Testimony before the US-China Economic and Security Review Commission: China's Agriculture Policy and US Access to China's Market

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Testimony by Dermot Hayes, Professor of Economics and Finance, Pioneer Chair in Agribusiness, Iowa State University, April 25, 2013

Question

What will be the impact of China's rising incomes and urbanization on food demand in China? In particular, how can China's large population shift to a protein-based diet?

Response

Let me begin with some background material to put the issue in perspective.

In an effort to slow the conversion of cropland to residential and commercial use, the Chinese government recently set a red line minimum of 120 million hectares of arable land. This area is about 20% smaller than the 360 million acres of cropland we have in the US. However, the Chinese definition of cropland is more generous than in the US because Chinese farmers plant crops on hillsides and in areas that would be used for pasture in the US. If we use an "apples with apples" definition of arable land, the US has more than twice the area available to China, yet China feeds more than four times the US population. This is a remarkable achievement and speaks volumes about the resourcefulness of the Chinese people.

It is worth asking how China managed to achieve its current level of food self-sufficiency before asking whether it can continue to do so. As you consider how it achieved this success, think about the rapid decline in the Chinese labor force and unprecedented movement of young people from rural to urban areas, and ask if this can continue.

How Does China Manage to Feed So Many People?

First, China has traditionally used its vast labor resources to plant multiple crops on the same acre within the same year. In order to maximize the number of crops per growing season, harvesting crews rush to gather one crop and then quickly plant a new crop. Most of the harvesting and planting is done by hand.

Second, Chinese livestock growers have in the past used farm, household, and restaurant waste to feed animals. As recently as five years ago, half the pigs produced in China came from these backyard units. Here again, China managed to stretch its land resources by utilizing labor. In this case, the labor was used to collect and process the waste as a substitute for commercial feed.

Third, and as mentioned above, Chinese farmers have traditionally cultivated places such as hillsides and rocky areas that could not be accessed by mechanized agriculture. They also grew crops in areas that would be considered too dry or infertile in the US. Here again labor acted as a substitute for land.

Fourth, Chinese consumers responded to the relative scarcity of animal protein by developing a cuisine that utilizes the entire animal. Consumers in the US utilize approximately one-half of

each live animal as muscle meat. The rest of the animal is rendered. Consumers in China value every single part of the animal and will often pay a premium for items such as chicken feet, fish heads, and pork ears. My own assessment based on several very interesting meals in China is that one hundred percent of every animal is eaten. By utilizing a much greater share of the animal for human consumption, scarce protein resources are stretched.

Finally, and out of necessity, many rural Chinese survived on a starch-based diet. As recently as 1990, Chinese consumption of beef, pork, and poultry was only one-third of the levels consumed in China today.

Looking towards the future, rapid urbanization will continue to reduce the tens of millions of farm workers who have been responsible for this miracle of production; and as these workers leave, the labor needed to grow multiple crops on the same acre and collect waste to feed to animals and cultivate land that cannot be mechanized will disappear. Meat consumption data shows that as families move from rural to urban areas meat consumption grows dramatically. These same families will need a place to live and, unless the central government can somehow bring new construction to a halt, China will continue to lose about 2.5 million acres per year to urban development. Couple this actual reduction in land area with the "land" that is lost as labor resources in agriculture decline and China is losing about 3% to 4% of its land area every year at a time when demand for land-based products is skyrocketing.

Figure 1 in my report shows the phenomenal growth in animal feed consumption that has taken place since 1990. This trend is projected out for ten years. To put this trend in perspective, if we assume that all of the additional corn and soybeans required to meet this anticipated demand is grown on land with a per acre yield equal to that achieved in the US in 2011, the additional feed will require an additional 70 million acres. Compare this to the 23 million acres in Iowa or the 25 million acres that have been devoted to corn ethanol in the US. Given the extreme scarcity of land in China and the need to add more acres for labor-intensive crops, it seems highly unlikely that China will find the additional acres to meet this new demand.

So where will China find the millions of new acres it needs? It will find them in the same place it found the protein used to expand meat consumption since 1990. It will import these acres.

Figure 2 shows the Chinese soybean market since 1990. As can be seen, ALL of the additional soybeans used to expand livestock production were imported. In fact, Chinese soybean production has fallen since 1990, and is now just enough to meet the domestic human food demand. The total number of "acres" of soybeans, cotton, and coarse grains imported in 2012 hit 70 million (again using US yields to translate tons to acres—see Figure 3). This all happened in the past twelve years.

