.2	102.6	
IPIA (per cent)	100	113.5	106.8	101.4	

**Notes:** RCPI and IPIA are the Rural Consumer Price Index and Input Price Index in Agriculture, respectively.

Real grain prices between 2000 and 1996 were derived using a compound deflator from RCPI and IPIA at 0.5:0.5.

**Source:** Calculated from National Bureau of Statistics, 2001. *Statistical Yearbook of China*, China Statistics Press, Beijing.



Gathering and Editing, China Agricultural Web 2002). The recovery in prices has been mild since the surplus of grain stock has not been fully absorbed. Total grain stocks were still large at the end of 2001.<sup>8</sup> Therefore, a larger recovery in grain prices could be expected in the coming years—without a major increase in imports—before normal storage levels are reached.

One may conclude from the above description that either the 1995-96 domestic market prices or the 1997 quota price significantly exceeded an intermediate internal equilibrium level, whereas the 2000 domestic prices were far below that equilibrium. To compare with world prices, we may use the average domestic market price level (in constant terms) during the period of 1985-2000 to represent an intermediate internal equilibrium price level. This average level is equal to 79 per cent of 1995 market prices and 137 per cent of 2000 market prices. It is 10 per cent higher than 1985 market prices. By accident, it is equal to the mean of market prices between 1995 and 2000.

We should note that the farm gate prices are not comparable with world market prices for two reasons: the price of imported grain will be higher than world market prices after including transport, insurance and other costs; and to compare domestic prices with prices of imported grain, domestic purchase, transport and wholesale costs should be added.

It is reasonable to compare domestic wholesale prices and the import CIF prices. Laping Wu (2001) has found that the CIF prices of imported rice and wheat were significantly higher than the domestic wholesale prices from 1996 to 2000. In this comparison, however, there are a few important things we should note. First, the quality of exported, imported, and domestically wholesale grain may not be fully comparable. For example, imported rice and wheat is usually of a higher quality than the domestic grains. Second, if we compare the domestic wholesale prices of grain with rural market prices or state purchase prices, the former were usually similar to, or even lower than, the latter. This was either a result of state subsidy in the earlier years or due to surpluses in the domestic market in recent years.

Historical data on quota, above-quota, rural market, wholesale, FOB and CIF prices for rice, wheat, corn and soybeans are presented in Tables A5.4-A5.7. They show that the rural market prices of wheat, corn and soybean were not significantly lower than the CIF or FOB prices, even in

Table 5.4 Comparing rural market prices with CIF prices (yuan per tonne)

Items	Rural market price	2000 CIF
Rice	2,452	3,859
Wheat	1,477	1,375
Corn	1,265	976*
Soybean	2,341	1,785

**Note:** Rural market prices are calculated as the mean of 1995 and 2000 rural market prices (1995 prices have been converted to 2000 constant prices). CIF prices are derived from the imported volumes and values in 2000, converted from US\$ to RMB. The CIF price is for 1999 since data for 2000 are unavailable.

**Source:** Calculated from Table A5.4-A5.7 and National Bureau of Statistics, 2001. *Statistical Yearbook of China*, China Statistics Press, Beijing.

year 2000. Only the rice price is significantly lower than the CIF price. Given consideration of the quality differences and the domestic costs for purchase, transport, storage and wholesaling, domestic prices of the major grains, except for rice, would still be higher than import prices.

In Table 5.4, the means of real market prices between 1995 and 2000 are compared with CIF prices. The comparison shows that, except for rice, between 1995 and 2000 the means of the rural market prices for major grains are all higher than the 2000 CIF prices. If the domestic costs of purchasing, transport and wholesale activities are added, the domestic prices would be even higher.

In general, it is reasonable to accept the points of many Chinese experts who believe that only rice production has comparative advantage, albeit weak, in China, whereas all the other major grain products have either weak or strong comparative disadvantage. Even for rice, due to the quality differences between domestic and imported products, large imports are still possible in the intermediate term. Therefore, the WTO tariff quota will have major impacts on the domestic grain production.

## The direct impact of the WTO quota for grain imports

### Major changes after WTO accession

There will be several important changes in China's agricultural policy following from its WTO accession commitments.

- China adopts a tariff quota for total grain imports at a 1 per cent token tariff rate. The quota will be 18.31 million tonnes in 2002, 20.2 million tonnes in 2003, and increasing to 22.16 million tonnes in 2004 (Table 5.5). According to the accession agreement, the 22.2 million tonnes of tariff quota is to be shared between the state and private trading enterprises, and all unused state quotas are to be transferred to private enterprises.
- The above-quota tariff rates for the major grains will be 65 per cent, and for soybeans the tariff rate will be 3 per cent.
- The average tariff rate for all agricultural products to be reduced from 22 per cent to 17.5 per cent.
- The average rate of domestic support for agricultural products will be zero. There will be no export subsidies.
- Other non-tariff restrictions on imports of agricultural products, such as licensing, are to be eliminated. This includes restrictions on imports of wheat from the north-west areas of North America, which may have TCK disease.

