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Economic Reform and the Changing Pattern of China's Agricultural Trade

By

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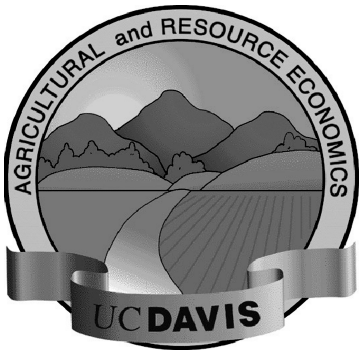

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Abstract

This paper examines the composition of China's trade from 1980 to 1996, with a focus on agriculture and a view towards understanding its changing structure relative to other sectors. We analyze the time series behavior of individual goods at the SITC three-digit level, categorized into three groups: agricultural commodities, "other primary" commodities, and manufactures. We find that agricultural trade has expanded along comparative advantage lines in a very modest way, compared to manufactures and other primary commodities.

Introduction

Over the past decade, the annual U.S. trade balance with China has gone from a small surplus to a deficit of over $57 billion (in 1998). The mounting trade deficit has resulted in renewed U. S. pressure to expand access to China's markets. Recently, there have been intensive U.S.-China discussions over trade concessions and the related issue of China's bid to join the World Trade Organization (WTO). Agricultural trade is at the center of these negotiations as China's high trade barriers in agriculture are believed to be partly responsible for the trade deficit.[1]

In a typical year, China has neither a large surplus nor a large deficit in its agricultural trade balance. For instance, in 1995, China ran a relatively small agricultural trade deficit of $1.47 billion (U.S. dollars) and then in 1996 the balance shifted to become a small surplus, with agricultural exports exceeding imports by $673 million in that year.[2] Even though its overall agricultural trade balance is small, China is a significant but erratic trader for certain agricultural commodities such as wheat, maize, oilseeds, edible oils, tobacco and cotton.

China's agricultural trade regime has not been liberalized to the same extent as its trade in manufactures (Naughton, 1999; Martin, 1999). So there is great uncertainty as to what might happen if and when China liberalizes its agricultural trade. Some projections suggest that China will become a consistent net importer of food (Wang 1997a). Based on its large and growing population and

[1] The trade deficit of $57 billion is the official U.S. figure. China estimates that the deficit is much lower. Feenstra et. al. (1998) find the U.S. trade deficit with China may be smaller than the U.S. official figure, once proper adjustment is made for China's exports to the U.S. via Hong Kong.

[2] These trade balance data are based on China's Customs Statistics, and they are on a calendar year basis. They underestimate the value of China's imports because they do not account for agricultural products smuggled from Hong Kong into China. Apart from the smuggling issue, the trade data must be interpreted carefully because there are alternative ways to define which commodities make up agricultural trade. For instance, depending on the data source, seafood and lumber may or may not be included in agricultural trade statistics. For the purposes of this paper, in order to determine which products are included in China's agricultural trade, we follow closely the U.S. Department of Agriculture's (USDA) classification system. Compared to the USDA, the Food and Agricultural Organization of the United Nations (FAO) includes more commodities in their definition of agricultural trade and thus the FAO's annual value of exports and value of imports for China exceeds that reported by the USDA. In Table 1 we also report the trade balance including "other agricultural and resource products" such as seafood, leather, forest products, and fabrics.

fluctuating grain stockpiles, some fear that China could destabilize world markets after agricultural trade liberalization (Wan and Anderson, 1990).

Agricultural trade barriers will be a key issue with regard to China's application to join the World Trade Organization (WTO). For instance, China's non-tariff trade barriers (NTBs) in grains (wheat, maize, rice and soybeans) are very controversial. The barriers in grains are not transparent because China's state trading in grains is conducted through its Cereal, Oil, and Foodstuffs Importing and Exporting Corporation (COFCO). COFCO is one of the world's largest STEs in agriculture, and over the past decade, COFCO has imported as much as 17 percent of world wheat traded, and exported as much as much as 10 percent of the world's corn.

The reemergence of China as a significant trading nation in merchandise trade has been described by West (1993), Lardy (1994), World Bank (1994), Wall, Boke, and Xiangshou (1996), and Naughton (1996). Greater integration with the global economy began in the mid 1980s and is now recognized as a fundamental feature of China's ongoing economic reform. Outside of agriculture, significant import tariff reductions have occurred in the past decade. As a measure of openness, China's nominal value of exports grew by 13 percent annually from 1980 to 1996. During the same time period, imports grew by 12 percent per year, on average. By 1997, China's total trade accounted for about 3 percent of world trade, up from 0.8 percent in 1978.

However, the degree to which China's door is open to the world is debatable and China may be less open to foreign trade than initially appears (Naughton, 1996). From 1986 to 1996, China's growth in real merchandise trade exceeded growth in real GDP by 2.1 percent, which was not particularly high by international standards. For instance, during the same time period, growth in real trade less growth in real GDP was 6.9 percent in Thailand and 4.5 percent in the United States.

China's ratio of foreign trade (exports plus imports) to GDP rose from 13 percent in 1980 to about 35 percent in 1996, valued at the official exchange rate. However, this ratio may overstate the relative importance of foreign trade in China's economy because it is based on the official exchange rate (Bell, Khor and Kochhar, 1993). If instead, the purchasing power parity (ppp) exchange rate (i.e., real exchange rate) is used, trade as a percent of GDP has not changed all that much since the mid 1980s. Using the real exchange rate, China's trade as a percent of GDP only grew slightly from 6.6 percent in 1986 to 7.1 percent in 1996 (World Bank, *World Development Indicators*, 1998). In relative terms, India's trade as percent of GDP grew faster than China's over this time period, going from 3.9 percent to 4.5 percent. In comparison, Thailand's trade as a percent of GDP grew from 14.7 percent to 31.3 percent from 1986 to 1996.