Until recently, China was able to avoid significant imports of corn. However, as backyard production, multi-cropping rates, and the total area of cropland continues to fall, corn imports will be required to balance the imported soybean meal in rations. The only obvious alternative is for China to import a significant amount of animal protein.

Under similar economic and demographic forces, Japan and South Korea first shifted to a 100% reliance on imported feed and then began to import 40% to 50% of their meat supplies.

Question

Is China's attempt to remain self-sufficient in meat and key staple crops viable given the country's inherent supply constraints (e.g., declining arable land, decreasing aquifers, and extreme water, air and soil pollution)? To what extent can China raise productivity in order to enhance supply, particularly in the corn, pork, and poultry sectors? If this effort requires an increase in the use of fertilizers, won't this also cause further degradation of the water that would be required for enhanced crop production? What are some of the (1) technology- and (2) policy-based measures that China might pursue?

Response

I will deal first with the question of whether China will remain self-sufficient in meat. This is a key issue for US livestock producers. If China imports corn and soybeans, this will drive up feed prices in the US to the detriment of the US livestock industry. However, if China buys livestock products, it will create a new customer for US livestock producers.

Import meat or feed?

There seems to be a very strong preference in China for self-sufficiency in meat, especially in pork. China currently imposes significant technical and economic barriers on US beef, pork, and chicken. If China continues to close its borders to imported meat, it will be able to maintain self-sufficiency in these products. The laws of supply and demand will work and Chinese meat production will rise to meet demand. The only real issue is the prices that consumers will need to pay for this achievement. Japanese consumers were once willing to pay enormous prices for domestically produced livestock products, and it is possible that Chinese consumers will put up with the same price pressures.

The reason that meat produced with imported feeds is so expensive is that the costs of shipping bulky feed all the way to an Asian port and then via truck to farms is expensive. Soybean meal prices in China are typically $100 per ton higher than in the US, and corn is typically $3 per bushel higher. These price differences simply reflect international transportation costs.

Based only on the difference in feed costs alone, Chinese pork production costs and farm-level livestock prices would be 40% greater than in the US. In contrast, US meat packers can transport frozen meat to China for a transportation cost equal to 5% of the Chinese domestic price.

The cost of production comparison described above works so long as animal productivity is similar in both countries. My own research has shown that as China has added to the density of livestock production, animal disease problems have been exacerbated. This problem is so bad that China has experienced reduced animal productivity (see Figure 3). This figure compares the

productivity of US and Chinese sows over the past 30 years. Notice how US productivity has increased while Chinese sow productivity has fallen.

Because of persistent disease issues and expensive livestock feed, Chinese pork production costs are now at least twice as high as in the US. This differential will continue to increase unless China can get the disease issue under control.

The cost to consumers of achieving meat self-sufficiency is enormous and this objective means little so long as the animals are fed on imported feed. The burden is borne disproportionally by low-income households who would otherwise have been able to increase their animal protein intake. The bias against meat imports also eliminates the possibility of stabilizing prices when domestic production is low.

Even if livestock production cost were identical in both countries, there would be an opportunity for profitable trade based only on differences in preferences and tastes. The US has a surplus of exactly those parts of the animal that Chinese consumer's prize, and as a result, the delivered prices of some items are often one quarter of the cost of producing these items from domestic producers.

Ultimately, this issue will be decided by the veterinary experts that have been brought in to address the disease issues and by the willingness of Chinese consumers to sacrifice food affordability for food security. Consumers may eventually rebel against this policy much as they have done under similar circumstances throughout human history.

How best to increase productivity?

(a) Increase Corn Yields

Now to the second part of the question about how China can increase productivity. China still produces an enormous amount of corn and it generally experiences yields that are more than 40% lower than in the US (see Figure 4). One reason for low yields is that China uses a much lower planting density for corn. It does so because corn is still hand planted, and because farmers need to weed between the corn plants by hand. One solution would be to adopt genetically modified varieties so that weeds can be sprayed instead of hand cultivated. In addition, China could encourage a switch to mechanical cultivation with higher planting densities.

US seed companies have developed varieties designed to perform at very high planting densities. Research has shown that these US varieties can potentially provide a 20% boost in corn yields if they are adapted to Chinese conditions.

