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**Integrating China's Agricultural Economy Into Global Market:
Measuring Distortions in China's Agricultural Sector**

Or

**An Uncommon Agricultural Policy:
Trade Liberalization in China's Agriculture**

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China now accounts for around 18 percent of global agricultural production, substantially more than traditional agricultural production and trade heavyweights such as the European Union, the United States, India and Brazil (see Table 1). Despite this importance in terms of production, China has historically played a relatively minor role in global agricultural trade. Given the substantial reforms undertaken in China's agricultural trade policies, this seems likely to change over time, with important implications for the rest of the world. In this paper, we examine and seek to quantify the nature and extent of these reforms as a basis for understanding the changing role of China's agriculture and its potential future engagement in international trade.

Much research has been done on the micro-economics of China's agricultural economy (e.g., Lardy, 1983; Sicular, 1988a; Lin, 1992; Rosen et al., 2004), but less attention has focused on the incentive environment in which the changes in China's agriculture have occurred. In particular, there has not been a complete study of the trade policy environment creating the incentives for producers (as well as affecting the welfare of consumers). In the past, there has been considerable work on the nature of the distortions of China's agricultural economy (for example, Huang et al., 2004; OECD, 2005, 2007; Orden et al., 2007). Unfortunately, previous studies have not provided the long time series of data needed to identify changes in the stance of agricultural protection.

Huang et al. (2004) only examined distortions in a single year; Orden et al. (2007) examined a small set of commodities for only six years between 1995 and 2001, while the very comprehensive OECD (2005, 2007) studies covered from 1993 to 2005.

The main purpose of this paper is to document the changes in the policy and pricing environment in which China's agricultural sector has operated during the past quarter-century. The main part of our analysis examines the differences in prices between international prices and domestic prices at the border (Nominal Rates of Assistance or NRAs). We also consider distortions in the domestic economy by examining the differences between farmgate and border prices (NRA_f 's). Because input-related interventions have generally been much smaller and less volatile than measures affecting output prices, we focus on output-related distortions. The measures that we report summarize the impact of a wide range of policy instruments used in China on domestic prices, and hence on production, consumption and trade outcomes.

The wide scope of our goals and objectives impose certain limitations on the scope of the study. First, the absence of data precluded us from examining the entire agricultural sector. Instead, we sought to include commodities that account for two-thirds or more of the gross value of agricultural throughout the study period. Second, although we are able to judge from the price trends and an understanding of domestic marketing and pricing and trade policy reforms the broad sources of the shifts in the distortions of the agricultural economy, we can not identify the exact sources of these changes or those resulting from exchange rate distortions prior to 1994, a subject that is addressed in other work by the authors. Finally, we do not examine the effects of complementary policies such as investments in rural infrastructure, research and development, education and

health, where government policies have a potentially important role to play in overcoming problems of market failure (World Bank 2008).

In the next section, we discuss our approach and sources of data. The results of the distortion analysis are presented and discussed in following section. The final section concludes.

Methodology and data sources

In this paper, we have utilized an approach suggested by Anderson, et al (2007). The approach is broadly based on comparisons between domestic and international prices. During the reform era these price comparisons provide indicators of the incentives for production, consumption and trade, and of the income transfers associated with interventions.

Our approach essentially creates two measures of distortions for each major commodity in the agricultural economy. The most basic measure in our analysis is the Nominal Rate of Assistance (NRA). NRAs are used to compare the prices of commodities in the domestic economy (at the port) with the international prices of commodities at the border (that is, cif in the port for importable goods; fob in the port for exportable ones). Conceptually, with the NRAs we are trying to measure the extent of the distortions due to tariffs, export taxes and subsidies, exchange rate distortions, and the many non-tariff barriers, such as state trading, quotas and licenses, that have affected China's agricultural trade.

Because of barriers within the domestic economy, the extent of protection (or dis-protection) that is afforded by trade policies may not be the same as the real rate of

protection to farmers. Since we have independent observations on the prices obtained by farmers we are able to estimate the *nominal rate of assistance at the farm level* taking into account *both* border distortions and domestic distortions—and particularly the procurement system prevailing prior to the mid 1990s—affecting farmer returns (NRA_f 's). NRA_f 's are calculated after allowing for quality adjustment, taxes or subsidies, transport, storage and handling costs in moving commodities from the farm to the wholesale level. Differences between NRAs and NRA_f 's arise from subsidy or transfer payments that cause the prices received by farmers to differ from what they would receive under competitive internal market conditions. In China, the most important source of this difference was historically the procurement pricing system, which provided ration allocations to urban consumers at below-market prices, with this transfer funded in part by a requirement for farmers to deliver part of their output to the state at a below-market procurement price (Sicular 1988a). This definitely generated an income transfer away from China's farmers but, as Sicular has shown, the effects on incentives to produce are somewhat less clear, since the market price received by farmers for their over-quota production was conceptually the marginal price incentive for production.

The data

In compiling our data on agricultural prices we necessarily had to make choices on the coverage of the commodities included in the study. We included 11 commodities: rice, wheat, maize, soybeans, cotton, pork, milk, poultry, fruit (using apples as a representative product), vegetables (using tomatoes as a representative product) and sugar (both sugarbeet and sugarcane). Over the study period, these commodities accounted for

between 75 percent (in the late 1980s) and 60 percent (during the early 2000s) of the total value of agricultural output in China. Because decisions on production and consumption to China's domestic market prices were only gradually being allowed to respond to domestic prices, and because we do not have access to reliable data on secondary market exchange rates prior to 1981, we focus on data for the period beginning in 1981.

The data used in this study come from a number of sources, depending on the time period of analysis and the commodity. Commodity balance data (production, utilization trade and others) are from CCAP's CAPSiM database, which are mainly from the Ministry of Agriculture (production), NSBC (consumption and others) and Ministry of Commerce (trade). Domestic prices are from several different ministries. Specifically, farm-gate output prices come from the cost of production surveys conducted by National Development and Reform Commission (NDRC). Wholesale and retail prices of most products are from Center for Price Monitoring, National Development and Reform Commission (NDRC), Ministry of Agriculture (China Agricultural Development Report), and Department of Rural Survey under National Bureau of Statistics of China. When wholesale and retail prices for some commodities in some years are not available, price margins from farmgate to wholesale and retail are estimated. Many of the data on margins, transportation costs and other transaction costs are from Rozelle et al. (2000) and Huang et al. (2004), which provided information on substantial quality differences between some imported and domestic commodities and resulting biases in price comparisons as a measure of protection. To update these comparisons for more recent years, we interviewed traders in 10 cities around China in 2006.

The international price data (fob and cif) for all commodities except milk are the unit values of the exports or imports with adjustments for quality. These data are from the Ministry of Commerce and China's Customs Administration. For the border price of milk, because no import prices for milk are available, we use the farm gate price of milk in New Zealand adjusted by international transportation and insurance rates to create a series for the international price of milk (cif) that we refer to as the "reference price."

