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Chinese Market Access Barriers Of U.S. Oilseeds And Grains

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CHINESE MARKET ACCESS BARRIERS OF U.S. OILSEEDS AND GRAINS

by

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DEDICATION

This thesis is dedicated to my family, Felicia Owusu-Ansah, Andrew Appiah-Danquah, and Priscilla Akwabi Ameyaw, for the inspiration, love and support they provided me during the course of this study. Special dedication also goes to my dear uncle, Dr. Albert Owusu-Ansah, for believing in me and encouraging me throughout this period. I love you all.

BIOGRAPHICAL SKETCH

Gloria Appiah-Danquah was born on June 16, 1985 in Accra Ghana. She received the Bachelor of Science degree in Business Administration from the University of Ghana Business School in 2008. She majored in Banking & Finance and she graduated with a First Class Honors. While she was in the University Of Ghana Business School, she volunteered at the King of Kings Children's Club where she taught students English and Mathematics. She worked with the SIC Life Insurance company from 2008 to 2009. She is a candidate for the Master of Science in Agricultural Economics.

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LIST OF ABBREVIATIONS

ERS	Economic Research Services
GDP	Gross Domestic Product
FAS	Foreign Agricultural Services
OECD	Organization For Economic And Co-operative Development
SPS	Sanitary and Phytosanitary Measures
TRQ	Tariff Rate Quota
USDA	United States Department of Agriculture
VAT	Value Added Tax
WTO	World Trade Organization

ABSTRACT

Appiah-Danquah, Gloria. CHINESE MARKET ACCESS BARRIERS OF U.S. OILSEEDS AND GRAINS. (**Major Advisor: Dr Osei-Agyeman Yeboah)**, North Carolina Agricultural and Technical State University.

China was admitted into the WTO in December 2001 and this raised the hopes of the U.S that China will open up to agricultural trade with the U.S. This is due to the fact that China is the most populated country in the world with a rising mile income and therefore has the potential for increasing its food consumption. However, this potential has not been realized. China has used various strategies such as devaluing the Yuan against the dollar to promote exports and impede imports. The U.S currently has a trade deficit of 252 billion dollars with China. China is currently the largest importer of U.S oilseeds such as soybean, but the import of U.S grains such as corn has been minimal.

The goal of the present study is to determine the impacts of trade impediments and barriers of the Chinese market access of U.S oilseeds and grains. In order to achieve this goal the study examined the barriers to market access of U.S oilseeds and grains in China. It also econometrically determined the impacts of these barriers on the U.S. The barriers that were identified were sanitary and phytosanitary barriers, subsidies on the Chinese agricultural sector, trading rights, exchange rates and tariff rate quotas. To econometrically determine the impacts of these barriers on the U.S, a market access variable was obtained by dividing the total value of U.S soybean and corn exports to China by U.S agricultural GDP. This was regressed on China's per capita income, exchange rate of the Yuan to the dollar, arable land to labor ratio in the U.S and a dummy

variable representing China's WTO accession. The per capita income of China was found to have a positive impact on market access of U.S oilseeds and grains. Therefore, an increase in the per capita income in China will lead to an increase in the market access of U.S oilseeds and grains in China. The exchange rate of the Yuan to the dollar was also found to be significant in determining market access and as expected had a negative impact on market access. Therefore, if the Chinese Yuan depreciates against the U.S dollar, there will be a decrease in market access of U.S oilseeds and grains in China since U.S oilseeds and grains will be more expensive in China as a result of this. However, China's WTO accession and the arable land to labor ratio in the US did not have any significance on the market access of U.S oilseeds and grains into China.

CHAPTER 1

INTRODUCTION

1.1 Background

Trade between the U.S and China rose dramatically after the normalization of diplomatic relations between these two countries on January 1,1979. Many American firms were eager to enter into trade relations with China because of the vast potential that a country of that size holds. U.S-China trade could not have progressed so rapidly without the concerted efforts of both parties. On the American side, the U.S granted most favored nation status to China in early 1980. The Chinese were also offered the use of subsidized export-import bank credit facilities. Also, in 1980, licensing regulations governing the export of high level technology to China was relaxed. On the Chinese side, there was almost a complete reversal from its former policy of economic isolationalism and self- reliance to one of increased interaction and interchange with advanced capitalist economies. In 1979, total U.S-China trade (exports plus imports) was 2 billion dollars. China ranked as the 23rd largest U.S export market and 45th largest source of U.S imports.

Since the beginning of economic reform and its openness to the outside world, China's economy has been growing at a rate of nearly 10 percent annually and its external trade has expanded since. Nominal per capita gross domestic product (GDP) grew from 379 Yuan to 6,534 Yuan between the periods of 1979 to 1999. In 1999, China's trade volume reached 360.7 billion dollars, ranking 9th in the world. China

emerged to become an important player in the world trading system. As a result of this growth coupled with the fact that China is the most populated country in the world, it was in the interest of the U.S and the World for China to be admitted into the World Trade Organization (WTO).

In December 2001, China was admitted into the WTO and this raised the hopes of the U.S that China will open up to U.S agricultural trade. With a population of over 1 billion people and a per capita income increasing at 10 percent annually, China has a potential for increasing its consumption of food annually. Among the sectors most significantly affected by China's WTO accession is Agriculture. To gain WTO membership, China made several concessions that fundamentally altered it's domestic and trade policy for agricultural products. For instance, China agreed to limit and incrementally reduce its level of trade distorting domestic agricultural support and also agreed to immediately eliminate all export subsidies on agricultural products. In market access, China pledged to lower agricultural tariffs from 22 percent to 17.5 percent by 2004 with certain products of most importance to the U.S dropping from 31 percent to 14 percent. Also new market access opportunities were created by establishing tariff rate quotas (TRQs) on commodities such as oilseeds and grains that were traditionally handled by state trading enterprises.

However, China's policy makers are using various strategies such as a devalued currency to continue exports and impede imports. China does not maintain a market based floating exchange rate. Between 1995 and July 2005, China pegged its currency to the U.S dollar at about 8.28 Yuan to a dollar. As long as China devalues its currency,

Chinese goods will be cheaper than American goods. This strategy among others resulted in a U.S trade deficit with China. By 2010, the U.S China deficit had reached 252 billion dollars (U.S Census Bureau, Foreign Trade Statistics 2010). This study examines the factors affecting import demand of U.S oilseeds and grains to China.

An increase in China's grain imports was expected to be a main effect of China's accession to the World Trade Organization in December 2001. When China was admitted into the WTO, China made a number of promises that was expected to affect its grain industry. For instance, China's commitments as a WTO member required China to eliminate export subsidies for corn and open an initial 5.85 million metric-ton (mmt) quota for corn at a low 1 percent tariff. However, it is becoming clear that WTO accession will not have immediate dramatic impacts on China's grain trade. China's policy makers are using various strategies to continue grain exports and impede imports. For instance, while the tariff is only 1 percent for in-quota imports of grains such as corn, imported corn is also assessed a 13 percent value added tax (VAT).

The VAT plus the cost of shipping and unloading, elevates the cost of grain imports from the U.S above the cost of domestic grain in China. For instance in 2002, rising of general prices in the U.S pushed the cost of corn to more than 130 dollars per ton, eliminating prospects for any significant corn imports in that year. In addition, import quotas are not distributed to private importers on time, giving potential buyers little time to arrange purchases. China's new regulations on labeling food containing genetically modified food organisms are also an additional obstacle to corn imports. All these factors have kept the import of U.S grain into China minimal.

Exports of U.S oilseeds into China have been more successful. During the 1990s, Chinese government policy significantly impacted trends in production and trade of oilseeds such as soybeans and soybean products. Exports, particularly soybeans represent a significant source of demand for U.S producers and make a large net contribution to the U.S agricultural trade balance. China is currently the largest importer of oilseeds such as soybeans from the U.S.