However, so long as property rights are weak in China, US seed companies do not have the incentive to adapt their very best varieties to Chinese conditions. The solution is to protect the property rights of plant genetics companies with the same vigor used to eliminate counterfeit copies of the Beijing Olympic mascot.

(b) Improve Animal Productivity

China prohibits the use of all beta agonists including Ractopamine. This product is in use in the US for pigs, and for cattle in the US, Brazil, Japan and Canada. Last summer the international

food standards agency of the UN, the Codex Alimentarius adopted a minimum residue level that implicitly acknowledged that the product is safe. Ractopamine can increase feed efficiency by as much as 15% and it allows producers to grow larger leaner animals. China can save millions of tons of feed by adopting the international standard.

(c) Increase the Productivity of Farm Workers

The greatest opportunity for increasing Chinese farm productivity is to allow the farm workers who currently grow land intensive crops such as corn, to switch to crops where China has a comparative advantage. Consider the human resource waste when a skilled farmer spends an entire year growing three acres of corn in a world where a single US farmer can grow three thousand acres. If China were to allow the market to incentivize these farmers to grow high value crops such as flowers, fruits, vegetables and ornamental plants, total farm income and the value of farm output would soar. The US can play a role by importing these products to the benefit of US consumers.

Question

What are the main challenges to US-China agricultural trade, in the (1) short, (2) medium, and (3) long terms?

Response

I will give a brief overview of the current trade issues and would be happy to provide a more detailed description during my oral testimony if needed.

Short Run Challenges

The short-run trade issues involve US restrictions on the importation of Chinese poultry products and Chinese restrictions on US pork (ractopamine), beef (BSE), and chicken parts (anti-dumping). On the US side, the general distrust of Chinese food quality standards by US political officials needs to be addressed. It seems unlikely that China will purchase US livestock products so long as the US restricts imports of Chinese cooked poultry.

Medium Run Challenges

Medium term challenges involve China's refusal to accept technologies such as genetically modified varieties of corn and wheat, and animal performance innovations such as Ractopamine. The currency manipulation issue will also continue to cause strains. US political leaders should realize that negative statements they make about China are widely reported on in China and that these comments are used to reinforce the arguments of those in China who favor food security and protectionism.

Long Run Challenges

The US and China need to find a way to allow enormous trade flows without the on again/off again price volatility that we have experienced over the past couple of decades. The US farmer does not really need a new customer who buys enormous quantities one year and disappears the

next. China does not want a supply source that it cannot rely on. This problem can be resolved by use of long term production contracts and the commitment by both governments not to interfere with deliveries made under these contracts.

