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Introduction

According to the World Bank, living standards in China (if measured using purchasing power parity) are about equal to those that existed in Taiwan twenty-five years ago (*The Economist* 1992).

The same source suggests that when incomes in China catch up to the level that exists in Taiwan today, the Chinese economy will be equal in size to the combined economies of the countries comprising the Organization for Economic Cooperation and Development (i.e., Canada, the European Union, Japan, and other industrialized countries).

If this level of development is to be achieved in China, markets will have to be allowed to work freely, which means that consumers must be allowed to increase their consumption of meat, dairy, alcohol, and fish to levels commensurate with their growing incomes. However, China must achieve this consumption growth with only 9 percent of the world's arable land. Table 1 compares China's arable land mass and population with those of the United States, Europe, and the Russian Federation. Based on the data presented

in Table 1, China must feed 13.0 people for each hectare of arable land, whereas Europe must feed 4.1 people, the United States must feed only 1.4 person, and the Russian Federation must feed 1.1 person per arable hectare.

It has become obvious to most observers that China will need to import feed grains or livestock products to achieve consumer diets similar to those of the developed world. Coyle (1996), for example, cites eight different studies, all of which project that China will be a large net importer of grains (30 million to 50 million metric tons) early in the next century.

China's switchover from a net exporter to a net importer of feed grains has enormous implications for U.S. pork producers. Countries that export feed grains, as China did in the early 1990s, must sell them at a discount to world market prices (to cover transportation costs). Countries that import feed grains must pay a premium over world market prices. Pork producers in Japan and Taiwan, for example, pay about twice as much for feed as do pork producers in Iowa.

Table 1. Arable land mass and population of China compared to data for the United States, the Russian Federation, and Europe

	Arable Land (1,000 hectares)	Population (1,000 people)
China	92,708	1,208,842
Europe	122,174	505,502
Russian Federation	129,500	147,370
United States	185,742	260,631

Source: *FAO Production Yearbook* 1994.

China is in the middle of a transition from Iowa-type corn prices to Japanese-type corn prices—a transition that will make the world's largest pork industry uncompetitive with imported products. Consider also that (1) Chinese consumer tastes are an ideal complement to U.S. tastes in that consumers in each country will pay a premium for cuts and products that consumers in the other country dislike; (2) livestock feeding industries have proven to be extremely mobile in response to economic incentives; (3) China, which currently has a larger trade surplus with the United States than does Japan, hopes to join the World Trade Organization in the near future; and (4) the United States has a large competitive advantage in supplying China with large volumes of the cuts consumers will demand at an acceptable price. This evidence suggests that U.S. pork producers currently have an unprecedented opportunity to create market growth.

The first part of this report discusses the supply and demand situation for the Chinese pork market through 2007. The second section provides an in-depth analysis of the Chinese market for pork variety meats and the potential benefits that will accrue if this market is opened. The last section lists actions that would allow U.S. pork producers to make the most optimal use of these new opportunities.

Pork Supply and Demand in China to 2007

Data on the size of the Chinese pork market is readily available, but the quality of the data is extremely suspect.

For example, the USDA, which uses disappearance data from the Chinese government, shows a per capita consumption of meat and poultry of 42 kilograms in 1996. Huang (1996) shows a per capita consumption level of less than half of this amount.

The data from Huang originate from household expenditure surveys in which consumers actually report how much they buy. The USDA (1996) data are derived by guessing how many hogs were slaughtered and then calculating how much meat had disappeared.

The survey data will miss consumption that was obtained for free, and the disappearance data will include spoiled meat and will be upwardly biased if local officials inflate their production amounts to meet production criteria. This issue is important for two reasons. First, some have looked at the high per capita numbers from the USDA and predicted a decrease in the rate of growth in per capita meat consumption as consumers reach saturation. Second, 10 percent growth from a 42-kilogram base is much greater than 10 percent growth from a 20-kilogram base.

To a certain extent, these errors will tend to offset each other because a prediction that reduces expected growth from 10 percent to 5 percent due to market saturation might well come up with the same projection as one that predicts 10 percent growth from a much smaller base.

The importance of the per capita number led Dermot Hayes, the co-author of this report, to conduct a field study on this topic during the summer of 1995.