Sudden and dramatic policy shifts and their subsequent effects on China's international trade profile make China a relatively volatile player. Farm value of U.S oilseeds production in 2008/2009 was 29.6 billion dollars; the second highest value among U.S produced crops, trailing only corn. The U.S Soybean and Export Council recorded in 2009 that China purchased 23 percent of the entire soybean produced by the U.S. China's feed production has doubled but its use of soybean meal has increased by 600 percent over the past 15 years. This reflects the increased sophistication of China's livestock sector and the rapid shift from raising hogs on scraps in the farmers' yard to commercial hog operations.

There is a great need for oilseeds such as soybeans for vegetable oil and for soybean meal. Since China produces about half of the world's hogs, the demand for soybean is high. However, hogs are not the only sector driving soybean demand in China. China raises more poultry (Chickens, ducks and geese) than any other nation, and has a 70 percent share of world aquaculture. China is moving more into large – scale intensive livestock production with higher levels of technology and better management (Corn and Soybean Digest, 2010).

Various factors have accounted for why China has become a major market for U.S oilseeds. China's economy has evolved from a centrally planned system, which was mostly closed to international trade to a rapidly growing market oriented economy that is the most important player in the global economy. This began with the phasing out of collectivized agriculture. Reforms in China have included price liberalization, fiscal decentralization, increased autonomy for state enterprises, the development of a diversified banking sector, and stock markets. China has therefore experienced unprecedented economic growth of between 8 and 12 percent per year and as a result of these reforms, there has been rapid growth of the private sector and an opening to foreign trade and investment. This growth has lifted an estimated 200 million people into the middle class and transformed the economy and consumption patterns of the people of China.

China's rapid economic growth and gradual transition toward a market economy has brought about a significant change in its food consumption patterns and trade behavior. With increased income and improved market accessibility, Chinese consumers especially those in urban areas are shifting their food consumption from grain to meats such as pork (Wang, Jensen & Johnson, 1993).

China has over one-fifth of the world's consumers and the country's consumption of food has the potential to significantly impact world food demand. In decades past, policy makers in China were concerned primarily with supplying enough grain to meet basic nutritional needs of China's huge population. However, the emphasis is now shifting from quantity of food demanded to the changing composition of food demand.

Strong income growth and rapid urbanization are diversifying the Chinese diet and creating demands for high- value and specialty foods.

There has been a massive urbanization in China, which has had dramatic effects on food consumption. When people move to cities or towns, they tend to consume more meat, processed foods, and restaurant meals. In 2000, China's household surveys showed that per capita red meat consumption in urban areas was 40 percent higher than in rural areas. Urban per capita grain consumption was only one-third the rural average. Urban residents are more likely to shop in modern supermarkets and frequently patronize restaurants. Rising living standards in urban areas are boosting demand for high-quality grain, meats, and processed foods.

Within the urban market segment in China, incomes vary greatly. An emerging middle class of relatively high-income consumers consume more of most foods on a per capita basis, especially milk, fruit, beer, poultry, meat, fish, eggs, and vegetables. China's urban residents increase their purchases of fish, poultry, and pork at rates faster than their growth in income. The Chinese consumer's preference for pork and other livestock meats bring about a derived demand for U.S feed grain (Gale, 2002).

1.2 Problem Statement

Trade and currency issues between the U.S and China have become a delicate topic. Generally, China is able to produce goods that Americans want at a lower cost. Most economists agree that China's competitive pricing is as a result of two factors.

China has a lower standard of living, which allows them to pay lower wages to workers and also an exchange rate that is partially set to be always priced lower than the dollar. China is the largest importer of U.S soybean, but the import of U.S corn into China has not been very successful. The simple answer to why China has not imported much U.S corn is that Chinese corn is much cheaper than U.S corn. The import of soybean on the other hand keeps on increasing. Chinese officials opened the market to soybeans in the 1990's as a strategy to promote the livestock industry (by increasing the supply of soy meal). Since then imports have grown faster than anyone expected. Corn on the other hand is considered a strategic commodity so officials are less willing to allow corn imports into China.

According to the Economics Research service in 2002, China was expected to increase its corn imports after joining the WTO in December 2001. Elimination of export subsidies was expected to make Chinese corn less competitive, but instead, China kept imports minimal. China's WTO accession agreement set a 7.2 mmt tariff – rate quota for corn imports in 2004. The duty for in-quota imports is just 1 percent, but China also adds a 13 percent value added tax on imported grain that raises the effective duty to over 14 percent (Gale, 2002). The VAT plus the cost of shipping and unloading, elevates the cost of corn imports from the U.S above the cost of domestic corn. Also, China maintained a fixed exchange rate of roughly 8.28 Yuan per 1 U.S dollar from 1995 to 2005. China has resisted strong pressures from its trading partners to revalue its exchange rate. As long as the Yuan is lower than the dollar, Chinese goods are cheaper than U.S goods in comparison.

Since China's accession to the WTO in December 2001, China's utilization of grain TRQs has been very low, being only about 12 percent on average from 2002-2008. This is in sharp contrast to anticipation of many analysts who believed that China's grain imports would grow significantly after its WTO accession. Import quotas are not distributed to private (non-state) importers early, and quotas for state traders are distributed even later, giving potential buyers very little time to arrange purchases. In July 2002, rising international corn prices made imports unattractive, so the quotas mostly were unused. A survey of private owners (mainly Chinese feed mills) of 2002 import quotas undertaken by a private consultant, China food and agricultural services inc, found that nearly all respondents planned to apply for a larger quota in 2003. Thus, it was evident that there was significant interest in importing corn when market conditions were right, even though quotas were not used in 2002.

China's regulations on labeling food containing genetically modified organisms are also an additional obstacle to corn imports. Genetically modified corn will require safety certificates and a waiting period of up to 270 days for approval to import to china (as is the case for soybeans). Even conventional corn varieties may face import problems, since it will be difficult to prove that no transgenic corn or soybean material is present in a shipment. Importers are usually afraid to import corn because the quarantine authorities might reject the shipments if they find unapproved types of genetically modified corn in the shipment. Therefore, how Chinese officials decide to implement the GMO regulations for corn will have an important effect on imports (Gale, 2002).

Spiraling international shipping costs also reduces the competitiveness of U.S corn in China. For instance, in 2003 rising Chinese corn prices would normally have made U.S corn competitive in Chinese markets. However, shipping costs to Asia more than doubled to as much as $55 per ton, largely due to China's enormous demand for shipments of soybeans, oil and steel that tied up a large share of the world's ocean freight capacity. On the other hand, subsidies are given for buying and transporting domestic corn across the country, reducing the price of domestic corn (Gale, 2002).

Some agricultural industry representatives complained that the Chinese government interfered with corn imports during 2002 by allocating import quotas in small uneconomic quantities and allocating quotas to applicants in western and northern provinces where there is little demand for imported corn. On the other hand, southern China, particularly Guadong province which traditionally uses a lot of corn since it is the site of large feed and livestock producers but is not a major corn producing area received only twenty percent of the total corn TRQ in 2002.

This study researches the effects these barriers have on U.S oilseeds and grains exports into China and how best corn exports into China can be improved. China's policy makers are using various strategies to continue corn exports and block imports until burdensome stocks are drawn down to manageable level.

Figure 1.1 shows export values of U.S corn and soybean to China. From the figure, it can be seen that from 1983 to 1994, exports of both U.S corn and soybean to China were minimal, however, export of soybean has been increasing since 1995 while exports of corn have been negligible.

