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CONFERENCE
PROCEEDINGS

Objective
Analysis
for Informed
Decision Making

China's Role in World Livestock and Feed Grain Markets

Dermot Hayes

Introduction

When we look back at trends that shaped U.S. agriculture in the 1990s, one of the most important may well have been the impact of the economic and dietary changes that are taking place in China. In the years since the Great Leap Forward, China has been transformed from a country that did not meet the basic food needs of its people to one that should be able to provide meat, poultry, dairy products, and even alcohol to a majority of consumers within twenty years. It will have achieved this by allowing markets to work and by utilizing China's comparative advantage. To meet this potential, China will need to change many of the food and trade policies that are currently in place. If China makes changes in its food and trade policies to fulfill consumer food needs, the United States will experience a large and sustained growth in agricultural exports and U.S. farmers should temporarily benefit from strong prices. The purpose of this paper is to describe the type of policy changes that might take place in China and then discuss what these changes would mean to U.S. farmers.

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Policy Changes

When one speaks with senior Chinese policymakers, certain features stand out. First, there is an amazing amount of similarity in their views. Second, they all agree with the importance of China maintaining self-sufficiency in food. Third, many seem to have a very unsure grasp of market economics. For example, they seem to believe that food consumption and food expenditure patterns can be controlled by the government. They also appear to believe that any Chinese food imports would cause world food prices to rise to such an extent that Chinese food prices would be higher under free trade than under self-sufficiency. The general consensus among these senior leaders is that China can continue to experience rapid per capita income growth while meeting all or most of the food needs of its people through increases in domestic production. This is to be achieved by creating new arable land, increasing yields, and encouraging people not to consume grain-intensive products such as pork and alcohol. This line of argument is so ingrained and the self-sufficiency outcome is so strongly desired that it is easy for the Chinese to believe that it will happen simply because so many people wish it to be so.

There is a fundamental problem with the logic behind China's self-sufficiency argument. China has about 6 percent of the world's arable land (see Figure 5). But China has about 21 percent of the world's people (see Figure 6). To achieve self-sufficiency, China must feed five people for every acre of arable land, an achievement that is possible only if the diet is restricted primarily to grains. Meat, eggs, dairy products, and alcohol are all very inefficient ways to consume grain. Countries can achieve a more

Figure 5. Share of World Arable Land

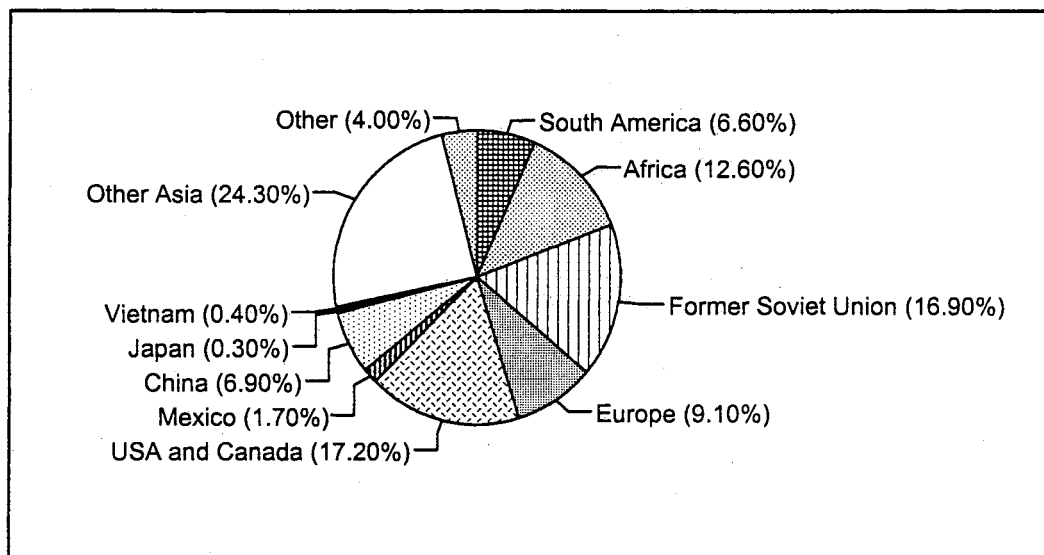
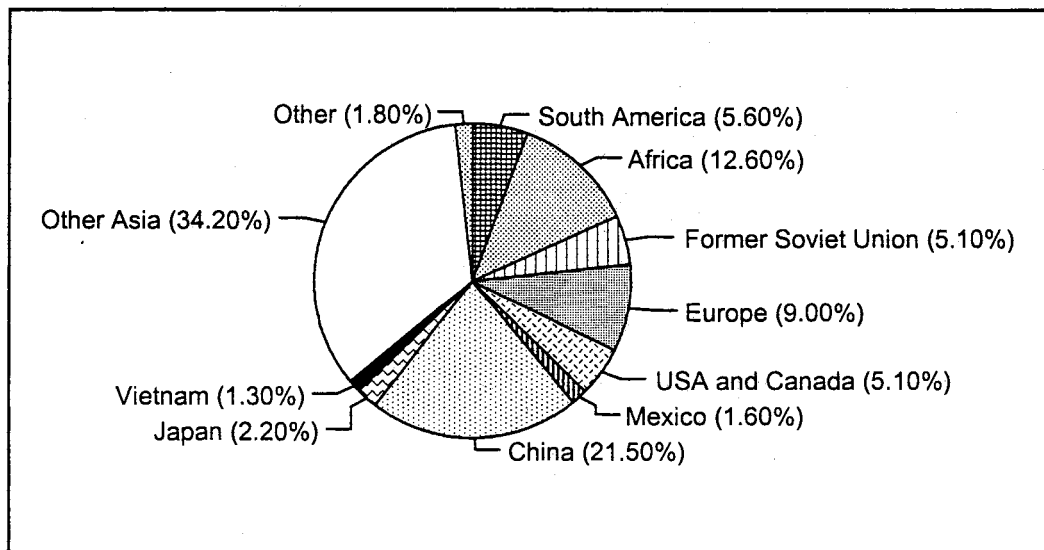