A large potential for increased pork consumption clearly exists among rural consumers and lower-middle-class (and below) urban consumers in China. These groups together comprise about 90 percent of the population. Therefore, the projections contained herein do not include a saturation effect.

Estimates by Hayes and others show that 10 percent income growth in China will cause pork demand to increase by 6 percent. Most projections (e.g., WEFA) show continued 10 percent per capita income growth that, coupled with population growth of 1.2 percent, should cause pork demand to increase by 6 percent to 7 percent per year. This outward shift in demand will cause an increase in either prices or consumption, depending on whether or not the government allows pork imports.

Interviews with top government officials, conducted by Hayes during a second field trip in the summer of 1996, indicated that there is very little possibility that China will open its pork muscle meat market to outside competition. (As discussed in the next section, however, there is a strong possibility that the Chinese government will open the market for pork variety meats.)

In the absence of any liberalization in China's pork import policies, Chinese demand for pork will have to be met by Chinese pork producers, who in turn will increasingly depend on imported grain. The demand increase will force prices up, which will allow Chinese pork producers to modestly expand production in the face of increased production costs. Therefore, the analysis

that follows shows 2.5 percent annual growth in Chinese pork consumption.

This relatively slow consumption growth and higher internal prices will make Chinese pork exports less competitive. However, the Chinese government has shown itself willing to subsidize its pork industry and, by extension, pork exports (USDA). The Chinese government accomplishes this by subsidizing feed inputs for some smaller producers and by allowing the state-owned processing industry to operate at a loss. Most of China's pork exports consist of vacuum-packaged muscle meats. This meat appears to be of good quality and competes directly with U.S. product in some destination markets (e.g., Russia and Hong Kong).

For much of 1996, the cost of hog feed in China was RMB 2 per kilogram, or 11.5 cents per pound (Hope Group). Using the feed conversion factor obtained by the best operators (3.6:1) implies a *feed cost* of about \$40 per hundredweight, which is about equivalent to the total U.S. cost of production. (U.S. feed costs ranged from 5 cents to 8 cents per pound over the same period.) Add to this U.S. feed cost advantage a quality differential of about 30 percent, reflecting the poor carcass composition of much of the Chinese inventory (attributable in part to low protein in hog diets) and the presence of foot-and-mouth disease in China. Also, the Chinese packing and transportation industries operate at a much lower level of efficiency than do the U.S. industries. These U.S. advantages imply that, in the absence of subsidies, China cannot compete against the United States at *today's* costs.

As China's production costs grow within a protected environment, the U.S. advantage will increase. Although a more formal analysis of these subsidies would be required to prove a World Trade Organization (WTO) case, U.S. pork producers would benefit from a WTO entry agreement for China prohibiting direct and indirect use of export subsidies.

Projections

As mentioned, the Chinese government places a strong emphasis on self-sufficiency in pork. This stance means that China's negotiators at the WTO accession meetings will request permission to maintain the current de facto ban on pork imports. However, the United States is in a position to obtain some concessions from China, and one of these concessions might be to open China's pork market. Therefore, two sets of projections—each representing one of the above outcomes—are presented. Both scenarios assume that Chinese pork exports will decrease. In the self-sufficiency (baseline) scenario, the decrease occurs because internal prices increase. In the WTO concession scenario, the decrease occurs because free trade in pork products precludes subsidized exports.

Both scenarios assume that consumption and production level off for the next two years as the market responds to the current surplus of frozen pork and relatively high production costs (see Figures 1 through 4). After 1998, the WTO concession scenario shows 4 percent growth in per capita

consumption and zero growth in production. (Note that the 4 percent growth figure is lower than the 6 percent figure mentioned earlier to account for the overestimate of consumption levels inherent in the USDA data.) The self-sufficiency scenario shows 2 percent annual growth in both production and consumption.

By construction, the self-sufficiency scenario shows a no-trade situation throughout the projection period. The WTO scenario shows a very large import level (exceeding U.S. production).

These figures make a simple point. China is in the process of building a pork industry in the wrong place. Pork that should be produced in grain-surplus countries will be produced at great expense in a grain-deficit country. This misallocation of resources will cause Chinese pork prices to be much higher than would otherwise be the case and will divert Chinese investment in agriculture away from other, more lucrative, opportunities.