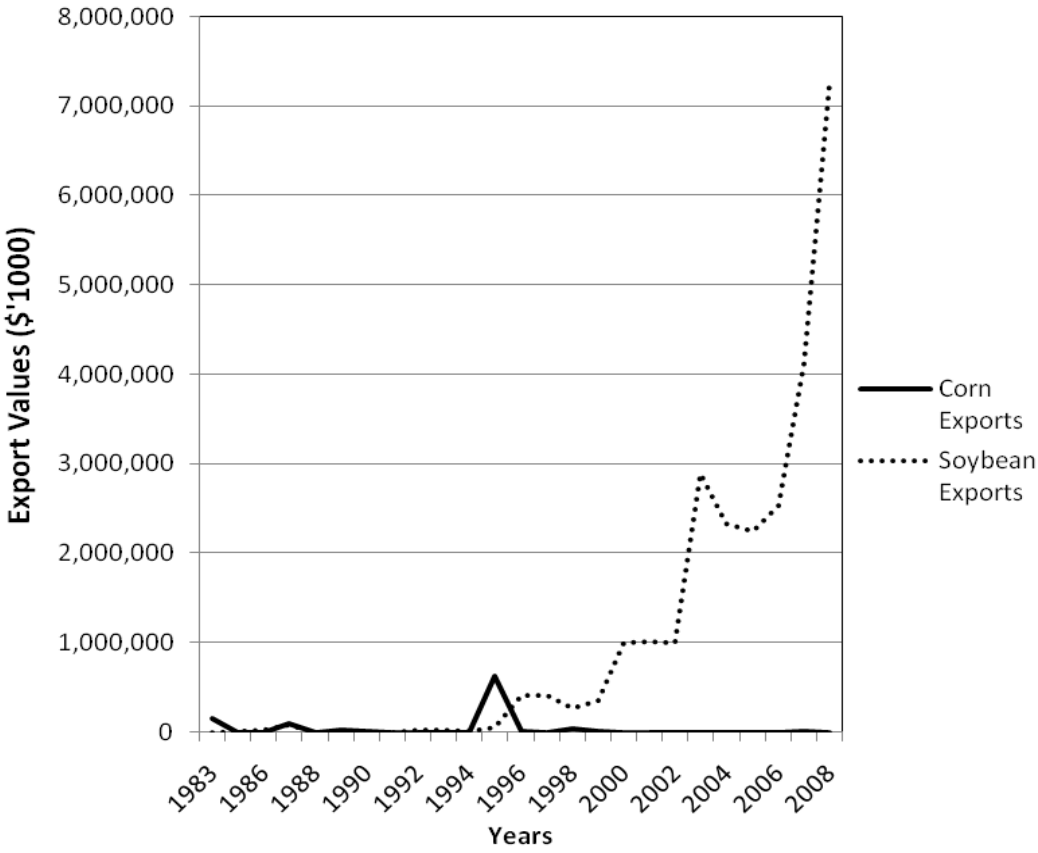

Figure 1.1. U.S. Corn And Soybean Exports To China (1983-2008)
Source: USDA FAS

1.3 Justification

China's commitments relating to imports of bulk agricultural commodities are of particular importance to U.S farmers. Since China's accession into the WTO, a series of problems have undermined the market access opportunities envisioned by the U.S. China's economy produces 9.9 trillion dollars, making it the third largest economy in the world (After the U.S and the EU). Rising incomes for China's 1.3 billion consumers have fueled a strong demand for a better diet.

China has slightly less cropland than the U.S to feed a population that is 4.5 times larger than that of the U.S. It also has severe problems such as depletion of water resources in major production areas, desertification, and overgrazing and water pollution from chemical runoff. Agriculture remains a strong suit for rural America. Unimpeded flow of U.S agricultural exports into China will go a long way in decreasing the trade deficits the U.S has with China since agriculture is the one major sector the U.S has a trade surplus with China.

Bilateral agricultural trade in 2008 consisted of 12.2 billion dollars in U.S exports to China and 3.4 billion dollars in imports from China. The growth of exports of U.S agricultural goods into China will have important implications for U.S farmers and rural businesses. With food consumption growing and limited potential for increased Chinese production, it seems likely that China will import more oilseeds and grains, bringing significant benefits to the U.S corn and soybean producers. An increase in import demand in China will increase international demand and prices of corn and soybean will increase. It is very essential to the U.S to have unimpeded market access of U.S agricultural goods into China. Figure 1.2 shows U.S agricultural trade with China from 1983 to 2010.It shows the continuous surplus the U.S has in agricultural trade with China.

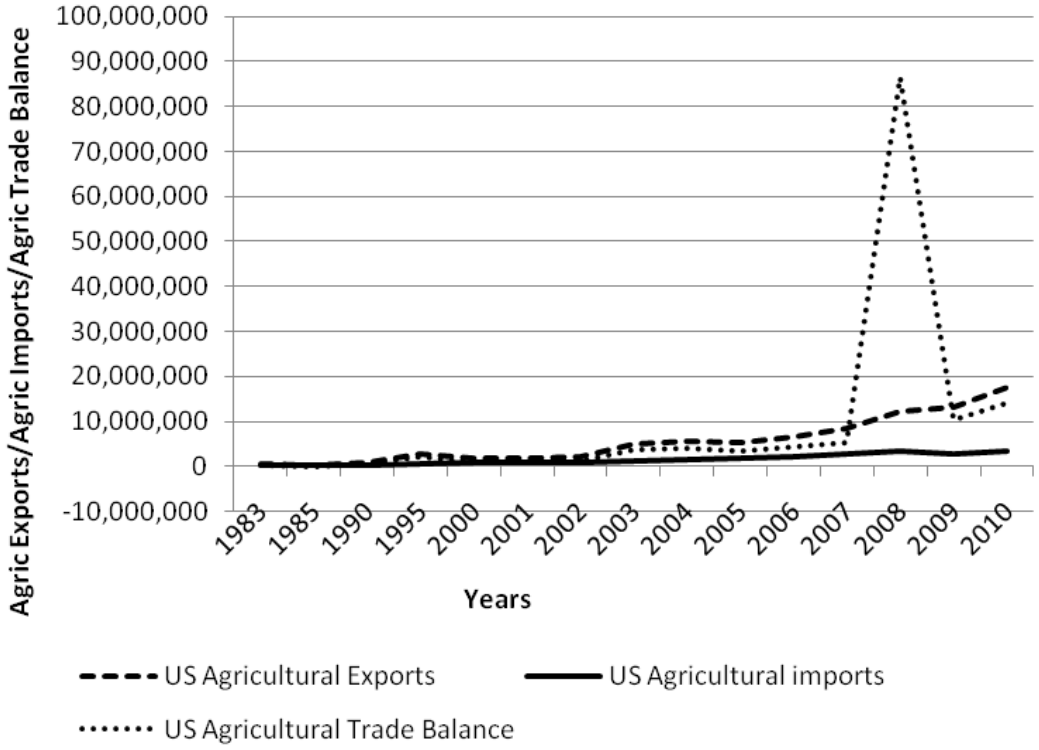

Figure 1.2. U.S. Agricultural Trade With China (1983-2010)
Source: USDA FAS, 2010

1.4 Objectives

The overall objective of this study is to describe the impacts of trade impediments and barriers of the Chinese market access of U.S grain and oilseed.

The specific objectives are:

1. To describe the barriers to market access of U.S oilseeds and grains and assess the trend of market access of U.S oilseeds and grains to China
2. To econometrically determine the effects of these factors on U.S grain and oilseed exports.
3. Examine the implication of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Market Access

Foreign trade is an important component of any economy generally accounting for a significant share of a country's GDP. According to the U.S Department of Agriculture, the U.S is now the world's largest agriculture exporter. Agriculture sector productivity in the U.S has been rising at an annual rate of about 2 percent resulting in excess supply. The U.S has to come up with market entry and marketing endeavors to gain market access to other countries. According to the WTO Market access is a term for the conditions, tariffs and non-tariff measures agreed by members of the WTO for the entry of specific goods into a country.

There are a number of measures that a country may use to restrict imports. The most common form of such restrictions is tariffs on imported goods. Non-tariff barriers to market access also exist for goods, such as technical standards, antidumping suits, and import quotas, import licensing and variable levies. Market access also concerns regulations of imported services. Some countries may limit the number of Foreign Service suppliers in a sector, or limit the number of service transactions a foreign supplier sector may perform.

There is a general view that U.S businesses are being unfairly hurt by barriers to access in foreign markets. This has raised demands for market access requirements. While policies to increase market access have received much attention in recent years,

little attention has been paid to the issue of implementing these policies. Irwin, (1994) notes that the United States never seems concerned about the mechanisms by which 'voluntary' bilateral agreements are carried out and acts as if the government can carry it out.It is well understood that enforcement is critical to the success of any results oriented policy. It is somewhat surprising that implementation has been ignored.

