INVESTIGATION OF THE INTERNATIONAL FOOD-GRADE SOYBEAN MARKET

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MASTER OF SCIENCE

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ABSTRACT

This study provides an overview of the international soybean market and takes a look at a case study of an exporter and their target markets, China, Japan, and South Korea. Then it estimates future soybean import demands for these countries.

Results indicate that China's soybean import demand will remarkably increase compared with those in Japan and South Korea. Although Korean and Japanese buyers are willing to pay a premium for food-grade soybeans, China market may grow faster than those in Japan and South Korea. This is because as income increases, Chinese consumer may concern more about their health which makes them to be willing to pay premium for high quality food-grade soybeans.

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CHAPTER 1. THE WORLD SOYBEAN MARKET

1.1. Introduction

The U.S. leads soybean exports in the world. The soybean industry is growing and prospering in the U.S. Soybeans are also important for farmers in the U.S. because they increase nitrogen in the soil to facilitate corn growth and other commodity crops.

However, it is difficult for U.S. farmers to find information about the international soybean market situation, export barriers of the country to which they export, as well as the distribution of soybeans after they sell them. While many U.S. exporters tend to export commercial soybeans, they have a problem when they try to export food-grade soybeans because of a lack of information. The food-grade soybean market is important to study because of premiums and has potential economic contribution to the U.S. agricultural industry.

This paper has four objectives: 1) to provide an overview of the international soybean market; 2) to look briefly at a case study of a food-grade soybean exporter; 3) to discuss the East Asian soybean market, the exporter's target market; 4) to analyze and forecast soybean import demands for China, Japan, and South Korea to derive the exporter's future strategy. This paper will contribute by providing useful information to researchers, farmers, local elevators, and exporters about the food-grade soybean market. This also will give us an idea of soybean export opportunities in East Asia.

1.2. International Soybean Market Situation

Fast growing economies of the developing countries, particularly in Asia, are increasing their demand for soybeans such as soy meal for livestock, cooking oil, and

biodiesel production. Reduced planting area for soybeans in East Asia means less production, so these countries must import soybeans.

About 90% of the international soybean market destination is captured by the top ten importers. Especially, East Asian countries hold four of the top ten destination markets and imports about 70% of international soybean market. Table 1 ranks the countries by soybean imports measured in thousand metric tons.

Table 1: Soybean Import Quantity (Thousand Metric Tons)

Rank	Importer	2008/09	2009/10	2010/11	2011/12*	2012/13*
1st	China	41,098	50,338	52,339	57,000	63,000
2nd	EU-27	13,213	12,674	12,482	11,000	11,000
3rd	Mexico	3,327	3,523	3,498	3,400	3,500
4th	Japan	3,396	3,401	2,917	2,700	2,800
5th	Taiwan	2,216	2,469	2,454	2,250	2,450
6th	Indonesia	1,393	1,620	1,898	1,950	2,100
7th	Thailand	1,510	1,660	2,139	1,975	2,000
8th	Egypt	1,575	1,638	1,644	1,600	1,675
9th	Vietnam	184	231	924	1,050	1,380
10th	Turkey	1,076	1,648	1,351	1,100	1,200
	Other countries	8,403	7,632	7,201	6,190	6,710
	Total	77,391	86,834	88,847	90,215	95,815

*: Predicted
Source: U.S. Department of Agriculture (USDA), 2012

The world's largest soybean purchaser was the EU in 1997. However, China's crushing capacity has grown so rapidly that it imports more than twice twice the amount of

soybeans as the EU today. Furthermore, Japan is the 3rd largest country that imports soybeans from the U.S. (USSEC, 2009).

Over the decades, the soybean industry has changed a great deal. In the 1970s, the U.S. soybean growers dominated international trade, followed by the second largest, the Chinese soybean growers. In the 1980s, soybean production in Brazil and Argentina started to grow as they concentrated on soybeans more than corn because soybeans can be used in many other industries. In 2002, South American soybean production exceeded that in the U.S. They can export with the advantage of low prices and less foreign material levels. Table 2 and Table 3 show major soybean producers and exporters in the world.