Despite China's move to lower average tariffs, China continues to restrict imports through a variety of barriers, including tariff-quotas, taxes, import quotas, import licenses, and state trading (United States Trade Representative, 1998). In addition, China uses other non-tariff technical trade barriers such as sanitary and phytosanitary measures. These barriers are commonly applied to agricultural products. For instance, under the guise of phytosanitary measures, China prohibits imports of U.S. citrus (United States Trade Representative, 1998).[3]

Lardy (1994) explains that the commodity composition of trade has changed along with domestic market reforms, and that trade patterns (especially on the export side) are more consistent with China's comparative advantage, compared with the pre-reform and early reform time periods. China has shifted away from petroleum exports and has increased exports of labor-intensive

[3] In April 1999, the U.S. and China signed a tentative agreement that aims to further open Chinese markets to wheat, beef and citrus. Prior to the agreement, China had officially banned imports of wheat from the Pacific Northwest region of the United States and citrus from Florida, Texas and California. These import bans were on the grounds of worries about plant diseases. (See the Office of the United States Trade Representative press release, April 10, 1999, available at www.ustr.gov).

manufactured goods, to the point where manufactured goods accounted for 85 percent of exports in 1996. The share of primary commodities in total imports fell from a little over one-third in 1980 to about one-fifth by 1996.

China's agriculture has a comparative advantage in labor intensive crops, not grains (Carter, Zhong, and Cai, 1996). However, policy has tilted China's agricultural production away from its comparative advantage which lies in non-grain activities. Naughton (1996, p. 309) argues that China's merchandise exports have shifted to reflect its abundant labor. Has this happened in agriculture? To what degree is agricultural production and trade becoming more specialized to capture its comparative advantage in labor intensive food products?

From a conceptual basis, Anderson (1990) argued that China's economic reform would have a significant impact on the pattern of agricultural trade. More recently, the same argument has been made from an empirical perspective by Wang (1997) and Wailes, Fang, and Tuan (1998). Wailes, Fang, and Tuan (1998) point out that the growth rates for China's agricultural trade are much slower than for total trade and consequently the share of agricultural trade in total trade has declined quite dramatically. However, Wailes, Fang, and Tuan (1998) also argue that China's agricultural trade has expanded rapidly and that the pattern of trade roughly adheres to the laws of comparative advantage. Alternatively, Anderson and Strutt (1999) find there has been little growth in China's food import dependence.

Wang (1997) has argued that China's agricultural net trade structure is consistent with its resource endowment. He found that land-intensive bulk[4] and processed intermediate commodities account for most of the imports, while labor-intensive horticultural and consumer ready products make up most of the agricultural exports. However, he based his analysis on 1995 and 1996 data, a period

[4] Wang uses a USDA classification system. Bulk commodities include grains, oilseeds, cotton, raw rubber, and raw tobacco. Processed intermediate goods include flour, feed, live animals, animal fats and oils, and wool. Horticultural

during which China had a temporary export blockage on grain exports. In late 1994, the central government placed a (temporary) moratorium on grain exports in an effort to control higher domestic food prices. Rice and maize have traditionally been net exports but they shifted to a net import situation during the export blockade.

Yiping Huang (1995) has argued that economic reforms in China have generated a significant impact on agricultural trade. He supported this observation with three points. His first point was that the growth of exports outpaced that of GDP during the reform period. Second, he noted that distortions to agricultural trade have been reduced significantly and agricultural trade experienced dramatic expansion. Third, he noted that trade was brought into conformity with the pattern of resource endowments.

Import liberalization has been a theme stressed in many of the above mentioned papers. The trade reforms that have been implemented in China since 1979 are characterized by demonopolisation of foreign trade, the phasing out of trade subsidies, replacing of planned-quotas with a tariff- quota regime (for cereals, soybeans, edible oils, and wool), progress toward currency convertibility, and provisions to attract foreign direct investment. The opening-up has
been a means to promote economic growth and conform with general international trade rules so as to finally join the WTO.

In general, some significant changes in the nature and extent of government trade interventions have occurred in China. Prior to the reform period, the allocation of imports and exports were strictly based on administrative planning and undertaken by only 12 foreign trade corporations. The process of trade policy reform has involved the introduction of some competition in international trading and the

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products include fresh fruits and vegetables. Consumer-ready products include canned fruits and vegetables, fresh and frozen meat, dairy products, and beverages.

gradual development of policy instruments for indirect controls. In 1984, the foreign trade system was decentralized considerably, when the provincial branches of national foreign trade corporations (FTCs) were allowed to become independent and each province was allowed to create its own FTCs. By 1986 there were about 1,200 FTCs, and by the early 1990's they numbered more than 3,000. Although firms must obtain approval to engage in international trade, this permission has been granted very liberally and there are now approximately 200,000 firms eligible to engage in foreign trade (Martin and Bach, 1998).

On the other hand, the foreign trade of so-called "strategic products" such as food grains, textile fibers, and chemical fertilizers, continue to be restricted to specialized national trading corporations with monopoly trading rights. China's agricultural trade policy, particularly with regard to grain, is characterized by import/export licenses and quotas. But even in the case of agricultural trade, some progress has been made since the 1980s. The overall purpose of this paper is to measure this progress, relative to trade in manufactures and other primary commodities.

Overview of China's Agricultural Trade

Prior to the 1978 reforms, almost all of China's foreign trade was subject to central planning through a small number of foreign trade corporations. For most sectors, the government has since replaced central planning over trade with import licenses and import and export tariffs. The opening of China's economy involved policies to promote exports and attract foreign direct investment. However, agricultural trade is a major exception to this move towards decentralization of foreign trade. This is somewhat ironic because agriculture was largely responsible for the initial success of China's overall economic reform.

In China, rapid economic growth has been accompanied by dramatic changes in the structure of the economy. Agriculture's share in the total economy has declined from about 40 percent of the GDP in 1970 to less than 20 percent in 1997. At the same time, agriculture's share in total employment declined from 81 percent to 49 percent.[5] The declining role of agriculture in the economy means the share of agricultural trade in China's total trade has decreased significantly. In 1980, agriculture's share of both exports and imports was around 30 percent, and this declined to about 10 percent in 1997. This is an indication of the improvement in resource allocation among sectors and the shifting of comparative advantage between agricultural and manufactured products.

