WTO Entry and the Changing Structure of Chinese Industry

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I. INTRODUCTION

China's WTO entry comes at a critical stage of its transition to a market economy. The entry, therefore, will not only forcefully change the market structure of Chinese industry, but also profoundly weaken the dominance of state enterprises in the economy. This article addresses the changing structure of Chinese industry in both perspectives of the scale effect resulting from changing market concentration and the systemic effect resulting from the accelerated phasing out of the state-enterprise dominance.

The structure of the paper is as follows. In the second section, I will first examine the current systemic structure of the Chinese industry using most recent available from Chinese official sources, highlighting the declining state dominance in general and the rapid development of certain sectors in particular. In section III, the market structure from scale perspective is examined to estimate the status of concentration and the competitiveness of Chinese firms. Then in section IV, the impact of WTO is examined from both perspectives of systemic and scale effects. The author argues that while TWO entry will accelerate the consolidation of Chinese firms, thus leaving China's major sectors and industries more concentrated, the effect on the extent of state dominance varies among sectors depending on the systemic structure of the sectors prior to the entry. To the extent that administrative and ideological barriers are broken, firms will consolidate and restructure according to economic efficiency requirements. This dynamic adjustment will lead to the weakening of the state dominance in the agriculture and service sectors, but an unclear overall effect in the industrial sector. The fifth section concludes the paper.

II. THE CURRENT STRUCTURE: A SYSTEMIC APPROACH

It has been a stylized effect that the state economy is on the decline in all former centrally planned transition economies. In China such decline has accelerated in the 1990s, especially in late 1990s. We will analyze the dynamics in three aspects. To guide the analysis, the classification of China's economic sectors is provided in Table 1. Many of the tables to follow cover the structure and dynamics of industrial and tertiary sectors. The primary (or the agriculture) sector is analyzed only in the assessment of the impact of WTO entry.

1. The Significantly Weakened State Sector Measured by Urban Employment

China's economy consists of enterprises of various ownership types. Statistically, four types of enterprises are officially listed as the state-owned enterprises (SOEs), the collectively-owned enterprises (COEs), privately owned enterprises and self-employment (we will address the two together as private enterprises hereafter), and other types of enterprises. The last category of "other types" consists of share-holding corporations, foreign founded enterprises, and enterprises founded by entrepreneurs from Hong Kong, Macao, and Taiwan.

The decline in the dominance of the state sector in the urban economy can be seen from the negative growth of the urban employment by the state enterprises in the 1990s (Table 2) despite the fact that China's state enterprises are known to have large disguised unemployment and the situation is persisting. The collectively-owned enterprises have experienced a similar decline. Moreover, the share of total urban employment by the

state sector has shrunk from 70.24% in 1990 to 55.58% in 1998 and by the collective sector from 24.10% in 1990 to 12.20 in 1998, while the private sector has increased from 4.55% to 20.76% and "other types" increased from 1.11% to 11.45% during the same period (Table 3). The non-publicly owned enterprises, which include the last two types of enterprises, together now employ 32.96% of total urban employment. But if we define dominance as possessing more than 50% of the total share, China's state sector, not to mention together with the collective sector as the public sector, is still in a dominant position, though such position has weakened significantly.

The data in Table 2 also show that from 1980 to 1990, there was an expansion of employment in all sectors, and the state and collective sectors declined between 1990 and 1998, suggesting a more rapid reform and labor resource reallocation in the 1990s.

2. The Lost Dominance in the Industrial Sector Measured by Gross Value of Industrial Output (GVIO)

First, a conceptual delineation must be made to eliminate confusion on the scope of the term "industry." In China, an industry involves non-agricultural activities that turn physical inputs into physical outputs, thus excluding service activities of any kind. China's industrial sector includes mining and quarrying, manufacturing, and the production and supply of electricity, water, and gas, and construction. The calculation of the gross value of industrial output includes only these listed industrial activities.

As shown in Table 4, the share of the gross value of industrial output produced by the state enterprises has decreased from 54.6% in 1990 to less than 28.24% in 1998. It is

safe to say that China's state sector has retired from its dominant position in the manufacturing sector, though such position has been well maintained in the public utilities and several other sectors as indicated by the employment shares in Table 3.

It is interesting to note, however, the state sector in 1998 produced 28.24% of GVIO with 57.25% of labor force compared to about the same share of GVIO produced by 62.33% of the labor force in 1996 and, worse yet, 25.52% of GVIO with 65% of the labor force in 1997. A most obvious reason was higher efficiency, which in turn suggests that there existed severe disguised unemployment. The extra labor being shunted away from the sector had zero, if not negative, marginal productivity, holding other factors constant.

3. The Changing Priority of the State Sector: An Inter-Sectoral Perspective

While the overall state dominance measured by total urban employment and the share of gross value of industrial output has declined significantly, the state enterprises have remained their dominance in many sectors of the economy.

As shown in Table 3, the state has declined significantly in the manufacturing sector, but has remained its dominance or monopoly position in the sector of education, culture and arts, radio, film, and television (97.07% of urban employment); in scientific research and polytechnic services (92.04% of urban employment; in services for farming, forestry, animal husbandry, and fishery (89.06%); in health care, sports, and social welfare (87.2%); in production and supply of electricity, gas, and water (85.9%); in

mining and quarrying (83.26%); in real estate trade (70.58%); in banking[1] and insurance (69.13%); and in transport, storage, post, and telecommunications (65.54%).

In terms of absolute size, the state sector has experienced expansion in the public utilities sector, the banking and insurance sector, the education, culture and arts, radio, film and television sector, the real estate sector, and the scientific research and polytechnic services sector. This development not only reveals the priority of the state, but also that the economy as a whole has become increasingly service oriented.

Within the industrial sector, the state dominance exists in the productions that are considered to be vital to national interests. As shown in Table 5, the state has kept its dominance of higher than 70% of the share of GVIO in tobacco manufacturing, logging and transport of timber and bamboo, ferrous metal mining and dressing, production and supply of public utilities, petroleum processing and coking, smelting and pressing of ferrous metals, coal mining and dressing, and smelting and pressing of nonferrous metals (51.97%).

Enterprises that have grown most rapidly are those under the ownership type of "Other Types" including mostly share-holding enterprises, joint-ownership enterprises, limited-liability corporations, enterprises funded by entrepreneurs from Hong Kong, Macao, and Taiwan, and foreign-funded enterprises. The growth of employment in these enterprises has accounted for a large portion of the declined shares of the state enterprises. Enterprises in the collective sector seem to have the least favorable growth.

[1] In a separate source from The People's Bank of China (February 6, CCTV), the "big four" commercial banks of the Bank of China, the Industrial and Commercial Bank of China, the China Construction Bank, and the Communications Bank of China have total market share of 82.3%, foreign competition 0.6%, and others 17.1%.

Except for noteworthy expansion of employment in scientific research and polytechnic services, all other sectors have either declined dramatically or barely changed (see Table 3).