Appendix

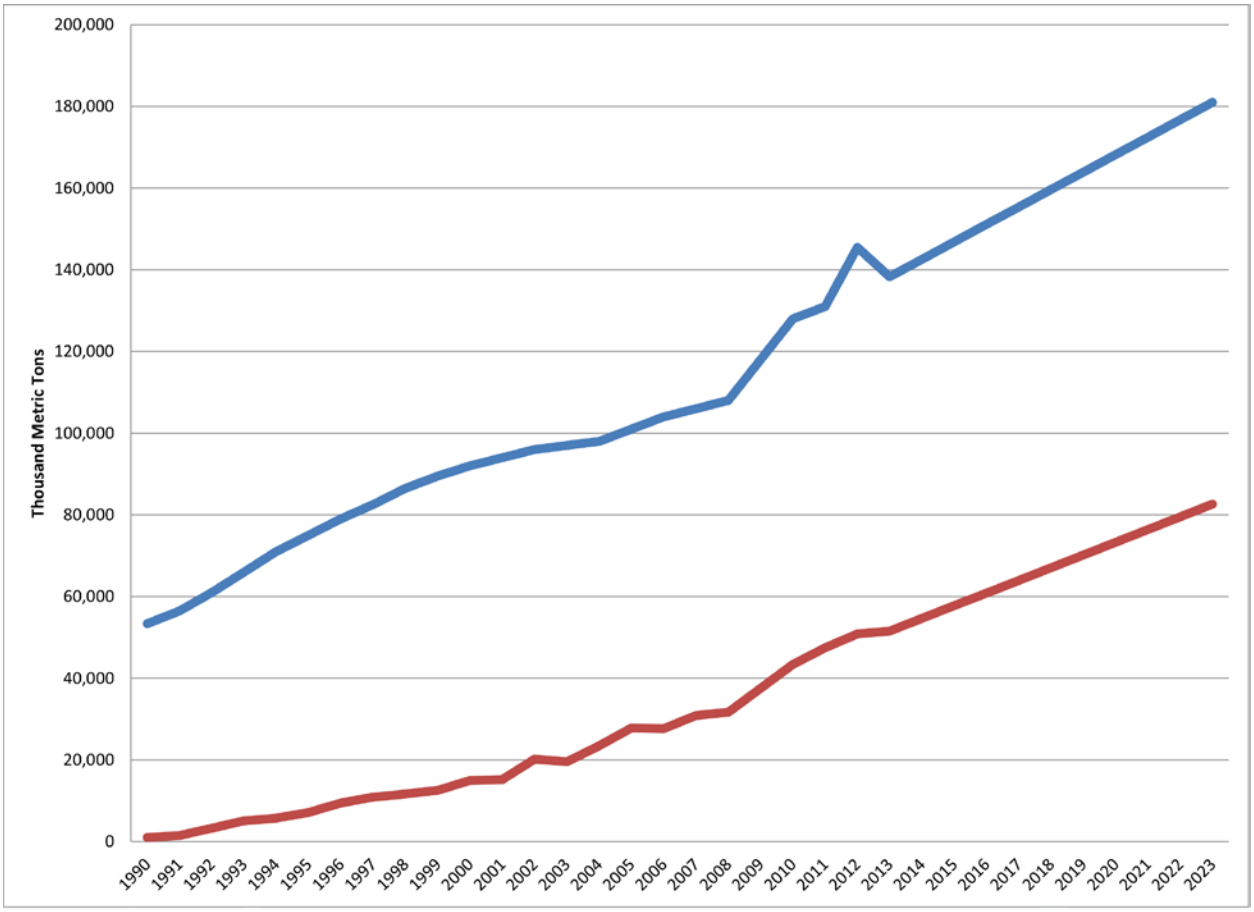

Figure 1. Corn and soybean meal used in animal feed in China: Projected to 2023