In nominal terms, the value of China's agricultural exports grew at an average rate of 7.1 percent a year from 1980 to 1996. Agricultural imports grew at an average rate of 5.9 percent over the same time period. However, the real value of China's agricultural trade (exports plus imports) grew at only 2 percent per year, on average, from 1980 to 1996.

The overall composition of China's agricultural trade is presented in Tables 1 through 3. Tables 1 and 2 report exports and imports, respectively, over the five year 1992-96 time period. For the purposes of summarizing these extensive trade data, we have broken the agricultural trade figures in Tables 1 and 2 into four categories: grains, horticultural products, animal products, and other.

[5] There is considerable variation in estimates of the percent of the labor force engaged in agriculture in China. With a total population exceeding 1.2 billion, China's rural population accounts for roughly three-fourths of this number and about three-fourths of the employed population is rural. The Statistical Yearbook of China 1996 (State Statistical Bureau), reports that approximately 330 million workers remain in China's agriculture, which represents over 70% of the rural work force (450 million in total). However, according to the 1990 National Population Census (conducted on July 1, 1990 and published by the Population Census Office), the rural labor force and agricultural labor force is underreported in the SSB Statistical Yearbook. The Census data suggest there could be an additional 80 to 100 million employed in agriculture. This large discrepancy in the official labor statistics is not widely discussed, with the exception of Banister and Harbaugh (1992).

China's total agricultural exports were valued at $10.6 billion in 1996. Exports of grains were valued at $1.4 billion in 1996 (about 13 percent of the total) and edible oilseeds and oils accounted for most of these grain exports. Maize exports were near zero in 1995 and 1996 (due to the government blockade). Earlier, in 1992 and 1993, maize exports were much more important and maize alone accounted for 13 percent of total agricultural exports in each of those two years. Prior to the export blockade, grains accounted for over 27 percent of total agricultural exports.

In 1996, China's horticultural exports totaled $5.1 billion, up from $3.5 billion in 1992. As a share of total agricultural exports, horticultural products increased from 39 percent in 1992 to 48 percent in 1996. Fruit and vegetable products are by far the most important component of horticultural exports, followed by "other crops" and vegetables (see Table 1).

Exports of animal products also grew over this 1992 to 1996 time period, from $2.0 to $3.4 billion, and from 22 to 33 percent of total agricultural exports. Unlike, grains and horticultural products, no one commodity has dominated animal product exports. Processed poultry, processed swine, and raw wool were the most valuable exports in 1996 but in total these three commodities accounted for less than 15 percent of animal product exports.

Table 1. China's Agricultural Exports, 1992-96, in Millions $US

	1992	1993	1994	1995	1996
Total Exports	**9,189**	**9,158**	**11,001**	**9,902**	**10,609**
Grains	**2,491**	**2,485**	**3,095**	**1,343**	**1,402**
Rice	218	253	515	16	112
Wheat	0	8	10	2	0
Maize	1,187	1,154	944	13	30
Barley	0	0	0	0	0
Other Grains	80	58	63	45	45
Grain Products	47	66	80	90	223
Oil Seeds	465	434	665	521	476
Vegetable Oils and Fats	494	511	818	655	515
Horticultural Products	**3,572**	**3,703**	**4,618**	**5,300**	**5,137**
Vegetables	637	680	912	849	788
Nuts	132	169	175	172	171
Fruits	123	153	205	252	246
Fruit and Vegetable Products[a]	1,296	1,323	1,721	2,207	2,092
Plant Based Fibers	30	34	35	22	20
Tea	362	356	294	275	283
Tobacco Crops	141	135	94	147	111
Other Crops[b]	498	511	764	852	803
Other Food Products[c]	353	342	418	524	623
Animal Products	**2,060**	**1,934**	**2,534**	**2,708**	**3,484**
Live Bovine	74	72	70	69	48
Live Swine	290	272	270	279	294
Live Poultry	23	22	26	29	121
Processed Bovine	127	193	126	169	138
Processed Swine	182	198	277	406	328
Processed Poultry	6	8	13	35	774
Meat Products	86	70	93	110	144
Dairy Products	22	27	23	28	32
Seafood Products[d]	4	5	10	7	50
Raw Wool	307	292	456	273	323
Raw Silk	325	245	405	353	313
Other Animal Products	614	531	766	951	919
Other	**1,066**	**1,035**	**755**	**551**	**588**
Beverages	623	597	322	189	250
Sugar	226	214	271	313	324
Raw Cotton	217	224	161	49	14

[a] These include canned, processed and preserved fruits and vegetables
[b] These include bulbs, tubers, trees, flowers, coffee, spices, seeds, pharmaceutical plant products, gums, saps and other vegetable materials.
[c] These include starches, glucose, fructose, pastas, biscuits and animal feed.
[d] This category does not include total trade in aquatic products (see the appendix).
Source: compiled from China's Customs Statistics.

Table 2. China's Agricultural Imports, 1992-96, in Millions $US

	1992	1993	1994	1995	1996
Total Imports	**4,930**	**3,408**	**6,578**	**11,376**	**9,936**
Grains	**2,250**	**1,514**	**3,128**	**6,234**	**5,145**
Rice	39	35	141	434	286
Wheat	1,504	834	961	2,026	1,890
Maize	0	0	0	816	73
Barley	134	128	179	241	304
Other Grains	0	0	0	65	1
Grain Products	38	16	22	40	156
Oil Seeds	31	28	61	107	323
Vegetable Oils and Fats	503	472	1,763	2,505	2,111
	882	**733**	**821**	**1,067**	**1,433**
Horticultural Products					
Vegetables	38	23	14	74	69
Nuts	9	8	10	8	12
Fruits	14	22	40	67	185
Fruit and Vegetable Productsa	49	76	104	115	131
Plant Based Fibers	6	14	37	54	35
Tea	3	3	2	2	1
Tobacco Crops	87	51	28	75	61
Other Cropsb	174	168	152	180	200
Other Food Productsc	501	368	434	492	739
	1,067	**994**	**1,280**	**1,747**	**1,671**
Animal Products					
Live Bovine	1	2	0	0	0
Live Swine	0	0	0	2	2
Live Poultry	16	11	10	14	15
Processed Bovine	23	38	54	149	100
Processed Swine	8	5	9	13	8
Processed Poultry	0	0	0	1	140
Meat Products	5	5	5	10	6
Dairy Products	59	48	76	58	55
Seafood Products[d]	11	11	8	10	10
Raw Wool	793	716	825	1,018	880
Raw Silk	3	1	9	15	7
Other Animal Products	149	159	285	457	449
	731	**167**	**1,348**	**2,329**	**1,687**
Other					
Beverages	255	111	406	901	393
Sugar	28	36	31	9	30
Raw Cotton	447	20	910	1,419	1,264