Equally noteworthy in Table 3 is the changing role of the non-foreign private sector. Private enterprises have grown in the manufacturing sector to hire four times more employees in 1998 than in 1990 and nearly two and a half more in wholesale and retail trade and catering services during the same period. Entry barriers to private enterprises have continued to exist in public utilities production and supply and mining and quarrying in the industrial sector excluding construction. The branches of the service sector are virtually all off limits to the private sector except in the wholesale and retail trade and catering services. The continued distrust in private enterprises is apparent also from the fact that many sectors are enterable by joint venture firms (under "Other Type"), but not domestic private firms. The entry barriers to domestic private firms but not Other Types of firms also arise from the requirement of production scale and capital investment that are beyond the reach of private firms.

III. THE CURRENT STRUCTURE: A SCALE-EFFECT APPROACH

Studies of Chinese industrial structure point to two problems: overcapacities in many manufacturing industries, on the one hand, and shortages of high-tech products and infrastructures. While both aspects are important, we will in this article focus on the overcapacity issue of the Chinese industry.

1. How Concentrated Are Chinese Industries?

Official data on concentration ratios of China's industries hardly exist, though in some industries, market shares of leading firms have started to appear.[2] It has become a standard realization that Chinese industrial firms have been too small and overcapacities have been too severe in many industries.

Table 6 provides data on the "crowdedness" of Chinese market in the industrial sector. It is clear that each industry has numerous numbers of firms supplying to the market and that average firm size measured in sales revenues is very small. The profile of the larger firms is also revealed indirectly in Table 6. The 1998 data include only SOEs and scaled non-SOEs with sales revenues of more than five million yuan, showing a large number of large-scale firms. Though different price systems prevent us from inferring the nature of "smallness" of the firms in comparison with other countries, the sheer number of the large firms indicates that the concentration ratios of the top firms are very low in China's industrial sector.

2. Too Many Firms in the Markets?

--------The R ratio

Does the low concentration ratio carry any implication on the engineering scale effect about the industries and firms? While generally conclusions in this regard require statistical analysis of firms' cost structures in relation to their sizes, anecdotal evidence as well as data in Table 7 do imply properties of similar nature. Table 7 shows the

[2] The industry of transport equipment, for example, had a 10-firm concentration ratio of 22.83%, 50-firms concentration ratio of 43.32%, and the industry is said to have scale economies. The industry of electronic and telecommunications equipment, on the other

production capacity of key firms in industries and the total output of these industries. The ratio of output to the collective capacity of key firms is very indicative of the overcapacity situation and may lead to sensible inference to whether the industries have too many firms.

Let the ratio of output to capacity be R. If R >1, the industry's total output is greater than the capacity of the key industries, indicating that the small firms are needed to fill the unsatisfied market demand by the key firms. In these industries, therefore, the key enterprises are leading firms and the markets are shared by many fringe firms. If, for example, R = 1.23, it means that about 20% of the production is produced by fringe firms or that the key firms have market concentration ratio of 81.3%. The greater is the ratio, the lower concentration ratios of the key firms, and the more evenly spread is the market power, though we cannot infer the absolute scale of the firms in the industry without knowing the number of firms in the "key" segment.

Coal, natural gas, pig iron, and motorcycle industries are observed to have R>1 with steel industry being the boarder-line case (or R = 1) (see Table 7). Except the motorcycle industry, the other three are perceived as stylized fact to have many small-scale producers--in fact so many that the government will foreclose many "small coalmines" as a way to rescue the industry from its heavy losses from over-supply and a part of cracking down on the "Five Smalls"(of small oil refineries, small hydroelectric power plants, small steel plants, small glasses plants, and small cement production). Another factor contributing to the R >1 is the high demands for energy and material

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hand, has a 10-firm concentration ratio of 16.62% and 50-firm concentration ratio of 33.98%, but the industry did not seem to have scale economies (Cui and Zhang, 1998).

resources relative to their supplies, consistent with the situation of shortage in energy supply in China. In the case of motorcycle industry, however, high demand, relative to that for cars, seems to be the sole explanation for the greater than unit R.

If $R < 1$, the industry's total output is smaller than the production capacity of its key firms, indicating clearly the existence of overcapacities. The lower is R, the more severe is the situation, which in turn indicates that "too many" firms exist relative to the market demand. The marginal firms' being able to stay in business may be explained by several underline reasons. First, although the key firms are larger, they are unable to lower cost and drive out their smaller competitors because of heavier burden of retirees and social welfare expenditures on housing, medical service, day care etc. Second, the fringe firms exist as a result of lower cost, opposite to the burdensome situation endured by the large firms. Local protectionism and exit barriers may also constitute their continuing existence. In the cases of $R < 1$, Dynamic adjustments will take place to eliminate the inefficient firms if market is allowed to work.

Table 7 shows that overcapacity prevails in most of the listed industries and that the most severity is observed in the markets for electronic products. This very much confirms the investigated market situation. In 1996, the production capacity of color television sets was 60% higher than market demand; the capacity utilization rate in the production of air conditioners was 30%; wash machines, 43.3%. 75% of all electronic products were over-supplied, and only 10% under-supplied in the year (Research Group, 1997).

Competition as a result of overcapacity of many industries has led to consolidation of firms, especially in the electronic product market.[3] In fact, these domestic producers have not only established their dominance in Chinese market, but also started to compete in the international markets, indicating that many of China's infant industries have matured from their infancy.

--------The Cases

Several well-noted cases of over-competition or overcapacity are worth citing to support the finding from Table 7. The auto industry, for example, has long been noted to have too many producers. In early 1990s, there were 125 producers in the auto industry with an average annual production of 6000 automobiles (Xia, 1993). In 1996, 47% of all auto producers (more than 100) produced on average less than 1000 vehicles during the first 9 months of production; 67% of the auto firms experienced declined production from the same period a year before; and the nationwide unsold automobiles held as inventory reached 116 thousand (Research Group, 1997). At present, almost every Chinese province has its own auto producers, and each province practices local protectionism to set block to cars of other provinces from entering local market (*China This Week*, CCTV June 24, 2000).

The textile industry had experienced similar overcapacity of 40% above market demand (Research Group, 1997). The government in 1992 set the target to eliminate the overcapacity (*Xinhua Forum*, Nov. 2, 1998) of 10 million spindles and established an

[3] Several recognized brands, such as Changhong and Kangjia in color television production, Hai-er in wash machines and refrigerators market, and Chunlan in air

aide project to eliminate the overcapacity. Under the "Aide" project, the government would provide a subsidy of three million yuan to an enterprise that idles 10,000 spindles and additional two million for alternative placement of its employees. By October 15, 1998, state textile enterprises had idled 4.32 million spindles, and of which, 3.56 million were done by large and medium state enterprises. For the first nine months of 1998, 10.8% of, or 450,000, textile workers had been shunted away from the industry through regular or early retirement, reemployment in other occupations, self-employment, and extended leaves (*Xinhua Forum*, Nov. 2, 1998). Finally, by the end of 1999, as reported by the State Economic and Trade Commission, the textile industry had turned its heavy losses since 1992 into profits of 800 million yuan (*China Report*, CCTV, Jan. 25, 2000).