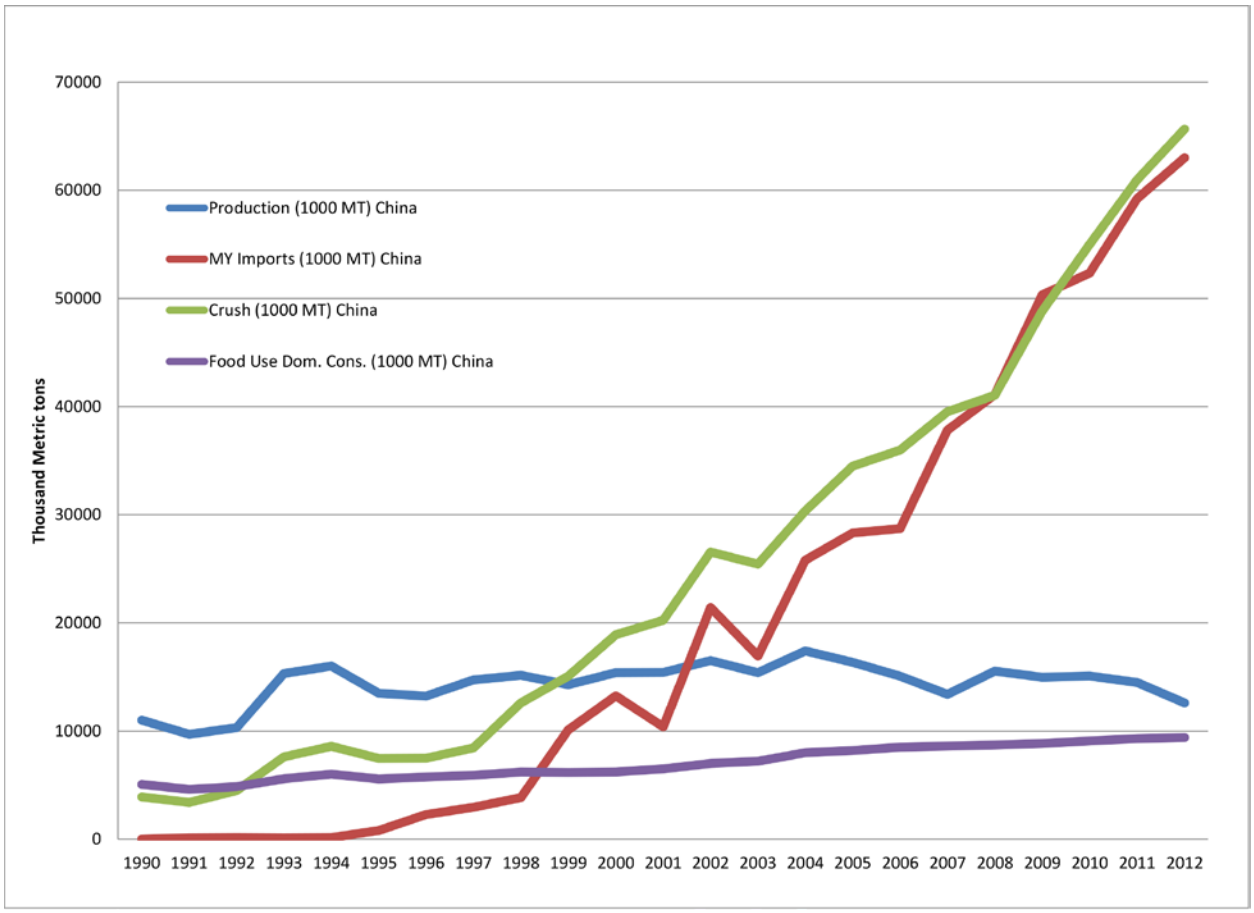

Figure 2. The Chinese soybean sector: 1990 to 2012

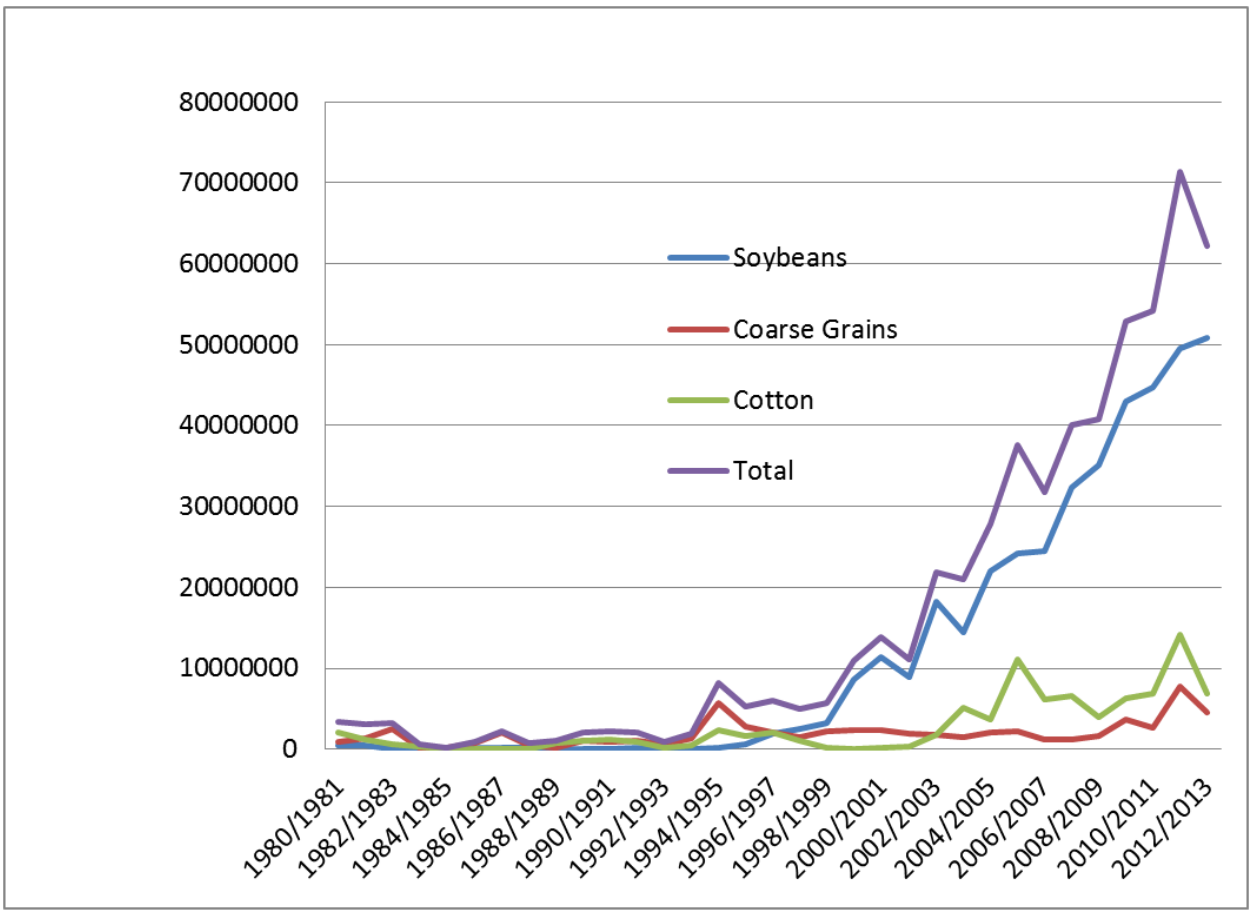

Figure 3. "Acres" imported by China