While Ethier and Horn (1993) and Cronshaw and Markusen (1995) among others examine results oriented policies, Greaney, (1995) specifically incorporates the problem of implementation in her analysis. In her model, the government enforces the market share agreement by threatening the home firm with a financial penalty in the event the import target is not met. There has been a general conclusion that market access requirements reduce competition. According to Krishna, Roy and Thursby (1997), if the level of the instrument used by the government to enforce the market access requirement can be manipulated by the firms, the result is higher prices. Also, previous theoretical analysis by Irwin (1994), Greaney (1996) suggest that market access requirements also reduce competition. An exception to this conclusion is however found in Krishna and Morgan (1995) showing that there exists conditions under which completion is increased when a market access requirement on a specific market is implemented by threats on a related market.

Numerous research shows that there is a correlation between openness to international trade and both income and growth. There is however advocates of free trade such as Panagariya (2004) who argue that countries perform better with outward orientation than with import substitution. On the other hand are those who take a more

skeptical view of the evidence on the relationship between trade and growth as expressed in Rodriguez and Rodrik (2000). This view is that the quality of institutions overrides anything else and that integration has essentially no independent effect on growth.

2.2 Exchange Rates

One factor that determines market access is exchange rates. The issue of China's exchange rate regime has an effect on market access of U.S agricultural products in China. There is a compelling case that the Chinese currency, the renminbi is significantly undervalued. When exchange rate is used to provide protection to domestic firms, it is through undervaluation, the analysis of which owes a great deal to Dornbusch's (1976) theory of overshooting. An undervalued exchange rate protects domestic firms from imports and gives domestic firms greater incentives to export The Chinese Renminbi was pegged to the U.S dollar from 1995 to July 2005, as the exchange rate of the Renminbi (RMB) against the U.S dollar did not change much over that period. The Renminibi was fixed at 8.28 Yuan to a dollar.

Pegged exchange rates also have tended to stimulate domestic demand for consumer goods and thus contributed to overheating, which itself may have had different origins. For example, the growth of domestic demand in the Czech Republic accelerated in the early 1990's following a rapid rise in wages. However, the concurrent sharp appreciation in the real effective exchange rate has added considerably to the growth of domestic demand for imported consumer goods. Moreover, the pegged exchange rate

combined with inflation higher than abroad has forced up the level of interest rates, thus attracting foreign capital, which also stimulated the growth of domestic aggregate demand.

The shift to a managed float and the 2% revaluation of the RMB, announced on July 21, 2005 has not resulted in a significant flexibility as the RMB remains closely managed in narrow margins of fluctuations. As in every pegged or de facto pegged regime, the suitability of the parity could be questioned on the grounds that it is decided by the country's monetary authorities instead of resulting from the forces of supply and demand. Generally speaking, pegged currencies could be thought of as more prone to misalignment, even if floating currencies also suffer from this snag (Coudert & Couharde, 2007). In the case of China, the issue has become especially important in recent years as China's role in international trade is soaring. From the U.S point of view, China's huge current account surplus with the U.S raises the question of a possible undervaluation of the Renminibi (Goldstein, 2003). China's defacto peg to the dollar also explains the reluctance of Asian countries to let their currencies rise against the dollar (Bergsten, 2004). As a result, this has impeded the necessary adjustments of the U.S current account deficit.

Renminbi appreciation with respect to the U.S dollar would increase China's excess demand, and decrease the excess demand of its trading partners. This would drive offsetting adjustments of supply and demand around the world. Despite these offsetting adjustments there would still be price increases for agricultural commodities in U.S dollar terms, and increased China's imports, but there would be responses for different

commodities, and the changes would be smaller than traditional models indicate (MacDonald & Seekey, 2006).

2.3 Gravity - Import Demand Model

The traditional import demand theory has a microeconomic foundation, which is based on the theory of consumer demand, which states that the aim of the consumer is to maximize satisfaction. This argument is extended to the demand for imports such that the demand for imports by a consumer is influenced by income, import prices and prices of other commodities. The sum of individual demand for Imports constitutes the aggregate imports demand for the economy (Harrod & Hague, 1963). Theoretically therefore, it is possible to have negative income elasticity of demand for imports, though evidence of this is hard to come by. Since imports are the excess of domestic consumption over domestic supply, the income elasticity of imports could be negative if domestic supply is more income elastic than domestic consumption.

From the microeconomic foundation, import prices are similarly asserted to be important in determining imports demand. Cave and Jones (1985) postulate that if the price of imports rises, three ingredients contribute to a decline of import demand: (a) a substitution effect in consumption (less is demanded); (b) an income effect (the rise in the price of imports lowers real income and therefore lowers imports); and (c) a production effect (the rise in import price serves to attract resource from other industries to the import-competing industry, so that importable decrease).

According to Pilbeam (1998), Collier and Gunning (1994), the domestic price of importable can be related to the exchange rate and foreign prices assuming purchasing power parity (PPP) exists. Thus for instance, an overvalued domestic currency would artificially cheapen imports in relation to domestic substitutes, with increased imports as a direct consequence. This argument therefore highlights the idea that in influencing imports, there is a significant role for the exchange rate to play. The gravity model is a well known econometric model that has been widely used in international economics to analyze and predict bilateral trade flows.

Similar to the law of gravity in physics, the gravity approach suggests that the volume of trade between two countries depends positively on their economic size, and negatively on the distance between them. Polder (2002) gives the models similarities to the law of gravity and describes the theory behind the gravity model in international trade flows as follows; the key objectives in international trade flows are the exporting and importing countries. The 'masses' of the countries are the sizes of their economies, from which a certain potential trade flow results. Therefore the larger the economies of the countries, the larger the trade among these countries will be. However, greater distance between the countries causes a resistance to trade, because of transportation related costs and time, among other factors.

Also trade restricting factors such as import tariffs, border controls, and quantity restrictions etc are also factors which are indirect costs but are not related to distance but more to the fact that goods are transported from country to country. Anderson (1979) was the first to draw linkages to economic theory that was pioneered in the analysis of

international trade by Tinbergen (1962), Poyhnen (1963); and Linneman (1966). The generalized framework Anderson developed incorporates the Armington assumption, that goods produced by different countries are inherently imperfect substitutes by virtue of their provenance. This framework assumes Cobb-Douglas expenditure system.

Many variables have been employed by researchers using the gravity model in their analysis beyond the ordinary variables of GDP, population, distance and preferential trade variables such as colonial ties, common language and common border. Egger (2002) adds exporter and importer viability of contracts, exporter and importer rule of law, and real bilateral exchange rate to estimate a panel projection of potential bilateral trade between Organization for Economic and Co-operative Development (OECD) countries to other OECD countries and 10 central and Eastern European countries from 1986 -1987. Comparing different estimators, he found none of the estimators used prior to his study were consistent or efficient in his application.

Egger and Pfaffermayer (2002) add importing country foreign currency reserves and real exchange rate to the traditional variables to estimate bilateral exports for 11 (APEC) countries from 1982 – 1998. He found the included time-invariant exporter-by-importer (bilateral) interaction effects (distance, border, language) were significant in their model and accounted for the majority of variation in it. Helpman and Krugman (1985) demonstrated that the basic gravity equation can be derived from a trade model with differentiated goods. Deardorff (1995) showed that the gravity equation is consistent with the Heckscher–Ohlin theory of international trade. The consistency that the gravity

model has with different trade models has increased the confidence of analysts in using this model as a tool for analyzing and predicting potential trade flows.

The gravity model has over the years provided a strong approach in explaining bilateral trade patterns. For instance, Koo and Karemera (1991) revised the conventional gravity model into a commodity specific model to determine factors affecting trade flows of wheat. These authors also used panel data instead of only cross-sectional data in estimating the model. The results from their analysis revealed that all the independent variables, including production capacities, income, input and export unit values, price of wheat, inflation and exchange rates in respective countries and policies relative to wheat trade play an important role in determining trade flows of wheat.

