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## **Agricultural Trade and Rural Poverty in Post-reform China**

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**Abstract:** In this paper, by employing Chinese provincial data, we develop a simultaneous equation model to estimate the relationship between agricultural trade and rural poverty in post-reform China. We find that trade liberalization can affect China's poverty both directly through providing the poor with effective access to factor and product markets, and indirectly through its 'growth effects' and 'distributional effects'. However, although China's impressive economic growth and trade expansion have led to remarkable reduction in rural poverty over the last two decades, this process was negatively affected and severely slowed down by recent deterioration in income distribution.

JEL Classification: F10; I32; O53

Keywords: Trade; Poverty Reduction; Chinese Economy

## 1. Introduction

Since the implementation of the Open Door policy in the late 1970s, China has experienced increasingly intensive integration into the world economy. Increased trade openness has significantly accelerated China's economic growth over the last two decades. According to official statistics, China's real GDP per capita grew at an average annual rate of 7.7% during the period of 1978-2002. China's impressive economic growth was accompanied by remarkable achievements in the reduction of poverty, especially rural poverty. Based on China's official poverty line, the rural poor population dropped from 250 million in 1978 to 28 million in 2002, and the incidence of rural poverty, measured by the proportion of the poor in rural population, declined dramatically from 30.7% in 1978 to 3% in 2002. Similar trend can also be found using various poverty lines or different estimated methods (e.g., World Bank, 1992, 2000; Park and Wang, 2001). However, what is the role played by foreign trade in China's war against poverty? This critical issue has attracted considerable attention and been at the center of many studies (e.g., Ravallion and Chen, 2004; Huang et al., 2005).

Meanwhile, China is a vast country with diverse regional development levels and contrasting economic structures. Both the development paths and the impacts of trade on poverty may vary greatly across regions. Therefore, provincial-level analyses on this variation allow us to better understand the links between trade and poverty, and help to obtain deeper insights into this critical nexus.

In this study, using Chinese provincial data and applying the simultaneous equation estimation, we attempt to empirically investigate the trade-poverty nexus in China. Due to the limitation of Chinese statistics, we focus primarily on China's rural poverty. More recently, the problems of urban poverty have also attracted much concern. However, compared to rural poverty, China's urban poor have been relatively few in number; the size and severity of urban poverty remain on a much lesser scale than that in the rural areas, and thus poverty in China is still mainly a rural phenomenon (Fan et al., 2004).

The rest of this paper is organized as follows. The next section provides a brief theoretical review on the trade-poverty linkages. Section 3 highlights recent trend of agricultural trade and rural poverty in China. Econometric model and estimated method are described in Section 4. Empirical analyses are presented in Section 5. Our empirical results show that the development of agricultural trade can affect China's rural poverty through multifaceted channels. Finally, the paper concludes with Section 6.

## **2. The Trade-Poverty Linkage: a Brief Literature Review**

The last several years have witnessed a growing interest amongst both academics and policy makers in exploring the relationship between trade and poverty (e.g. World Bank, 2002; Dollar and Kraay, 2004; Ravallion, 2004).<sup>1</sup> Trade can affect poverty through multifaceted channels. First, as an important aspect of 'globalization', trade

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<sup>1</sup>: The literature on the relationship between trade and poverty is rich and extensive. Because excellent literature review on the trade-poverty nexus have existed (e.g. Hertel and Reimer, 2004; Nissanke and Thorbecke, 2005; Winter et al., 2004), we are not going to broadly repeat these survey works in the present study.

openness directly influences the process of poverty alleviation through providing the poor with effective access to the factor and product markets, and may have greater potentials in creating more opportunities for the poor to increase their income level, to improve their living standard, and to escape poverty. Second, trade can also indirectly affect poverty through two important channels (i.e., the ‘growth channel’ via its impacts on economic growth, and the ‘distributional channel’ via its impacts on income distribution).

However, cross-country empirical studies suggest that the effects of trade on poverty can vary significantly among countries, and that its impacts depend crucially on national policies (World Bank, 2003). Therefore, a deeper insight into this critical nexus requires detailed empirical research in a country- and region-specific context (Nissanke and Thorbecke, 2005).

As for the case of China, there is evidence that China’s trade reform and rapid integration into the world economy have greatly contributed to poverty reduction (e.g., World Bank, 2002; Dollar, 2004). However, this view is challenged by several recent studies. For instance, using China’s aggregate data, Ravallion and Chen (2004) find a rather fragile correlation between trade and poverty. This may be due to the fact that so many factors are at work for poverty alleviation, and all these factors (including trade) are likely to interact with each other and simultaneously come into play when they affect poverty. As such, it is very difficult to isolate the effect of trade on poverty and to accurately assess this impact. Moreover, with limited aggregate data, Ravallion and Chen (2004) are not able to take into account the variations among Chinese provinces.

Therefore, more disaggregated data and further investigation are needed to draw more convincing conclusion.

With the help of more recent and systemic data at Chinese provincial level, this paper attempts to add to the literature by empirically investigating the relationship between trade and poverty in post-reform China, and thus contributes to the ongoing debate on the trade-poverty linkage.