The economic impact of the latter changes is not clear and the issues are strongly debated. More detailed information and analysis are needed. The above-quota tariff rate is not likely to be important because experiences with grain imports show little likelihood of grain imports exceeding the quota. In the following, the focus is on the impacts of the tariff quota on agricultural production, farmers' incomes, employment, and consumers. These impacts appear to be the most important. The impact of the elimination of domestic support for agricultural products is also discussed.

Table 5.5 Tariff quotas for grains, 2002-2004 (million tonnes)

Year	2002	2003	2004
Wheat	8.468	9.052	9.636
Corn	5.850	6.525	7.200
Rice	3.990	4.655	5.320
Total	18.308	20.232	22.156

Source: World Trade Organization, 2001. 'Accession of the People's Republic of China, decision of 10 November 2001', cited from <http://www.moftec.gov.cn/>

Table 5.6 Estimation of the volume of non-traded grain (unprocessed), 2000

	Total consumption (million tonnes)	Self-consumption ratio	Self-consumption (million tonnes)
Rural food grain	201.9	0.8	161.5
Feed grain			83.4
Meat	85.7	0.5	51.4
Poultry and eggs	22.4	0.5	13.4
Cultivated fish, etc.	13.0	0.3	3.9
Milk	9.2	0.3	0.8
Draught animals	17.4	0.8	13.9
Seed grain	16.3	0.6	9.8
Total			254.7

**Note:** Rural food consumption of grain is derived from household survey data.

Feed grain is derived from livestock production data. The quantity of meat (pork, beef and lamb) is converted from the gross weight (with bones) at a conversion ratio of 0.5. The weight conversion ratios between meat and feed grain are assumed to be 2.8 for meat production, 1.0 for poultry, eggs, cultured fish and shrimp, etc., and 0.3 for milk production.

The feed consumption of draught animals was assumed to be 0.5 kg per animal per day. The consumption of seed grain was derived from the sown area of grain in year 2000 at an estimated average 0.15 tonnes per hectare.

Self-consumption ratios are the proportions of farmers' living or production consumption of grain that is provided by themselves as a percentage of their total consumption. They are based on the author's personal experience in various rural surveys.

**Source:** Calculated from statistical data on grain production, rural household grain consumption, livestock production, draught animals, grain sown area, rural population and household size in year 2000. National Bureau of Statistics, 2001. *Statistical Yearbook of China*, China Statistics Press, Beijing.

## The size of the domestic grain market

To assess the impact of the 22 million tonnes grain import quota on the domestic grain market we need to calculate the size of the domestic market. Total grain output was between 435 and 512 million tonnes (unprocessed grain) during the 1990s (462 million tonnes in 2000). However, the domestic market is far smaller than the total output because a substantial part of the grain output is consumed by farmers and does not enter the market. In the 1990s, the state quota and above-quota purchases of grain were around 180 to 200 million tonnes per year (possibly higher in 1998-99); however, there are no statistics on the quantity of grain sold in the free market. The size of China's domestic grain market (grain traded both by the state dealers and in the free market) may be approximated from a calculation of the volume of non-market grain consumed by farmers in 2000 (Tables 5.6 and 5.7).

In Table 5.6, the estimated volume of non-traded grain (self-consumption) is shown as 255 million tonnes for the year 2000. The volume of traded

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Table 5.7 The estimated size of the domestic grain market in 2000 (million tonnes)

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	Unprocessed weight	Trade weight
Total production	462	400
Non-traded consumption	255	221
Change in stocks	-20	-17
Net exports	12	10
Domestically traded	215	186
Total domestic demand	470	407
Tariff quota (2004 and later)		22.2
TQ as per cent of traded grain		11.9 per cent
TQ as per cent of total demand		5.5 per cent

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**Note:** Trade weights are derived from the unprocessed weight. Rice is converted from paddy at a conversion ratio of 0.68; other grains are unprocessed. The change in grain stock is assumed.

**Source:** Calculated from Table 5.6 and National Bureau of Statistics, 2001. *Statistical Yearbook of China*, China Statistics Press, Beijing.

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grain is derived in Table 5.7 under an assumption of a negative change in grain stocks by 20 million tonnes. Under these calculations, the tariff quota (2004) for imported grain at the 1 per cent tariff rate accounts for about 12 per cent of the domestic market.