China's tobacco industry consisted of 178 firms in 1995, and the market concentration ratio measured by the output of top 14 firms is 34.17% (Shi, 1999), which indicates that the industry is much less concentrated than their counterparts in the US and the Europe. In the 1990s, the capacities of the industry were one third in excess of the market demand (Zhou, 2000).

3. Why So Many Firms?

--------N_p vs. N_f

The sheer large numbers of Chinese firms arises in part from the fact that, in China, a firm has usually one plant. Let N_p be the number of plants and N_f the number of firms. The two variables approximately equal to each other. In the West, on the other

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conditioners, have emerged successfully to become leaders in China's market and to enter world markets as well.

hand, market concentration ratios based on top corporations and conglomerates that usually have many plants nationwide are high, but the concentration ratios based on top plants would be much lower. In other words, $N_f < N_p$ in the West, and the fact that in China $N_f = N_p$ instead of $N_f < N_p$ may exaggerate the smallness of production scale on the floor. Be that as it may, the same fact (of $N_f = N_p$) contributes to the division of national market and its operation in an efficient way. To illustrate, if corporation x owns plants A, B, and C in three different locations, the corporation then can coordinate the size of the production according to their engineering economic features and demand and supply conditions of the local markets. Such coordination, however, will fail to take place among three plants that are owned by three different firms, or local governments as in the case of China. Instead, they try to compete with each other by building up their capacity and by protecting their local market. Now if we expand the case to N firms, with each trying to outrun others and protecting its own market, it's hardly surprising that we have as many firms as shown in the table.

--------Local Protectionism

Unnecessary replication of production facilities has been a long noted problem in China as a result of deregulation in Chinese industries and firms' effort to snatch a share of the market that had long been a sellers' market. But when the market turned into a buyers' market in the 1990s, production facilities became redundant and overcapacities resulted. Instead of letting market eliminate inefficient firms, local protectionism prevailed by blocking products from other jurisdictions to enter the local market and/or

by subsidizing local inefficient firms. Either way, it protects the inefficient firms and aggravates the overcapacity situation.

--------The Coexistence of Free Entry and Exit Barriers

The overcapacities persist also as a result of exit barriers of many state firms. These firms face exit barriers because they are not at liberty to cut the labor force to the efficient size and, in many cases, they have no freedom to leave an unprofitable business and shut down for the same concern of labor welfare that allows only gradual reduction of disguised unemployment accumulated in the past decades.

What then does the numerousness of firms and the overcapacities imply about the nature of the "state monopoly?" The author argues that "state monopoly" is more of a systemic monopolization of the market than share monopolization of the market. The term virtually refers to the dominant of the state enterprises as a whole, rather than the monopolization of market by individual firms. The fact that many state firms do compete with each other suggests a low degree of monopolization by individual firms in the market at least at the national level. The state monopolies will phase out as a result of both the expansion of private businesses domestically and the entry of foreign firms following WTO accession. As the reform deepens, inefficient firms are to be eliminated and efficient firms are to prevail. The accelerated reform of enterprises is accompanied, therefore, by expansive consolidation of firms.

IV. THE IMPACT OF WTO ENTRY ON THE STRUCTURE OF CHINESE INDUSTRY

1. General Assessment: The Openness and the Extent of Monopolization

The impact of WTO entry on the structure of Chinese industry is two fold: the effect on the competitiveness of Chinese domestic firms compared with that of foreign firms, and the effect on the domestic market structure, primarily the systemic structure of domestic firms, as a result of increased foreign competition. If we put aside the impact on the systemic change, the severity of the impact of foreign competition following the WTO entry depends primarily on two factors: the openness and the extent of monopolization prior to the entry.

The openness refers to the exposure of firms to foreign competition, whereas the monopolization refers to the firms' market share in the domestic market. A firm can be a monopoly in the domestic market and yet faces fierce foreign competition. Meanwhile, a firm can be nearly perfectly competitive in the domestic market but protected from foreign competition. In general, the more closed the sector is to foreign competitions, the more impact it will bear after the accession to WTO; the more monopolized is an industry, the more dramatic decline will be the market shares of the firms as a result of the accession provided that entry does occur. These two criteria are used in our assessment of the impact of WTO entry.

2. The Impact on the Three Sectors

Table 8 reveals important information that we may use when we analyze the impact of WTO entry to China's agriculture and industrial sectors. It shows the composition of bilateral trade of major goods between the US and China. While the data

in the table do not correct the official US trade statistics for trade via Hong Kong and the absolute size of the trade surplus (or deficits) is subject to debate, the data do indicate the comparative advantages of the goods between China and the US and among themselves.

As shown in Table 8, the last column numbers of the ratio of the ratio of Imp/Exp, or the ratio of imports from China to exports to China, indicate the comparative advantages. If the ratio is smaller than one, the US has comparative advantage in the good's production, and if it is greater than, China does. The greater is the ratio, the more advantageous is China in producing the good. The magnitudes of the ratio imply that China has the greatest comparative advantage in the production of apparel, clothing, and textiles, followed by leather, travel goods, sports equipment, feather and down articles, toys, etc. The table indicates, on the other hand, that China is a net importer of aircraft, spacecraft, and parts, oil seeds, grains, and fruits, fertilizers, and aluminum products.

Table 8, however, is by no means a comprehensive list of exports and imports between the US and China, especially many high-tech and service industries such as telecommunications and internet development, are unlisted. The summary of the impact is highlighted in Table 9.

--------The agriculture sector

China's agriculture sector features primarily family-based production as a result of de-collectivization. Though the number of producers is numerous, the state continues to monopolize the wholesale distribution of grains. Moreover, the sector has been protected from foreign competition through tariff, quota, export subsidies, and other means. This sector, therefore, is characterized by low monopolization as well as low openness. The

massive disguised unemployment in the sector has driven down marginal productivity to nearly zero, if not negative. Low level of mechanization and technology application leave the sector at disadvantage relative to foreign competition in many agriculture productions such as grains, dairy products, meats, etc. Although the sector can continue its comparative advantage in some productions to meet the idiosyncratic demand of Chinese consumers, it fails to have competitive edge against foreign competition in bulk commodities such as soybeans, wheat, corn, rice, cotton, and barley.

The WTO accession requires lowering of overall average tariff for agricultural products to 17%, and even lower by 2004 and for some products from the US. China will cease to subsidizing its exports and will adopt a tariff rate quota (TRQ) system (i.e. a system in which imports up to the quota level are charged a minimal tariff –usually 1-3%--and imports above that level a high tariff) that provides strong incentive for state enterprises to purchase bulk commodities at world market rates). The TRQ will apply on bulk commodities such as soybean oil, wheat, corn, rice, cotton, barley, wool, sugar, palm oil and rapeseed oil.[4]

Moreover, China will for the first time provide full trading rights (the right to import and export) and distribution (wholesaling, retailing, maintenance and repair, transportation, etc.), which will eliminate an important layer of non-tariff protection to Chinese firms (Government Releases, 1999 and Whitehouse Factsheets, 2000).