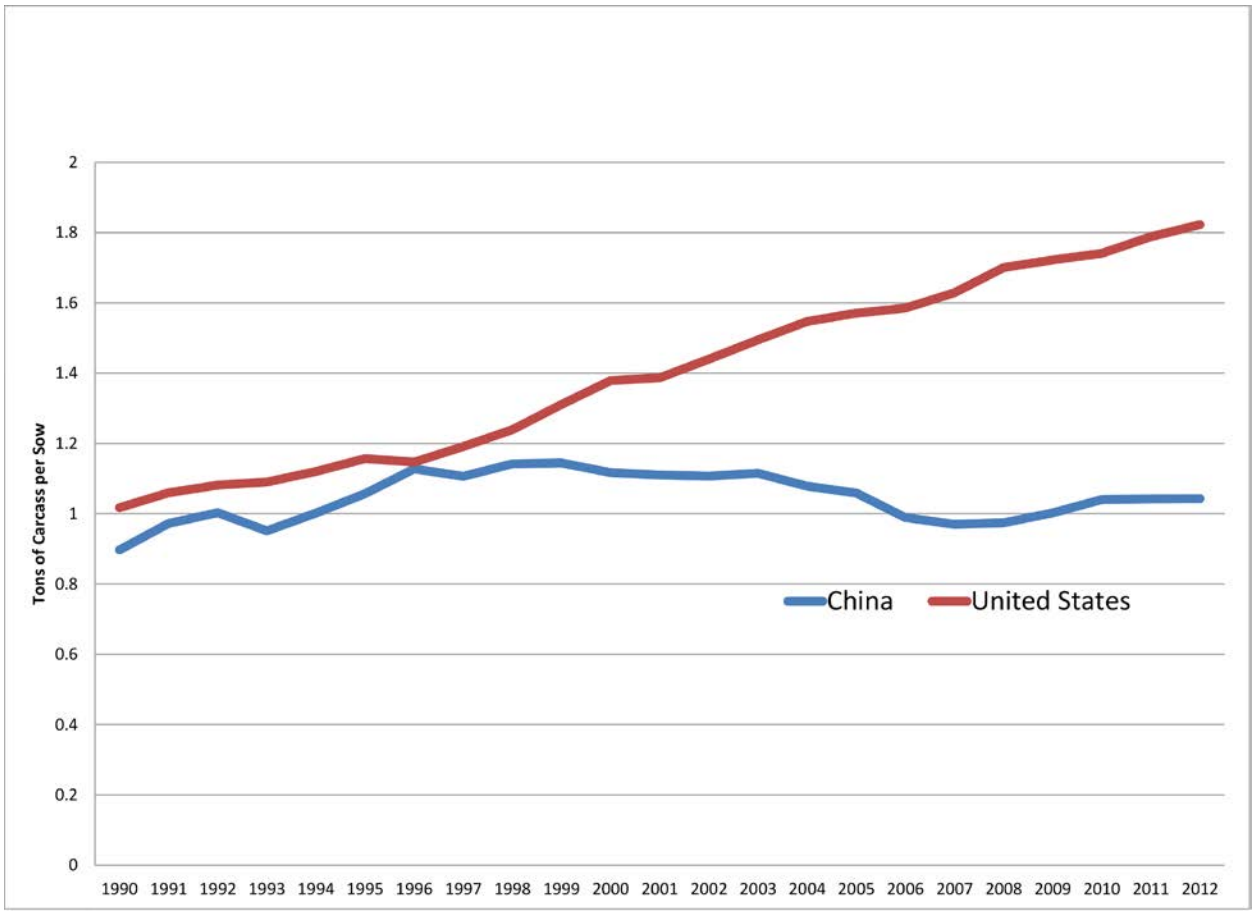

Figure 4. Tons of pork carcass produced per sow per year in the US and China 1990 to 2012