Table 2: Major Production Countries (Thousand Metric Tons)

Production	2008/09	2009/10	2010/11	2011/12*	2012/13*
Brazil	57,800	69,000	75,500	66,500	81,000
United States	80,749	91,417	90,605	84,192	80,858
Argentina	32,000	54,500	49,000	41,000	55,000
China	15,540	14,980	15,100	14,480	12,600
India	9,100	9,700	9,800	11,000	11,500
Paraguay	3,647	6,462	7,128	4,357	8,100
Canada	3,336	3,518	4,445	4,298	4,300
Other	9,464	10,605	12,211	13,798	14,339
Total	211,636	260,245	263,589	239,625	267,597

*: Predicted
Source: USDA, 2012

Table 3: Major Export Countries (Thousand Metric Tons)

Exports	2008/09	2009/10	2010/11	2011/12*	2012/13*
Brazil	29,987	28,578	29,951	36,315	37,400
United States	34,817	40,798	40,859	37,063	36,605
Argentina	5,590	13,088	9,205	7,368	12,000
Paraguay	2,283	5,655	6,700	3,100	5,400
Canada	2,017	2,247	2,943	2,932	2,900
Other	2,200	2,497	3,019	3,274	4,197
Total	76,894	92,863	92,640	89,907	97,256

*: Predicted
Source: USDA, 2012

Although the U.S. soybean production has grown substantially, the U.S share of exports in the international market is dwindling because of rapidly increased soybean production from the Southern Hemisphere.

In contrast to the U.S. growing season, Brazil and Argentina harvest soybeans from March to April and plant soybeans from September to October because they are located in the Southern Hemisphere. They can have lower prices when they sell soybeans because buyers and exporters in South America can buy soybeans in Brazilian real or Argentine peso and sell it to the international market in U.S. dollars.

There are also advantages in foreign material standards for soybeans in Brazil and Argentina. While the U.S. exports No.2 grade soybeans with 2% foreign material standards, Argentina and Brazil export with 1%. Consequently, international buyers are dissatisfied with U.S. soybeans. Table 4 provides the information for U.S. soybean grades.

Table 4: Soybean Grade and Grade Requirements

Grading Factors	Grades			
	No. 1	No. 2	No. 3	No. 4
Minimum limits of test weight 1bs/bu	56.0	54.0	52.0	49.0
Damaged kernels:				
Heat (part of total)	0.2	0.5	1.0	3.0
Total	2.0	3.0	5.0	8.0
Foreign Material	1.0	2.0	3.0	5.0
Splits	10.0	20.0	30.0	40.0
Soybeans of other colors *	1.0	2.0	5.0	10.0
Maximum count limits of other materials:				
Animal waste	9	9	9	9
Castor Beans	1	1	1	1
Crotalaria seeds	2	2	2	2
Glass	0	0	0	0
Stones **	3	3	3	3
Unknown foreign substance	3	3	3	3
Total ***	10	10	10	10

* Disregard for Mixed soybeans.

**In addition to the maximum count limit, stones must exceed 0.1 percent of the sample weight.

*** Includes any combination of animal filth, castor beans, crotalaria seeds, glass, stone, and unknown foreign substances. The weight of stones is not applicable for total other material.

Source: “International Buyers’ Guide”, USSEC, 2012.

Many international buyers tend to have restrictions on genetically modified organism (GMO) soybeans and the trend is stronger than before because of the potential problems attributed to GMO products. It is not very difficult to separate GMO seeds in Brazil and Argentina because GMO seeds were adopted in those countries comparatively later than those in the U.S. Also the distribution of the soybeans from Brazil and Argentina are simpler than U.S. soybeans because most of their soybeans pass through export elevators directly, while there is at least one elevator to pass through before reaching the export elevators in the U.S. (USSEC, 2009).