The costs of this misallocation will increase over time as China tries to extract more and more pork from a limited supply base. Eventually, China will be forced to import some pork to reduce food prices—much as has happened in South Korea and Japan. However, Chinese policymakers will work to delay this date. China's concern about pork self-sufficiency can be understood when one considers the enormous quantity of pork (12 million metric tons) that China would require under the WTO scenario. Chinese policymakers are concerned about the possibility of an embargo or pressure to

change their economic and social

policies



Figure 1. China: Pork Production, 1986-2007

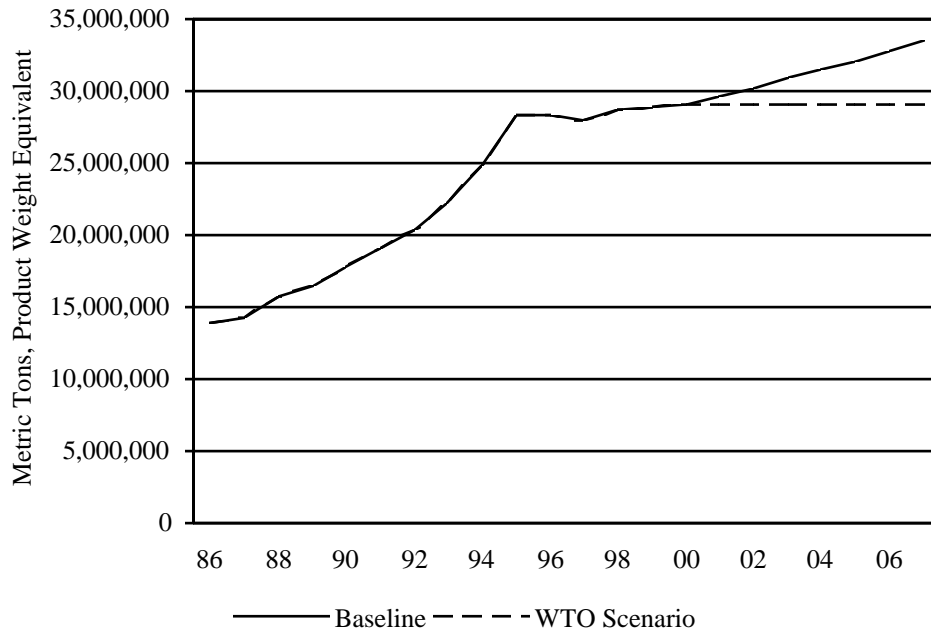


Figure 2. China: Pork Consumption, 1986-2007

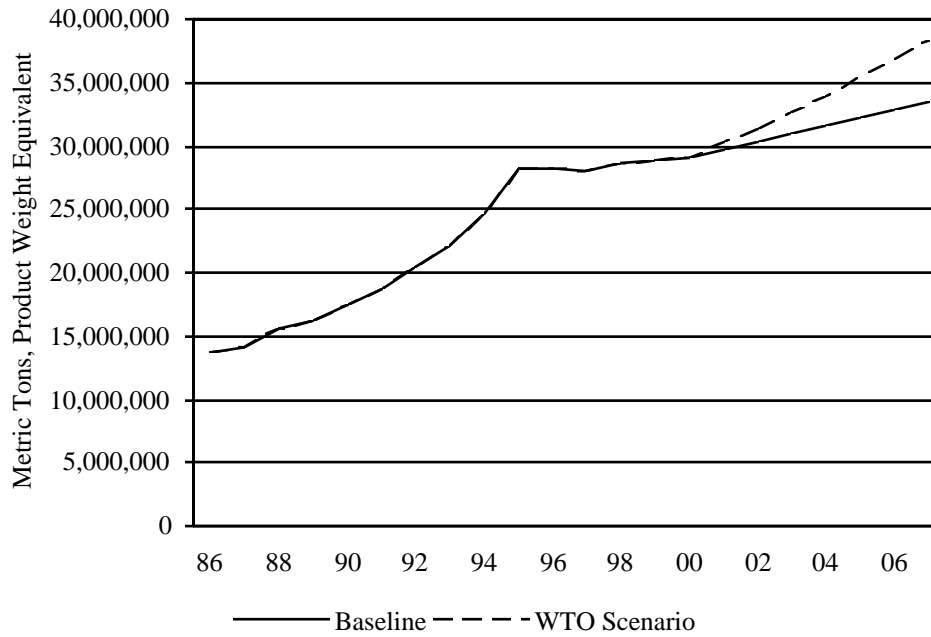


Figure 3. China: Pork Imports, 1986-2007

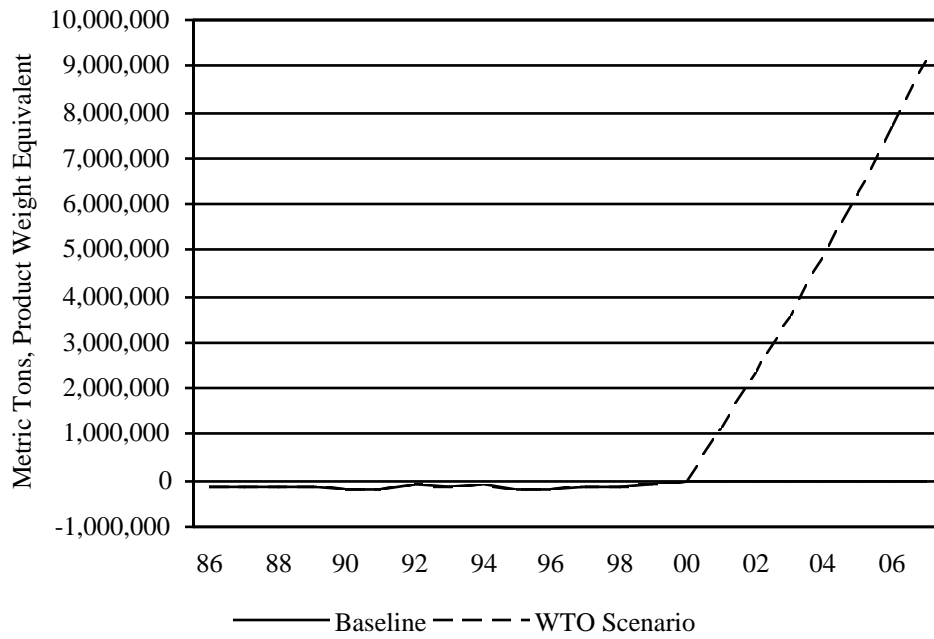
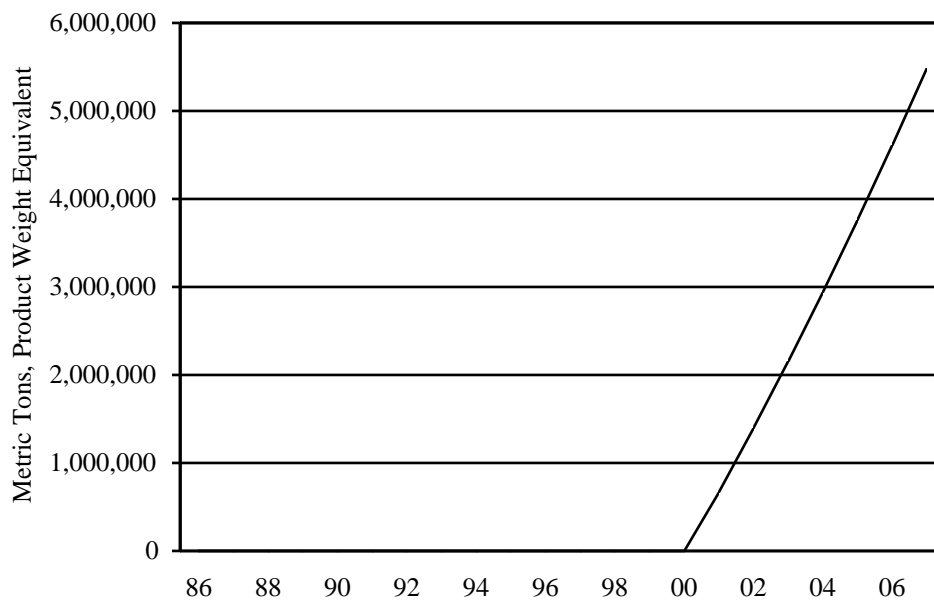


Figure 4. China: Imports of U.S. Pork under WTO Scenario, 1986-2007



in response to the threat of a trade war. Curiously, this concern is less important when it comes to grain imports.