[a] These include canned, processed and preserved fruits and vegetables
[b] These include bulbs, tubers, trees, flowers, coffee, spices, seeds, pharmaceutical plant products, gums, saps and other vegetable materials.
[c] These include starches, glucose, fructose, pastas, biscuits and animal feed.
[d] This category does not include total trade in aquatic products (see the appendix).
Source: compiled from China's Customs Statistics.

Turning to Table 2, we find that China's agricultural imports grew from $4.9 billion in 1992 to $9.9 billion in 1996. Grains typically make up over one-half the value of imports, with wheat and vegetable oils and fats the major imports. In 1992, wheat plus vegetable oils and fats made up over 40 percent of total agricultural exports, with wheat at 30 percent and vegetable oils/fats at 10 percent. In 1996, these two commodity groups still had a 40 percent share of imports, but wheat's share fell to 19 percent and vegetable oils/fats increased to 21 percent.

From 1992 to 1996, the value of horticultural imports increased from $0.8 to $1.4 billion, but horticultural's share in total agricultural imports fell from 18 percent to 14 percent over this period. Fruits tend to be the most important horticultural import, but imports are diversified across this product grouping. The share of animal products in total imports also fell over this period from 22 percent to 17 percent (valued at $1.7 billion in 1996). Raw wool is by far the most important item in this group, accounting for over one-half of animal product imports.

The data in Table 2 are the official imports and for some commodities they significantly under-report the value of trade due to smuggling from Hong Kong. This is especially true for horticultural and animal products and this issue is discussed below.

We can utilize Table 3 to comment on Wang's (1997b) finding that China's pattern of agricultural trade is consistent with its resource endowment, importing land intensive bulk commodities and exporting labor intensive horticultural and consumer ready products. For this purpose, we have aggregated China's agricultural trade into the same categories defined by Wang (1997b): bulk commodities, consumer ready products, horticultural and other food products, and processed intermediary products. The make-up of these four categories is explained in the notes to Table 3.

Our database for Table 3 covers the 1992 to 1996 time period, whereas Wang's analysis was based on 1995 and 1996 data alone. Because of the export blockade, we believe the 1992 to 1994 time period (before the blockade) gives a clearer picture of the economic forces within China that are influencing trade patterns, but of course it is still a very short time period. With the information revealed by these additional years, the conclusions by Wang (1997) are found to be questionable.

Consider the top panel of Table 3. This panel shows that from 1992 to 1994, bulk commodities were indeed an important component of exports, accounting for anywhere from 25% to 29% of China's exports. As expected, there was a sharp decline in the share of bulk commodity exports in 1995 during the blockade. In 1995 and 1996, China became a net exporter of rice and maize, shifting away from a net exporter position in the 1992-1994 time period. From 1992 to 1996 there was little change in the percentage of exports explained by two of the categories; horticultural and other food products, and processed intermediary products.

The pattern of imports over the 1992 to 1996 time period is shown in the bottom panel of Table 3. The most striking result associated with these data is the lack of any trend, measured by the relative import percentages shown in the bottom one-half of the panel. Either bulk commodities or processed intermediary products account for around 90% of China's official imports of agricultural products. The bulk imports are heavily concentrated in grains, vegetable oils, and cotton. In 1996, these commodities accounted for over 50% of the value of imports. In recent years, China has been the world's largest importer of cotton, with annual imports average about 800,000 mt. However, in 1998/99 China will revert to becoming a net cotton exporter. China also has excessive stockpiles of grain and cotton. For instance, for 1998/99, China's cotton stockpile is estimated to be 3.3 mmt, or 40 percent of the world's stocks.

Table 3. China's Agricultural Exports by Category in Millions $US

Agricultural Exports	1992	1993	1994	1995	1996
Bulk Commodities[a]	2,698	2,644	2,763	1,034	1,081
Consumer Ready Products[b]	2,193	2,281	2,844	3,718	4,279
Horticultural and Other Food Products[c]	1,069	1,180	1,559	1,578	1,526
Processed Intermediary Products[d]	3,229	3,053	3,835	3,573	3,723
Total	9,189	9,158	11,001	9,902	10,609
Other Agricultural and Resource Products (OARP)[e]	5,613	5,891	7,881	9,526	8,581
Total including OARP	14,802	15,049	18,883	19,428	19,191
Exports as a Percentage of Total					
Bulk Commodities[a]	29%	29%	25%	10%	10%
Consumer Ready Products[b]	24%	25%	26%	38%	40%
Horticultural and Other Food Products[c]	12%	13%	14%	16%	14%
Processed Intermediary Products[d]	35%	33%	35%	36%	35%
Agricultural Imports					
Bulk Commodities[a]	2,504	1,206	2,686	5,989	4,610
Consumer Ready Products[b]	208	251	324	260	443
Horticultural and Other Food Products[c]	118	106	133	296	350
Processed Intermediary Products[d]	2,100	1,845	3,435	4,831	4,534
Total	4,930	3,408	6,578	11,376	9,936
Other Agricultural and Resource Products (OARP)[e]	4,088	4,179	4,888	5,570	6,343
Total including OARP	9,018	7,587	11,465	16,946	16,280
Imports as a Percentage of Total					
Bulk Commodities[a]	51%	35%	41%	53%	46%
Consumer Ready Products[b]	4%	7%	5%	2%	4%
Horticultural and Other Food Products[c]	2%	3%	2%	3%	4%
Processed Intermediary Products[d]	43%	54%	52%	42%	46%

[a]Grains, seeds, raw tobacco and raw sugar; [b] Processed meat, dairy products, processed vegetables and fruits; [c] Trees, flowers, fresh fruits and vegetables; [d] Live animals, flours and meals, gums, saps, oils, hides and skins, raw wool; [e] Seafood, beverages, leather, forest products, wool yarn and fabrics, cotton yarn and fabrics. Source: compiled from China's Customs Statistics.