Figure 6. Share of World Population



variable diet only by having a proportionate share of arable land, as do the United States and Europe, or by importing foodstuffs, as do Japan and South Korea. Chinese officials argue that yields can be increased and that more land can be brought under the plow. But yields and land utilization are already quite high in China. Some of the proposed new lands have not previously been tilled for very good reasons.

Other features that stand out on visits to China are the intelligence, work ethic, entrepreneurial skills, and language abilities of the younger generation. Also evident is the lack of any real government control over market forces. The Beijing government may, for example, dictate a maximum retail price for pork, but this has little meaning in distant provinces where most hogs are slaughtered for private markets. A great bulk of the rural Chinese seem to perform enormous amounts of hard labor, not because of government dictates, but because they too want to experience the varied diet and the prosperity of their urban and Western counterparts.

Most economic forecasters believe that these labor-intensive efforts will pay off. They project that Chinese per capita incomes will continue to increase at 6 percent to 8 percent annually for the foreseeable future. In order to meet these projections, China will have to continue to free the economy and find export markets for the labor-intensive goods and textiles that it will have in such great surplus. To do this, it will want access to world markets, and this can best be achieved if China becomes a member of the World Trade Organization. Pressure from this body and a gradual realization that a Japanese-style food self-sufficiency policy will lead to Japanese-style food prices should eventually overcome the insecurities associated with food imports. A likely scenario is that China will allow a gradual opening of food markets in return for multiyear access to U.S. and European textile markets. The opening will be phased in over a five-to-fifteen-year period and will probably exclude rice and some other politically important commodities.

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What Will Chinese Trade Liberalization Mean to the U.S. Farmer?

With all of the details that have yet to be worked out, it is premature to attempt a precise evaluation of the outcome of any Chinese trade liberalization. Economic models can be used; but these economic models offer, at best, a more formal structure within which the data can be analyzed and the projections made. Those models that have been used to make Chinese import projections (in the absence of a trade agreement) have a disturbing tendency to agree that in ten years China will need to import about 30 million tons of grain. None have projected any meat imports. The fact that the models tend to agree on what is really the difference between two enormous numbers (Chinese grain consumption and Chinese grain production) shows the subjective nature of these formal modeling processes. However, economic theory has a lot to teach us about what might happen. It is worth reviewing what the theory suggests. Economic theory is much less definitive than a formal model, but the results deduced from theory are more intuitive and understandable. The economic theory, once explained, allows one to make his or her own subjective judgment. The balance of this paper describes what economic theory tells us and uses theory to make general projections about what might happen if China frees up food and agricultural markets.

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The Factor Price Equalization Theorem. This concept of economic theory is known among economists, but it raises eyebrows outside of academia. The theorem states that under free trade in goods and in technology and capital, wage rates (adjusted for education) will be about equal in every country. This will occur even if labor is *not* allowed to emigrate. The intuition is that labor rates depend on labor productivity and that as long as capital and technology can move, wages in poor countries will rise as industries adopt new technologies that allow them to increase labor productivity. This does not mean that U.S. wages will fall if we have free trade with China. Rather it means that Chinese wages would increase gradually to catch up with U.S. wages.