[4] For details of the WTO agreement between China and the US, see US government releases on Market Access and Protocol Commitments (April 1999) and While House Factsets (February 17, 2000).

Table 8 shows that agriculture goods of oil seeds, grains, and fruits grain are one of the four listed groups of goods with the ratio of Imp/Exp smaller than 1 or, in other words, with comparative disadvantage.

The overall effect of the accession is, therefore, strong on the entire sector. Anticipated results are multifaceted. One would expect a sector-wide resource, primarily labor resource, reallocation to other sectors, though some sub-sectors will better adjust to foreign competition. Within the heavily impacted sub-sectors, some type of consolidation of land may emerge in the long run to regain economies of scale so that Chinese farmers can meet the challenge of foreign competition.

The accession will also end the long-existed state monopoly in China's grain marketing at the wholesale level. agriculture goods of oil seeds, grains, and fruits grain are one of the four listed groups of goods with the ratio of Imp/Exp smaller than 1 or, in other words, with comparative disadvantage.

The accession will also end the long-existed state monopoly in China's grain marketing at the wholesale level. As recently as June 1, 1998, China's State Council, in an effort to maintain grain price stability and minimize losses by state grain bureaus, issued a new stipulation (No. 244) to enforce the administrative control of grain pricing and state monopoly in grain marketing. The stipulation explicitly states that only state grain bureaus can purchase grains from farmers and they must do so within their own counties (Chen, February 2000). The Stipulation has reaffirmed government's grain price control and minimized competition from private grain dealers and among state grain enterprises. The impact of foreign competition following WTO entry will, therefore, be most profound.

---------**The Industrial Sector**

In this sector, China has agreed to reduce average tariffs from 24.6% in 1997 to 9.44% and to implement two thirds of tariff cuts by 2003 and the rest by 2005 (with a limited number of exceptions), bringing tariff levels to levels comparable with major trading partners and below those of most developing countries. China will also phase-out of all quantitative restrictions on imports. Moreover, as in the agriculture sector, China will provide full trading rights and distribution to foreign firms in most industries.

The effects of the entry on this sector are by no means uniform. An important feature is the concurrence of foreign entry and domestic consolidation. As analyzed previously, China's industrial sector features low concentration and overcapacities in production. The consolidation among Chinese producers in the reform process and in preparation of the WTO entry, however, has increased their competitiveness. To phase out are domestic fringe firms. The number of firms in each industry, therefore, will decrease despite the entry of foreign firms if exit barriers are eliminated.

Labor-intensive products such as textile products, toys, umbrellas, shoes and hats will benefit from the accession to the WTO because of their greater access to foreign markets. In the bilateral trading with the US, these goods have enjoyed the highest margin of trade surplus as shown in Table 8. But the comparative advantage is shrinking because of cheaper labor from other developing countries.

To meet the challenge and experience dynamic changes are industries that have recently grown out of their infancy and become capable of competing with foreign firms, such as consumer electronic products of color television, wash machines, refrigerators, fans, and air conditioners. Changhong Corporation, for example, is now producing nearly

50% of the domestic television markets that were primarily foreign firm dominated. China also has comparative advantage and certain degree of competitiveness in the international market in shipbuilding industry because of its comparative advantage in factor supply (Research Group, 1997).

To struggle are such products as beverage, beer, and consumer chemical goods. China has also lagged behind in automobiles, computers, and aircraft, spacecraft and parts. These industries not only have no comparative advantage exporting but also face fierce international competition for domestic market. Table 8 shows that aircraft, spacecraft and parts are among the few that China imports more form the US than it exports to the country.

China's auto industry, though unlisted in Table 9, is recognized as a stylized fact to bear heavy impact of WTO entry. We have aforementioned that the industry features many producers with sub-optimal scales. Consolidation in this industry is, therefore, bound to happen. The question left to be answered is whether Chinese auto firms will have enough time to develop their comparative advantage and phase out of infancy before July 2006 when tariffs on autos will decrease from the current rates of 100% and 80% to 25%. Meanwhile, China does not commit to allowing foreign firms to enter wholesaling of tobacco and wholesaling and retailing of salt (Whitehouse Factsheets, 2000), leaving these industries to continue to be protected.

To summarize, the overall effect of WTO entry on China's industrial sector is that increased foreign competition will force domestic firms to cut costs, adopt new technology, and boost exports. The rise or fall of Chinese firms following the entry,

however, varies significantly among industries in the sector and among firms in each industry. Resource reallocation will take place among industries within the sector.

--------The Service Sector

As shown in Table 1, the service sector (or the tertiary sector) consists of four levels. WTO entry has diverse impact on the different levels in this sector.

As we know, China has made the biggest concession as an effort at WTO entry to let down entry barriers in the areas of distribution and telecommunications services, leaving the first level of the tertiary sector greatly impacted as a sub-sector. The foreign competition as a result of WTO entry will also prevail in the banking, insurance, professional and technical services (including accounting services, management consulting and taxation services, legal services, and agricultural, engineering, and urban planning services), thus affecting in a comprehensive manner the second level of the tertiary sector. This change will bring most significant improvement to the economic life of Chinese citizens. Foreign involvement in these areas will not only force the Chinese firms to continuously cut cost and keep abreast of technological development, but also bring higher quality services at lower prices. The lower prices have already been observed for telecommunications services.

WTO accession, however, has limited effect on the third level, consisting of education, culture and arts, broadcasting, movies, television, public health, sports, social welfare and scientific research, etc. Books, magazines, newspapers are one exception, [5]

[5] For books, magazines and newspapers, China will allow foreigners to provide wholesale services within three years from the date of accession and retail services within five years (Whitehouse Factsheets, 2000).

there will also be increased quota of foreign films imported to China and there has been at least one reported case of foreign film company starting business in China. The fourth level, consisting of government agencies, political parties, social organizations, military and police service, will naturally remain intact. While one would not expect any foreign involvement in the fourth level of the sector for most obvious reasons, the remaining entry barriers in the third level result primarily from ideological concerns and the lack of comparative advantage of foreign competition. The state monopolies are, therefore, to continue in the third level of China's service sector.

3. The Systemic Effect of the WTO Entry: The Ratio of SOE/(SOE+NSOE+FE)

What will WTO entry do to the systemic structure of the Chinese industry? Will it re-enforce the decline of state sector and the expansion of the private economy? Our logical sense tells us that WTO entry, which allows privately-owned foreign firms to operate and employ workers in many Chinese industries including services that have been off-limits to domestic private firms, will reduce the overall significance of the state economy, thus impacting the systemic structure in favor of the non-state sector. The effect on the systemic structure, thus, parallels the sectoral effect previously analyzed.

We will focus our systemic effect analysis on the change in the dominance of the state in terms its market share in each sector. In extreme cases, systemic effect shows in the breaking of state monopoly. Let SOE be state-owned enterprises, NSOE non-state enterprises, and FE foreign enterprises. The state dominance is therefore reflected in the ratio of SOE to SOE plus NSOE and FE.