It is somewhat puzzling that the share of land-intensive agricultural exports such as grain and cotton has not declined, because China does not have a comparative advantage in land-intensive commodities. One possible explanation to this puzzle could lie with the domestic "two-tier" pricing system. The "two-tier" price system may cause trade patterns to diverge from what might be expected from domestic resource endowments and this possibility has not been adequately examined in the literature. The potential trade distortions caused by the domestic pricing policy also has important implications for future trade policy reform.

More than 95% of China's marketed cotton and 50% of the marketed grain[6] is procured by the government. Under the "two-tier" pricing system, COFCO in the case of grain, and China's National Textiles Import and Export Corporation (CHINATEX) in the case of cotton, could earn profits from exporting even when the domestic free market price is lower than the world price. COFCO and CHINATEX will have an incentive of export grain and cotton whenever the world price PW > PP (procurement price) + marketing costs + taxes. This is the case even if the domestic free market price PF > PW (world price). This was true in 1993-94 when the domestic free market prices rose significantly as the slowdown in domestic production created excess domestic demand, and at the same time, China's grain exports reached historical records. In 1993-94, domestic grain prices increased dramatically and the State Grain Bureau could have sold grain into the domestic market to stabilize prices, but instead they increased exports and reduced imports. Partly to override these perverse incentives, the central government eventually imposed a grain export embargo in 1995. More recently,

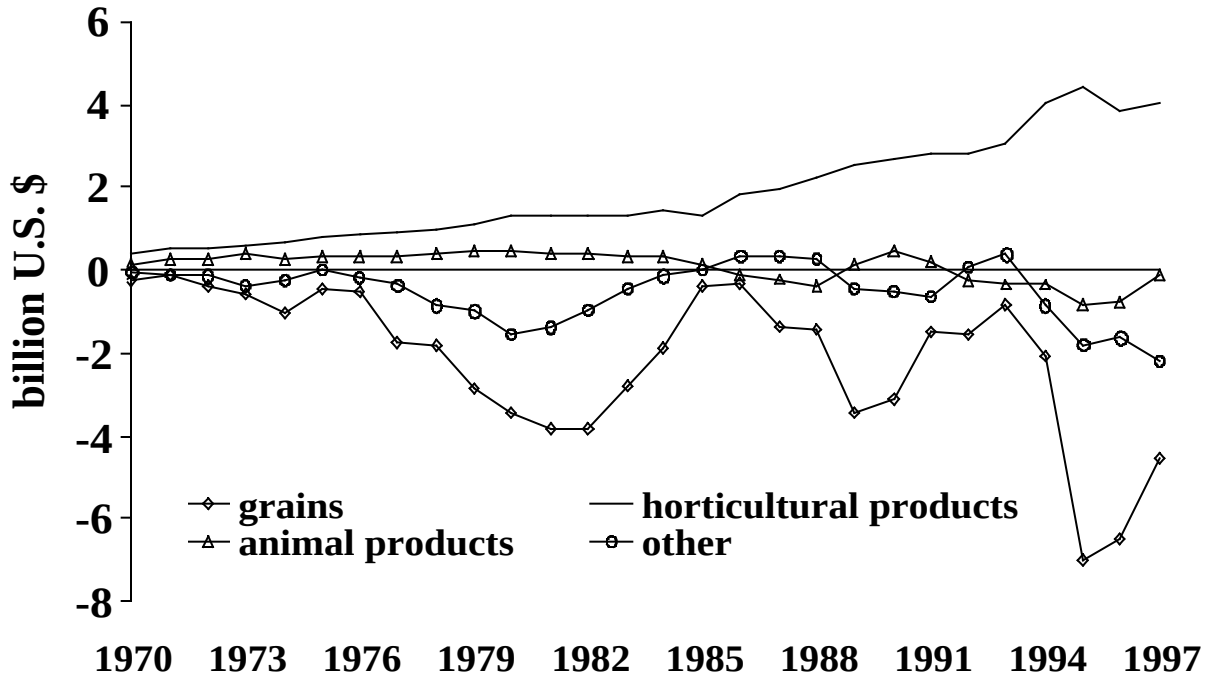
[6] As of 1998, China's government announced a new grain policy that will reduce the role of the free market in grain purchases. Under the recently announced policy, there will be unlimited purchasing of grain by state agencies from farmers at "contracted purchasing" prices and "protected" prices. The "protected" prices will be lower than the "contracted" prices and the "protected" prices will be applicable to above-quota deliveries. Under the new policy, the free market is not allowed to buy grain from farmers.

COFCO has exported corn to world markets, even though world prices were below domestic free market prices.[7]

Figure 1 displays China's net agricultural exports for four aggregate groups: grains, animal products, horticultural products and "other." Although there are erratic swings in the value of exports, China continues to be a net exporter of grains (mainly rice and coarse grains). The data in Figure 1 show exports of horticultural products have grown, and these are products where China probably does have a comparative advantage. However, China's official trade data do not account for smuggling. If net exports of horticultural products (in Figure 1) were adjusted for imports smuggled into China, the rise in horticultural exports on the part of China would not be so strong.