The Heckscher-Ohlin-Vanek Theorem. This economic model states that countries will export those products that use intensively those factors with which the countries are relatively well endowed. Countries will import commodities that use intensively those factors that are relatively scarce in their countries. For example, countries with an abundance of copper will export products that require a large amount of copper. China is well endowed with people and poorly endowed with land. In contrast, the United States and Canada are well endowed with land and have relatively few people. Feed grains and feed grain products such as meats are land intensive. With modern technology, feed grains do not require a lot of labor for production. The implication of this theorem is that as China opens its economy to trade, it will tend to expand production of labor-intensive crops, such as fruits and vegetables, and reduce feed grain production. This is exactly what happened in South Korea and Japan after those countries partially opened their markets. However, the possibility of China expanding production of labor-intensive crops and reducing the production of feed grains is the opposite of the plan that has been adopted by the current Chinese leadership.

International Dietary Convergence. Research suggests that when people are exposed to the same set of relative prices and experience the same income levels, then the composition of their diets will eventually converge. The implication is that the vast differences in dietary patterns we see around the world are driven by different relative prices. In other words, the market works so that people eat the foods that are available.

If markets are liberalized so that new foods become available at affordable prices, then the diet will eventually change. This is a very gradual process. It will take many years before relative prices in China are the same as those in the United States. It will take many years after that before menus and tastes fully adjust. But, the trend is clear. China will eventually see an increase in per capita meat consumption from a current estimate of 17 kgs per capita today to the 80 kgs that is common in Europe or the 100 kgs per year that we consume in the United States.

Meat or Grain Imports?

If China does become a *feed grain* importer, will it import meat or feed grains? We know that livestock production is capital intensive (just ask any farmer with a feedlot pen full of market-ready steers). So it makes more

sense to add value to livestock in countries like the United States that are capital rich. China is capital scarce. This means that real interest rates in China will be high. All else being equal, this would suggest that China would import the capital-intensive product (meat) as long as it is practical to do so using available transportation technology. It is now possible to transport boneless boxed meat from the interior of the United States to Asian markets for as little as \$0.14 per pound. It takes only \$0.06 to transport a pound of grain to an Asian farmer. But a pound of boneless-boxed pork or beef contains 8 to 16 pounds of grain. So the transportation argument also favors meat imports.

The way in which these economic forces will become evident is as follows. First, China will become a reliable importer of grain. Second, Chinese grain prices will rise to world prices *plus* transportation costs. This in turn will mean that Chinese feed rations will be about twice as expensive as those in the United States. Third, Chinese animal feeders will be unable to overcome this feed cost disadvantage because capital costs in China will also be greater than those in the United States. Fourth, imported meat will arrive in Chinese ports at a price that is lower than the cost at which Chinese meat can be produced. These economic forces, coupled with a Chinese preference for those parts of the carcass least in demand in the West, make it likely that imported meat will eventually dominate the market. Much of this meat will come from the United States because it has the land and capital resources that are required.

Conclusions

Combining these ideas means that Chinese incomes will continue to grow rapidly. Higher income levels will create a demand for a diet that is similar to that in wealthy countries such as the United States or the European Union. Not only will total feed grain requirements rise as meat consumption increases, but this will happen at a time when Chinese feed grain production is falling. At first, the Chinese government will oppose grain imports. Then the Chinese government will relax grain import restrictions and restrict meat imports. Finally, in about twenty or thirty years, meat imports will begin with a trickle and turn to a flood. China will eventually consume more U.S. meat products than will be sold on the U.S. domestic market.

Such economic reasoning and the resulting conclusions may seem particularly optimistic for U.S. agriculture and pessimistic for Chinese agriculture. In fact, many Chinese officials have become very concerned about similar predictions made by Lester Brown, a well-known author on world food security who has predicted that China will cause worldwide food scarcity. However, there is more to the story. Economists also believe in the ability of markets throughout the world to respond to additional needs. Higher prices will draw forth additional supplies, along with the technologies that are needed to ensure that yields and production rise to meet the challenge. The long-run supply curve is not flat, but as experience in the European Economic Community in the 1970s has shown, farmers can greatly expand production when the price is right. The projected delays in the implementation of the reforms will also work to stabilize markets.

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About the Author

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These trends will occur over a period of twenty or thirty years. This will allow the farmers in food-exporting countries to increase production to meet the challenge. Prices will rise when the demand increase is unanticipated but otherwise should reflect actual production costs. Production costs will rise in part because land prices will rise to absorb any benefits. Chinese consumers will have access to inexpensive food and a varied diet.

The implications of the above are that (1) market development efforts in China will eventually pay off, although this return may be many years in coming; (2) U.S. feed grain farmers will soon lose a competitor (China) and gain a customer (China); (3) U.S. feed grain exports will increase, and these exports will eventually be replaced by meat exports; (4) profits to feed grain and meat producers will be good in the years when exports expand most, but these profits will not continue indefinitely; (5) these trends will cause U.S. land prices to grow at a higher rate than would otherwise have been the case.