Other data used in this study include tariff rates, taxes and subsidies. Tariff rates are from the Office of Tariff Regulation (Import and Export Tariff Regulation and Import Tariff and Export Tariff Rebate Compilation). Agricultural tax data come from cost of production surveys conducted by National Development and Reform Commission.

Results

Before turning to our investigation of China's agricultural trade reforms, we first place China's agriculture in international perspective by comparing the value of agricultural output in China with world output value, and the value of output in other major producing and trading countries. These shares are presented in Table 1 for China and a number of important agricultural producing and trading countries. Because these numbers are at domestic market prices, they do not measure the volume of output, but rather the share of resources devoted to agricultural production. A striking feature of the table is the increase in China's share of global agricultural value added, which increased over two and a half times between 1980 and 2005, vaulting it over India, the United States and the 27 member European Union as an agricultural producer. Part of this

change was likely due to higher productivity in China than in other countries, while another influence may have been the changes in price incentives on which we focus.

Nominal rates of assistance for China's main agricultural commodities

In this section we focus on the distortions faced by farmers in China between 1980 and 2005. To do so, we plot NRAs and NRA_f 's over time for each of the 11 commodities. We report the consumer subsidy measures in the aggregate (for all of China's agriculture) later in the section. As discussed above, all NRAs and NRA_f 's are computed using estimated equilibrium exchange rates in the period prior to 1994—removing the effects of overvaluation of the official exchange rate under the dual-exchange rate system prevailing at that time¹.

Distortions to the grain economy before 1995. The distortions to the rice economy of China in the 1980s and early 1990s are characterized by two important features (Figure 1, Panel A). First, the NRA of rice, an exportable commodity, is negative in every year between 1981 and 1995. Ranging between -40 and -10, the negative NRAs show that China was highly competitive in international rice markets during these years. Trade policy, however, kept exporters from shipping large quantities of rice onto world markets and kept the free-market price of rice in China's port cities below the world price. Clearly this demonstrated China's commitment to keeping domestic prices low. Even if there had been no other distortions in the rice economy, producers would have faced prices below world market prices.

The second feature demonstrates how domestic marketing and procurement placed a greater tax on farmers and insulated the domestic price of rice from the world market price even if trade policy had been liberalized (Figure 1, Panel A). Through the mid-1990s, the state's artificially low procurement price kept the prices received by

¹ In contrast with Orden et al (2007), we do not seek to remove the effects of other influences on the equilibrium exchange rate.

farmers below the free market price of rice as seen by the NRA_f 's. Because of this, the tax on rice ranged between -70 in the early 1980s to -30 in the early 1990s. Rice producers were among the most heavily taxed farmers in China—given the large share of the crop's sown area and large negative rates of protection. Importantly, our analysis shows how the state used both trade and procurement policy to tax its rice farmers.

Unlike rice, the NRA measures show that trade policy offered high rates of protection to domestic wheat markets in China between 1981 and the mid-1990s (Figure 1, Panel B). After 1980, during most years, the free market price of wheat in China's port cities was about 60 percent higher than the international price of wheat (cif, China's port cities), ranging between 50 and 70 percent. Unlike rice, which China produced competitively during the 1980s, wheat producers—who have been shown to have higher costs than producers in many other countries (Huang and Ma, 2000)—received strong incentives from trade policy through higher market prices. This policy on its own, unlike that for rice, would not have been consistent with providing inexpensive food for consumers. It was, however, consistent with a policy of food self-sufficiency since it encouraged greater production by keeping out imports and keeping domestic prices high.

Domestic marketing policies, however, were working in the opposite direction to trade policies in terms of their effects on farm incomes. The trends in the NRA_f 's show how the forced deliveries of wheat quotas lowered the average prices that farmers received (Figure 1, Panel B). Although there was still positive protection for wheat farmers in most years between 1980 and 1995, the rates were lower (all below 50 percent except for in 1994 and 1995) and were zero and even slightly negative in 5 of the 16 years (1981; 1982; 1990; 1992; 1993).

The story of maize is a mixture of those for rice and wheat (Figure 2). By contrast with rice and wheat, the trade status of maize has varied from year to year. In Panel A, we examine the distortions to maize as if it were always an imported commodity; in Panel B, we examine the distortion for maize as an exported commodity; in Panel C, the calculations were done taking into account whether maize was a net import or a net export in that year. This panel suggests that the market price in China has varied around the world price, with negative protection for a few years in the early 1980s, followed by positive protection until 1988, then around five years of negative protection. As was the case with rice and wheat, procurement policy further lowered the average prices received by China's farmers for maize. In fact, except for 1985 and 1994, from the 1980s to early 1990s the net effect of international trade and domestic marketing policy was to tax China's maize producers.

Distortions to the grain economy after 1995. After 1995 our distortions analysis shows that China's international trade and domestic marketing policies changed strikingly (Figures 1 and 2—right hand sides of graphs). It is apparent from the way the differences in the estimates of NRAs and NRA_f 's narrow that China's reformers were able to eliminate the procurement policies that had been taxing rice, wheat and maize farmers (either by increasing the tax imposed by

The liberalization of domestic markets in the mid-1990s was accompanied by a liberalization of trade policy, at least in the case of China's major food grains. After 1995 the taxation and subsidization of rice and wheat clearly were being phased out as the NRAs for rice steadily rose (became less negative) and the NRAs for wheat fell. Likely in part in preparation for its accession to the WTO, China's leaders liberalized trade for its

main food grains to such an extent that between 1995 and 2001 most of the protection for the crops was eliminated. Since 2001, the NRAs for both rice and wheat have averaged close to zero. However, the introduction of minimum prices for grains in 2004 (OECD 2005, p88) creates the potential for support to be triggered without explicit policy decisions, should prices fall.

The case of maize is a bit different than for other crops (Figure 2). In a number of years after 2000, the NRA for maize was positive. This indicates that at least in some years national leaders have been protecting maize producers. In part, as discussed in Rozelle and Huang (2004), this may in part be due to the rise of the Jilin lobby that has been successful in gaining protection for the producers of its most important crop.

Edible oils and cotton. Over the entire sample period, the biggest difference between the analysis of distortions of grain crops and for cash crops (at least for soybeans and cotton) is that domestic marketing policy has historically played less of a role. Although some counties had procurement delivery quotas for soybeans, this was not as widespread as for grain (in many counties soybeans were not procured by the state procurement system). In addition, the implicit tax on soybeans where soybean quotas were collected was lower than for the staple grain crops. As a result, there is little difference between the NRAs and NRA_f 's. The same is true for cotton—except that free market procurement of cotton by private traders was not allowed through the mid-1990s. When reform finally came in the mid-1990s, leaders did not move to a two-tier pricing system, but instead allowed both private trade and commercialized government cotton procurement stations. As a result, the NRAs and NRA_{fs} for cotton are nearly the same. In fact, the same is true for all of the rest of the commodities (livestock; horticulture and

milk and sugar). As a result, the discussion in the rest of this section focuses on trade policy.