### The impact on domestic grain prices

In estimating the impact of the WTO import quota on the domestic prices, we may consider two possible situations. First we may assume that the 22 million tonnes of grain imports is an external shock at a time when the domestic market is in equilibrium. The domestic equilibrium prices are based on the calculation in Table 5.4 with a 15 per cent increase to include the domestic purchase, transport and wholesale costs. In this situation, the wholesale price of rice before the shock will be 27 per cent lower than for imported rice (but the average quality of domestic rice is also lower). Prices of wheat, corn and soybean before the shock will be higher than the imported prices by 24 per cent, 49 per cent and 51 per cent, respectively. In this situation, we may assume that the entire wheat and corn quotas, and 50 per cent of the rice quota, will be used. Altogether, these sum to 19.5 million tonnes. If we include other grains (for example, soybean imports may increase dramatically), total grain imports in 2004 could be above 21 million tonnes, that is, an increase of 18 million tonnes from an average 3.47 million tonnes between 1998 and 2000. This equals 9.6 per cent of the market demand and 4.4 per cent of total demand. (By the same calculation, imports will be around 17 million tonnes in 2002 and 19 million tonnes in 2003.)

Grain consumption in China is price inelastic. Based on estimations of China's grain demand elasticity in the literature, the author uses 0.37 as the weighted average elasticity of total demand for grain (alternatively, we could use 0.81 as the elasticity of market demand, which can be derived from the ratio between total demand and market demand).<sup>9</sup> The price effect of the 18 million tonnes of imports will lead to a 12 per cent decline of prices in the domestic market.

As an alternative situation (but more likely to be true), the external shock comes when the domestic market is still in surplus. In this case, the domestic prices of rice and wheat before the shock will still be lower than the imported

prices, but that of corn and soybean is higher. Imports will be significantly smaller than in the first case. However, because the remaining quota can be used at any time when the domestic price is going up, the effects of imports will be similar to that in the first case, that is, they prevent the domestic price from recovering instead of pushing the price down. Therefore, for simplicity, only the first case is discussed in the following.

### The impact on domestic production

How much grain production declines due to the price reductions will depend on the price elasticity of supply. According to the estimate by Wang (2001), the total price elasticity of grain supply is 0.52, and the effect of price changes on output will be fully realised within two years. Based on this elasticity, grain output will decline by 6.2 per cent in two years. There is likely to be a 'cobweb effect' because the price elasticity of demand is smaller than that of supply. In a standard 'cobweb effect' case, both production and price fluctuate to a larger and larger extent and can never converge to the equilibrium. However, this effect can be reduced by government operation of a price stabilisation scheme and improvement in information services to grain producers. For simplicity, we may consider the case where, on average, the price level declines by 6 per cent and output falls by 3.1 per cent as an equilibrium result.<sup>10</sup>

### Producer losses

The producer losses can be approximately derived from the following formula

(Price before shock) x (percentage price reduction) x (volume of market grain before shock - net imports) + (Output reduction) x (domestic price after shock) - (material input cost) + (fixed costs that cannot be reduced) - (net incomes from new jobs after shock).

Using the 2000 production and consumption data, we can calculate

$[1,815 \times 6 \text{ per cent} \times 215 + (462 \times 3.1 \text{ per cent}) \times 2006 \times (1 - 6 \text{ per cent} - 40 \text{ per cent} + 10 \text{ per cent})] \times (1 - 30 \text{ per cent}) = 28.0$  (billion yuan)

where 1,815 is the mean of 1995 and 2000 real grain price levels as a weighted average (constant yuan of 2000 per tonne), which is the assumed internal equilibrium price before shock, 6 per cent is the calculated price reduction due to the import shock, 215 is the calculated volume of market grain that is produced domestically before the shock, 3.1 per cent is the calculated reduction in total grain output, 40 per cent is the ratio of material input costs derived from the ratio between gross output value and value-added of agriculture in 1998, 10 per cent is the assumed ratio of fixed costs to the reduced output, which cannot be proportionally reduced, and 30 per cent is the assumed proportion of farmers who can move to the non-grain sector in the short run and earn the same income as before.

In this calculation, farmers' self-consumed grain is excluded because it is offset by their own production.

The derived 28.0 billion yuan of net losses is equal to 0.31 per cent of GDP, or 2.0 per cent of the agricultural value-added in 2000, and 4.2 per cent of farmers' net income from farming. Those grain farmers who have no other employment opportunities would incur a 9.1 per cent net income loss on average.

Producer losses could be much smaller if grain farmers can efficiently shift to non-grain production with the same resources available. However, the current situation is that the number of grain farmers (those fully or mainly engaged in grain production) is still very large, at least accounting for 60 per cent of the total 350 million farmers. Grain farmers are concentrated in the less developed central and west regions. Most of them have very low productivity, annually producing only 2 tonnes of grain per capita, and receive very low incomes. However, the transfer of these farmers to other sectors has been slow. The major obstacles are

- limited employment opportunities for unskilled labour in other sectors and the low level of education and skills
- accessing domestic or international markets of non-grain products is difficult for many farmers due to poor information, telecommunication and transport services in the remote rural areas
- the government has imposed grain production quotas and provided price protection, and thus reduced farmers' incentives to move out of the grain sector. These policies have been gradually relaxed in recent years.