Hellvin and Nilsson (2000) used the gravity model to estimate trade flows between 3 major trading blocs; NAFTA, EU and Asia. The authors formulated a model that includes dummies for each of the three major trading blocks, a dummy representing a common border and another for common language. Projected values from the estimated model were compared to the actual trade values to estimate whether trading between blocks are below or above levels as expected. The studies are revealed that the EU is lagging behind North America on the Asian market. Also, Martinez – Zarzoso and Nowak – Lehman (2001) applied the gravity model to assess Mercosur – European Union trade and trade potential following the agreements between both trade blocs. In this model the authors included a number of variables such as infrastructure, income differences and exchange rates to the standard gravity equation and found them to be important determinants of international trade flows.

Dell'Ariccia (1999) used the gravity model to analyze the effect of exchange rate volatility on bilateral trade flows. The author used panel data from Western Europe for this analysis instead of just cross sectional data. He explains that the use of both time series and cross – sectional data will help explain some of the problems that were encountered in previous literature. A major advantage of using panel data is the availability to control for possible unobservable individual country- pair effects .Such effects if omitted, would result in biased Ordinary Least Squares (OLS) estimators. In addition to the traditional gravity model, the author included two dummy variables to represent common borders and common languages. A proxy to represent exchange rate uncertainties was also included in the gravity equation specified by the author. The model was estimated through a pooled ordinary least square regression. The result therefore showed that exchange rate uncertainty had a negative effect on trade.

Rasken (1998) also states that the inclusion of explanatory variables in the traditional gravity model must be weighed by a number of factors such as statistical suitability, relevance and purpose. The author argues that too many variables in a regression analysis may present difficulties in economic interpretation, although sometimes adding yet another variable may improve the explanatory variables in the traditional gravity must be weighed by a number of factors, such as statistical suitability, relevance and purpose.

Vollrath, Gehlhar and Hallahan (2007) use exporter and importer income,distance,the difference in per capita income, land/labor differences, exchange rate misalignment, language, colonial heritage, common border and bilateral protections, such

as specific variable and compound tariffs, tariff-rate quotas and special preferences granted through free trade agreements. They find support for the Heckscher-Ohlin theory that a positive relationship between exporter-to-importer land/labor ratio and agricultural trade and processed food trade, and a negative relationship with land/labor ratio and merchandise trade.

CHAPTER 3

METHODOLOGY AND DATA

This first objective of this study is to describe the barriers to market access of U.S oilseeds and grains and assess the trend of U.S Market access of oilseeds and grains in China. Table 3.1 illustrates the effects of China's barriers to market access of U.S agricultural products before and after China acceded into the WTO and the impact this has on the US.

Table 3.1. Effects Of China's Market Access Barriers On The U.S.

Market Access Issue	Pre WTO Accession Conditions	Post WTO Accession Conditions	Impacts on the United States
Sanitary & Phytosanitary Measures (SPS)	China regularly imposed unscientific SPS barriers on US oilseeds and grains	China promised to eliminate unscientific SPS barriers	Greater access to China for U.S corn and soybean
Subsidies	China subsidized its agricultural sector. Chinese corn was sold in the global market at a prices significantly below those in the domestic market	China promised to eliminate export subsidies on agricultural products	Elimination of export subsidies benefits U.S corn producers because it competes with Chinese corn both in China and in international markets
Trading Right	Only State enterprises designated by the Chinese government could engage in import and export activities	Private trade was introduced between private parties in agriculture	An increase in U.S export opportunities for corn and oilseeds

China has currently set up a Tariff rate quota for corn. The effect of a tariff quota on trade depends on excess demand of imports. According to Figure 3.1, the in quota value of 7.2 million metric tons has a tariff of 1%.However,if the quota should exceed the 7.2 million metric tons, a tariff of 50% will be put on the import value. Soybean on the other hand has no quota and has a tariff of 3%.

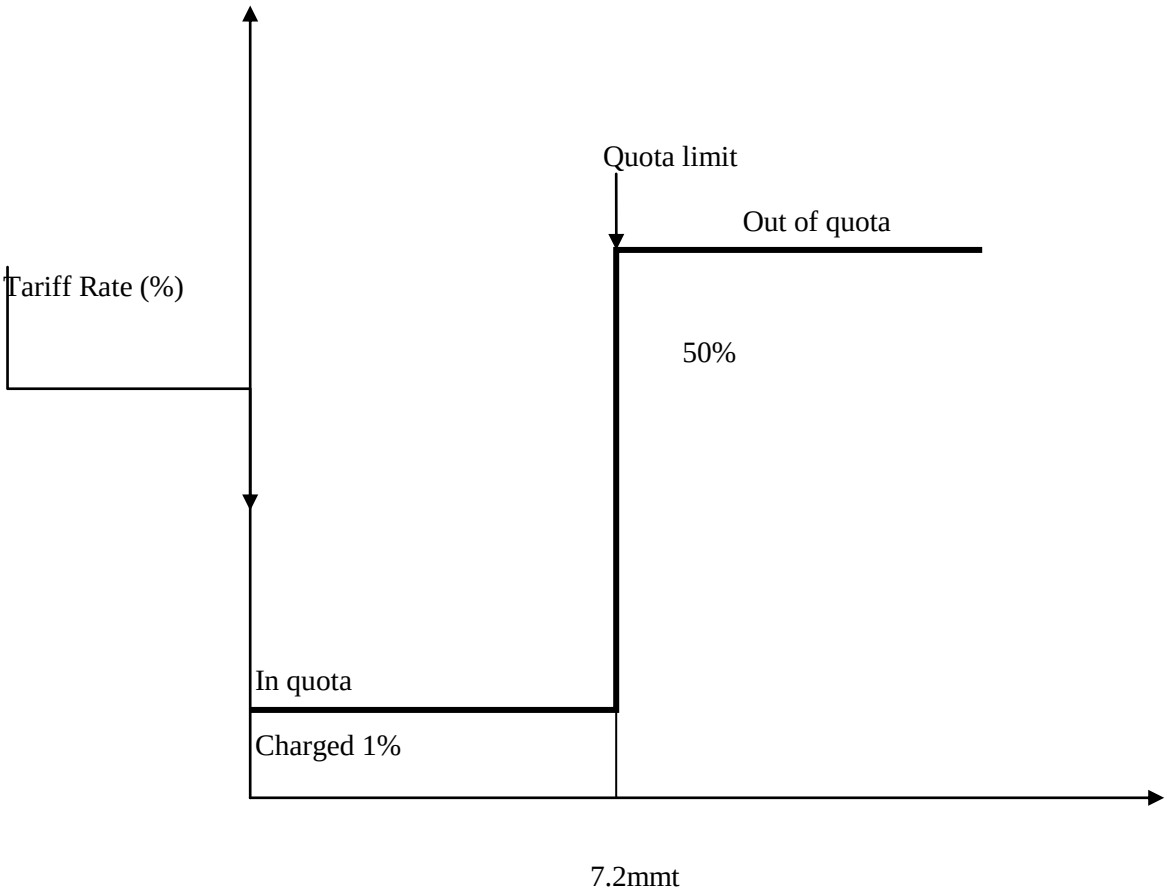

Figure 3.1. Tariff Rate Quota For U.S. Corn In China

However, for unprocessed commodities, there is a value added tax (VAT) of 13%.This raises the effective duty to 14% for corn. Therefore for a $1million worth of corn that is imported into China, the importer will end up paying:

1.13 x 1.01 x $1million = $1.14 million dollars.

For soybeans, there is no quota and the tariff is 3%.There is also a 13% VAT on soybean imports. For $1million worth of soybean imports, the importer will end up paying:

1.13 x 1.03 x $1 million = $1.164 million.

This makes domestic corn and soybean much cheaper than imported U.S soybean and corn.However, Chinese officials opened the market to soybeans in the 1990's as a strategy to promote the livestock industry by increasing the supply of soymeal. U.S soybean has a higher oil content, uniform size and overall quality. Corn on the other hand is considered a more strategic commodity, therefore officials are less willing to allow corn imports. Generally, corn produces a larger volume of output per hectare than soybean, so the strategy of focusing domestic production on corn and importing more soybeans allowed China to focus its land on getting a maximum amount of production from their land.