Before 1995, while not perfectly correlated with the trends of maize, our analysis shows that soybeans also fluctuated between being taxed and protected (Figure 3). Although the average level of protection was almost zero, in some years soybeans received protection of up to nearly 30 percent while in other years they were being taxed by 20 percent. A recent paper by Rozelle and Huang (2005) shows that a lot of this fluctuation was due to domestic production policies that would encourage soybeans, then discourage them, then encourage them while national planners allowed little trade.

The trends in the NRAs after 1995 show the strong commitment to trade liberalization for soybeans. Beginning in the late 1990s and continuing through to 2005 the protection for soybeans fell from around 30 percent to almost zero. This falling protection, in fact, should not be a surprise given the integration of China into world soybean markets and the monotonic rise in imports (which exceeded 25 million tons in 2005). The story of soybeans—and the fall in protection and almost full liberalization—stands in sharp contrast to that of maize which enjoyed increasing protection.

The distortion analysis for cotton, in some sense, produces results similar to those for rice (Figure 4). The combination of trade and monopoly procurement policies kept domestic cotton prices lower than world market prices in the 1980s and early 1990s. It appears that China's planners were taxing cotton farmers to supply its emerging textile industries with relatively inexpensive raw materials. It is no wonder that such high implicit taxes on cotton (and serious insect problems) led to stagnant and even falling cotton area in many regions (NBS, 2004).

After 1995, however, with the liberalization of domestic markets (mostly) and increased trade liberalization (somewhat) there clearly been a shift in the level of distortions faced by cotton producers. Although there were years in which there was fluctuation (protection was high in 2000; and cotton was implicitly taxed in 1999 and 2001), since the mid-1990s the NRA has been nearly zero. In recent years, China could have levied a tariff of up to 40 percent on cotton imported above a tariff-rate-quota that is only about a quarter of current imports, but has chosen to provide much more limited protection.

Livestock and horticultural commodities. With the exception of several years in the late 1980s and early 1990s for fruit, the patterns of distortions to China's livestock and horticultural sectors show remarkably similar patterns (Figures 5 and 6, Panels A and B). In all cases in the early reform era there was heavy implicit taxation on livestock and horticultural commodities. In part, as noted by Huang et al. (2004), this situation was created by China's grain-first policy. Although China can competitively produce livestock and horticultural products, farmers were encouraged neither to produce nor export these commodities on a large scale. Part of this was due to China's own barriers, such as quotas on exports to Hong Kong. Another part of the price gap shown in these figures reflects trade barriers facing China in export markets. While there quite possibly were grounds for some of the barriers (for example, foot and mouth disease is widespread in China), even if a claim was blatantly false it could not be adjudicated effectively since China was not part of WTO. As a consequence, China's livestock and horticultural producers produced commodities far below the world market price and were neither inclined nor able to increase exports into global markets.

Since the late 1990s the gap between domestic and world prices of livestock and horticultural producers has fallen (Figures 5 and 6). Emerging markets and relaxation of grain-first policies (often called agricultural structural adjustment policies inside China) allowed producers to greatly expand livestock and horticultural production in large part to meet the rising demand inside China (Rosen et al., 2004). At the same time China's accession to the WTO and the appearance of an export-oriented segment of the livestock and horticultural industries has increased the interest in and feasibility of participating in international markets. In response, the price gap measures have risen towards zero for all commodities—pork, poultry, vegetables and fruit. It should be noted, however, that the NRAs calculated using our standard price comparisons are all still negative. If anything, China's presence in global food markets has given rise to more stringent rules and regulations on the import of livestock and horticultural commodities from China. Since the measured price gaps do not reflect China's own distorting policies, we have not included them in the overall NRA measures presented later—rather, we have assumed them to be zero from 1994. We report the price comparisons in Figures 5 and 6 because of the information they provide on the impacts of uncertainty about access to foreign markets.

Milk and sugar. The story for milk and sugar is in some sense the opposite of that for livestock and horticultural commodities. During the 1980s the NRAs for milk and sugar were positive and large (Figure 7, Panels A and B). Those for milk ranged from 50 to more than 200 percent between 1981 and 1987. Those for sugar were above 40 percent through the late 1990s. Although beginning earlier and falling further, by the late 1990s and after 2000 (in the early 1990s for milk), NRAs for milk and sugar were falling (to

around 20 percent by 2003) and for milk were near zero. In other words, the patterns for import-competing milk and sugar are nearly the mirror image of those for livestock and horticultural commodities.

The picture for agriculture as a whole

Aggregating the 11 commodities in our study together (and by importables and exportables) and assuming that our study commodities largely reflect the distortions to all of China's agriculture, there is a striking pattern (Figure 8—left hand side of figure). In the 1980s and through the mid-1990s, importables (such as wheat, soybeans, milk and sugar) were protected. On average, the protection rates were between 15 and 35 percent. The same was true for exportables, except the distortions show that commodities such as rice, livestock commodities and horticultural commodities were implicitly taxed. The implicit tax rates ranged from 40 to 50 percent. Overall, since the value of exportable agricultural products accounted for a greater part of the economy than importables throughout the early reform era, China's agricultural was highly distorted and on average the distortions were negative. In other words, China was taxing its agriculture—with both its international trade and domestic marketing policies.

One of the main findings of this study is evident from the right hand side of Figure 8. After 1995, the NRAs of importables fall from around 20 percent to less than 10 percent. During this period, the NRAs of exportables rose, or the implicit taxes on them fell, from about 40 percent to around 15 percent. When taken together, the distortions in China's agriculture fell to less than 10 percent. In many years the overall protection was between 0 and -5 percent. Clearly, the combination of domestic marketing reforms and

international trade liberalization has generated an economy that, on average, is one of the least distorted in the world.

Not all distortions have been eliminated, however. When aggregating over 2000 to 2005, there are still some commodities that have relatively high rates of protection (Figure 9). For example, sugar and milk are still around 20 percent or greater. Maize and soybeans are around 10 percent. In the exportable categories, fruit, vegetables, pork and poultry have essentially zero protection, while rice appears to have been slightly negatively protected.

The summary statistics presented in Table 2 provide a valuable overall summary of the key findings of the study. They show that exportables were, on average, taxed by about 50 percent in the early 1980s, including both the taxation through depressed domestic prices resulting from border measures, and the further depression of farm prices through the procurement price system. High overall rates of taxation persisted into the early 1990s, but declined sharply in the late 1990s, to essentially zero by 2000-05. Import competing commodities were taxed at a much lower rate in the early 1980s, and the rate of assistance for these products became positive, on average in the late 1980s. It was over 20 percent in the late 1990s, and the average rate of support fell to 7.5 percent in the early 2000s.

Conclusions and Implications

The main finding of our paper is that the nature of policy intervention in China's agriculture has changed dramatically over the past 25 years, transforming the agricultural sector from one characterized by high distortions to one that is relatively liberal. In the

1980s and early 1990s (or the *early reform period*) there were distortions in both external and domestic policies that isolated domestic producers and consumers from international markets. Importantly during the early reform period domestic marketing and pricing policies actually served to make the prices that domestic producers and consumers faced almost independent from the effects of trade policy. Because of this even in the case of an exportable commodity (e.g., rice), a commodity that enjoyed little protection at the border from tariffs (meaning that the international price of rice and the free market price of rice were nearly identical), domestic pricing and marketing policies did not allow producers to reap the profits from international-level prices and instead forced farmers to sell much of their surplus to the state at artificially low prices. Hence, domestic policies levied a tax on farmers even though there was little protection at the border. Similar dynamics characterized importable commodities such as wheat and soybeans where, despite fairly high rates of protection from trade policies, producers were receiving much less protection than they would have had there been a free domestic market for the importable, while consumers were being implicitly taxed.