## Consumer gains

Consumer gains from increased imports can be approximately calculated from the difference in grain prices before and after the increase in imports times the market consumption of grain after the shock, as follows

$$1,815 \times 6 \text{ per cent} \times 215 \times (1 + 9.6 \text{ per cent} - 6.8 \text{ per cent}) = 24.1 \text{ (billion yuan)}$$

where 9.6 per cent is the ratio of imported grain to domestic grain before the import shock, and 6.8 per cent is the ratio of output reduction to the market grain before the shock. Again, the farmers' consumer gain from the price changes is excluded for the reason mentioned earlier.

The 24.1 billion yuan of consumer surplus is equal to 0.27 per cent of GDP, 0.52 per cent of total consumers' average income, or 0.83 per cent of urban residents' income.

## The impact on employment

If we assume that the imported grain will replace domestic production and crowd out farmers without causing any decline in other farmers' income, then 4.4 per cent of the grain farmers, equal to 9.2 million, will lose jobs; although the increase in imports can only marginally increase employment opportunities in the grain export countries due to their far higher labour productivity. Assuming that all these grain imports would come from the United States, for example, this would create only 40,000 new jobs in its farming sector according to its average productivity per capita.

## The direct impact of grain imports

The results show that the major side effect of grain imports in the short term is not losses in value but the unbalanced distribution of losses and gains (Table 5.8). The costs directly impact low-income farmers, resulting in a relatively large percentage decline of their incomes; whereas the benefits mainly goes to urban consumers who have a much higher income, and therefore accounts for only a small proportion of their income. In addition, due to the inelastic adjustment, job losses will exert pressure

Table 5.8 The direct impact of grain imports

Costs and benefits	Producer losses	Consumer gains
Value (billion yuan)	28.0	24.1
Per cent of GDP	0.31	0.27
Per cent of farmers' incomes	4.2	
Per cent of pure grain farmers' incomes	9.1	
Per cent of all consumers' incomes		0.52
Per cent of urban consumers' incomes		0.83
Rural employment opportunities '000 persons	Domestic losses 9,240	Foreign gains 40

**Note:** Foreign gains in employment opportunities are calculated using the labour productivity of the US farming sector.

**Source:** Author's calculations.

on the economy in the years ahead. Given that this situation cannot be avoided, the key issue is how to accelerate the structural adjustment.

## Structural adjustment

### Adjustment of the agricultural structure

To deal with the grain import shock, an adjustment that might be made is to change the proportions of grains according to China's comparative advantage. Rice production may be expanded to replace other grains. Some adjustment is already in process. Compared with the year 1995, the total area sown to grain had fallen by 4.5 per cent by 2000. Of this, the wheat area was down by 7.6 per cent whereas the rice area was only reduced by 2.5 per cent. Further adjustment can be expected. However, the capacity for further adjustment is limited because rice normally requires irrigation, whereas most of China's north areas, which mainly produce wheat, corn, soybean and other grains and not rice, are dry. Only the north-east provinces, that is, Liaoning, Jinlin and Heilongjiang, may have the potential to expand rice production.

A second way of adjusting is to replace grain with other agricultural products, for example, vegetables, cotton, oil-bearing crops, tea, fruits, etc.

The proportion of land area sown to grain to total sown area has fluctuated between 70 per cent and 80 per cent over the past 20 years, and fell to its lowest level of 69 per cent in 2000 due to low grain prices. In addition, the government has abolished the grain production quotas on the major grain importing provinces in the coastal areas to provide more market for those provinces that have higher comparative advantage. Quotas to the major grain producing provinces have also been dropped because there is still a surplus of grain supplies. The formal abolition of the government quota system or price protection will have a positive effect on the market-oriented structural adjustment.

Export-oriented agriculture has had limited development in China, mainly in the coastal areas such as Guangdong. In 2000, exports of food and food animals were US\$12.3 billion, accounting for only 4 per cent of the total value of output of China's agricultural products. There are possibilities for further development of export-oriented crops and animal products. Future adjustment should be directed towards increased exports of labour-intensive products with low land intensity. However, a major effort is needed, especially for remote inland areas, to develop business connections with world markets, and also to develop related human resources, infrastructure and other facilities. These are long-run tasks, not only as a reaction to the import shock but also a way towards modernisation of agriculture.

### Removing price protection

Past experience indicates that government protection of grain prices has had a negative impact on farmers' incomes because it has distorted market prices and led to supply adjustment in the wrong direction. Government grain prices set at levels higher than market prices encourage farmers to produce grain in excess of market demand, eventually resulting in declines in market prices and surpluses of grain products. This has resulted in large fluctuations in grain prices and production in the past (see Wang 2001), and adversely affected farmers' incomes. Although currently price protection is not in place, under the WTO commitments of the government, price support is ruled out.