### **3. China's Agricultural Trade and Rural Poverty**

#### **3.1 China's Open Policy and Development of Agricultural Trade**

##### **3.1.1 Open Policy and Trade Liberalization in Post-reform China**

The implementation of the Open Door policy in China since the late 1970s and the choice of development strategy in accordance with its comparative advantages have accelerated China's integration into the global economy. Local experimentation of the Open Door policy was first pursued in Guangdong and Fujian provinces with the establishment of four Special Economic Zones (i.e., Shenzhen, Zhuhai and Shantou in Guangdong province, and Xiameng in Fujian province), being followed by opening-up process along the coast (i.e., the successive establishment of 14 coastal open cities, a number of coastal open development zone, an open coastal belt, Hainan Special Economic Zones and Pudong new area in Shanghai) and then to inland regions.

The priority to the development of coastal regions has been clearly and definitely stipulated in the government's sixth five-year plan (1981-1985) and the seventh five-year plan (1986-1990), because the coastal regions are not only closer to

international market and hence more advantageously located in geographical term to engage in international trade, but also more advanced in the level of human capital and social development, as such they are more able to benefit from favorable circumstance to improve their productive efficiency, exploit their comparative advantage, expand their production and attain sustainable growth. Therefore, increasing state investments were thrown into coastal regions. Meanwhile, preferential policies were formulated and given to coastal provinces for the purpose of promoting international trade, attracting foreign direct investment, and accelerating economic development in these regions.

In consistent with regions' comparative advantages, new pattern of regional specialization emerged in China: coastal regions highly specialized in the production of industries with high value added and up-graded technologies; inland regions, originally less industrialized, were to concentrate on energy production, raw material and transformation industries, and energy consuming industries. Hence, one notable objective of China's regional development strategy in the reform era was to exploit region's comparative advantage in the globalization of production and to speed up regional development.

China's increased integration into the global economy has led to rapid trade growth. From 1978 to 2002, China's total export and total import grew at an average annual rate of 15.7% and 14.7% respectively (Figure 1); China's share in total world export and that in total world import also amounted to 4.3% and 3.8% respectively in 2002, making China the fifth largest international exporter and the sixth largest

importer in the world. Remarkable trade expansion and increased economic openness have significantly contributed to China's economic growth.

### **3.1.2 Recent Trend of Agricultural Trade in China**

The last two decades have witnessed rapid development in China's agricultural trade. The total export value of agricultural products amounted to 18 billions US dollar in 2002, up from 4.5 billions US dollar in 1981; the total import value of agricultural products also rose from 6 billions US dollar in 1981 to 12.4 billions US dollar in 2002. Figure 2 presents the dynamic pattern of China's agricultural trade over the period of 1992-2002. We find that along with a steady increase in agricultural trade, China has preserved a trade surplus for agricultural products in all these years.

Meanwhile, in the same period, China has experienced high-speed economic growth, remarkable trade expansion, and great industrial structure upgrade, therefore there is also evidence that the proportion of agricultural trade in China's total trade tended to decline steadily from 1992 to 2002 (Figure 3).

Table 1 presents the export value of agricultural products by category of commodities for China from 1997 to 2002. In consistent with China's comparative advantage in agriculture, we find that China's agricultural export mainly concentrates in the labor-intensive agricultural products. Meanwhile, the import value of agricultural products by category of commodities for China during the same period is reported in Table 2.

## **3.2 Rural Poverty in China**



After more than two decades of market-oriented reforms, the rapid developments of China, especially its considerable achievements in stimulating economic growth and reducing poverty, have been widely highlighted in the literature. According to China's official statistics, more than 220 million people have been lifted out of absolute poverty in rural China over the period from 1978 to 2002.<sup>2</sup> However, it is often criticized in previous studies that China's official statistics tend to underestimate the extent of rural poverty and to overstate the speed of poverty reduction over time, because China's national poverty line is set at a much lower level than that of the international standard (e.g., World Bank, 2000; Park and Wang, 2001).

Based on various estimated standards and poverty line, rural poverty estimates for China since the beginning of the 1990s are reported in Table 3. According to China's official poverty line, China's rural poor population declined from 85 million in 1990 to 28 million in 2002. In contrast, using the World Bank's international standard poverty line of income measure set at one dollar per day (in purchasing power parity), the number of China's rural poor decreased dramatically from 261 million in 1990 to 88 million in 2002; when it was estimated with the poverty line of consumption measure set at one dollar per day, the rural poor population in China fell substantially from 358 million in 1990 to 161 million in 2002.

The issues concerning the virtual magnitude of China's absolute poor population and poverty incidence are still open to debate. However, there is no doubt that China's rural poverty has sharply decreased over the last twenty years. Figure 4 presents the

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<sup>2</sup>: The official poverty lines in China currently adopted by the National Bureau of Statistics (NBS) are based on a minimum nutritional standard at a daily calories intake of 2100 per person and a standard food bundle recommended by the Chinese Nutrition Association.

geographic distribution of rural poor in Chinese regions over the period of 1990-2002. We find that the rural poor further concentrated in western regions since 1990. The ratio of western rural poor population to the total number of China's rural poor rose from 38.6% in 1990 to 51.8% in 2002, while this ratio declined from 51.7% to 35.4% for the central regions, and from 15.9% to 11.7% for the coastal regions during the same period. Meanwhile, the incidence of rural poverty based on the official estimates was also much higher in the western regions than that in the other two regions for all these years (Figure 5).