In contrast, since the late 1980s and early 1990s (the *late reform period*), the liberalization of domestic markets has reduced the distortions from domestic policies (as the market gradually has replaced the state as the primary mechanism for allocating resources and has become the basis of farmer production and marketing decisions). At the same time, especially in the case of importable commodities, trade policy has become more liberalized, with distortions from border measures falling substantially. As a result, we find that in recent years China's agriculture is much less distorted in two ways. First, the differences between international and domestic market prices have narrowed

considerably for many commodities due to trade policy liberalization. Second, the elimination of domestic policy distortions mean that when trade liberalization allows for the increased import or export of agricultural commodities, prices in China's domestic market change and farmers are directly affected by them.

Despite the finding that considerable liberalization has occurred due to policy reforms in both domestic and external policies, there are still distortions to agriculture in the mid-2000s, nearly 30 years after the beginning of reforms. In some cases, these remaining distortions arise from tariffs on importable commodities and non-tariff trade barriers of other countries on China's exportable commodities. While low by international standards, China's tariffs are still providing a degree of protection for a number of importable commodities (e.g., wheat and soybeans). For at least one exportable commodity (maize), the use of export subsidies (which in fact are mostly configured as domestic marketing, transport and storage subsidies) continues to keep a wedge between the domestic price in China and the international market. Further, the presence of minimum prices for grain means that this wedge could expand automatically should prices decline.

Our analysis suggests that China's agricultural economy has become one of the least distorted in the world. Clearly, the combination of domestic marketing reforms and international trade liberalization has greatly freed up the decision making environment for producers. In this environment phenomena such as rapid structural change from grain to more labor intensive commodities and the rise of a horticulture and livestock-based export economy become more understandable. When farmers face smaller distortions they tend to move into those commodities in which they have a comparative advantage.

Another important consequence has been dramatic growth in land and water-intensive commodities such as soybeans and cotton, in which China's comparative advantage appears to be declining, and for which there is rapidly-growing demand from downstream users.

However, this is far from implying that all rural development problems have been overcome. Markets only provide signals for private production and consumption signals. Much remains to be done to improve the efficiency of agricultural production, to reduce the barriers to migration out of agriculture, and to improve the provision of infrastructure, health and education services in rural areas. Such investments in public goods typically have very high returns both in terms of efficiency and in the mitigation of rural poverty (World Bank 2008). A combination of investments in these critically important public goods and the liberal trade policy regime that now characterizes China's agriculture would allow China's agriculture to realize its potential contribution both to domestic goals of poverty reduction and income growth, and to the development of world markets for agricultural products.

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Table 1. Shares (%) in global agricultural value added at domestic prices

	1980	1990	2000	2001	2002	2003	2004	2005
China	7.3	8.5	15.5	16.4	17.1	15.9	17.1	17.7
EU	18.9	21.0	15.7	16.0	16.3	17.0	17.1	14.8
India	8.3	7.9	8.6	8.9	8.5	9.0	8.1	8.4
United States	9.6	9.8	9.8	9.7	8.7	9.4	9.9	na
Brazil	3.0	2.8	3.0	3.3	3.1	3.5	3.7	3.8
Australia	1.3	0.9	1.3	1.4	1.1	1.4	1.3	na
Canada	1.4	1.4	1.3	1.3	1.3	na	na	na
Thailand	1.0	0.9	1.0	0.9	1.0	1.1	1.1	1.1
World	100	100	100	100	100	100	100	100

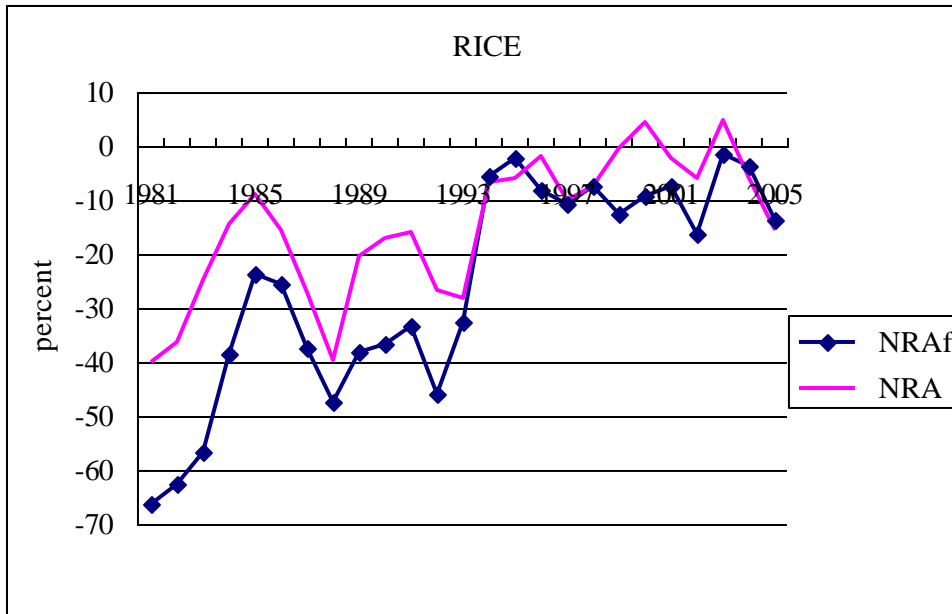
Source: World Bank data. National account statistics in current US \$ at market prices.

Table 2: Nominal rates of assistance to agricultural industries, China, 1981-2005