To replace the price protection and assist low-income farmers, more effective measures may be to improve information, technical, and training services to farmers to help them to adjust their production and to shift to the more efficient production areas. In particular, more effort can be made to help farmers to find employment opportunities in non-grain and non-agricultural sectors.

## Industrialisation and urbanisation

A major structural adjustment that can be expected is the further transfer of agricultural labour and other resources to the industrial and service sectors. The transfer of agricultural labour to the rural TVE sector and the urban sectors during the 1990s was 68 million; but this only reduced the agricultural labour force from 366 million to 344 million (see Table 5.1). In the process there were only minor increases in labour productivity and farmers' incomes, far slower than in the 1980s. Employment growth in TVEs stagnated in the late 1990s and rural-urban migration has also faced more resistance because urban unemployment has increased rapidly. According to past experience and the current situation, it is assumed that rural industrialisation and urbanisation will together absorb 5.1 million rural labourers per year on average from 2001 to 2010, and on net reduce the agricultural labour force by 4 million per year (Table 5.1).

To absorb the grain import shock fully, at least an additional 6 million farmers should be employed by the TVE and urban sectors between 2002 and 2004 (assuming that 3.2 million will move to non-grain agricultural production during this period). This is obviously impossible. However, over a longer period, urbanisation could be accelerated via policy adjustments (including removing the policy bias against medium and large sized cities) and improvements in urban infrastructure (Wang and Xia 1999). Assuming that the speed of rural-urban migration can be doubled, an additional 30 million agricultural workers would move to the urban sector between 2001 and 2010. In this case, the grain shock would be absorbed and there would be a larger improvement in agricultural productivity. Greater absorption of the surplus agricultural labour by the industrial and service sectors may lead to a net reduction of the number of farmers by another 100 million or more over the coming 20 years.

## Notes

- 1 Data are from the National Bureau of Statistics, various years. *Statistical Yearbook of China*, China Statistics Press, Beijing. The same source is used below unless specified otherwise.
- 2 The definition of 'net income' is similar to 'disposable income'.
- 3 For references see for example, Sicilar (1988), Lin (1992, 1996), Rozelle and Boisvert (1993), Huang, Rosegrant and Rozelle (1998), and Wang (2000).
- 4 This is according to official statistics. However, according to the 1996 national agricultural census data (and supported by satellite imaging data), in the past the cultivated land area was understated by 27 per cent in the official statistics (calculated from NBS 1999, 2001). The same ratio should also apply to sown areas. Adjustments are therefore made by the author in Tables A5.1 and A5.2. After this adjustment, grain yield in China is still significantly higher than in most developing countries.
- 5 Major sources for the estimation were a recent survey by the Department of Training and Employment of the Ministry of Labour and Social Security, and the Rural Social and Economic Survey team of the National Bureau of Statistical (MLSS & NBS 1999), and National Bureau of Statistics (1991). The samples of the former survey cover 179,450 rural labourers in all provinces except Tibet. The author assumes that all the 'floating workers' who were working outside their home county and half of those who were working outside their home town but within their home county were in urban areas and were excluded from the TVE employment statistics. The changes from 1998 to 2000 were estimated according to the average growth rate of 'floating workers' from 1990 to 1998.
- 6 There were serious discrepancies between the 1990 data for the population and labour force, which were from the 1990 national census, and the data before and after 1990, which were from the regular statistical reports. The National Statistical Bureau made adjustments to the population statistics before and after 1990 according to the census, but did not adjust the labour statistics. The author adjusted the labour data from 1972 to 2000 according to the information from the 1953, 1964, 1982, and 1990 national census and rural and urban birth rates, as well as the labour participation rates for each year since the 1950s. For reference see Wang (2000b).
- 7 Estimated by the author (see Wang 2000b). Official statistics show a lower growth rate of 0.5 per cent during the same period.
- 8 From a speech at the symposium 'Agriculture and Private Enterprises in China' in Guangzhou, by Du Runsheng, the former director of the State Committee of Agriculture and the former director of the Rural Development Research Center of the State Council, 18 December 2001.
- 9 Lin, Liu and Wu (2001) estimated the price elasticity of rural demand for wheat, corn, paddy rice and beans as -0.857, -0.044, -0.155 and -0.549, respectively. The elasticities of wheat and beans are far higher than those of corn and rice, apparently because the former can be substituted by cheaper grains. This is not the case for rice because rice

is the only major grain consumed in the whole of south China. Their weighted average is 0.34. In this study, it is adjusted to 0.37 to include urban demand.

- 10 The impact of price fluctuations on production and farmers' incomes would be far more serious if the government incorrectly responds to the price changes. Lessons can be drawn from past experience (see Wang 2001).