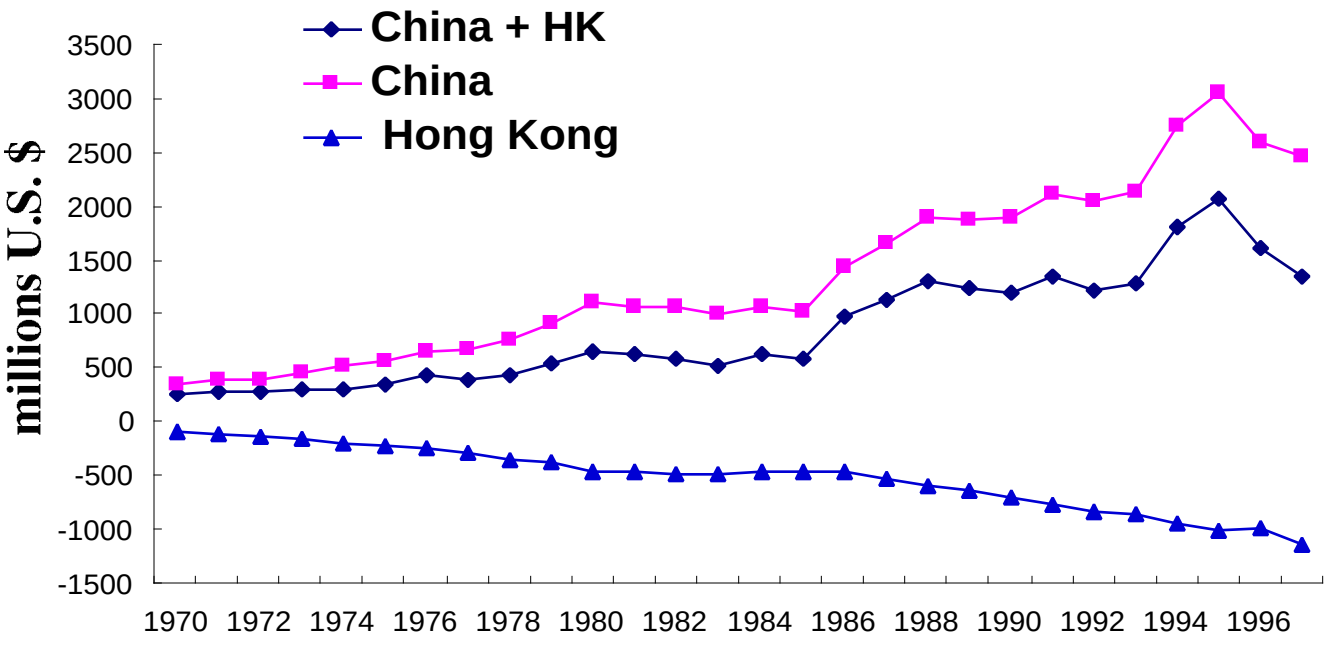
[7] The USTR (1999) reports that most of China's 4 million metric tons of 1998 corn exports were sold at prices $US 25 to $US 40 per metric ton below domestic wholesale corn prices.

Figure 1. China's Net Agricultural Exports: 1970-1997



Source: compiled from FAO trade data

Figure 2. China and Hong Kong: Net Exports of Fruits and Vegetables: 1970-1997



To help illustrate this point with regard to smuggling, Figure 2 shows net exports of fruits and vegetables from China, Hong Kong, and the two combined. We see from Figure 2 that both Hong Kong's imports and China's exports of fruits and vegetables have risen significantly in the past ten years. However, China's exports did drop off in 1996 and 1997. If we combine the two, we find that the 1997 value of net exports into the region was not much different from that of the late 1980s.

China tends to directly import bulk agricultural commodities, whereas a large share of the processed food and consumer ready products are first imported into Hong Kong and then re-exported to mainland China. For example, almost all of the U.S. meat, fruit, and vegetable exports to China are routed through Hong Kong. Despite a relatively small population of only 6 million, Hong Kong imported over $14.2 billion in agricultural products in 1996 (U.S. Department of Agriculture, ERS, 1997) more than official imports into mainland China. Hong Kong ranks as one of the top Asian markets for farm products, and it is the second largest Asian market for U.S. horticultural products. As an additional measure of its importance, Hong Kong imports 20 percent of U.S. fruit and vegetable exports and it has been a growing market. However, these imports are not all for domestic consumption purposes and, in fact, Hong Kong officially re-exports about 55 percent of its agricultural imports.

There is a large two way trade in agricultural products between Hong Kong and China. Hong Kong's imports from China include poultry, fruits, vegetables, rice, and nuts. At the same time, Hong Kong exports substantial amounts of poultry, fruits, vegetables, nuts, oilseeds, and cotton to China. In addition to the legal shipments from Hong Kong to China, there is a large illegal trade (FAS, 1996; USTR, 1998; Wong, 1998). Undocumented shipments of fresh fruit may account for up to 70 percent of Hong Kong's imports (Wong, 1998). For example, the value of chicken parts smuggled into China

alone could amount to over $300 million per year (USTR, 1998). It is difficult to estimate the total dollar value of undocumented agricultural exports from Hong Kong to China, but it could exceed $1 billion per year.

Changing Trade Patterns

To more fully examine the question of whether or not China's agricultural exports increasingly reflect its changing comparative advantage, we study the persistence of trade patterns in this section, following the methodology of Gagnon and Rose (1995) and Carolan, Singh, and Talati (1998). This involves an examination the persistence of trade balances for three groups: agricultural products, "other" primary products, and manufacturing. It is the relative trade performance of agriculture compared to other primary products and manufacturing that is the interesting question. Our trade data were obtained from Statistics Canada (the World Trade Analyzer) and the original source was the United Nations. The raw data were the nominal U.S. dollar values of China's exports and imports annually from 1980 to 1996, disaggregated at the 3-digit level.

Using 3-digit SITC classifications, we first divided the data into 67 agricultural subgroups, 56 subgroups of "other" (i.e., nonagricultural) primary commodities, and 175 manufacturing subgroups. Examples of goods at this level of disaggregation for agriculture are 'unmilled wheat' (SITC #041), 'fresh, chilled and frozen vegetables' (SITC #054), 'manufactured tobacco' (SITC #122), and 'unmanufactured tobacco' (SITC #121). For other primary commodities, examples include 'crude fertilizer' (SITC #271), 'coal, lignite and peat' (SITC #322), 'tanned furskins' (SITC #613). For manufactures, examples include 'telecommunications equipment, parts, and accessories' (SITC #764),

'toys, games, and sporting goods, etc (SITC #894), and 'passenger motor vehicles excluding buses' (SITC # 781).