The restrictive trade policy will cause Chinese pork prices to rise above world market levels, and China's pork industry will evolve in a manner similar to that of Japan. There is some good news for U.S. pork producers from this scenario. China has been exporting between 150,000 and 200,000 metric tons of pork muscle meat (excluding live animal exports to Hong Kong) and these exports should decline to zero over the next five years.

Also of relevance is the perception among Chinese policymakers that such enormous quantities of imports would drive world pork prices up so high that pork would no longer be affordable. This latter concern is clearly false because pork prices in China will be much higher under the baseline scenario than under the liberalization scenario.

The level of concern about self-sufficiency among the senior policymakers encountered by Hayes caused him to conclude that it is extremely unlikely that China will eliminate its current ban on pork imports as part of the WTO process. However, it may be possible to get an agreement to tariff the ban or to agree to liberalize at some future date. Work to achieve these goals is probably the most important policy-related work that U.S. pork producers can undertake. And because policy-driven change is likely to have an impact on pork exports to China, one cannot justify using a large portion of market development funds to promote muscle meats at this time.

There is, however, one possible market opening that is achievable as part of WTO that, if accepted, would be of immediate benefit to U.S. pork producers. This objective would be to obtain immediate and unlimited access to China's pork variety meat market. This topic is the subject of the following section of this report.

The Potential Market for U.S. Pork Variety Meats in China

Chinese consumers view products such as loins and tenderloins as uninteresting and lacking in taste. Chinese dishes call for small pieces of strong-tasting products, and Chinese consumers will pay accordingly.

During a May 1996 visit, Hayes collected the prices shown in Table 2 for pork and pork variety meats at Chinese wet markets and wholesale markets. The prices are presented both in U.S. dollars per pound and as the ratio of the meat or variety meat price to the loin price in order to avoid errors due to currency valuation.

The direct price comparison shown in Table 2 is somewhat suspect because of production subsidies in China, questions about the exchange rate, and the various locations from which the prices were collected. The price ratios are, however, an accurate measure of the taste differences that exist between Chinese and U.S. consumers. For example, pork stomach sells at a 50 percent premium to loins in China, whereas stomach sells at 40 percent of the loin price in the United States. Lungs sell at only 2 percent of

the loin price in the United States but at 20 percent of the loin price in China.

The reason these ratios are so different is that, until recently, China has protected its variety meat market. Discussions between the author and numerous individuals along the Chinese pork chain indicate that Chinese restrictions on pork variety meat imports are currently under review. One reason for this review is that the market price differences shown in Table 2 are creating a large and very visible black market in imported variety meats (mostly from the United States). The Chinese government's attitude seems to be that some control over this market is better than no control. Also, the Chinese government is acutely aware of recent food price inflation, especially in urban areas. Imported variety meats are viewed by urban Chinese as being much more palatable and more attractive than the frozen split sides currently on offer from Sichuan province. Chinese pork producers realize that they cannot produce sufficient variety meats to satisfy local tastes without producing a surplus of loins.

These factors suggest that the United States could quite easily obtain a variety meat exemption as part of the WTO accession agreements, and it is useful to speculate as to what might happen if Chinese restrictions on variety meat imports were lifted and a low or zero tariff was applied to imported variety meats.

Recently, China permitted the importation of selected variety meats for sale in hotels. The official tariff on these imports was 44 percent, to which a 17

percent sales tax was added.

Discussions between Hayes and Mr. Yao, the individual who imported these products, suggest that after paying tariffs and sales tax, the variety meats imported under the official exemption were just competitive with smuggled imports. This competitiveness would suggest that the tariff equivalent of the current ban is between 40 percent and 50 percent.