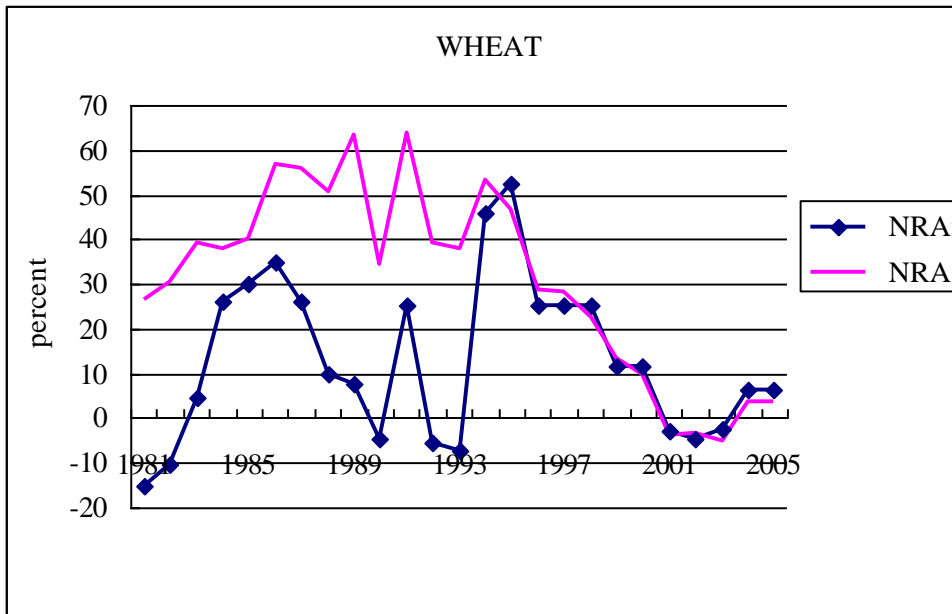
Crop	1981-85	1986-90	1991-95	1996-00	2001-05
Exportables*	-52.7	-47.4	-14.6	-0.9	-0.2
Rice	-49.1	-36.6	-23.5	-7.8	-7.1
Fruits	-23.9	-9.9	-2.4	0.0	0.0
Vegetables	-42.1	-57.8	-13.4	0.0	0.0
Poultry	26.4	-34.6	-1.6	0.0	0.0
Pork	-70.2	-47.5	-8.9	0.0	0.0
Import-competing*	-2.2	8.1	8.8	19.9	7.6
Wheat	7.7	15.4	22.7	22.2	2.1
Soybeans	6.4	-3.6	10.4	26.8	15.6
Sugar	51.3	29.1	15.5	35.4	21.9
Milk	134.9	25.1	-4.1	28.3	20.7
Mixed Trade Status*					
Maize	-27.0	-25.1	-18.6	8.5	13.3
Cotton	-30.9	-36.0	-20.8	0.8	-3.5
Weighted ave of above products*	-45.5	-42.4	-11.5	2.0	0.8
Standard Deviation^a	74.4	42.3	19.8	19.7	13.2
Coverage, % of value of total agric production (at undistorted prices)	84.5	90.1	85.9	75.1	65.9

Figure 1: Nominal Rates of Assistance (NRAs) and Nominal Rates of Assistance for Farmers (NRA_f) for rice and wheat in China, 1981-2005

Panel A. Rice



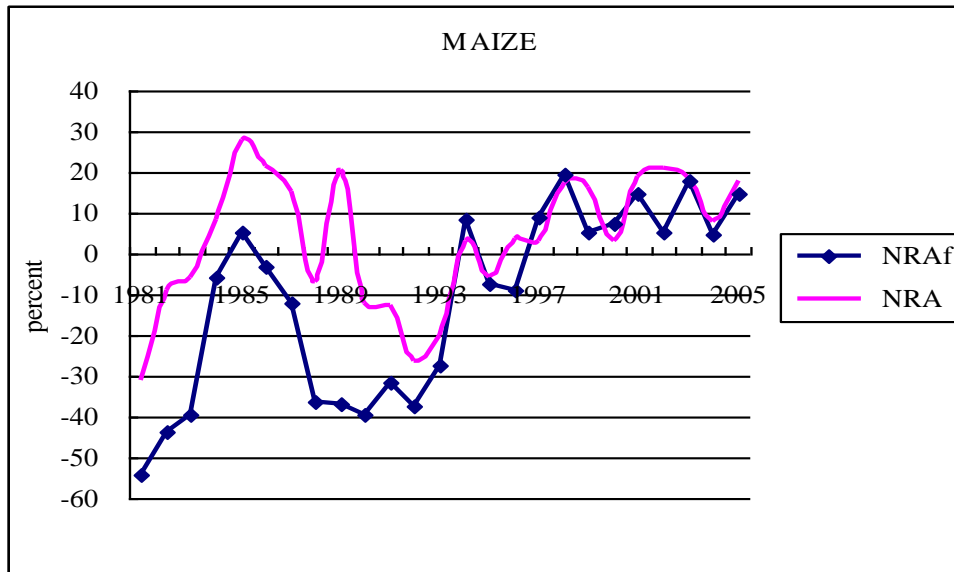
Panel B. Wheat



Note: Negative NRAs and NRA_fs mean that this sector is being taxed; positive NRAs and NRA_fs mean agriculture is being protected.

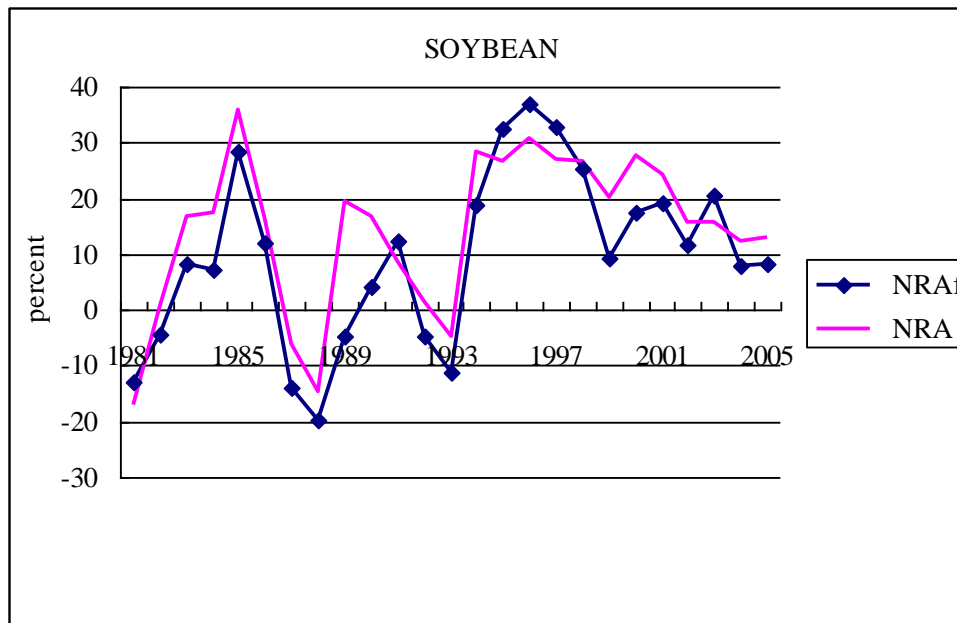
Figure 2: Nominal Rates of Assistance (NRAs) and Nominal Rates of Assistance for Farmers (NRA_fs) for maize in China, 1981-2005