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## Appendix

Table A5.1 World cereal yields and production

	Yield 1980 kg/ha	Yield 1995 kg/ha	Cereal production 1995 million tonnes	Areas under cereal production 95 million ha.
UK	4,944	6,978	22.0	3.15
France	4,854	6,458	53.6	8.30
Germany	4,228	6,051	39.9	6.59
Japan	4,843	5,737	13.4	2.34
<b>China (unadjusted)</b>	<b>2,948</b>	<b>4,664</b>	<b>416.8</b>	<b>89.36</b>
US	3,771	4,647	277.0	59.61
Indonesia	2,866	3,840	58.1	15.13
Vietnam	2,016	3,523	25.2	7.15
<b>China (adjusted)</b>	<b>2,153</b>	<b>3,406</b>	<b>416.8</b>	<b>122.36</b>
Poland	2,337	2,940	25.1	8.54
Canada	2,141	2,705	49.7	18.37
Ukraine		2,522	32.4	12.86
Brazil	1,576	2,504	49.6	19.83
Mexico	2,189	2,463	25.3	10.29
Bangladesh	2,006	2,424	25.9	10.70
Thailand	1,911	2,386	25.4	10.63
India	1,350	2,134	214.9	100.68
Turkey	1,855	1,977	28.2	14.24
Australia	1,052	1,770	26.6	15.01
Russia		1,165	61.8	53.05
<b>World</b>	<b>2,309</b>	<b>2,730</b>	<b>1,896.4</b>	<b>694.52</b>

**Note:** The table includes all the countries in which cereal output exceeded 25 million tonnes in 1995, plus UK and Japan. Countries are ranked according to their 1995 yields. Yields are by sown area.

**Source:** World Bank, 1997. *World Development Indicators*, World Bank, Washington, DC. Data are from the Food and Agriculture Organisation. China Data are adjusted according to satellite imagery data for cultivated land area.



Table A5.2 Agricultural inputs in China and other major producing countries

	Per cent irrigation of arable land 1994	Fertiliser kg/ha 1994/95	Tractors /1000 ha 1994	Share of labour in agriculture per cent 1990	Labour intensity person/ha 1990-95
Bangladesh	33.9	108	0.5	64	8.00
Vietnam	26.6	175	0.5	72	7.20
China	51.5	309	7.9 (100.1)	54	4.09
India	28.3	80	12.5	64	3.37
China (adjusted)	51.5	226	5.8 (73.1)	54	2.98
Indonesia	15.2	85	3.7	57	2.73
Thailand	23.1	62	11.4	64	1.78
Japan	62.9	403	876.1	7	1.75
Turkey	15.1	54	53.7	53	1.15
Mexico	24.7	62	16.7	28	1.04
Brazil	5.9	93	37.1	23	0.72
Poland	0.7	98	153.5	27	0.46
Ukraine	7.5	35	34.0	20	0.30
Germany	4.0	413	197.3	4	0.20
UK	1.8	384	158.7	2	0.20
Russia	4.1	12	21.6	14	0.20
France	7.6	297	173.5	5	0.15
US	11.4	103	80.5	3	0.06
Canada	1.6	49	40.3	3	0.03
Australia	4.5	15	21.0	5	0.03
World	17.3	85	37.4	49	1.88

**Note:** Countries are ranked according to their labour intensity per hectare in 1995.

Fertiliser is measured by plant nutrient.

Tractors per hectare exclude garden tractors. Data in parenthesis include garden tractors.

Labour intensity is the agricultural population divided by the area of arable land. The statistical base for the calculations is arable land per capita and the share of labour in agriculture.

**Source:** Calculated from World Bank, 1997. *World Development Indicators*, Washington, DC; International Labour Organization, 1998. *Yearbook of Labour Statistics*, International Labour Organization, Geneva.

Table A5.3 China's grain trade, 1953-2000 (10,000 tonnes)