Following Gagnon and Rose (1995), the trade balance figures were then normalized in order to remove any trend in the data due to systematic factors such as inflation. The normalized trade balance for commodity group i at time t is defined as:

$$NB_{it}^{j} \quad \left(\frac{X_{it}^{j}}{\sum_{i} X_{it}^{j}} - \frac{M_{it}^{j}}{\sum_{i} M_{it}^{j}} \right) \leftrightarrow 100$$

where for each j (agriculture, other primary products, and manufacturing), X_{it} is the value of exports of subgroup i at time t, M_{it} is the value of imports. The sum of NB_{it} is zero for any given year, for each j, j = 1, 2, or 3. After the data were normalized, the NB subgroups were then classified into three categories for each year; namely, trade surplus, trade balance, or trade deficit. Subgroups in trade *surplus* were defined as those goods whose NB was greater than one standard deviation above zero. Those subgroups with an NB within one standard deviation of zero were classified as being in *balance.* Finally, those subgroups with a value of NB more than one standard deviation below zero were classified as being in a trade *deficit.* As part of this classification procedure, the standard deviation was computed for each commodity's NB series.

After normalizing and categorizing[8] each NB subgroup, we constructed the two-way trade tables, labeled as Tables 7, 8 and 9. These tables provide a breakdown of China's trade values by the initial and final trade balance. For the initial period we chose a three year period centered on 1981 and for the final period the three year mean is centered on 1995. The results in Table 4 suggest that for

[8] For categorization purposes, we estimated two standard deviations for each NB, one for the first half of the data set (1980- 1988) and one for the second half of the data set (1989-1996).

agriculture, the subgroups that were in surplus in 1980-82 accounted for 52.74% of the value of normalized agricultural trade in 1994-96. Of these goods in surplus, subgroups accounting for 7.02% of the end-of-period trade moved to a balance, and sub-groups accounting for 1.32% of the end-of-period trade moved to a deficit. 21.66% of the trade volume moved from balance or surplus to deficit. If we add up the percentage of trade that is persistent, the diagonal elements in Table 4, we find for agriculture that this sum is 71%.

For "other" primary products, the subgroups that were in surplus in 1980-82 accounted for 40.34% of the value of normalized agricultural trade in 1994-96. Of these goods, 15.74% of (1994-96) trade moved to balance by 1994-96 and 10.34% moved to a deficit. Adding up the diagonal elements in Table 5, we find that 44.4% of the trade in manufacturing was persistent, from 1980 to 1996. These results suggest less persistence in "other" primary products trade compared to agricultural trade.

Turning to manufacturing, in Table 6, the subgroups that were in surplus in 1980-82 accounted for 31.82% of the value of normalized agricultural trade in 1994-96. Of these goods, 4.93% of (1994-96) trade moved to balance by 1994-96 and 0.81% moved to deficit. Adding up the diagonal elements in Table 6, we find that 65.5% of the trade in manufacturing was persistent, from 1980 to 1996. These results suggest almost as much persistence in manufacturing trade compared to agricultural trade.

As a statistical measure of trade persistence, we can use a transformation of the standard chi-squared (χ) test, Cramer's C-statistic, suggested by Carolan et. al.. The C-statistic lies between zero and one, with one representing complete association between the beginning and the ending trade balance. From Tables 7, 8 and 9 we find the C-statistic is 0.66 for agriculture, 0.39 for other primary products, and 0.54 for manufactures. These results suggest there was the least change in the trade balances over the 1980-1996 time period for agriculture, because the C-statistic is relatively high. For

manufacturing and other primary products the results suggest there was relatively more change in the trade balances over the time period studied, because the C-statistics are lower.[9]

Table 4. Breakdown of China's 1994-1996 Agricultural Trade

	1994-96 Surplus	1994-96 Balance	1994-96 Deficit	1994-96 Total
1980-82 Surplus	44.40	7.02	1.32	52.74
1980-82 Balance	0.32	13.19	20.34	33.86
1980-82 Deficit	0.00	0.00	13.41	13.41
1980-82 Total	44.72	20.22	35.06	100.00
χ^2	86.82			
C-statistic	0.66			
Number of goods	67			

Source: estimated from UN trade data.

[9] Carolan, Singh, and Talati examined U.S. trade with eight Asian countries (Hong Kong, Japan, Malaysia, Taiwan, Indonesia, S. Korea, Singapore, and Thailand). Their estimated C-statistics exceeded 0.5 in only two cases, Hong Kong and Indonesia. They suggested that if the C-statistic was less than 0.5, this indicates considerable change in trade patterns.

Table 5. Breakdown of China's 1994-1996 Other Primary Products Trade

	1994-96 Surplus	1994-96 Balance	1994-96 Deficit	1994-96 Total
1980-82 Surplus	14.26	15.74	10.34	40.34
1980-82 Balance	14.54	3.42	7.95	25.91
1980-82 Deficit	4.43	2.60	26.71	33.74
1980-82 Total	33.23	21.76	45.01	100.00
χ^2	30.98			
C-statistic	0.39			
Number of goods	56			