Protection measures for maize based on trade status, 1981-2005



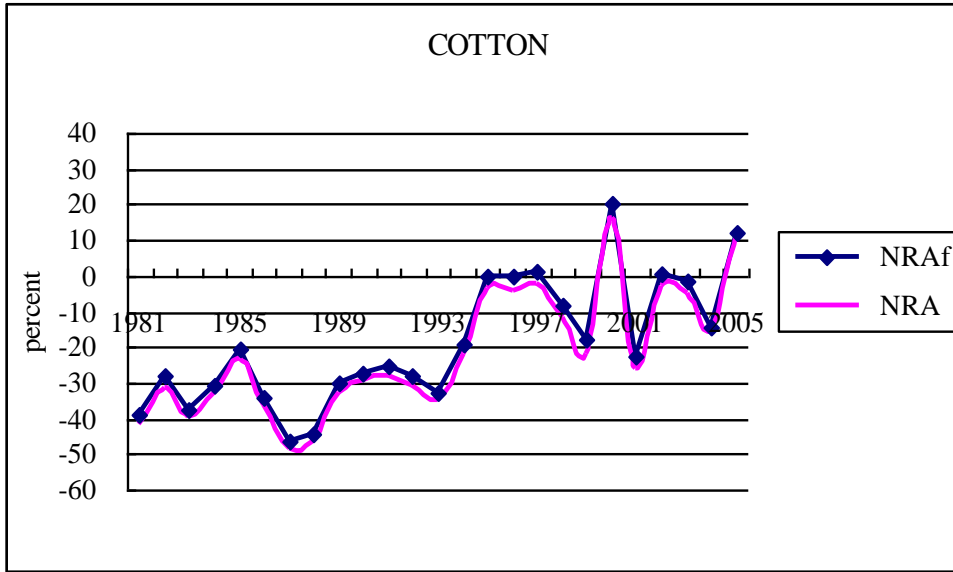
Note: Negative NRAs and NRA_fs mean that this sector is being taxed; positive NRAs and NRA_fs mean agriculture is being protected.

Figure 3: Nominal Rates of Assistance (NRAs) and Nominal Rates of Assistance for Farmers (NRA_fs) for soybean in China, 1981-2005



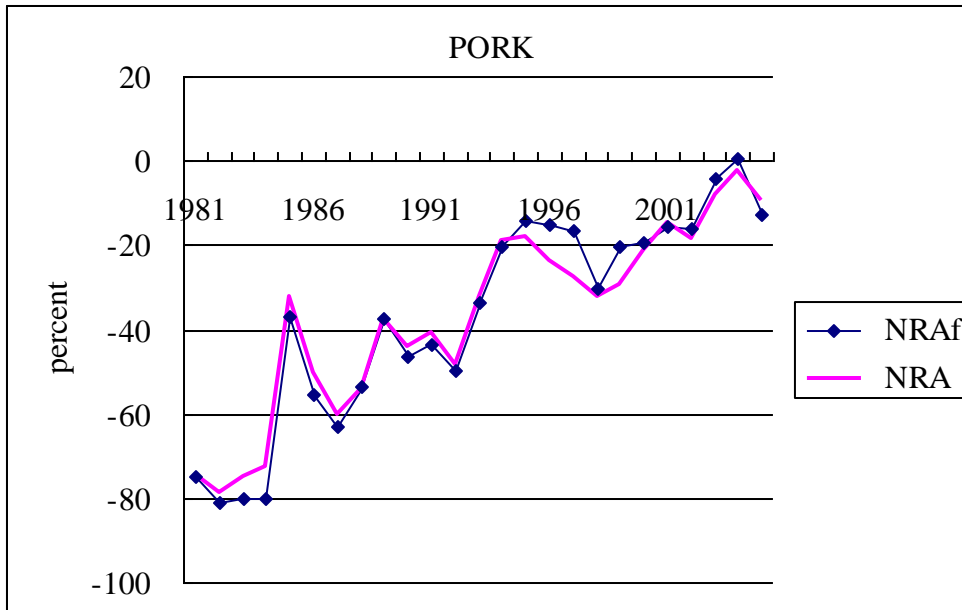
Note: Negative NRAs and NRA_fs mean that agriculture is being taxed; positive NRAs and NRA_fs mean agriculture is being protected.

Figure 4: Nominal Rates of Assistance (NRAs) and Nominal Rates of Assistance for Farmers (NRAs_f) for cotton in China, 1981-2005
 Protection measures for cotton based on trade status, 1981-2005

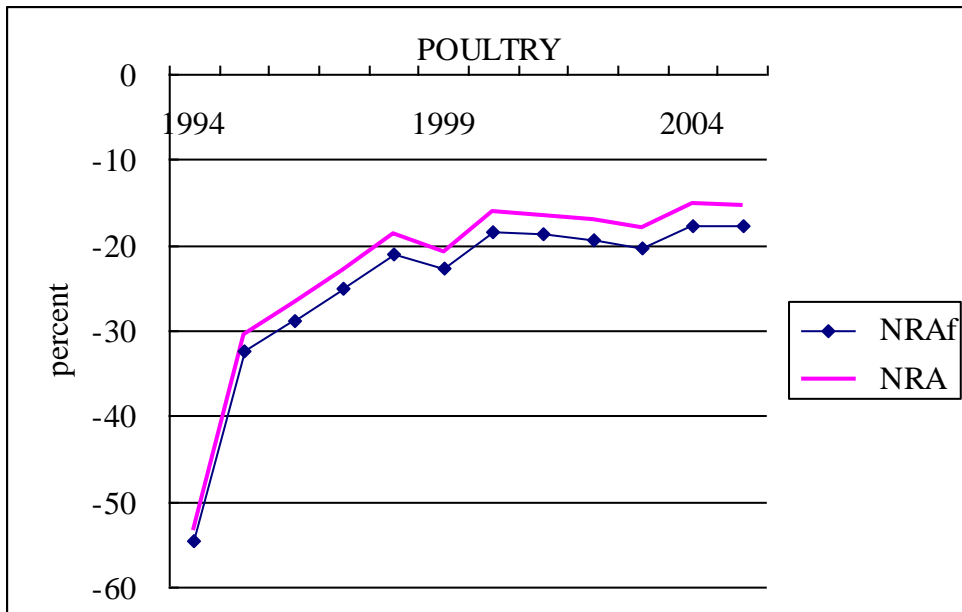


Note: Negative NRAs and NRAs_f mean this sector is being taxed; positive NRAs and NRAs_f mean it is being protected.

Figure 5: Nominal Rates of Assistance (NRAs) and Nominal Rates of Assistance for Farmers (NRA_fs) for livestock commodities (pork and poultry) in China, 1981-2005
 Panel A. Protection measures for pork



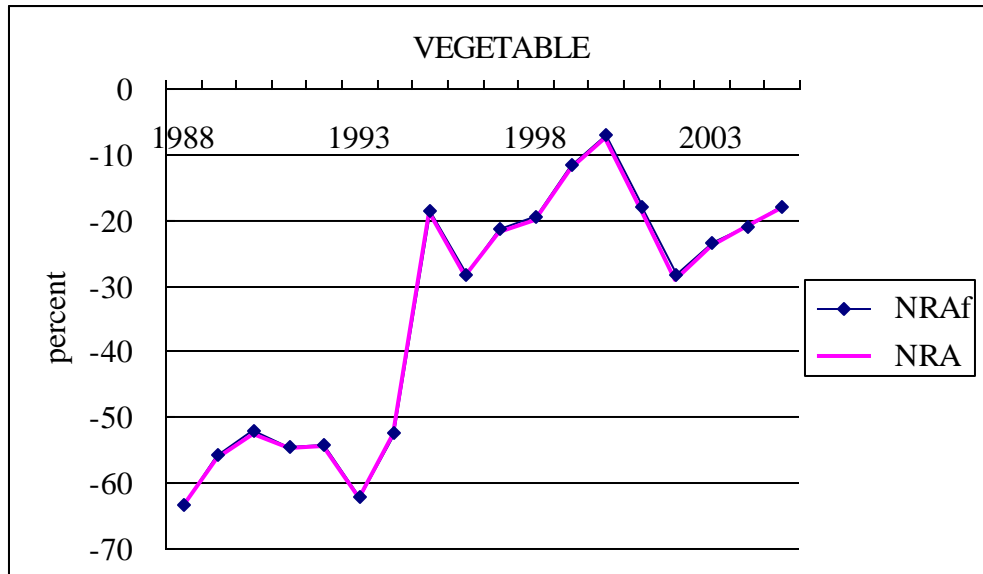
Panel B. Protection measures for poultry