China has used exchange rate as a barrier to market access of U.S oilseeds and grains. A series of devaluations and reforms in the 1980s and early 1990s, caused China's trade surplus to grow From Figure 3.2, it can be seen that the exchange rate of the Yuan to the U.S dollar did not fluctuate much between 1995 to 2005. Chinese authorities allowed a one-time 2.1% Yuan re evaluation and allowed the currency's value to float

slowly upward. The Yuan appreciated against the dollar to 7.6 Yuan per dollar in July 2007, a cumulative appreciation of 9 % over two years (ERS 2007).

The second objective for this study is to econometrically determine the effects of the market access factors that have been described above on U.S grain and Oilseed exports into China.

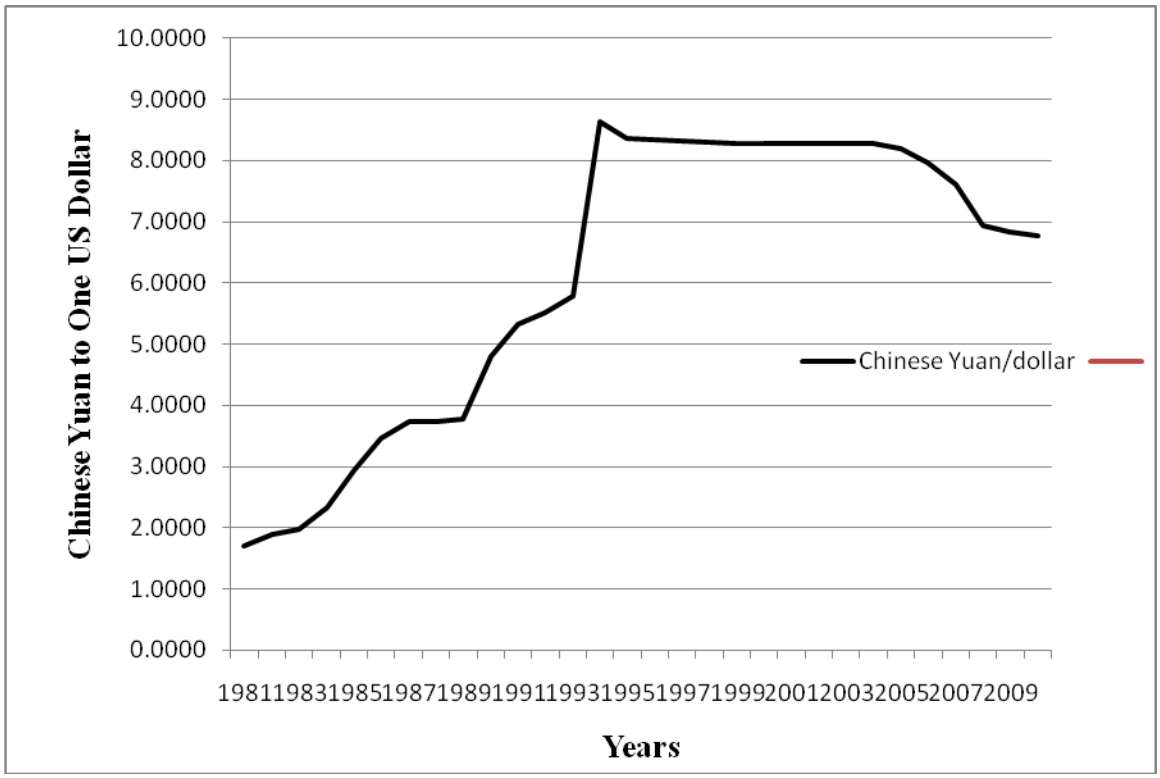

Figure 3.2. U.S. CHINA EXCHANGE RATE (1981-2009)
Source: St Louise Federal Reserve Bank

The gravity model will be used to econometrically determine these effects. The gravity model was originally inspired by Newton's gravity equation in physics and has become very popular in describing and analyzing spatial flows. Anderson's generalized framework assumes Cobb-Douglas expenditure system and incorporates the Armington assumption that goods produced by different countries are inherently imperfect substitutes by virtue of their origin. Each country specializes in different products and has identical homothetic preferences under the assumption of monopolistic competition. Zero balance of trade is also assumed to hold in each period.

The application of the gravity model has recently enjoyed a big revival. According to Anderson (1979), Bergstrand (1985), this revival has not so much been driven by its more rigorous theoretical foundation but more by the opportunity to project bilateral trade relations. According to the traditional concept of the gravity equation, trade can also be explained by GDP and/ or GDP per capita figures and both trade impediment (distance) and preference factors (common border. common language, etc).The gravity model takes into account the population size of two places and their distance from each other. Carrillo and Hernandez (2000) state that larger places attract more people, ideas and commodities than smaller places, and places closer together have a greater attraction than places further apart, the gravity model incorporates these two features.

3.1 The Econometric Model

For this study, the typical gravity model for aggregate goods is re-specified into a gravity import demand model to analyze Import demand of US grains and oilseeds in

China. Although the gravity model takes into account the distance between the two trading countries, the distance between China and the US is not be included in this model since the distance variable does not vary over the study period. According to Linneman (1986) and Bergstrand (1985, 1989), a gravity model is a reduced form equation from the partial equilibrium of demand and supply systems. From consumer theory, the import demand equation for a commodity for the importing country (China) can be derived by maximizing the constant elasticity of substitution (CES) utility function (U_{kj}) subject to income constraint:

$$Uk_j = \left(\sum_{i=1}^{N} X_{ki}^{\theta} \right)^{I/\theta J} \quad (1)$$

Where:

X_{ki}= the quantity of the commodity *k* imported from country *i*

It is assumed that the commodity can be differentiated by country of origin. Therefore, the exponent $\theta_J = (\varphi J\text{-}1)/\varphi_J$ where φ_j is the CES among imports. Consumption expenditures are limited by the income constraints (Y_j) of importing country *j*.

$$Y_j = \sum P_{ji} X_{ji} \text{ where } P_{ji} = P_{ji} WTO_{ji} C_{ji} / E_{ji} \quad (2)$$

Where:

P_{ji} = the unit price of country *i's* commodity sold in country *j's* market;

X_{ji} = The quantity of country *i's* commodity sold in country j's market

WTO= Dummy Variable for importing country *i's* accession into the WTO

C_{ji} = *cost of shipping commodity from country i to country j; and*

E_{ji} = *Exchange rate of country j's currency in terms of i's currency.*

For this gravity-import demand model, the unique characteristics and policies associated with imports of the commodities are incorporated. These effects can be captured in variables that aid and hinder trade flows. Tariff rates and quotas are two factors that significantly have impeded exports of goods and services. Traditionally, tariff rates and quotas are used as they appear in the data. However, in this case there will be no variation since the tariff rates were fixed at 22 percent for agricultural goods prior to 2001 when China was not a member of the WTO. After China's WTO accession in December 2001, the tariff rate on soybean was set at 3 percent and the tariff rate for the in-quota corn imports was set at 1 percent.

Therefore for this study a dummy variable representing the potential effect of China's WTO accession on U.S grain and oilseed imports into China before and after China joined the World Trade organization will be created. The years after China joined the WTO will be denoted by 1, otherwise 0. Exchange rate is constructed as the rate of the Chinese Yuan to the US dollar. The national disposable per capita income of China is in U.S dollars. Also, a variable measuring the arable land to labor ratio in the U.S will be included in this model to measure agricultural productivity in the U.S. The total export value of U.S corn and soybean to China was divided by the total U.S agricultural GDP to find out the fraction of U.S agricultural GDP that is responsible for the exports of corn and soybean into China. This reflects a market access variable and is the dependent variable for this study. The empirical gravity model to measure U.S exports (China's import demand) of U.S grains and oilseeds in China is specified as follows:

$$MRKA_{jit} = \beta_0 + \beta_1 PCI_{jt} + \beta_2 EXRATE_{jit} + \beta_3 ARBL_{it} + \beta 4 WTO_{jt} + \varepsilon_{it} \qquad (3)$$

Where:

i = U.S. and j= China

$MRKA_{jit}$	Market Access variable which is the total value of corn and soybeans exported from the US into China divided by the total value of US agricultural GDP in time t
PCI_{jt}	The Per capita income in China in time t
$EXRATE_{jit}$	Exchange rate of the Chinese Yuan to the US dollar in time t
$ARBL_{it}$	Arable land to labor ratio in the US in time t.
WTO_{jt}	Dummy variable representing the years before and after China's WTO accession
ε_{it}	error term.