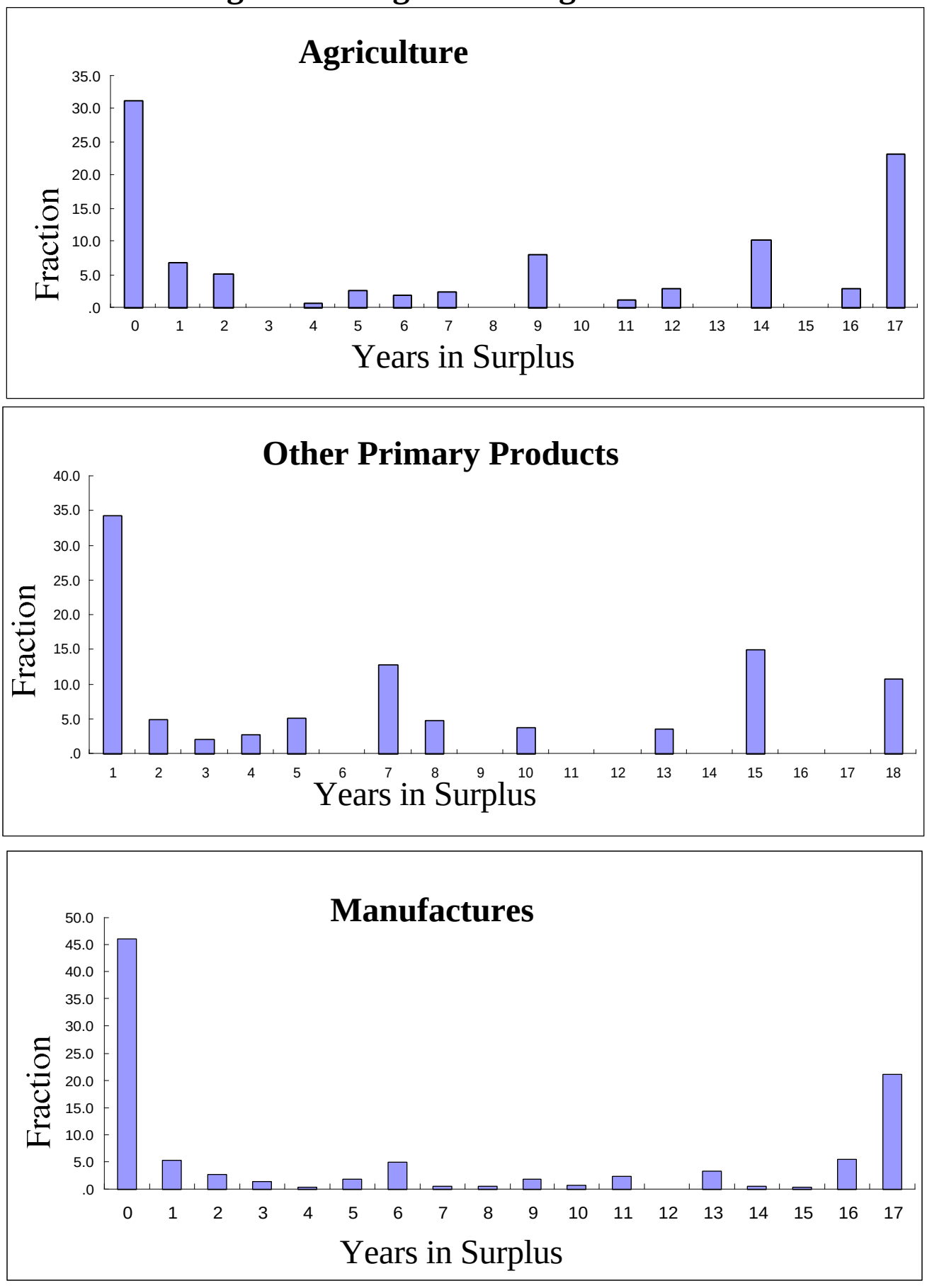
Source: estimated from UN trade data.

Table 6. Breakdown of China's 1994-1996 Manufacturing Trade

	1994-96 Surplus	1994-96 Balance	1994-96 Deficit	1994-96 Total
1980-82 Surplus	26.07	4.93	0.81	31.82
1980-82 Balance	9.10	5.43	10.71	25.25
1980-82 Deficit	0.15	8.76	34.03	42.93
1980-82 Total	35.32	19.13	45.55	100.00
χ^2	58.46			
C-statistic	0.54			
Number of goods	155			

Source: estimated from UN trade data.

Figure 3. Weighted Histograms



Source: Compiled from UN trade data

Rather than just comparing the beginning and ending time periods, we can construct histograms for agriculture and manufacturing, based on the number of years each subgroup runs a surplus (see Gagnon and Rose). Figure 3 shows histograms for agriculture, "other" primary products, and manufactures. Figure 3 classifies subgroups indicating how many years the subgroup was in surplus. This means, that a subgroup that was in surplus for each of the 18 years would be in the cell at the extreme right of the histogram. The histogram for agriculture displays the strongest evidence of bi-modality, which indicates persistence in trade flows. These histograms are therefore consistent with the C-statistic results, suggesting more persistence in the composition of agricultural trade, compared to the other two groups.

Finally, the results of an additional test for association are reported in Table 6. We regressed $NB_{1994\text{-}96}$ on $NB_{1980\text{-}82}$. The regression coefficients for all three groups are all statistically significant, but the coefficient for other primary products is smaller than for agriculture or manufacturing. Similarly, the R^2 is relatively small for other primary products (0.13) compared to either manufacturing (0.28) or agriculture (0.49). These results support the conclusion that the trade patterns appear to change the most for "other" primary products, and the least for agriculture.

Table 7. Regression Results: $NB_{1994\text{-}96}$ on $NB_{1980\text{-}82}$

	Agriculture	**Other Primary Products**	**Manufacturing**
Intercept	0	0	0
(t Stat)	(0)	(0)	(0)
X Coefficient	0.32	0.16	0.35
(t Stat)	(7.85)	(2.96)	(7.68)
R^2	0.49	0.14	0.28
Observations	67	56	155

Source: estimated from UN trade data.

Summary and Conclusions

The major finding of this paper is that China's agricultural trade structure has not changed dramatically since 1980. China's agricultural trade may loosely correspond to the basic principles of comparative advantage, but that in itself is not such a big achievement. Even under central planning, the obviousness of comparative advantage was such that in general terms, China's agricultural trade corresponded to basic principles of comparative advantage. What is more striking is the modest and limited way that agricultural trade has expanded along comparative advantage lines, despite an increase in foreign trade overall, and the implicit evidence this provides of foregone opportunities for benefit from agricultural trade. There is little evidence of increased reliance on comparative advantage in China's agriculture.

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