The patterns of China's rural poverty reduction are greatly affected by Chinese policies. In 1986, the Chinese government worked out its seventh five-year plan (1986–1990), in which stimulating the economic development of poor areas and helping the poor to get rid of poverty were formally placed on the agenda. This also marked the beginning of the implementation of the Targeted Poverty Reduction Programs in rural China. Soon after that, the Leading Group for Economic Development of Poor Areas was established, under the leadership of State Council. For better targeting, 258 poor counties were first selected in 1986 as the “national designated poor counties”, which would receive special funds of poverty alleviation from the central government to finance three main targeted poverty investment programs, i.e., the subsidized loan program, the public works program of food for work, and the budgetary grant program.<sup>3</sup> The total amount of Government's poverty alleviation funds in 1986 was RMB 4.2 Billions, and then it steadily increased in the

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<sup>3</sup>: The number of national designated poor counties increased to 328 in 1988. After the establishment of Hainan province, three poor counties were added to this list. In 1994, according to the new adjustment and more updated poverty estimations, 592 poor counties were designated as the national poor counties.

following years (Table 4). In addition, the Chinese government also put forward a series of important measures to strengthen the effects of poverty alleviation.

In 1994, the Chinese government launched an ambitious poverty reduction program, i.e., the National Eight-Seven Poverty Reduction Plan. It was a program designed to lift the remaining 80 million rural poor out of absolute poverty by the end of this century, and it was also the first action program for China's poverty reduction with clear and definite objectives, targets, measures and a time limit (Information Office of the State Council, 2001).

More recently, the Chinese government launched the 2001-2010 Rural Poverty Reduction Plan, i.e., a new program emphasizing multidimensional development objectives and multiple poverty reduction approaches, in which the poor villages, rather than the poor counties, became the basic targeting unit, so as to improve the effectiveness of targeting and anti-poverty. This also marked the entry into the new stage of China's poverty reduction activities.

Estimated with China's official poverty line, the number of rural poor dropped to 28 million by the end of 2002, and the implementation of the new century poverty alleviation plan is anticipated to further accelerate the pace of poverty reduction in China. However, recent deteriorating income distribution in rural areas seems to have severely and negatively affected China's anti-poverty activities. The rural Gini coefficient rose sharply from 0.212 in 1978 to a much higher level of 0.365 in 2002, an increase by more than 70% during this period. Rising rural inequality has posed serious challenge to China's future works in poverty reduction. Therefore, greater

efforts are required to lower China's rural inequality, so as to create a better environment for rural development, and to improve the effectiveness of China's poverty alleviation programs in the new Century.

#### 4. Model and Methodology of Estimation

In this study, we attempt to empirically explore the impact of agricultural trade on rural poverty in China. Theoretical studies have shown that trade can affect poverty through multifaceted channels, and there is also evidence that these channels may often interact dynamically over space and time. Therefore, the trade-poverty linkage is complex and heterogeneous, and the usual single-equation approach may have difficulties in capturing these various impacts of trade on poverty. Meanwhile, many operative factors and poverty determinants are in fact generated from the same economic process. Ignoring this characteristic is likely to yield biased results and to draw misleading conclusions.

In order to better describe the dynamic interacting process between various poverty determinants, and to better estimate the effects of agricultural trade on rural poverty, this study develops a simultaneous equation model to investigate the trade-poverty relationship in post-reform China. The formal structure of the simultaneous system can be described as follows:

$$\begin{cases} POV = f(RINCOME, TOPEN, GINI, TVED, ILLITE) & [1] \\ RINCOME = f(RCAP, TOPEN, TVED, EDU) & [2] \\ GINI = f(RINCOME, RINCOME^2, TOPEN, TOPEN^2, ILLITE) & [3] \end{cases}$$

where  $POV$  is the rural poverty incidence;  $RINCOME$  is the logarithm of real per capita rural net income, and  $RINCOME^2$  is its squared term;  $TOPEN$  denotes the

indicator of agricultural trade openness, and  $TOPEN^2$  is its squared term;  $RCAP$  is the logarithm of real per capita productive capital in rural areas;  $EDU$  is the variable of rural education level;  $TVED$  is the variable of development level of the township and village enterprises;  $ILLITE$  is the rural illiteracy rate; and  $GINI$  is the rural Gini coefficient.<sup>4</sup> The definitions of variables are presented in Table 5. In this simultaneous system, equation [1] models the determinants of rural poverty, while equation [2] and equation [3] model respectively the determinants of rural income and that of rural inequality.

Our empirical work is based on a panel data set covering 21 Chinese provinces over the period of 1997-2002.<sup>5</sup> Data used in our empirical test are from *China Statistical Yearbook* (various issues), *China Rural Statistical Yearbook* (various issues), *China Population Statistical Yearbook* (various issues), individual provincial statistical yearbooks, China's Customs General Administration, Ministry of Agriculture, and National Bureau of Statistics.

## 5. Empirical Results

Based on the methodology of system equation estimation, empirical results are reported in Table 6. Estimated results of the poverty equation (i.e., Equation [1]) show

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<sup>4</sup>: China's National Bureau of Statistics (NBS) has conducted well-established annually national household surveys covering both rural and urban areas for Chinese regions in the post-reform period. These data are ideal for the analysis on China's evolving pattern of income distribution. However, we do not have comprehensive access to these official household survey data. Fortunately, based on these rural household surveys, summary statistics for various income intervals of rural households are still available at provincial level, and we use these summary statistics to calculate China's provincial rural Gini coefficients.