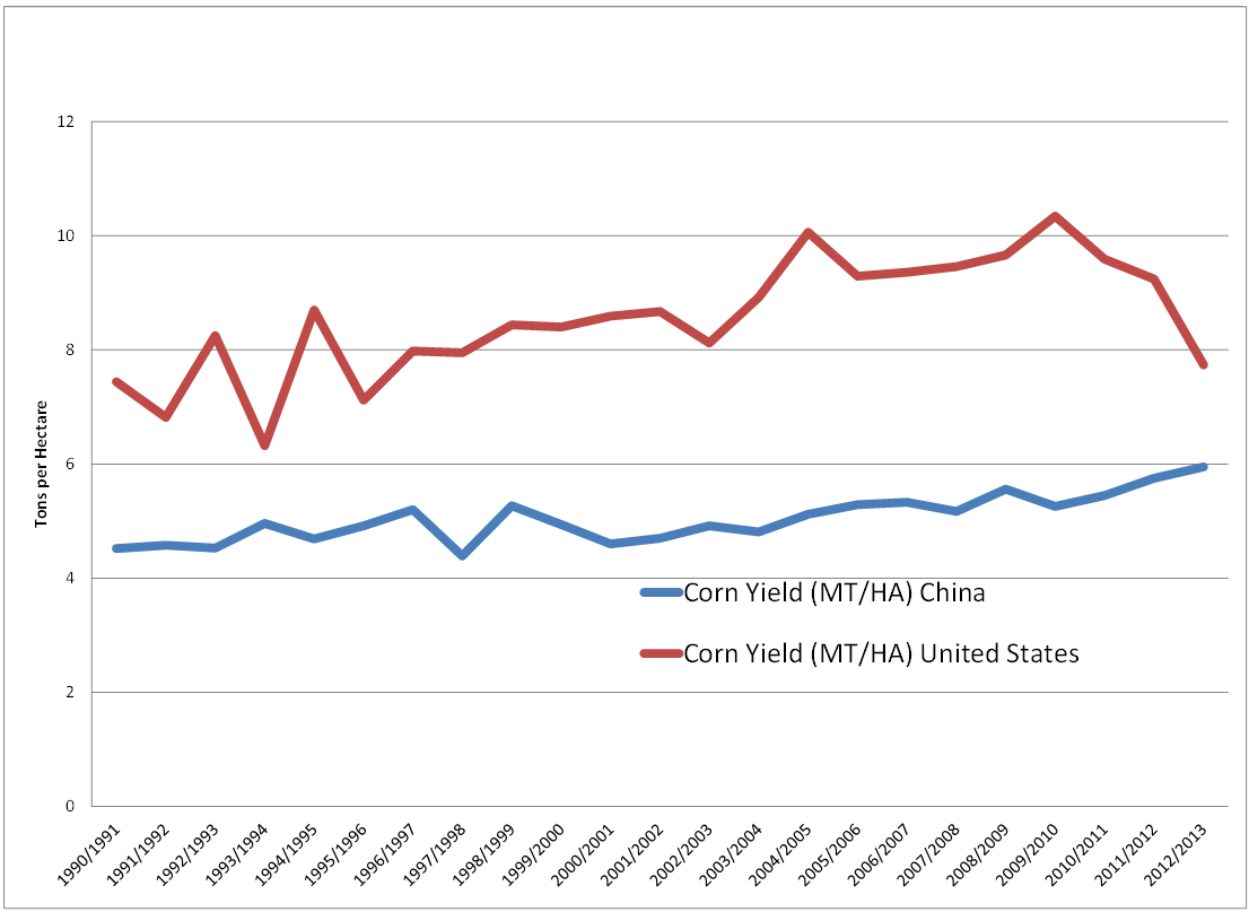

Figure 5. Corn yields in the US and China: 1990 to 2012