First, in the agriculture sector, the ratio of SOE/(SOE + NSOE + FE) after the entry is strictly smaller than that before the entry, because the net increase in FE is the only unambiguous effect as a result of the WTO entry. As we know, the state has little control over the production that has been family based since the decollectivization. Its dominance lies primarily in agricultural services, and the most important of which is the wholesale distribution of grains. Holding constant the no-control status in the production of agriculture, the state's involvement decreases significantly after WTO entry breaks the barriers in the services to agriculture. Such effect is apparent in at least the short run. In the long run, government's involvement may grow in the forms of heavier investment in agricultural research and extension services and continued agricultural price subsidies.

In terms of extent of effect, the private firms, or production entities, are affected most severely in the agriculture sector. But such effect is mostly short run and involves only the redistribution of private operation among economic sectors. The unemployed farmers as a result of WTO entry, for example, will eventually migrate into towns and cities and become re-employed by private sectors. The impact on the private firms, therefore, is short-run and distributional, whereas the impact on reducing the dominance of the state sector is permanent.

The systemic impact in the industrial sector is ambiguous. The ratio of SOE/(SOE+NSOE+FE) may change in either direction following the entry. Though there are offsetting changes in the numbers of SOE and NSOE, FE is expected to grow. As we afore-analyzed, firms in this sector, regardless of their ownership types, are consolidating and becoming more competitive. The net effect on the dominance ratio, therefore, depends on the net effect between the contraction or expansion of the domestic

enterprises of different ownership types. Although the large firms, usually the SOEs, have greater competitiveness because of their scale effect, the non-state firms possess advantage in better management, lower social burden, and higher efficiency. Without the help of the government, such as the "holding on to the large and freeing the small" project, it is hardly irrealistic to expect that the non-SOEs will better survive the changes in the market environment brought upon by WTO entry, which, if occurs, is itself a positive WTO entry effect on systemic changes in China if the SOEs as a result become more efficient and competitive.

The most striking systemic impact will be the termination of state monopolies in many of the services, because entry barriers have existed in public utilities sectors and state propaganda apparatuses such as TV-radio broadcasting, media services, banking and insurance, wholesale trade, air and rail transportation, and education services, especially to non-state enterprises. These sectors have been primarily off-limits to domestic firm, and it takes WTO entry to break the barriers. The significance of such effect lies far beyond the fact that Chinese consumers have already experienced lower prices and better quality of the services. The ending of state monopoly in the banking industry, for example, directly leads to an accelerated financial liberation and firms' adopting hard budget. The relationship between firms and banks will finally be economical, instead of political and policy oriented.

As we analyzed previously, WTO accession has limited effect on the third and the fourth levels of the service sector. With few exceptions, entry barriers are to remain in the third level of the service sector primarily as a result of ideological concerns and the lack of comparative advantage of foreign competition. The state monopolies are,

therefore, to continue in this level of China's service sector. Again, the fourth level of the sector will remain intact for the most obvious reasons.

V. CONCLUDING REMARKS

China's long sought WTO accession is approaching its final stage at a critical time of China's economic transition. The structure of the Chinese industry has changed significantly since the launch of economic reforms two decades ago in both scale and systemic aspects.

The role of the state (represented by state-owned enterprises) has declined in terms of urban employment, in both the size and the share, and of the share of gross value of industrial output. The state, however, has maintained its dominance in many industries where products and services have been considered vital to national interests and has even experienced expansion in employment size in several service industries.

Approached from the scale-effect perspective, the Chinese industry characterizes numerousness of firms, sub-optimal scale of production, as well as severe overcapacities in many industries. These characteristics arise from the lack of multi-plant firms, the local protectionism, as well as the existence of exit barriers. Facing the challenge of foreign competition ensuing the WTO accession, the Chinese firms, especially in the industrial sector, are consolidating and catching up. The impact of WTO entry, however, is by no means uniform across the sectors of the economy.

The agriculture sector is predicted to have strong overall effect as the sector has had low degree of openness despite the low degree of monopolization. Resource reallocation, primarily rural labor, is expected to flow toward other sectors. Systemically,

the role of the state in the sector is expected to decline, primarily reflected in the sharing of trading rights and distribution that have long been monopolized by the state.

The industrial sector, on the other hand, is predicted to have unclear overall impact from WTO entry. Some sub-sectors are to benefit from expanded foreign markets and will further extend their comparative advantage; some will contract in the effort to consolidate and become competitive; and yet some will shift resources to other industries. Thus, reallocation of resources in this sector occurs primarily among its own industries. Systemically, the state dominance is to stay in some industries where Chinese state-owned large enterprises possess comparative advantage over foreign competition and have become more competitive in the process of consolidation in preparation for the entry. Since the process eliminates many small firms and the large state enterprises may effectively gain the lost shares of these firms, the entry of foreign enterprises may not necessarily lead to, at least in the short run, the decline of the state.

Finally, China's service sector is predicted to experience strong overall effect from the accession. Retail sales excepted, this sector features most pronounced state dominance prior to the accession, such as in banking, insurance, telecommunications, wholesale distribution. WTO entry marks the sharing of market for the first time with any non-state enterprises in these industries. While state monopolies are ending in this sector, resources are also expected to flow into the sector as the economy becomes more advanced and privatized. Consumers in China have already started to experience the benefit of increased competition in anticipation of WTO entry.

In the nutshell, the WTO entry may cause considerable redistribution of resources and income between sectors and among individual firms and consumers. The long-run

effect is that it will not only enhance competitiveness in the Chinese economy and force firms to cut cost and adopt more advanced technology, but also accelerate the systemic reform of Chinese firms and the decline of the sate dominance in the economy. This research, however, is an early attempt to address the aspects of WTO entry, and it intends to provoke future researches to extend and deepen the issues discussed here.

Table 1
Classification of Chinese Economic Sectors

Name	Description
First Sector (Primary Sector)	Agriculture, including Farming Forestry Animal husbandry Fishery
Second Sector	1. Industry: Mining and quarrying Manufacturing Production and supply of electricity, water, and gas 2. Construction
Tertiary Sector	1. **Circulation sector (or first level)**: transportation, storage, postal and telecommunications whole sale and retail trade 2. **Service sector (or second level)**: banking, insurance, geological survey, water conservancy management, real estate; services for residents, agriculture; and forestry, animal husbandry, fishery, subsidiary services for transportation and communications, comprehensive technical services, etc. 3. **Third level**: education, culture and arts, broadcasting, movies, television, public health, sports, social welfare and scientific research, etc. 4. **The fourth level**: government agencies, political parties, social organizations, military and police service

Source: *China Statistical Yearbook 1999*, pp. 104-105.