<sup>5</sup>: Due to the limitation of Chinese data, computable and complete summary statistics of rural household surveys for the calculation of rural Gini coefficient are only available for 21 Chinese provinces over the period of 1997-2002. These 21 provinces included in our sample are: Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Henan, Hubei, Hunan, Guangdong, Guangxi, Yunnan, Shaanxi, Qinghai, Xinjiang.

that increased agricultural trade openness, faster rural income growth, decreased rural illiteracy rate, and greater development of township and village enterprises can significantly reduce poverty in rural China. First, the coefficients of agricultural trade openness (TOPEN) are negative and highly significant at 1% level, indicating that there exists a direct anti-poverty impact of agricultural trade openness for the case of China. Therefore, our empirical results provide strong evidence to suggest that agricultural trade can directly and significantly contribute to China's rural poverty alleviation. Meanwhile, empirical evidence also suggests that growth is a powerful instrument for fighting against poverty. The coefficients of RINCOME are negative and highly significant at 1% level, which strongly confirms the important role of growth in alleviating poverty. This result is also consistent with the findings in previous studies (e.g., Rozelle et al., 1998; Zhang et al., 2003; Fan et al., 2004). However, there is also evidence that the increase in rural income inequality (GINI) tends to raise the incidence of rural poverty in China. Therefore, an important proportion of efforts in reducing China's rural poverty have been severely offset by the deterioration of rural income distribution. This result also confirms the findings in many previous studies that had it been possible to hold inequality constant while still achieving these growth rates, China's poverty reduction would have been even more rapid (e.g., World Bank, 2000; Stern, 2001).

As for the estimates of the income equation (i.e., Equation [2]), we find evidence that agricultural trade significantly promotes growth in rural areas. The coefficients of TOPEN are positive and statistically significant at 1% level, which indicates that

agricultural trade remains a powerful engine behind China's rural growth over the sample period. Since empirical evidence from the estimation of poverty equation (i.e., Equation [1]) has confirmed the important role of growth in reducing rural poverty, thus the development of agricultural trade can also indirectly contribute to China's rural poverty alleviation through its positive impacts on rural growth (i.e., the 'growth effects').

Consider now the estimated results for the inequality equation (i.e., Equation [3]). The positive coefficient of *TOPEN* (statistically significant at 1% level) and the negative coefficient of *TOPEN*<sup>2</sup> (statistically significant at 5% level) indicate an inverted U-shaped relationship between agricultural trade openness (*TOPEN*) and rural income inequality (*GINI*), i.e., the development of agricultural trade might widen rural income inequality at the early period, but then tend to lower it. Because a unfavorable impact of inequality on poverty has been found in previous estimates of poverty equation (i.e., Equation [1]), therefore agricultural trade can also indirectly influence China's rural poverty through its effects on income distribution: in the early stage of trade liberalization, only a small proportion of rural population can participate into international trade, and thus trade might enlarge rural income inequality, which might in turn be detrimental to rural poverty; however, as trade openness intensified, agricultural trade development will help to reduce rural inequality because more and more rural agents and households can gain access to foreign trade and benefit from international division of production, which may in turn contribute to rural poverty reduction.

In sum, our estimated results suggest that although there may exist possible channels through which trade could negatively affect poverty (especially in the short-run), the gains that the poor benefit from trade liberalization can still largely outweigh the cost that it might bring.

## **6. Conclusion**

Recent literature has highlighted the importance of the trade-poverty linkage and the multifaceted channels through which trade may affect poverty (e.g., World Bank, 2002; Nissanke and Thorbecke, 2005; Winter et al., 2004). In this paper, with the help of more recent Chinese provincial data, we develop a simultaneous equation model to estimate the impacts of agricultural trade on rural poverty in post-reform China. Our estimated results provide strong evidence to suggest that agricultural trade can both directly contributed to rural poverty alleviation through providing the poor with more effective access to the product and factor markets, and indirectly through its favourable impacts on economic growth. Moreover, agricultural trade may also indirectly affect rural poverty through its effects on income inequality: in the early stage of trade liberalization, agricultural trade might widen inequality, and thus be detrimental to rural poverty; but as trade openness intensified, agricultural trade tends to narrow income inequality and thus contribute to the reduction of rural poverty. Therefore, in the long run, the gains that the poor benefit from trade can still largely outweigh the cost that it might bring.

Moreover, our empirical results also confirm the conventional wisdom that growth is a *necessary* condition - but by no means a *sufficient* condition - for poverty



reduction. Although China's impressive economic growth and trade expansion have led to remarkable reduction in poverty over the last two decades, an important proportion of efforts in reducing poverty have been severely offset by the deterioration of income distribution.

These findings have important policy implications to China's future works on poverty alleviation. Effective policy measures have to be forwarded to further accelerate China's integration into the global economy; meanwhile, great efforts are also required as well to ameliorate China's income distribution, so as to improve the effectiveness of China's poverty alleviation programs, and to provide more opportunities for the poor to raise their income and to escape poverty.