1.2.1. Soybean Use

Soybeans can be consumed by humans, but are mostly crushed into meal for animal feed production and oil for human consumption. The average products from soybeans are 79% meal, 18.5% oil and 2.5% waste and hulls. Intact soybeans are generally used for food products such as roasted soy nuts, soy milk, and protein bars (USSEC, 2009).

Soybean oil is the leading oil product for human consumption. It is used for cooking oil and added to other edible products such as mayonnaise, shortening, and margarine. It also can be used as a pharmaceutical, such as vitamin E and other anti-oxidants, and industrial applications, such as paints, lubricants, and varnishes. A rapidly growing biodiesel market also increases demand for soybean oil.

Soybean meal is the main source of animal feed because high energy contents cause rapid weight increase. Poultry and swine farmers prefer soybean meal because of its high protein content. It's also used for cattle, fish, and pets. Soybean meal also can be used for soy protein, soy isolates, soy flour, and soy concentrates. It has also special characteristics that offer forming, emulsification, and water holding capacity (USSEC, 2012).

1.2.2. U.S. Soybean Market Situation

Soybeans in the U.S. are generally planted around April or May and harvested in October or November. The times vary depending on the geographic area. Soybeans are transferred to elevators, storage, or processing plants after harvesting. Soybeans are generally stored in local elevators before going to an export terminal or a processor facility (USSEC, 2012).

Soybeans are the major export source from the U.S. soybean industry followed by soybean meal and soybean oil. Table 5 demonstrates U.S. soybean exports.

Table 5: U.S. Soybean Exports

Products	Value in dollars ($1,000)
Soybeans	17,564,000 (82%)
Soybean Meal	2,702,000 (13%)
Soybean Oil	1,268,000 (6%)

Source: USDA, 2011

Increasingly, growers tend to have their storage so that they can have control over the time of sale, which makes them able to wait for more profits. Some soybean growers also manage risks by future or option contracts for hedging.

Local elevators acquire soybeans from growers or other elevators and they sell them to processors who crush soybeans into soybean meal and oil or brokerage companies who export soybeans to the international market. Many local elevators are focusing on only merchandise due to the small size of their businesses. Generally, soybean meal is distributed to feed processing companies such as Tyson, Pilgrim's, and ConAgra, which have their facilities near to major soybean processing plants.

Soybean oil is usually used by refiners who purify crude oil to RBD (refined, bleached, and deodorized) oil, which is distributed to food industries for cooking. Soybean oil is also used for biodiesel, and industrial material such as paints and coatings. Mostly, soybeans are used by processing facilities, and then they are transferred to food processors and export terminals.

A majority of soybeans are produced in the corn-belt of the Midwest, which includes Iowa, Illinois, Minnesota, and North Dakota. There are more competitions among the soybean processing or elevator companies in this area due to the concentration of growers. That means there are broad opportunities to choose the best price for growers, while grain elevators are pushed to do more marketing to farmers. Conversely, farmers in minor soybean production states like Louisiana are likely to sell their soybeans directly to export terminals or export markets due to location near to major export port. Table 6 lists major soybean production states in the U.S.

Table 6: Major Soybean Production States

States	Million Metric Tons	States	Million Metric Tons
Iowa	12.69	S.Dakota	4.10
Illinois	11.33	Arkansas	3.38
Minnesota	7.35	N.Dakota	3.06
Nebraska	7.03	Kansas	2.76
Indiana	6.48	Michigan	2.32
Missouri	5.17	Wisconsin	2.00

Source: USDA, 2011

East Asian countries such as China, Japan, Taiwan, and South Korea import 70% of U.S. soybean exports. China is the biggest customer for U.S. soybeans and soybean oil. They do not need to import a lot of soybean meal because they produce more soybean meal than their needs. They export it to other Asian countries such as South Korea and Japan.

Generally, U.S. commodity soybeans are not eligible to be considered premium in the international market except for the Japanese market. Japan, especially, trades with the U.S. and is characteristically not willing to do business with a new country or company without trust. Since U.S. exporters meet their specific demands and requirements, Japanese buyers are willing to pay a premium (USSEC, 2009). Table 7 illustrates the top ten U.S. export customers.