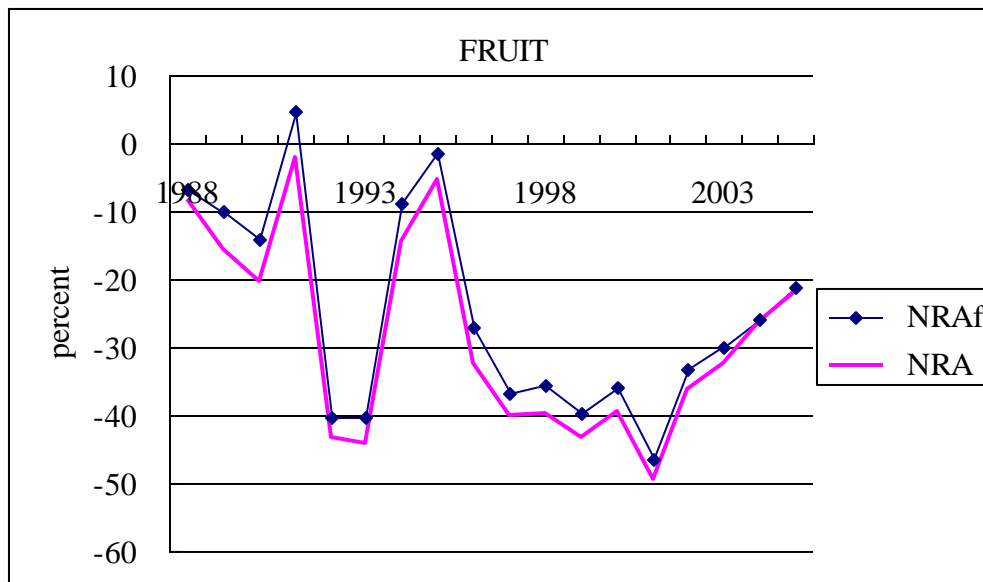
Note: These measures are calculated in the same way as NRAs and NRA_fs reported for other commodities. However, the true NRAs for these commodities become zero after 1994 because China has no policies holding their prices below world levels. The reported price comparisons therefore provide a measure of the extent of the taxation resulting from barriers faced in other countries.

Figure 6: Nominal Rates of Assistance (NRAs) and Nominal Rates of Assistance for Farmers (NRA_f) for vegetable and fruit in China, 1981-2005

Panel A. Protection measures for vegetable



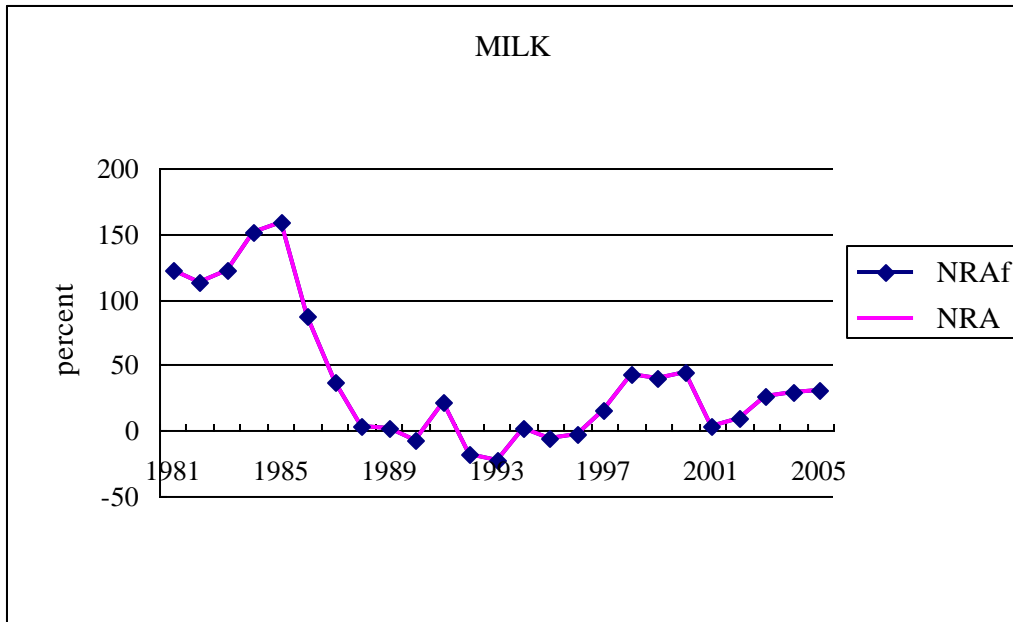
Panel B. Protection measures for fruit



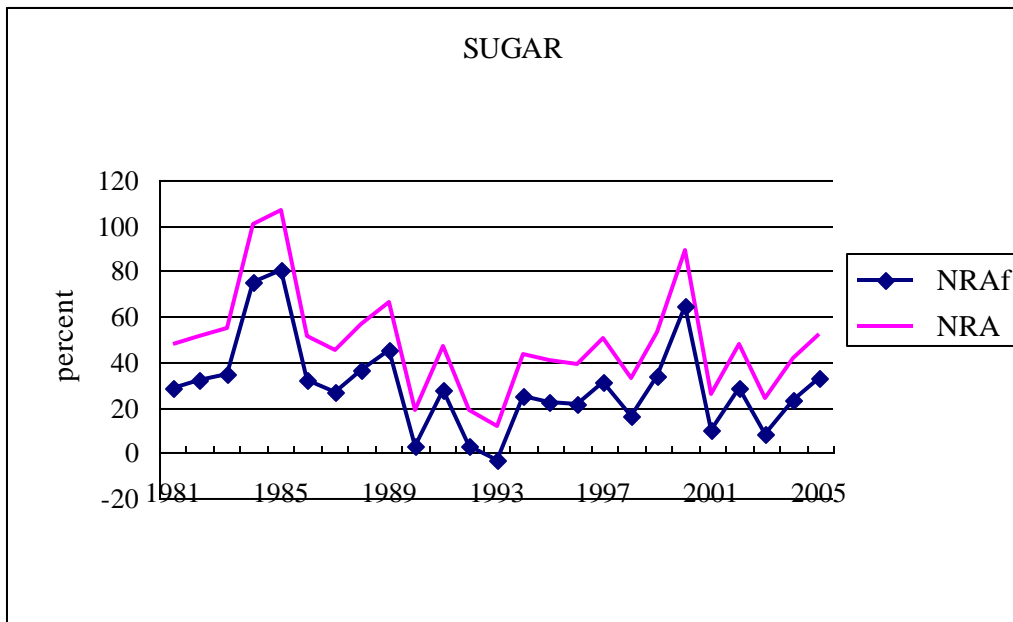
Note: These measures are calculated in the same way as NRAs and NRA_fs reported for other commodities. However, the true NRAs for these commodities become zero after 1994 because China has no policies holding their prices below world levels. The reported price comparisons therefore provide a measure of the extent of taxation resulting from barriers faced in other countries.