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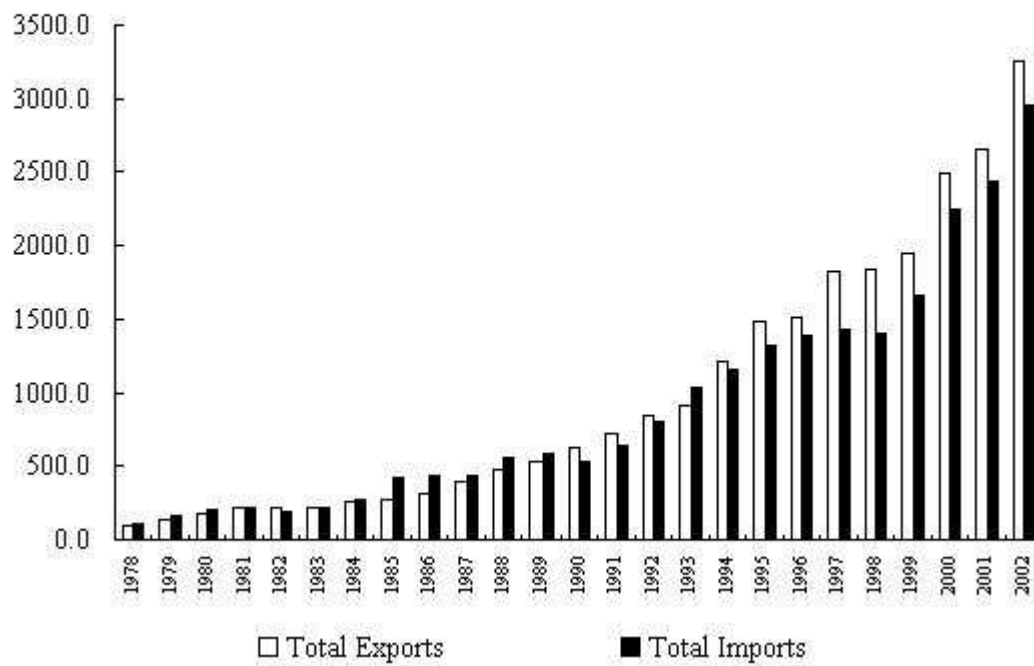
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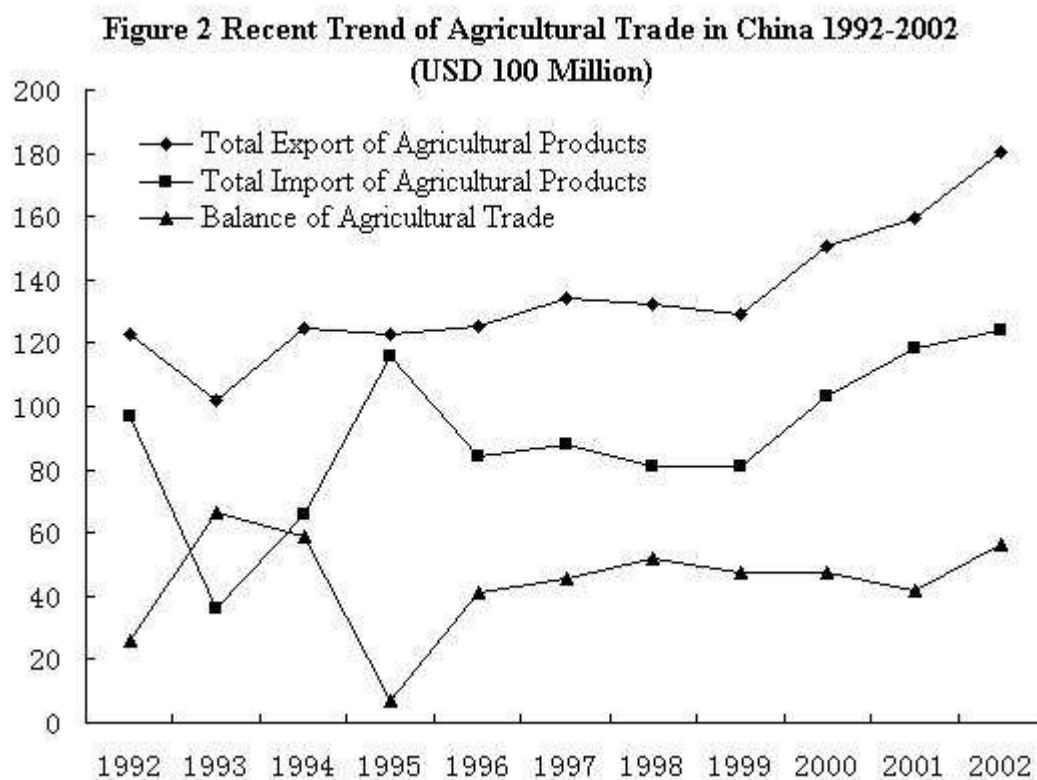
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Figure 1 Foreign Trade in China: 1978-2002 (USD 100 Million)