Year	Grain imports			Grain exports			Net grain Import [8]
	Total [1]	Wheat [2]	Import [3]=[2]/[1]	Total [4]	Rice [5]	Soybean [6]	
1953	1.5	1.4	93.33	182.6	56.1	92.0	-181.1
1954	3.0	2.7	90.00	171.1	54.0	90.7	-168.1
1955	18.2	2.2	12.09	223.3	70.0	105.8	-205.1
1956	14.9	2.3	15.44	265.1	107.7	112.4	-250.2
1957	16.7	5.0	29.94	209.3	52.9	114.1	-192.6
1958	22.4	14.8	66.07	288.3	139.7	122.4	-265.9
1959	0.2	...	...	415.8	177.4	172.7	-415.6
1960	6.6	3.9	59.09	272.0	107.2	111.1	-265.4
1961	581.0	388.2	66.82	135.5	42.8	40.9	445.5
1962	492.3	353.6	71.83	103.9	45.8	25.9	388.4
1963	595.2	558.8	93.88	149.0	68.5	40.9	446.2
1964	657.0	536.9	81.72	182.1	76.2	59.0	474.9
1965	640.5	607.3	94.82	241.6	98.5	65.3	398.9
1966	643.8	621.4	96.52	285.5	148.7	65.1	358.3
1967	470.2	439.5	93.47	299.4	157.7	67.0	170.8
1968	459.6	445.1	96.85	260.1	129.9	68.8	199.5
1969	378.6	374.0	98.78	223.8	117.9	59.5	154.8
1970	536.0	530.2	98.92	211.9	128.0	47.0	324.1
1971	317.3	302.2	95.24	264.8	129.2	58.8	52.5
1972	457.6	433.4	94.71	292.6	142.6	41.2	165.0
1973	812.8	629.9	77.50	389.3	263.1	40.0	423.5
1974	812.1	538.3	66.28	364.4	206.1	47.1	447.7
1975	375.5	349.1	92.97	280.6	163.0	40.5	94.9

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1976	236.7	202.2	85.42	176.5	87.6	20.0	..	60.2
1977	734.5	687.6	93.61	165.7	103.3	13.0	..	568.8
1978	883.3	766.7	86.80	187.7	143.5	11.3	..	695.6
1979	1,235.5	871.0	70.50	165.1	105.3	30.6	..	1,070.4
1980	1,342.9	1,097.2	81.70	161.8	111.6	11.3	..	1,181.1
1981	1,481.2	1,307.1	88.25	126.1	58.3	13.6	..	1,355.1
1982	1,611.7	1,353.4	83.97	125.1	45.7	12.7	..	1,486.6
1983	1,343.5	1,101.9	82.02	196.3	56.6	33.4	..	1,147.2
1984	1,064.5	1,000.0	93.94	344.0	118.9	83.4	..	720.5
1985	617.1	563.2	91.27	888.0	101.9	115.1	..	91.1
1986	728.2	575.4	79.02	909.5	95.7	130.1	..	595.7
1987	1,627.8	1,334.1	81.96	718.7	95.7	171.4	..	570.6
1988	1,478.8	1,391.0	94.06	654.2	98.9	145.9	..	384.7
1989	1,640.3	1,470.3	89.64	622.1	33.9	117.1	..	352.2
1990	1,356.4	1,233.5	90.94	543.4	30.3	91.0	..	349.7
1991	1,398.3	1,282.5	91.72	1,066.0	69.2	106.5	..	288.7
1992	1,156.9	1,034.0	89.38	1,445.1	120.4	84.5	..	748.7
1993	733.0	642.4	87.64	1611.9	170.9	34.5	..	1043.5
1994	920.0	730.0	79.35	1,346.0	152.0	83.0	..	1178.6
1995	2,081.0	1,159.0	55.69	214.0	5.0	38.0	..	205.0
1996	1,223.0	825.0	67.46	198.0	27.0	19.0	..	12.3
1997	417.0	186.0	44.60	834.0	94.0	19.0	..	16.0
1998	388.0	149.0	38.40	889.0	374.0	17.0	..	662.0
1999	339.0	45.0	13.27	758.0	271.0	20.0	..	469.0
2000	315.0	88.0	27.94	1,399.0	295.0	21.0	..	431.0
								1047.0
								-1,084.0

Source: 'Yearbook of China's foreign economy and trade', and 'China Statistical yearbook', Various issues from 1984. Cited from Wu, Laping, 2001. 'Price comparison between world and domestic grain markets', prepared for the ACIAR project on China's grain market, The Australian National University, Canberra.

Table A5.4 Comparison of the quota, above-quota, rural market, domestic wholesale, imported and exported prices of rice, 1985-2000 (yuan/tonne)

	Quota	Above-quota	Rural market	Wholesale	FOB	CIF
1985	540	557	640	..	..	..
1986	547	680	763	..	..	..
1987	587	784	896	..	..	..
1988	618	944	1,133	..	..	..
1989	741	1,340	1,582	..	..	..
1990	787	1,257	1,259	..	..	..
1991	786	1,120	1,126	..	..	..
1992	854	997	1,052	..	..	..
1993	949	1,140	1,268	..	..	..
1994	1,375	1,747	2,057	..	2,918	..
1995	1,694	2,588	2,838	..	2,712	..
1996	2,054	2,634	2,818	2,398	3,637	3,278
1997	2,277	2,267	2,244	2,088	2,552	3,631
1998	2,246	2,103	2,132	2,105	2,084	4,145
1999	2032		2,081	1,934	1,923	3,957
2000	1849		1,846	1,466	1,499	3,859

**Note:** Prices are in nominal terms. They are arithmetic averages from monthly data. The quota, above-quota, and rural market prices of rice are converted from paddy prices at a ratio of 0.65. The wholesale prices of rice are from Heilongjiang and Hunan markets. **Source:** The quota, above-quota, and rural market prices are from Ministry of Agriculture database. The wholesale, FOB, CIF prices are cited from Wu, Laping, 2001. 'Price comparison between world and domestic grain markets', prepared for the ACIAR project on China's grain market, Australian National University; and calculated from National Bureau of Statistics, various years. *Statistical Yearbook of China*, China Statistics Press, Beijing.