Figure 7: Nominal Rates of Assistance (NRAs) and Nominal Rates of Assistance for Farmers (NRA_f) for milk and sugar in China, 1981-2005

Panel A. Protection measures for milk

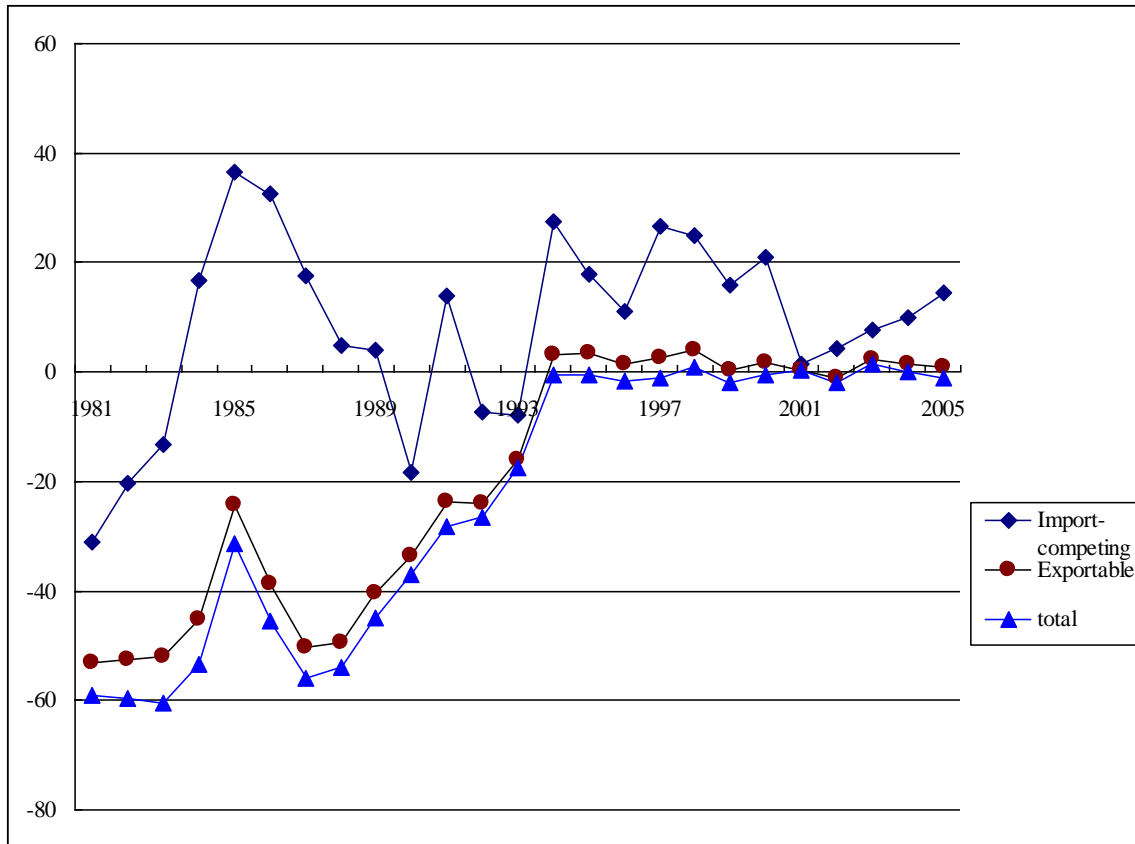


Panel B. Protection measures for sugar



Note: Negative NRAs and NRA_fs mean that agriculture is being taxed; positive NRAs and NRA_fs mean agriculture is being protected.

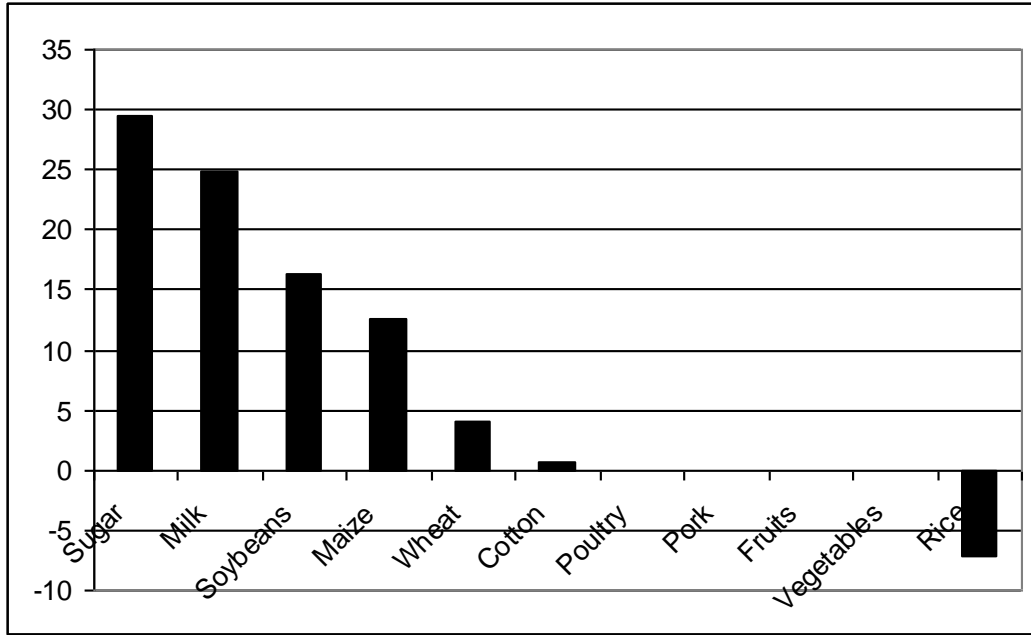
Figure 8: Rates of Assistance for farmers that Produce Importable Commodities, Exportable Commodities and for All of Agriculture (11 commodities) in China, 1981-2005



Source: Authors' spreadsheet using methodology from Anderson et al. (2006)

Note: Negative NRAs mean that agriculture is being taxed; positive NRAs mean agriculture is being protected. Since the distortions to inputs are so small, the graphs for NRA_f s are essentially the same.

Figure 9: Average Rates of Assistance for Producers of Major Commodities in China, 2000-2005.



Source: Authors' spreadsheet using methodology from Anderson et al. (2007)