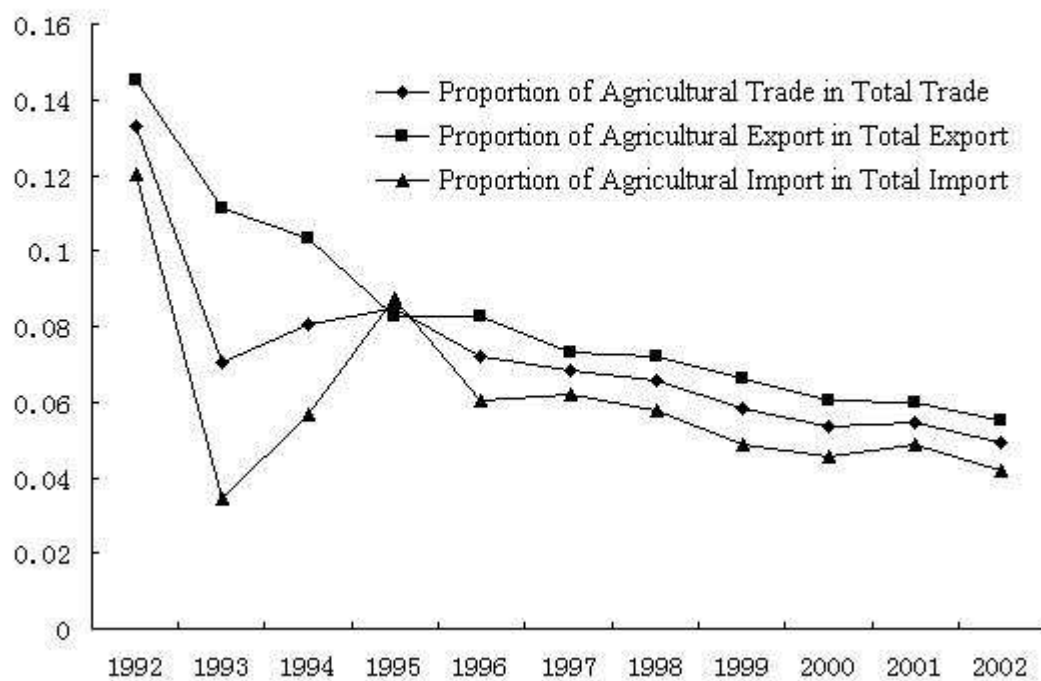


Source: *China Statistical Yearbook* (various years)



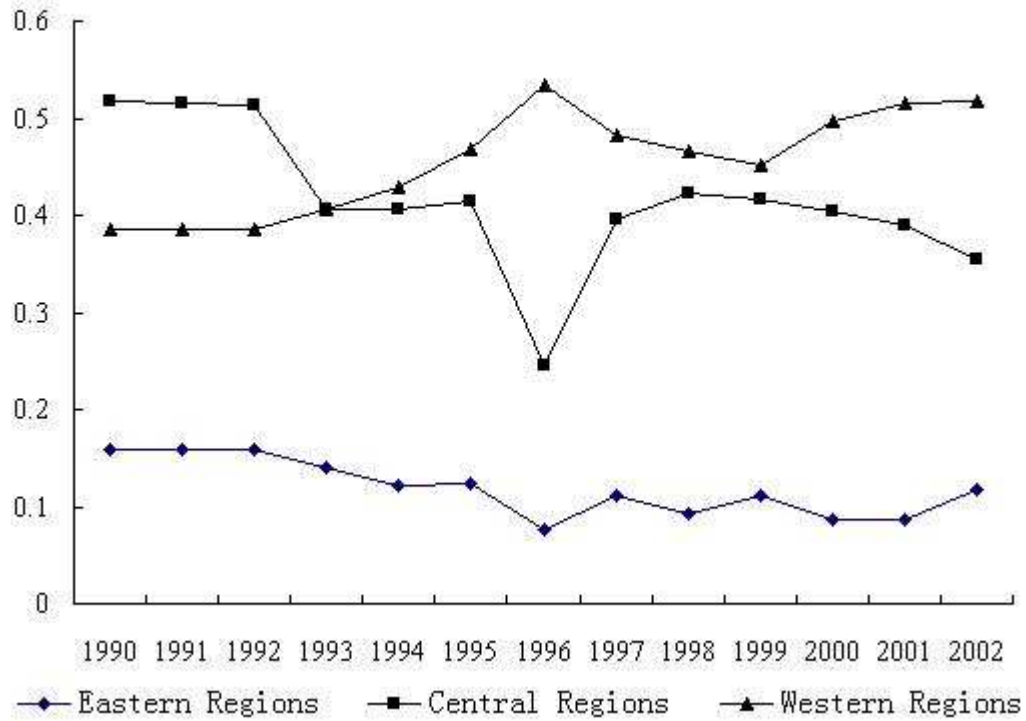
Source: China's Customs General Administration and Author's Calculation

**Figure 3 Proportion of Agricultural Trade in China's Total Trade: 1992-2002**



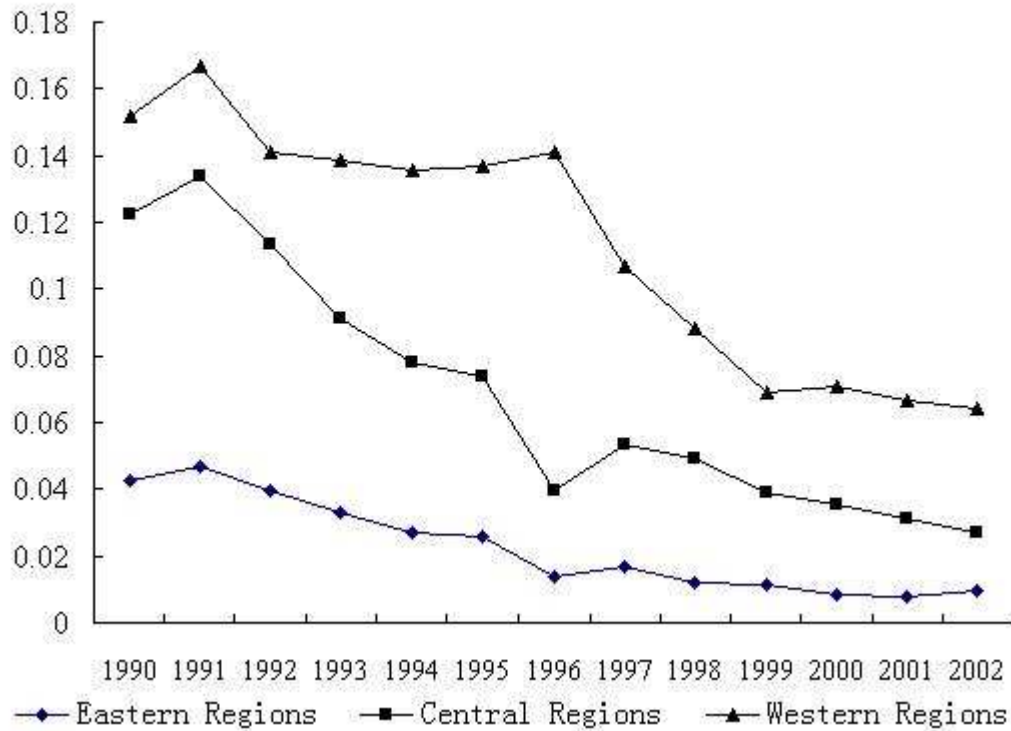
Source: China's Customs General Administration and Author's Calculation