Table 7: Top Ten U.S. Export Customers in 2011

Rank	Soybean	Million Dollars	Soybean Meal	Million Dollars	Soybean Oil	Million Dollars
1	China	10,453	Canada	375	Morocco	336
2	Mexico	1,651	Mexico	369	Mexico	194
3	Japan	954	Venezuela	260	China	129
4	Indonesia	859	Philippines	229	Colombia	77
5	Taiwan	704	Morocco	221	Algeria	72
6	Egypt	301	Dominican Republic	145	Dominican Republic	71
7	Germany	286	Japan	119	Venezuela	57
8	South Korea	267	Guatemala	110	Guatemala	52
9	Spain	194	Ecuador	84	Canada	47
10	Thailand	176	South Korea	71	Peru	36
All others		1,720	All others	720	All others	196
Total		17,564	Total	2,702	Total	1,268

Source: USDA & U.S. Department of Commerce, 2012.

CHAPTER 2. CASE STUDY OF U.S. FOOD-GRADE SOYBEAN EXPORTER

2.1. Identify the Company's Business

This chapter develops a case study of a U.S. food grade soybean company, Exporter A. This case study illustrates how small-size exporters which merchandise food-grade soybeans profit from its products. The information used for this chapter is provided by the international marketing assistant in this company.

The food-grade soybean exporters have grown tremendously due to increased demand. These exporters and processors are located near the growers. Therefore, excess supplies can be used locally instead of shipping out of the area to be distributed again. This trend will be continued in the Midwest area.

Exporter A merchandises food grade, Non-GMO and Identity Preserved, oilseeds and grains to domestic and worldwide customers. The company has 15 employees that include 3 Korean natives who know the Korean market well. It has its own processing and packaging facilities as well as warehouses where they are able to package products in bags, totes, or bulk for the customers. Also they provide soybean seeds to local farmers. They purchase soybeans from farmers in Midwest area to export abroad. In 2011, Soybeans accounted for 76.5% of the company's Revenue and the remainder includes other crops (17.3%) and services (6.1%). The company's sales have grown from $3.2 million in 2010 to 4.6 million in 2011.

2.1.1. The Vertical Boundaries of the Firm

Economists usually use the terms "upstream" and "downstream" to demonstrate a relative relationship among the firms. Generally, goods are flowed through a vertical chain from upstream, referring to raw inputs such as soybeans, to downstream, referring to

buyers or retail market (Besanko et al., 2009). Figure 1 represents the vertical chain for food-grade soybeans. The vertical chain contains handling and processing from raw material to food-products. In this vertical chain, Exporter A is downstream from soybean growers and upstream from food processing plants and importers.