Table 2
Changing Role of Enterprises of Different Ownership Types:
Employment (in 10,000) and Its Growth (% change in parentheses)

	State-owned Enterprises			Collectively-owned Enterprises			Privately-owned Enterprises & Self-employment			Other Types Of Enterprises	
	1980	1990	1998	1980	1990	1998	1980	1990	1998	1990	1998
Total of All Sectors	8019	10346 (29)	8809 (-16)	2425	3549 (46)	1900 (-46)	81.4	670.5 (723)	3231.9 (382)	163.8	1627.6 (894)
Farming, Forestry, Animal Husbandry & Fishery	740	737 (-0.4)	525 (-29)	48	42 (-13)	16 (-62)	0.2	0.6 (200)	43.4 (7133)	1.1	5.06 (360)
Mining & Quarrying	621	786 (27)	596 (-24)	76	95 (25)	49 (-48)	NA	NA	13.9 (∞)	0.67	56.96 (8400)
Manufacturing	2601	3395 (31)	1883 (-45)	1346	1773 (32)	742 (-58)	9.5	91.3 (861)	563.9 (518)	135.5	1143.6 (744)
Production & Supply of Electricity, Gas & Water	112	183 (63)	242 (32)	6	9 (50)	11 (22)	NA	NA	NA	1.09	28.68 (2348)
Construction	475	538 (13)	444 (-17)	235	357 (52)	311 (-13)	0.4	4.6 (1050)	55.2 (1100)	1.59	91.49 (5654)
Geological Prospecting & Water Conservancy	187	194 (3.7)	113 (-42)	1.0	3.3 (230)	2.0 (-39)	NA	NA	NA	0.04	0.10 (150)
Transport, Storage, Post, & Telecommunications	498	660 (33)	584 (-12)	216	232 (7.4)	79 (-66)	0.8	36.4 (4450)	190.3 (423)	1.63	37.73 (2215)
Wholesale and Retail Trade & Catering Services	1005	947 (-5.7)	694 (-27)	234	762 (226)	414 (-46)	57.1	431.2 (655)	1896.2 (340)	6.00	148.88 (2383)
Banking and Insurance	63	145 (130)	208 (43)	26	51 (96)	71 (39)	NA	NA	NA	0.05	21.90 (43700)
Real Estate Trade*	33	40 (21)	63 (58)	4	4	7 (75)	NA	NA	NA	0.51	19.26 (3676)
Social Services*	130	236 (82)	322 (36)	88	93 (5.7)	68 (-27)	13.0	94.3 (625)	397.2 (321)	15.03	61.02 (306)
Health Care, Sports, & Social Welfare	217	323 (49)	402 (24)	70	69 (1.4)	58 (-16)	0.4	7.0 (1650)	NA	0.05	0.98 (1860)
Education, Culture & Arts, Radio, Film, & TV	757	1112 (47)	1408 (27)	60	32 (-47)	41 (28)	0.7 (1981)	3.9 (457)	NA	0.26	1.52 (485)
Scientific Research & Polytechnic Services	104	148 (42)	155 (4.7)	1	3 (200)	7 (133)	NA	1.2	NA	0.20	6.43 (3115)
Government Agencies, Party Agencies, & Social Organizations	476	903 (90)	1079 (19)	14	26 (86)	5 (-81)	NA	NA	NA	NA	NA
Others	NA	NA	84	NA	NA	20	NA	NA	71.8	NA	4.04

Note: "Other Types of Enterprises" include mostly share-holding enterprises, jointly-owned enterprises, limited liability corporations, enterprises funded entrepreneurs from Hong Kong, Macao, and Taiwan, and foreign-funded enterprises. The data did not exist until 1990,

Source: Compiled from *China Statistical Yearbook* 1994, p. 98 for the data on Other Types in 1990; all other data are compiled from *China Statistical Yearbook* 1999, pp. 144-149 & 154. The percentage changes are calculated from the data.

Table 3
Changing Role of Enterprises of Different Ownership Types:
Share (%) of Total Urban Employment

	Total Employment by All Enterprises (10,000)		State-owned Enterprises		Collectively-owned Enterprises		Privately-owned Enterprises And Self-employment		Other Types of Enterprises	
	1990	1998	1990	1998	1990	1998	1990	1998	1990	1998
Sum of All Sectors	14729	15568.9	70.24	55.58	24.10	12.20	4.55	20.76	1.11	11.45
Farming, Forestry, Animal Husbandry & Fishery	780.7	589.5	94.40	89.06	5.38	2.71	0.08	7.36	0.14	0.86
Mining & Quarrying	881.7	715.86	89.15	83.26	10.77	6.84	NA	1.94	0.08	7.96
Manufacturing	5394.8	4332.5	62.95	43.46	32.86	17.13	1.69	13.02	2.51	26.40
Production & Supply of Electricity, Gas & Water	193.1	281.7	94.77	85.9	4.66	3.90	NA	NA	0.56	9.47
Construction	901.2	901.7	59.70	49.24	39.61	34.49	0.51	6.12	0.18	10.15
Geological Prospecting & Water Conservancy	197.3	115.1	98.33	98.18	1.67	1.74	NA	NA	0.02	0.09
Transport, Storage, Post, & Telecommunications	930.0	891.0	70.97	65.54	24.95	8.87	3.88	21.36	0.18	4.23
Wholesale and Retail Trade & Catering Services	2146.2	3153.1	44.12	22.01	35.50	13.13	20.09	60.14	0.28	4.72
Banking and Insurance	196.1	300.9	73.94	69.13	26.01	23.59	NA	NA	0.03	7.28
Real Estate Trade	44.51	89.26	89.87	70.58	8.99	7.84	NA	NA	1.15	21.58
Social Services	438.3	848.2	53.84	37.96	21.22	8.02	21.51	46.83	3.43	7.19
Health Care, Sports, & Social Welfare	399.1	461.0	80.93	87.20	17.29	12.58	1.75	NA	0.01	0.21
Education, Culture and Arts, Radio, Film, & TV	1148.2	1450.5	96.84	97.09	2.79	2.83	0.34	NA	0.02	0.10
Scientific Research & Polytechnic Services	152.4	168.4	97.11	92.04	1.97	4.16	0.79	NA	0.13	3.82
Government Agencies, Party Agencies, & Social Organizations	929.0	1084.0	97.20	99.54	2.80	0.50	NA	NA	NA	NA
Others	NA	179.8	NA	46.67	NA	11.12	NA	39.89	NA	0.84

Source: Compiled from *China Statistical Yearbook* 1999, pp. 144-147 & 154.

Table 4
Changing Role of the State Economy

Year	Number of Industrial Firms		Industrial Employment		Value of Gross Industrial Output	
	National Total (10,000)	Share of SOEs (%)	National Total (10,000)	Share of SOEs (%)	National Total (Billion Yuan)	Share of SOEs (%)
1985	518.53	1.81	5,557	68.65	971.65	64.86
1990	795.78	1.31	6378	68.42	2392.44	54.60
1991	807.96	1.29	6551	68.26	2824.80	52.94
1992	862.21	1.20	6621	68.28	3459.9	51.52
1993	991.16	1.06	6626	67.88	4840.2	46.95
1994	1001.71	1.02	6580	66.40	7017.6	37.34
1995	734.15	1.60	6610	66.52	9189.4	33.97
1996	798.65	1.42	6450	62.33	9959.5	28.48
1997	792.29	1.24	6215	65.00	11373.3	25.52
1998	797.29	0.81	4753	52.25	11904.8	28.24

Sources: Calculated from *China Statistical Yearbook*, 1992, pp. 403-404, 1997, pp. 411-412, 1998, pp. 431-432, and 1999 pp. 422-423.