**Figure 4 Geographic Distribution of Rural Poor in Chinese Regions: 1990-2002**



Source: National Bureau of Statistics and Author's Calculation

**Figure 5 The Incidence of Rural Poverty in Chinese Regions: 1990-2002**



Source: National Bureau of Statistics and Author's Calculation



**Table 1 Export Value of Agricultural Products by Category of Commodities in China: 1997-2002 (USD 100 Million)**

	1997	1998	1999	2000	2001	2002
<b>Live Animals &amp; Animal Products</b>	42.03	38.42	38.14	43.55	46.21	47.3
Live Animals	4.76	4.41	3.85	3.85	3.45	3.44
Meat and Edible Haslets	9.7	8.4	6.91	7.53	8.41	6.65
Fish; Shellfish; Molluscs and Other Aquatic Invertebrates	18.92	17.36	19.47	22.7	25.92	28.73
Dairy Products; Eggs; Natural Honey;	1.65	1.75	1.64	1.88	1.92	1.94
<b>Vegetables; Fruits and Cereals</b>	49.05	49.22	45.7	52.02	49.2	58.61
Edible Vegetables; Roots and Stem Tubers	15.13	14.83	15.19	15.44	17.46	18.83
Edible Fruits and Nuts; Muskmelon and Orange Peels	4.64	4.35	4.25	4.17	4.35	5.55
Coffee; Tea and Spices	5.53	5.2	4.89	5.06	5.42	5.52
Cereals	11.77	14.94	11.35	16.43	10.34	16.5
Oil Seeds and Kernels and Oleaginous Fruits; Other Seeds and Kernels and Fruits; Plants for Industrial and Medicinal Use; Straws and Forage	8.69	7.54	8.05	8.77	9.11	9.4
<b>Animal and Vegetable Oils; Fats and Wax; Refined Edible Oils and Fats</b>	6.81	3.28	1.41	1.29	1.18	1.08
<b>Food; Beverages; Liquor and Vinegar; Tobacco and Tobacco Substitutes</b>	46.55	42.85	43.26	51.66	57.92	67.01
Meat; Fish and Shellfish Products Molluscs and Other Aquatic Products	13.88	12.23	13.86	18.83	20.46	23.27
Sugar and Sugar Products	1.94	1.83	1.4	1.73	1.56	2.27
Cereals; Grain; Starches or Milk and Pastry Products	2.71	2.62	2.9	3.6	4.13	4.54
Products of Vegetables; Fruits and Nuts	10.45	10.31	11.26	13.15	14.97	17.57
Beverages; Liquor and Vinegar	4.65	4.45	4.57	4.93	5.73	5.97
Tobacco; Products of Tobacco & Tobacco Substitutes	6.57	5.78	3.36	3.02	3.86	4.33

Source: *China Statistics Yearbook* (Various Issues)

**Table 2 Import Value of Agricultural Products by Category of Commodities in China: 1997-2002 (USD 100 Million)**

	1997	1998	1999	2000	2001	2002
<b>Live Animals &amp; Animal Products</b>	9.17	10.55	17.29	22.79	23.56	27.09
Live Animals	0.41	0.55	0.65	0.52	0.35	0.53
Meat and Edible Haslets	1.49	1.43	4.99	6.37	5.98	6.27
Fish; Shellfish; Molluscs and Other Aquatic Invertebrates	5.44	6.66	8.83	12.12	13.31	15.65
Dairy Products; Eggs; Natural Honey;	0.68	0.89	1.64	2.18	2.19	2.72
<b>Vegetables; Fruits and Cereals</b>	23.3	25.02	26.68	43.21	47.49	40.63
Edible Vegetables; Roots and Stem Tubers	0.74	0.71	0.83	0.82	2.1	1.94
Edible Fruits and Nuts; Muskmelon and Orange Peels	2.35	2.42	2.58	3.68	3.67	3.78
Coffee; Tea and Spices	0.1	0.2	0.19	0.23	0.21	0.23
Cereals	8.92	6.96	4.97	5.74	6.07	4.82
Oil Seeds and Kernels and Oleaginous Fruits; Other Seeds and Kernels and Fruits; Plants for Industrial and Medicinal Use; Straws and Forage	9.89	13.45	16.38	30.72	33.44	27.77
<b>Animal and Vegetable Oils; Fats and Wax; Refined Edible Oils and Fats</b>	16.78	14.88	13.59	10.23	7.76	15.8
<b>Food; Beverages; Liquor and Vinegar; Tobacco and Tobacco Substitutes</b>	25.64	19.47	12.86	18.1	18.83	19.79
Meat; Fish and Shellfish Products Molluscs and Other Aquatic Products	0.08	0.07	0.12	0.12	0.14	0.19
Sugar and Sugar Products	2.5	1.71	1.82	1.77	3.76	2.8
Cereals; Grain; Starches or Milk and Pastry Products	0.17	0.15	0.48	0.71	0.93	1.49
Products of Vegetables; Fruits and Nuts	0.18	0.24	0.43	0.6	0.85	1.1
Beverages; Liquor and Vinegar	0.68	0.75	1.23	1.61	1.46	1.48
Tobacco; Products of Tobacco & Tobacco Substitutes	2.54	1.06	0.87	2.04	2.68	2.43