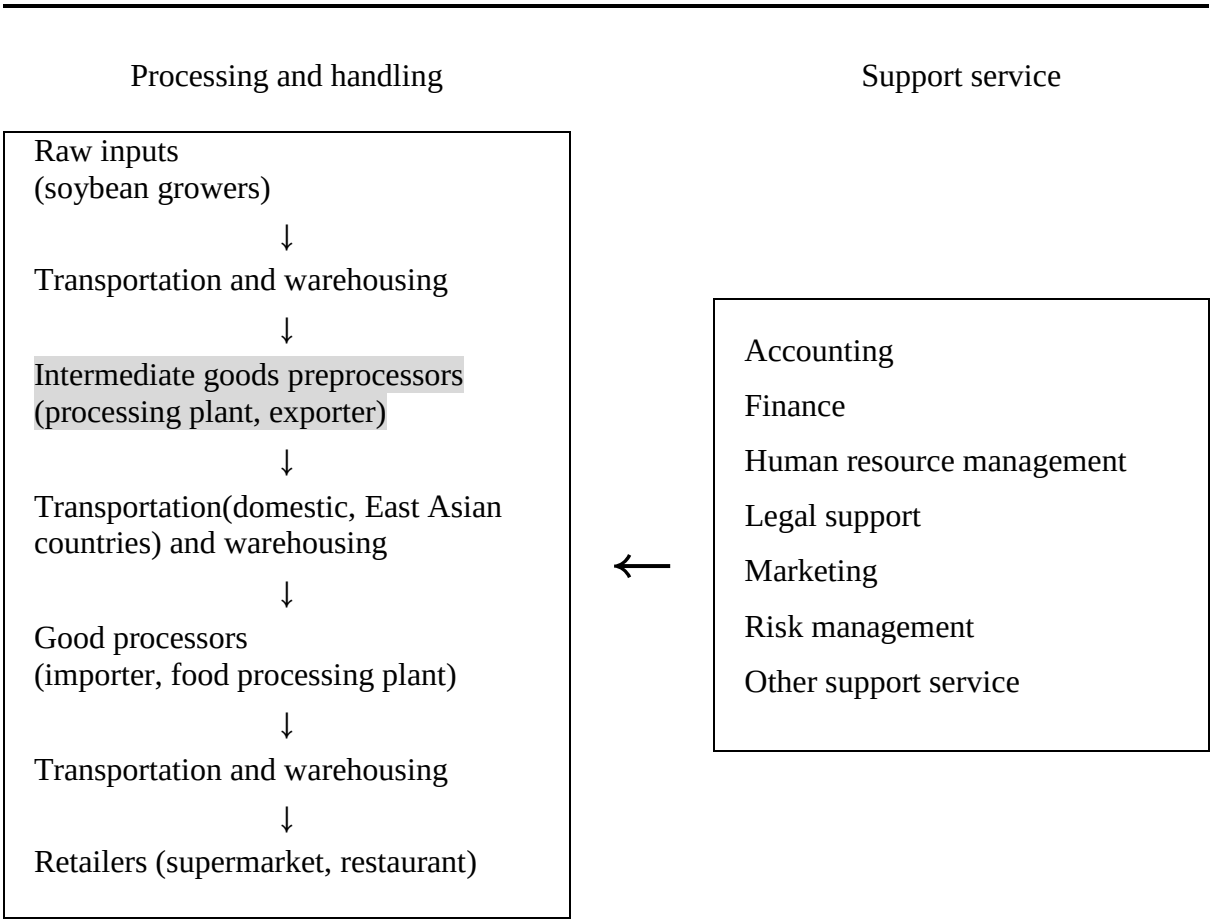

Figure 1: The Vertical Chain of Production for Food-Grade Soybeans

Exporter A also involves various support activities including accounting, human resource management, legal support, marketing, and risk management.

2.1.2. Make-or-Buy Decision

A make-or-buy decision is a company's decision to perform an activity itself or buy it from other specialized supporting firms. Generally, make-or-buy decisions for soybean

exporters or processors include whether to provide their own soybeans, provide their own transportation and export services, or operate their own warehouses and retail stores rather than depending on outside service providers.

Exporter A used to be only a brokerage company that bought soybeans from processors and sold them to the importers abroad. Being a brokerage company made them buy all the services, such as processing, packaging, warehouse storage, and other support services. However, in 2009, they successfully transformed into an exporter that has its own processing and packaging facilities and warehouses so they began integrating other services. Exporter A itself shows us a good make-or-buy decision example.

2.2. Company's Products (Food-Grade Soybean)

2.2.1. Food-Grade Soybean Market

According to the U.S. Soybean Export Council (USSEC, 2008), 60 million bushels of soybeans are exported for food-grade uses. Food-grade soybean demand from Asian countries that are willing to pay premiums is continuously increasing, but U.S. production does not meet the demand.

Although commodity soybeans for soy meal and oil, which are not for human consumption, are generally grown among U.S. farmers, "food-grade soybeans," also called "specialty soybeans," are grown for premium and the interest of food-grade soybeans are increasing these days. This usually requires "Identity Preserved (IP) soybeans" which can be tracked in every step of distribution.

Naeve et al. (2011) proposed that, while large U.S. agricultural companies focused on GMO soybeans and are not very interested in the relatively meticulous and riskier non-

GMO soybean market, small and private companies became enthusiastic about non-GMO soybeans while seeking premiums.