Table 5
The Shares (%) of State Enterprises in the Industrial Sector (1997)

Industries	Number of State-owned Enterprises	GVIO
Coal Mining and Dressing	15.70	73.49
Petroleum and Natural Gas Extraction	62.65	91.82
Ferrous Metals Mining and Dressing	11.96	33.61
Nonferrous Metals Mining and Dressing	21.91	46.47
Nonmetal Mineral Mining and Dressing	9.05	21.39
Logging and Transport of Timber and Bamboo	61.74	93.99
Food Processing	28.81	39.20
Food Manufacturing	28.59	26.84
Beverage Manufacturing	21.53	45.29
Tobacco Manufacturing	72.61	96.87
Textile Industry	15.52	31.58
Garments and Other Fiber Products	5.43	5.08
Leather, Furs, Down and Related Products	6.89	6.21
Timber Processing, Bamboo, Cane, Palm Fiber and Straw Products	7.46	12.11
Furniture Manufacturing	6.00	5.58
Papermaking and Paper Products	11.73	26.09
Printing and Record Medium Reproduction	21.97	34.23
Cultural, Educational and Sports Goods	8.43	6.86
Petroleum Processing and Coking	14.98	82.55
Raw Chemical Materials and Chemical Products	18.05	46.51
Medical and Pharmaceutical Products	35.30	41.39
Chemical Fiber	15.79	24.39
Rubber Products	12.12	29.60
Plastic Products	7.90	9.92
Nonmetal Mineral Products	10.67	24.62
Smelting and Pressing of Ferrous Metals	14.96	70.39
Smelting and Pressing of Nonferrous Metals	15.41	51.97
Metal Products	7.87	10.59
Ordinary Machinery	13.60	30.65
Special Purpose Equipment	21.19	42.41
Transport Equipment	19.88	47.44
Electric Equipment and Machinery	12.76	16.78
Electronic and Telecommunications Equipment	18.33	22.80
Instruments, Meters, Cultural and Office Machinery	19.56	23.08
Production & Supply of Electric Power, Steam & Hot Water	36.80	72.64
Production and Supply of Gas	71.47	88.90
Production and Supply of Tap Water	43.31	80.75

Source: *China Statistical Yearbook* 1998, pp. 452-453.

Table 6
Number and Size of Industrial Firms

Industries	1997		1998	
	Number of Firms	Sales Revenues Per Firm (million yuan)	Number of Firms*	Sales Revenues Per Firm (million yuan)
Coal Mining and Dressing	11526	12.21	3202	37.20
Petroleum and Natural Gas Extraction	83	2086.36	76	2178.5
Ferrous Metals Mining and Dressing	1948	7.13	577	23.56
Nonferrous Metals Mining and Dressing	3597	9.57	1416	21.72
Nonmetal Mineral Mining and Dressing	10902	3.78	1849	15.54
Logging and Transport of Timber and Bamboo	1197	13.81	634	22.54
Food Processing	27970	12.15	11909	26.71
Food Manufacturing	14304	8.18	5368	20.86
Beverage Manufacturing	12711	11.66	3817	39.03
Tobacco Manufacturing	398	321.94	352	377.44
Textile Industry	21844	19.04	11276	34.26
Garments and Other Fiber Products	17224	9.29	6768	26.29
Leather, Furs, Down and Related Products	8634	11.77	3312	32.66
Timber Processing, Bamboo, Cane, Palm Fiber and Straw Products	14001	3.75	2487	17.84
Furniture Manufacturing	8034	3.34	1470	18.15
Papermaking and Paper Products	13094	8.23	4763	23.62
Printing and Record Medium Reproduction	14359	3.60	3863	12.94
Cultural, Educational and Sports Goods	4921	8.80	1785	28.26
Petroleum Processing and Coking	2356	107.74	1052	224.70
Raw Chemical Materials and Chemical Products	26896	15.68	11303	37.12
Medical and Pharmaceutical Products	5028	23.42	3280	38.54
Chemical Fiber	1292	62.46	803	97.07
Rubber Products	4396	15.64	1785	38.77
Plastic Products	17831	7.17	6016	22.36
Nonmetal Mineral Products	58662	5.52	14496	19.77
Smelting and Pressing of Ferrous Metals	6109	61.10	3260	118.66
Smelting and Pressing of Nonferrous Metals	4297	31.20	2405	63.83
Metal Products	28283	6.37	8132	23.96
Ordinary Machinery	27837	8.88	9282	25.34
Special Purpose Equipment	17916	10.13	6638	25.83
Transport Equipment	18332	21.51	6779	59.18
Electric Equipment and Machinery	17773	17.05	7544	43.56
Electronic and Telecommunications		50.12		108.00

Equipment	7345		4166	
Instruments, Meters, Cultural and Office Machinery	5193	11.31	1821	36.45
Production & Supply of Electric Power, Steam & Hot Water	12164	37.78	4994	100.02
Production and Supply of Gas	361	33.59	291	51.63
Production and Supply of Tap Water	5223	4.94	2363	10.98

Note *: The 1998 figures include state-owned enterprises and scaled non-SOEs which are defined as firms with sales revenue of more than five million yuan, whereas the 1997 figures include all independent accounting industrial firms.

Sources: Compiled from *China Statistical Yearbook* 1998 (pp. 444-455) and 1999 (pp. 432-437).

Table 7
Production Capacity and Output (end of 1997)