Table A5.5 Comparison of the quota, above-quota, rural market, domestic wholesale, imported and exported prices of wheat, 1985-2000 (yuan/tonne)

	Quota	Above-quota	Rural market	Wholesale	CIF
1985	426	428	462	..	..
1986	436	512	537	..	..
1987	442	545	620	..	..
1988	467	629	763	..	..
1989	505	890	1,066	..	..
1990	508	846	890	..	..
1991	512	772	783	..	..
1992	594	734	776	..	..
1993	659	749	809	..	..
1994	895	1,044	1,141	..	1,134
1995	1,080	1,528	1,688	..	1,460
1996	1,312	1,649	1,741	1,774	1,891
1997	1,461	1,442	1,479	1,545	1,653
1998	1,440	1,317	1,357	1,384	1,514
1999	1,270		1,286	1,343	1,465
2000	1,199		1,136	1,004	1,375

**Note:** Prices are in nominal terms. They are arithmetic averages from monthly data. The wholesale prices are from Zhengzhou and Hubei markets.

**Source:** The quota, above-quota, and rural market prices are from Ministry of Agriculture database. The wholesale, FOB, CIF prices are cited from Wu, Laping, 2001. 'Price comparison between world and domestic grain markets', prepared for the ACIAR project on China's grain market, Australian National University; and calculated from National Bureau of Statistics, various years. *Statistical Yearbook of China*, China Statistics Press, Beijing.

Table A5.6 Comparison of the quota, above-quota, rural market, domestic wholesale, imported and exported prices of corn, 1985-2000 (yuan/tonne)

	Quota	Above-quota	Rural market	Wholesale	FOB
1985	312	327	373	..	..
1986	317	402	453	..	..
1987	332	445	503	..	..
1988	343	471	571	..	..
1989	370	643	782	..	..
1990	376	626	690	..	..
1991	375	546	596	..	..
1992	416	548	628	..	..
1993	459	644	731	..	..
1994	688	904	1,009	..	..
1995	855	1,385	1,580	..	..
1996	1,058	1,389	1,487	1,344	1,364
1997	1,235	1,089	1,145	1,179	1,122
1998	1,230	1,052	1,103	1,275	937
1999	984		986	1,071	850
2000	863		828	970	822

**Note:** Prices are in nominal terms. They are arithmetic averages from monthly data. The wholesale prices are from Heilingjiang and Hubei markets.

**Source:** The quota, above-quota, and rural market prices are from Ministry of Agriculture database. The wholesale, FOB, CIF prices are cited from Wu, Laping, 2001. 'Price comparison between world and domestic grain markets', prepared for the ACIAR project on China's grain market, Australian National University; and calculated from National Bureau of Statistics, various years. *Statistical Yearbook of China*, China Statistics Press, Beijing.

Table A5.7 Comparison of the quota, above-quota, rural market, domestic wholesale, imported and exported prices of soybeans, 1985-2000 (yuan/tonne)

	Quota	Above-quota	Rural market	Wholesale	FOB	CIF
1985	668	762	877	..	..	..
1986	704	877	1,001	..	..	..
1987	738	933	1,102	..	..	..
1988	748	1,026	1,296	..	..	..
1989	785	1,396	1,785	..	..	..
1990	832	1,335	1,591	..	..	..
1991	883	1,256	1,493	..	..	..
1992	909	1,476	1,806	..	..	..
1993	1,044	1,842	2,206	..	..	..
1994	1,539	2,125	2,451	..	2,310	2,286
1995	1,805	2,422	2,665	..	2,190	2,144
1996	1,954	2,920	3,212	3,018	3,009	2,380
1997	2,293	3,103	3,437	3,134	3,461	2,559
1998	..	..	2,439	2,546	3,373	2,232
1999	..	..	1,741	2,202	2,749	1,729
2000	2,366	..	1,811	2,217	2,817	1,785

**Note:** Prices are in nominal terms. They are arithmetic averages from monthly data. The wholesale prices in this table are from Heilongjiang and Fujian markets.

**Source:** The quota, above-quota, and rural market prices are from Ministry of Agriculture database. The wholesale, FOB, CIF prices are cited from Wu, Laping, 2001. 'Price comparison between world and domestic grain markets', prepared for the ACIAR project on China's grain market, The Australian National University, Canberra; and calculated from National Bureau of Statistics, various years. *Statistical Yearbook of China*, China Statistics Press, Beijing.