Much of the food grade soybeans are exported to East Asian countries. Those food-grade soybeans occupy a small portion of the international soybean market. Food-grade soybeans require more rigorous standards for seed quality, such as GMO issue, protein, and moisture, than commodity soybeans.

Lee and Herbek (2004) noted that buyers of specialty soybeans typically require a quality rating of Grade U.S. No. 1 or higher, whereas the commodity soybean market is based on a standard of Grade U.S. No. 2. Uniform seed size is very important for specialty markets. Many buyers who are from East Asia look for Non-GMO soybeans for their food products because the consumers are very sensitive concerning their health.

2.2.2. Identity Preserved (IP) System and Channeling System

Most of the food-grade soybeans are required to be distributed in the IP system. In the soybean industry, we can divide the soybean distributions into two ways: channeling and the IP system (Burke, 2012).

In the channeling system, soybeans are segregated in large volumes through production, processing, and distribution. For example, large amounts of soybeans, especially bulk non-GMO soybeans, are currently distributed by the channeling system. While it is not a very important issue if the soybean variety is blended with other varieties, they should be non-GMO soybeans in this system.

On the other hand, IP soybeans are more strictly planted, distributed and documented by farmers, processors, and exporters. Also, specific variety purity and

requirements such as size, clear hilum, or high protein are assured to the customers in the IP system.

IP soybeans are different from others in several aspects. First of all, farmers consent to the specific guidance for production practices. All of the handling and storage procedures for specific seeds are tracked in every step. Also, farmers make sure to clean all planting and harvesting equipment, all bins, and trucks before using with variety specific soybeans. Then they need to retain records for IP soybeans.

Second, Handling Practices is specially treated in the IP system. Cleaning facilities must clean the bin before unloading the soybeans and cleaning all the equipment. They designate the lot numbers which indicate the particular producers and specific varieties. They hold all of the documents for receiving, handling, and storage for each specific soybean variety from particular producers. Also IP soybeans require a 3rd party's verification.

2.2.3. Food Grade Soybean Distribution Procedure

Generally, food-grade soybean distribution procedure follows the IP soybean process which includes the following procedures. Figure 1 shows a typical IP soybeans distribution procedure.