Products	Total Industry Output	Production Capacity of Key Enterprises	Ratio of Output to Capacity (R)
Coal (10,000 tons)	137,300.00	74101.00	1.853
Crude Oil (10,000 tons)	16074.14	16194.17	0.993
Natural Gas (100 mil. Cu. M)	227.03	173.97	1.305
Sugar (10,000 tons)	702.58	1028.32	0.683
Liquor (10,000 tons)	781.79	1196.47	0.653
Beer (10,000 tons)	1888.94	2686.54	0.703
Cigarettes (10,000 cases)	3377.42	3789.88	0.891
Chemical Fiber (10,000 tons)	471.62	587.07	0.803
Machine-made Paper and Paperboard (10,000 tons)	2733.20	3509.48	0.779
Sulfuric Acid (10,000 tons)	2036.87	2370.71	0.859
Caustic Soda (10,000 tons)	574.40	662.08	0.868
Soda Ash (10,000 tons)	725.76	743.67	0.976
Synthetic Ammonia (10,000 tons)	3000.28	3864.66	0.776
Chemical Fertilizer (10,000 tons)	2820.96	3624.20	0.778
Chemical Pesticide (10,000 tons)	52.67	75.73	0.695
Plastics (10,000 tons)	685.76	759.92	0.902
Synthetic Detergents (10,000 tons)	279.91	464.11	0.693
Cement (10,000 tons)	51173.80	66016.53	0.775
Plate Glass (10,000 weight cases)	16630.70	20303.79	0.819
Pig Iron (10,000 tons)	11511.41	9357.49	1.230
Steel (10,000 tons)	10894.17	10892.28	1.000
Steel-rolling Capacity (10,000 tons)	9978.93	11512.38	0.867
Metal-cutting Machine Tools (10,000 tons)	18.65	19.83	0.940
Large and Medium Tractors (10,000)	8.24	10.50	0.785
Motor Vehicles (10,000)	158.25	240.00	0.659
Motorcycles (10,000)	1033.42	701.12	1.474
Bicycles (10,000)	2999.29	6274.73	0.478
Household Wash Machines (10,000)	1254.48	2513.95	0.499
Household Refrigirators (10,000)	1044.43	2579.57	0.405
Electric Fans (10,000)	8171.42	13246.33	0.617
Air Conditioners (10,000)	974.01	3317.29	0.293
Microcomputers (10,000)	206.55	402.00	0.514
Color Television Sets (10,000)	2711.33	5069.00	0.535

Source: Compiled from t*he China Statistical Yearbook 1999,* pp. 445- 447. The ratios in the last column are calculated from the previous two columns.

Table 9
Sectoral Impact of WTO Entry

The Sectors	Impact Assessment
Agriculture	**Strong overall impact** Domestic sector at disadvantage in general. Sector-wide reallocation of labor to other sectors.
Industry & Construction	**Unclear overall effect** The impact varies among its sub-sectors. Reallocation of resources among sub-sectors. Firms to consolidate.
Tertiary **The first level**: transportation, storage, postal and telecommunications, whole sale and retail trade **The second level**: banking, insurance, geological survey, water conservancy management, real estate; services for residents, agriculture; and forestry, animal husbandry, fishery, subsidiary services for transportation and communications, comprehensive technical services, etc. **The third level**: education, culture and arts, broadcasting, movies, television, public health, sports, social welfare and scientific research, etc. **The fourth level**: government agencies, political parties, social organizations, military and police service	**Strong overall impact** Unprecedented breaking of entry barriers in the **first and second** levels of the sector, e.g. the wholesale and retail trade channels, telecommunications, banking, and insurance services. Ending of state monopoles. Many entry barriers to remain or uninterested by foreign competition in the **third** level of the sector. State monopolies to stay. The **fourth level** is naturally intact

Table 8
Major US Exports to and Imports from China, 1999 ($ millions)

Product Category	Exports	Imports	Ratio of Imp/Exp
Boilers, machinery, and mechanical appliances	2,572	10,661	4.145
Aircraft, spacecraft, and parts	2,317	29	0.013
Electrical machinery, equipment, and parts	1,985	15,804	7.962
Fertilizers	932	1	0.001
Optical, photographic, and precision instruments	792	2397	3.027
Paper, paperboard, and pulp	541	542	1.002
Plastics and articles	522	2736	5.241
Chemicals	478	1,110	2.322
Oil seeds, grains, and fruits	371	88	0.237
Vehicles	213	1190	5.587
Aluminum and articles	179	157	0.877
Iron and steel articles	140	1563	11.164
Furniture, bedding, cushions, etc.	63	6325	100.397
Footwear and the alike	41	8901	217.098
Toys, games, and sports equipment	38	12074	317.737
Ceramic products	28	920	32.857
Apparel, clothing, and textiles	7	7092	1013.143
Leather, travel goods, handbags, and similar articles	4	3217	804.25
Feather and down articles: artificial flowers, artificial human hair	2	947	473.5
All other products	1488	12057	8.103
Total	13118	87787	6.692

Note: The data in this table do not correct the official US trade statistics for trade via Hong Kong.

Sources: The last column figures are calculated from the previous two, and the rest are from Hufbauer and Rosen (April 2000).

Table ???

The Scale of SOEs and Non-SOEs

1998	Total Industrial Firms p.421	SOE + Scaled Non-SOEs pp. 432-	SOEs (including enterprises with controlling shares by the state)	Non-SOEs With Scale	Small Non-SOEs
Number of Firms	7974600	165080	64737	100,343	7,809,520
GVIO Produced (bil. Yuan)	7017.6	6773.714	3362.1	3411.61	243.886
GVIO Per Firm (mil. Yuan)	0.88	41.03	51.93	33.999	0.031

Source: *China Statistical Yearbook* 1999, pp. 421 and 432-435. The figures for Non-SOEs are calculated from available data.

References

Chen, Aimin, "Has China's State Sector Really Turned the Corner?" *mimeo*, Indiana State University, April 2000.

--------, "Unemployment and Labor Market Development in China," presented at the International Symposium on 21st Century China and Challenge of Sustainable Development, September 3-5, 1999, Washington DC.

--------, "Inertia in Reforming China's State-owned Enterprises: The Case of Chongqing," *World Development*, Vol. 26, No. 3, pp. 479-495, 1998.

Cui, Minxuan, and Zhang, Cunping, "The Comparison of Scale Economies of Chinese Enterprises," *China Industrial Economy*, No. 5, 1998, pp. 53-58.

Frazier, W. Mark, "Coming to Terms with the 'WTO Effect' on U.S.-China Trade and China's Economic Growth," *The National Bureau of Asian Research*, September 1999.

Frazier, W. Mark and Hansen, M. Peter, "China's Accession to the WTO: A Candid Appraisal from U.S. Industry," The National Bureau of Asian Research, September 1999.

Hufbauer, Gary Clyde and Rosen, Daniel H., "American Access to China's Market: The Congressional Vote on PNTR," *International Economics Policy Briefs*, April 20, 2000, Institute for International Economics.

"Market Access and Protocol Commitments," *Government Releases*, April 1999.

Research Group, the Industrial Economy Research Institute, Social Science Academy of China, "Chinese Industry's Change from Quantity Expansion to Quality Enhancing," *China's Industrial Economy*, June 1997, pp. 5-14.

Shi, Yaodong, "The Problems Facing China's Tobacco Industry and Their Solutions," *China's Industrial Economy*, Feb. 1999, pp. 42-47.

White House Fact Sheets, February 17, 2000.

Xia, Yin, "A Firm Level Irrational Production Scale Will Lead to A Runaway Cost at the Macro Level," c*hengben yu jiage ziliao (Materials on Costs and Prices)*, No. 8, 1993, pp. 37-45.

Zhou, Huizhong, "Interjurisdictional Competition in an Imperfect market: The Case of the Chinese Tobacco Industry," paper presented at an ASSA session, January 2000.

Zhou, Shulian, and Wang, Yanzhong, "The Development of Chinese Industry in the 21st Century and Strategies," *China Industrial Economy*, February 1999, pp. 5-9.