Source: *China Statistics Yearbook* (Various Issues)

**Table 3 Poverty Line and the Incidence of Poverty in Rural China: 1990-2002**

Year	China's Official Estimates			World Bank's International Standard			
	Poverty Line (Current RMB)	Poor Population (Million Persons)	Rural Poverty Incidence	Income Measure (\$1/day)		Expenditure Measure (\$1/day)	
				Poor Population (Million Persons)	Rural Poverty Incidence	Poor Population (Million Persons)	Rural Poverty Incidence
1990	300	85	9.5	261	29.1	358	40
1991	304	94	10.4	255	28.2	344	38
1992	320	80	8.8	253	27.7	344	37.7
1993	350	75	8.2	247	27.1	346	37.9
1994	440	70	7.6	220	24	296	32.3
1995	530	65	7.1	186	20.3	264	28.8
1996	580	58	6.3	129	14	208	22.6
1997	630	49	5.4	116	12.7	208	22.7
1998	635	42	4.6	99	10.8	210	22.8
1999	625	34	3.7	97	10.5	217	23.5
2000	625	32	3.4	111	12	195	21
2001	635	29	3.1	99	10.6	182	19.5
2002	627	28	3	88	9.4	161	17.2

Source: National Bureau of Statistics and World Bank

**Table 4 Government's Poverty Alleviation Funds: 1986-2002 (RMB 100 million)**

Year	Subsidized Loan	Food for Work	Budgetary funds	Subtotal
1986	23.0	9.0	10.0	42.0
1987	23.0	9.0	10.0	42.0
1988	29.0	0.0	10.0	39.0
1989	30.0	1.0	10.0	41.0
1990	30.0	6.0	10.0	46.0
1991	35.0	18.0	10.0	63.0
1992	41.0	16.0	10.0	67.0
1993	35.0	30.0	11.0	76.0
1994	45.0	40.0	12.0	97.0
1995	45.0	40.0	13.0	98.0
1996	55.0	40.0	13.0	108.0
1997	85.0	40.0	28.0	153.0
1998	100.0	50.0	33.0	183.0
1999	150.0	50.0	43.0	243.0
2000	150.0	50.0	48.0	248.0
2001	185.0	60.0	40.0	285.0
2002	185.0	66.0	40.0	291.0

Source: Office of Leading Group for Economic Development of Poor Areas

**Table 5 Definitions of Variables**

Variable	Definition
POV	Incidence of rural poverty, defined as the proportion of rural population below China's official poverty line
RINCOME	The logarithm of real per capita rural net income
GINI	Rural Gini coefficient
RCAP	The logarithm of real per capita productive capital in rural areas
TVED	Development level of the township and village enterprises (TVEs), measured by the ratio of the output of the TVEs to the total rural output (i.e., the sum of output in agricultural sector and rural industrial sector)
ILLITE	Rural illiteracy rate
EDU	Rural education level, measured as the share of rural population with educational attainment of middle school and higher level
TOPEN	Indicator of rural trade openness, defined as the ratio of agricultural trade to agricultural GDP (i.e., $TOPEN = \frac{X + M}{GDP}$ , where X is the export value of agricultural products, and M is import value of agricultural products)

**Table 6 Estimation of the Simultaneous Equation Model**

		Estimated Equations					R <sup>2</sup>	Obs.	
[1] POV	=	-0.016 TOPEN (-2.57)***	+0.378 GINI (9.53)***	-0.043 TVED (-2.36)**	+0.394 ILLITE (12.70)***	-0.009 RINCOME (-2.76)***	0.886	130	
[2] RINCOME	=	0.592 TOPEN (5.22)***	+0.699 RCAP (26.65)***	+1.587 TVED (5.14)***	+0.641 EDU (1.54)		0.997	130	
[3] GINI	=	0.132 TOPEN (2.81)***	-0.08 TOPEN <sup>2</sup> (-2.50)**		+0.101 ILLITE (1.87)*	+0.111 RINCOME (9.74)***	-0.011 RINCOME <sup>2</sup> (-6.08)***	0.981	130

Note:

1. POV, rural poverty incidence; TOPEN, agricultural trade openness, and TOPEN<sup>2</sup> is its squared term; GINI, rural Gini coefficient; RINCOME, the logarithm of real per capita rural net income, and RINCOME<sup>2</sup> is its squared term; TVED, the development level of the township and village enterprises; ILLITE, rural illiteracy rate; RCAP, the logarithm of real per capita productive capital in rural areas; and EDU, the development level of rural education.

2. For all regressions, T-statistics values are presented in parentheses.

3. \*\*\*: significant at the 1% level; \*\*: significant at the 5% level; \*: significant at 10% level.