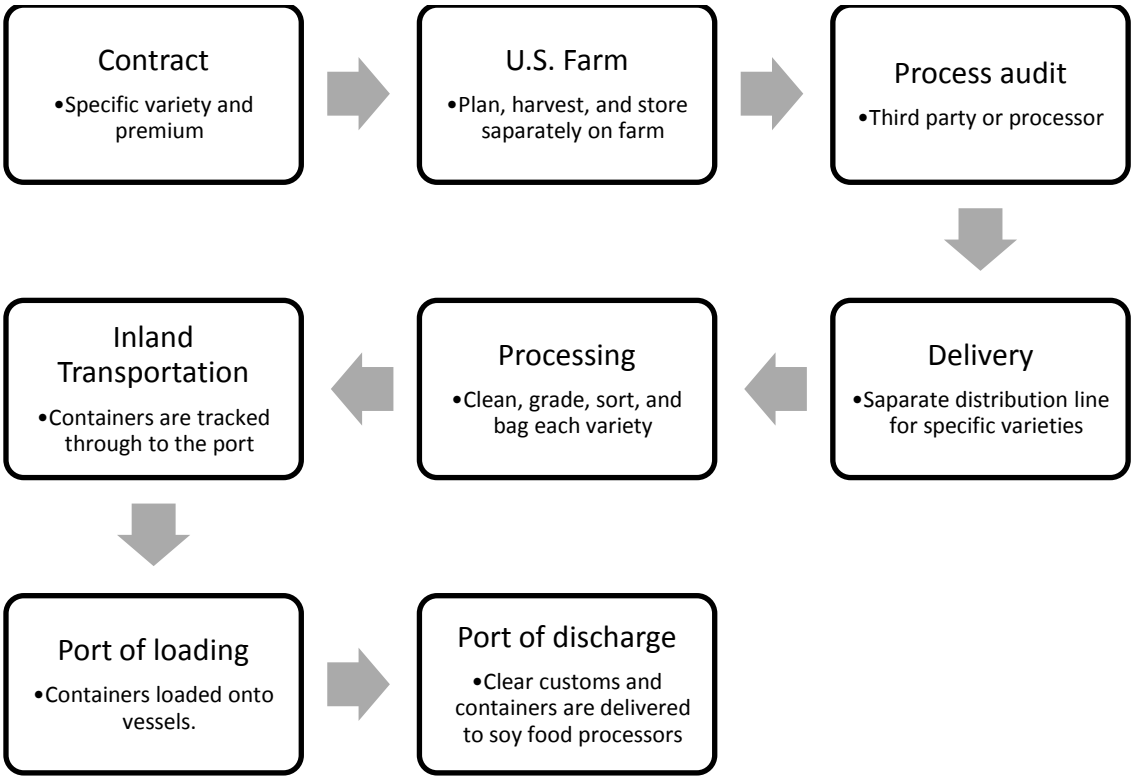

Figure 2: IP Soybeans Distribution Procedures

Source: United Soybean Board, 2008

In advance of planting, exporters and buyers make a contract for a specific variety at a specific premium. Exporters then counsel growers to grow, harvest, and store specific varieties separately on their farms. Farmers should maintain documentation of fields and planted varieties. Originators conduct audits of fields and documentation, and third-party auditors conduct audits if in the contract. Then originators separate distribution lines for specific varieties. After that, the varieties are cleaned, graded, and bagged using special procedures and stored in separate, designated bins. The bins are loaded into containers that are tracked through to the port. The containers are then loaded onto vessels that are also tracked to the port of discharge. Finally, the containers are unloaded from the vessels, clear customs, and are delivered to soy food processors. (United Soybean Board, 2008)

2.2.4. Soybean Types

Soybeans can be classified into two categories: commodity soybeans and food-grade soybeans which represent specialty soybeans. Most of the U.S. soybeans represent commodity soybeans for meal and oil products (Chad and James, 2004). Food-grade soybeans are used for tofu, natto, soy-sauce (Miso, doenjang and gochujang), sprout, soy milk, edamame, and soy nuts (Lee & Herbek, 2004).

2.2.4.1. Tofu

Tofu, which has the biggest portion of the food-grade soybean market, is used for Asian side dishes. For tofu, soybeans are soaked in water, ground, and coagulated. Soybeans for tofu should have clear hilium and contain high protein, around 40%. Large size seeds are used for tofu. Since it is ground, it doesn't need small seeds like natto, which are more expensive.

2.2.4.2. Natto

Natto is fermented food generally eaten by Japanese people with rice. Nowadays, people like small natto beans more than large ones. Most natto beans that Japanese buyers import are U.S. soybeans. And it is a most preferable product because of its high premium.

2.2.4.3. Sprouts

According to the Vice President of Company A, who exports soybeans to an Asian market, soybeans for sprouts need fastidious management because they need a high germination rate, which can be deteriorated by temperature while it is shipping. That is the reason why many exporters have difficulty exporting soybeans for sprouts. It should not be exported in summer because although it has enough germination rate tested by the U.S. third party, it can be deteriorated by warm temperature which makes less germination.

2.2.4.4. Miso and Doenjang

Doenjang and miso is used for soup in Asia. They are very similar in terms of producing procedure: fermenting soybeans. For those seasoning pastes, soybeans do not need to be very high quality and their size is not very important.

2.2.4.5. Soy Nuts

Soy nuts are roasted and salted snack-like products. They need clear hilium and large size.

2.2.4.6. Edamame

Edamame are green soybeans usually cooked and eaten directly or salted. Large size and clear hilium are needed. Edamame should be harvested in R6 growth stage, full seed and still green (Fehr & Caviness, 1977).