All variables except the dependent variable and the dummy variable were transformed into natural logs. Thus the model to be estimated is:

$$MRKA_{jit} = \beta_0 + \beta_1 lnPCI_j + \beta_2 lnEXRATE_{jit} + \beta_3 ln\,ARBLit + \beta 4 WTO_{jt} + \varepsilon_{it} \quad (4)$$

3.2 Data

The gravity model is applied to panel data for the period 1983 to 2008 for U.S. exports of corn and soybean into China. Data on export values (in $ 1000) are from foreign agricultural services (FAS) at http://www.fas.usda.gov/gats/default.aspx. Data for exchange rate of the Yuan to the dollar and the per capita income of China was obtained from the Economics Research division on http://www.ers.usda.gov/Data/macroeconomics/. The data for the arable land was

obtained from the FAO website on http://www.fao.org/corp/statisitics/en/ and the data for labor in the agricultural sector in the U.S. was obtained from the US Bureau of labor statistics on http://www.census.gov/eos/www/naics/.

Since China joined the WTO is 2001, dummy variables for WTO membership signifies this political procedure greatly. The WTO dummy variable was constructed with 0 representing periods before China joined WTO otherwise 1. Entry years were obtained from the WTO website.

3.3 Estimation Procedure

The statistical package for the social sciences (SPSS) is the statistical software that was used to estimate the model. Problems with zero dependent variables was present. If a zero import value is present for a particular year, the mean was taken of the value of the year before and after the year of zero imports and the mean value was used.
For this analysis, ordinary least squares (OLS) was used to estimate the unknown parameters in this linear regression model. All the independent variables were run in natural logs. The dependent variable was used as it was calculated i.e. total exports of corn and soybean divided by US agricultural GDP. Thus the final regression equation to be estimated is:

$$MRKA_{jit} = \beta_0 + \beta_1 lnPCI_j + \beta_2 lnEXRATE_{jit} + \beta_3 ln\,ARBLit + \beta 4 WTO_{jt} + \varepsilon_{it} \quad (5)$$

CHAPTER 4

RESULTS AND DISCUSSION

To assess the trend of U.S market access of oilseeds and grains in China over the years, the market access variable was plotted to examine trend over time. From Figure 4.1, market access of U.S oilseeds and grains in China were very low from 1985 to 1994.This could possibly be a result of the series of devaluations and reforms in China in the 1980's and early 1990's. However, China opened its country to the imports of U.S oilseeds from 1995 as a means of promoting its livestock sector. This can be seen from the diagram in an increase in market access from 1995. After China's WTO accession, China's soybean imports continued to increase even though not much corn was been imported. However, it can be seen from Figure 4.1 that market access dipped in 2002 and 2006.This could possibly be because there were absolutely no shipments of U.S corn to China in both years. The cost of shipping, tariffs and taxes pushed the cost of U.S grains above the cost of Chinese grain. This resulted in a higher price of U.S corn well above the cost of Chinese corn.

To examine the empirical validity of the gravity model with respect to market access of US oilseeds and grains in China from 1983 to 2008, equation (4) is estimated. The descriptive statistics of the variables in the model are reported in table 4.1. On average, the value of US soybeans exported to China from 1983 to 2008 is 10.4 billion dollars. This statistic is no surprise since China is currently the largest importer of U.S

soybean. However, the average value of U.S corn exported into China from 1983 to 2008 is 412 million dollars.

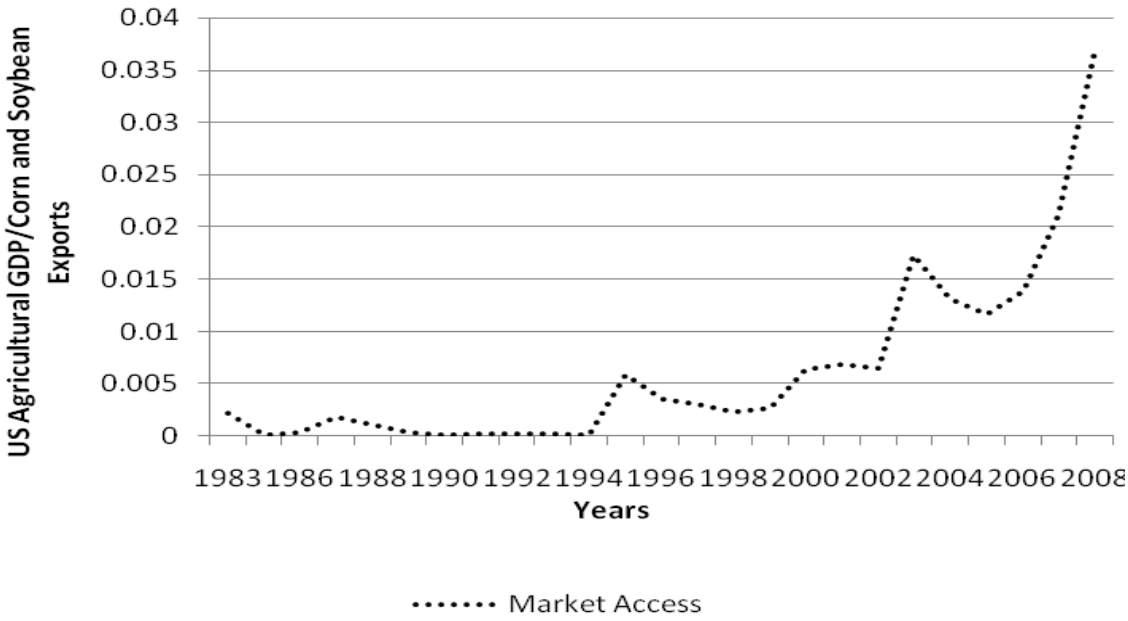

Figure 4.1. Trend Of Market Access Of U.S. Oilseeds And Grains In China

After China's accession into the WTO, it was expected that China's corn imports will increase but this has not been realized and can be seen that China's accession is not having much of an impact on its corn imports. The mean agricultural GDP for the U.S was 134.9 million dollars with a minimum and maximum of 72.6 million dollars and 196.8 million dollars respectively. The mean percapita income for China is 1000 dollars with a minimum and maximum of 275 dollars and 2,365 dollars respectively. The exchange rate of the Chinese Yuan to the U.S dollar ranged from 2 Yuan to 9 Yuan per

dollar with the average exchange rate of 6.54 Yuan to a dollar from 1983 to 2008.The arable land to labor ratio in the U.S has a minimum ratio of 52 and a maximum ratio of 90.

Table 4.1. Descriptive Statistics

Variable	N	Minimum	Maximum	Sum	Mean
AgriculturalGDP	25	72,623,353	196,897,157	3,372,826,783	1.35E8
Corn	25	0	629,253	1,030,163	41,206.52
Soybean	25	0	7,259,676	26,084,549	1,043,381.96
PCI	25	275	2365	25,011	1,000.44
EXRATE	25	2	9	163	6.54
ARBL	25	52	90	1667	66.67
WTO	25	0	1	.29	.464
MRKA	25	0.00000961	0.036874534	0.157967462	0.006318698
Valid N listwise)	25				

4.1 Converting Coefficients into Elasticities

The regression is estimated and the coefficients are converted into elasticities because the independent variables are transformed into logs. The elasticities are calculated by dividing the corresponding coefficients of the independent variables by the mean of the dependent variable.