Likely suppliers to China's variety meat market, should it be opened, would include the United States (with annual production of 8 million metric tons), Canada (production of 1.2 million metric tons), Denmark (production of 1.5 million metric tons), and the Netherlands (production of 1.36 million metric tons). Exporters that value variety meats (Eastern Europe, Taiwan, and Mexico) would not be in a position to supply this market. These potential exporters have a combined production of 12 million metric tons, carcassweight equivalent. Contrast this with Chinese production of 36 million metric tons and it becomes clear that variety meat prices in the rest of the world would tend to rise to Chinese levels, rather than for Chinese variety meat prices to fall to world levels. In other words, China would be the dominant market in pork variety meats.

To calculate the impact of this liberalization on the U.S. pork industry, we need to calculate the effect on U.S. drop credits of the removal of a 40 percent to 50 percent tariff. Because U.S. prices would *rise* to Chinese levels, this is equivalent to asking what a 40

Table 2. Price comparison for pork cuts and variety meats in China and the United States

	China Price (\$/lb.)	Ratio of Product Price to Loin Price in China	U.S. Price (\$/lb.)	Ratio of Product Price to Loin Price in U.S.
Loin	1.20	N/A	1.32	N/A
Lung	0.24	0.20	0.03	0.02
Pork Stomach	2.16	1.50	0.54	0.40
Pork Kidney	1.56	1.30	0.17	0.13
Lard	0.72	0.60	0.25	0.19
Feet	0.87	0.725	0.20	0.15
Boneless Butt	1.20	1.00	0.81	0.61
Ham	1.27	1.06	0.84	0.63
Tongue	1.61	1.35	0.55	0.41
Small Intestine	0.70	0.50	N/A	N/A
Large Intestine	0.38	0.31	N/A	N/A
Nape of Neck (incl. bones)	1.32	1.10	0.10	0.07
Head Mask	0.33	0.28	N/A	N/A

percent to 50 percent increase in the U.S. drop credit would mean.

Prior to the recent surge in U.S. pork variety meat exports, U.S. drop credits averaged \$6.50 per hog. More recently, the drop credit has risen to about \$10.50 per animal as exports have grown. This drop credit does not include all the items that could possibly be exported under such a ban, such as lard and ears, but it is a reasonable approximation of the current value of these products. A 45 percent increase in the U.S. drop credit would add \$4.72 to the value of each hog carcass, or about \$1.90 per hundredweight.

This additional value would eventually make its way back to U.S. hog producers, and it would do so without increasing retail pork prices in the United States. In fact, the U.S. broiler industry has discovered that new export

markets for chicken legs and wing tips have actually reduced the cost of producing chicken breasts, thereby allowing U.S. poultry producers to become more competitive on the U.S. domestic market while at the same time improving profits.

Because U.S. hog producers and U.S. and Chinese pork producers would benefit from such a move while causing only a very small reduction in Chinese hog prices, almost all participants would benefit from such a change. Therefore, it should be possible to obtain some concession in this area during the WTO accession talks. The net annual benefit to the U.S. pork industry of such a concession would be approximately \$300 million per year.

Conclusion

Chinese agricultural resources—if used efficiently—would favor labor-intensive crops such as vegetables and fruits. This land use pattern would not include feed-grain production because feed grains are land intensive and labor extensive. When China becomes an importer of feed grains, Chinese grain prices will increase dramatically, reflecting international grain transportation costs. Because it is so much less expensive to transport boneless boxed pork (\$0.14 per pound from Iowa to China) than the feed-grain equivalent (\$0.54 for the feed-grain equivalent of one pound of pork), future growth in Chinese pork consumption should, in theory, come from imported pork products. However, the enormous volume of China's import needs (12 million metric tons), coupled with a very strong desire among Chinese

policymakers for pork self-sufficiency, makes it very unlikely that China will open its pork muscle meat market in the near future. Funds spent by U.S. pork producers to move forward this liberalization will be well spent.

Chinese consumers are perfect complements to U.S. consumers in that they each like the parts of the animal the other dislikes. It is the authors' opinion, based on 20 days of interviews with Chinese officials and pork industry representatives, that China is prepared to open its variety meat market. Such a move would allow Chinese consumers access to products they view as delicacies and that are not effectively used in the United States, and would add about \$300 million to revenues earned by U.S. pork producers without increasing pork prices on the U.S. domestic market.

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