For instance the elasticity for exchange rate is calculated as follows;

From equation 5,

$$dMRKA_{jit}/dlnEXRATE_{jit} = dMRKA_{ji}/dEXRATE_{jit}/EXRATE_{jit} \quad (6)$$

$$dlnEXRATE_{jit} = dEXRATE_{jit}/EXRATE_{jit} \quad (7)$$

From equation (6), Elasticity is estimated as

$$E = (dMRKA_{jit}/dEXRATE_{jit})*(EXRATE_{jit}/AveMRKA_{jit}) \quad (8)$$

However, $(dMRKA_{jit}/dEXRATE_{jit})*EXRATE_{jit} = \beta_2$ (9)

Elasticity = $\beta_2/AveMRKA_{jit}$ (10)

Where $AveMRKA_{ji}$ = Mean of the Dependent Variable

B_2 = Coefficient of Exchange Rate

Elasticity of Exchange rate = -0.009/0.006318639

= -1.4242

Table 4.2 indicates the elasticities and significance level of the of the regression equation that was estimated. The model has an adjusted R-squared of .78 which confirms that seventy- eight percent of the variation of market access of US soybean and corn in China can be explained by the independent variables.

The function was estimated using Ordinary least squares. It was found that per capita income is significant at the 1 percent significance level and exchange rate is significant at the 5 percent significance level. U.S Arable land to labor ratio was not significant. Also the dummy variable representing effects of China's WTO accession on market access of U.S oilseeds and grains was not significant at any significant statistical level. This comes as no surprise since market access of U.S oilseeds and grains into China has not changed much since China's WTO accession. Exchange rate has an elasticity coefficient of -1.424. This means that a one percent depreciation of the Chinese Yuan to the U.S dollar will result in a decline in market access by about 1 percent in China. This supports the theory that an appreciated dollar with respect to the Chinese Yuan will result in a decrease in imports because imports become relatively expensive.

This result is consistent with the studies by Kost (1976), Batten and Belongia (1986) and Orden (1986). Chambers and Just (1981) in their study of US soybean export to Japan, using a time series data found exchange rate to be significant and negative.

Table 4.2. Results Of The Estimated Coefficients.

Variable	**Coefficients**	**Elasticity**	**T-Ratio**
Intercept	-.069		-2.497
lnPCI	.013	2.0573*	3.625
lnEXRATE	-.009	-1.424**	-2.690
lnARBL	.001	0.1583	-.692
WTO	.002		.614

R^2 = .857
Adjusted R^2 = .827
(*) – Significant at 0.01
(**)-Significant at 0.05
Dependent Variable: Market Access defined as Value of Total US Corn and Soybean export/US Agriculture GDP

Chambers and Just (1981) in their study of US soybean export to Japan, using a time series data found exchange rate to be significant and negative. Therefore assuming the bilateral exchange rate between the U.S dollar and the Chinese Yuan is 1:1, since the U.S has a comparative advantage over China in producing corn and soybean into China at a cheaper rate, the U.S can gain a larger market share in China.

As expected, percapita income has a positive sign and implies that income has a positive impact on demand. The percapita income elasticity coefficient of 2.0573 indicates that a one percent increase in percapita income will increase import demand of corn and soybean in China by about 2 percent. This result is consistent with Brestal et al (2002), Miljkovic et al (2002), Gale and Lohmar (2002). They all found that import demand is positively related to income and stimulates increase in demand for goods and

services. This implies that with rising mile income in China, the U.S should continue to endeavor to export into the Chinese market because increasing percapita income will back the demand.

CHAPTER 5

CONCLUSION AND IMPLICATION

5.1 Conclusion

The purpose of this study was to describe the impacts of trade impediments and barriers of the Chinese market access of U.S oilseeds and grains and to econometrically determine the effects of these factors on U.S grain and oilseeds exports to China. After China acceded into the WTO, it made several promises that was expected to improve market access of agricultural goods into China. However this has not been realized especially for U.S corn exports into China. China has imported very little corn since its accession in 2001.On the other hand, China is currently the largest importer of U.S soybean.

In order to achieve the objectives of this study, the market access factors imposed by China on U.S oilseeds and grain imports was described and assessed and the gravity import demand model was used to estimate China's import demand for U.S oilseeds and grains using time series data from 1983 to 2008. In most studies, import volumes are regressed on effective exchange rates, relative import price and domestic real income. This thesis however models the import demand in a gravity equation setting and regressed the ratio of U.S exports of corn and soybean to U.S agricultural GDP on exchange rate of the Yuan to the dollar, per capita income in China, arable land to labor ratio in the U.S, and a dummy variable representing years before and after China's WTO accession.

One noteworthy finding was China's WTO accession has not played any significant role in increasing market access of U.S oilseeds and grains in China. However exchange rate of the Yuan to the dollar and China's per capita income are the major factors affecting China's imports of U.S corn and soybean.

An increase in China's corn import was expected to be one of the main effects of China's accession into the World Trade Organization. China made promises that were expected to affect its corn industry. Instead, China's corn imports have not lived up to expectations. Soybean, on the other hand has been a better success story. China continues to import U.S soybean and is currently the largest export market for U.S soybean.

5.2 Implications

China's accession to the WTO has been widely supported by U.S agricultural interests. With a population of about 1.3 billion and a rapid per capita income growth, China has the potential to be a huge market for U.S agricultural trade and for this study U.S oilseeds and grains. Although China's WTO accession indicated huge potential benefits, it is becoming increasingly clear that exporters face an uphill battle before this potential is realized.

From this study, exchange rate and per capita income are two variables that proved to be significant in determining market access of U.S oilseeds and grains in China. Since China maintained a fixed exchange rate of roughly 8.3 Yuan per 1 U.S dollar from 1995 to 2008, some economists have estimated that this rate was as much as 40% below the rate that would prevail if the Yuan was freely traded. As long as the Yuan

is lower than the dollar, Chinese goods will be cheaper than U.S goods. An appreciation of the Chinese Yuan against the U.S dollar will make U.S exports to China less expensive and U.S imports from China more expensive. However, Chinese officials have insisted that the current currency policy is not meant to favor exports over imports, but instead to foster domestic economic stability. Abandoning the current currency policy, especially given the current state of the global economy could weaken its export industries and cause wide-scale layoffs therefore reducing demand.

Since China has a large potential to import U.S corn and is currently the largest importer of U.S soybean, the U.S should support China to increase China's recent economic reforms since this will go a long way to increase the per capita income in China. This rising income will increase the Chinese consumer's demand for pork and other live stock meat, which will bring about a derived demand for U.S oilseeds and grains.

This increase in demand of U.S oilseeds and grains will benefit the entire U.S since the rest of the country gains from agricultural trade through the supplying of input, export services,storage,transportation,insurance,finance and other related services that will in the long run help to decrease the trade deficit the U.S currently has with China. The U.S should therefore move cautiously on putting pressure on allowing the Chinese Yuan to appreciate against the dollar. Therefore a balanced approach will be more appropriate.

5.3 Limitations

The presence of zero variables placed limitations on the quantitative analysis of the study. There were zero values in the corn and soybean exports to China. Also, there was no data for labor employed in the agriculture sector prior to 1983.Therefore this limited the period for which data could be collected for the study for all other variables to 1983 to 2008.

5.4 Suggestions For Future Research

This study identified the market access barriers set up by China to prevent U.S oilseeds and grains exports into China. The demand for soybean and corn are derived demand from the Chinese consumer's preference for pork and other livestock meat resulting from a rising mile income in China. With China being the most populated country in the world, the import of oilseeds and grains should be higher than it is. Further studies could assess whether third country effects could be another reason why imports have been minimal, whether China is importing corn and soybean at a cheaper price from other countries.

Also, studies can be done on how best to implement market access requirements of U.S agricultural goods in China. This is because Agriculture is one sector the U.S has an advantage over China as far as arable land is concerned, and the U.S currently has an agricultural trade surplus with China. Therefore a study could be done on how best to implement market access requirements of U.S agricultural goods to China to increase market access of U.S agricultural goods in China.

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