2.3. Merchandising Procedures

2.3.1. Contracts

A contract describes the conditions of transactions or exchanges, and it is an important factor of economies. For instance, in many exchanges, each party performs its contract requirements. Trading partners cannot take advantages of another party because of contract conditions. (Besanko et al., 2009)

Also, Exporter A defines contract specification when doing business with growers and buyers. In the case of food-grade soybeans, Exporter A specifies soybean quality, sampling and shipment plan, and pricing specifications.

2.3.2. Purchase

Purchasing activities can be divided into three parts: contracting with growers, buying from other countries or buying from domestic processors. Currently the company

contracts with 32 growers in the U.S. and they purchase products from processors in the U.S., Canada, and Ukraine respectively.

The most profitable purchase method is to contract with growers directly. They facilitate this kind of contract by visiting, participating in local meetings and conferences, advertising by radio, local magazine, and newspaper, and sending letters to growers. Then growers contact Exporter A, who makes contracts with growers before or after harvest. Exporter A also buys the products from processors abroad or domestic as a brokerage company.

The price is decided based on CBOT, Chicago Board Of Trade, prices. The premium is decided by the products' quality when growers and the exporter make a contract.

2.3.3. Sale

International sales occupy 70% of their business, while domestic sales occupy only 30%. South Korea has the biggest share of its international sales by 50%, Japan is the 2nd big market which has 40% of their share, Ukraine has 9.7% of the share, and others which include Mexico, Germany, and England have 0.3% of share.

Exporter A does sales marketing by participating in international trade shows, buyers' mission trip events in the U.S., and mission trips to buyer's countries. They also receive the part of costs from Food Export Midwest or Small Business Association for export activities.

2.3.4. Risk Hedging

The company has a price change risk, so they work with a broker who cares about future transaction to risk hedging. When the company purchases or forward purchases cash

grain, the brokerage company sells nearly equivalent amount of futures. On the other hand, when the company sells the grain, the brokerage company buys futures. Then the company pays a commission to the broker for future transactions.

2.3.5. Company's Relationships with Buyers and Growers

Korean and Japanese customers mostly import food-grade soybeans from the U.S. However, it is difficult to find growers that cultivate non-GMO soybeans in the U.S. because many growers have moved to GMO commodity soybeans. Therefore, buyers want to keep their relationship with Exporter A who already has a good relationship with local growers cultivating non-GMO soybeans.

Because of uncertainty of the new contract with new company, they tend to have a contract with the company they had business with and trust. Moreover, current customers occasionally introduce new customers, so the relationship with a buyer is critical. Exporter A tries to strengthen the relationship with customers by mission trips to the customer's country.

It is a very common practice for food-grade soybean buyers from Korea and Japan to visit the U.S. producers. They want to know the condition of the soybeans they contracted and ensure the producers can produce food-grade soybeans continuously.

2.4. Target Market (China, Japan and South Korea)

Exporter A's target market is the East Asian market where people are consuming soybeans a lot, as they have many kinds of side dishes from soybeans, such as tofu, natto, miso, soybean sprouts, and soy-milk.

Exporter A's current target market is expanding the number of Korean and Japanese customers. In addition, Exporter A is also looking forward to extending the Chinese soy

food market. However, the Chinese soybean for human consumption import market requires very meticulous procedures from the U.S. soybean exporters. China has the requirement of zero percent GMO.

Exporter A has lots of customers that make tofu, soy sauce, and soybean sprout in South Korea. Since South Korea has implemented U.S.-Korea FTA, there are less and less barriers in the future. Table 8 shows the import quota for each association. This table shows that quota distribution to the companies in South Korea in 1st and 2nd years of U.S.-Korea FTA.

Table 8: Soybean Import Quota in South Korea

Associations of soy food processors	Food	2012	2013
Korea federation of tofu cooperative	Tofu	4,497	8,994
Korea jang cooperative	Soy sauce and paste	2,354	4,708
Korea foods industry association	Soy milk	1,665	3,330
Korea soybean foodstuffs association	Tofu	662	1,324
Soybean-curd manufacturer association of Korea	Fermented soybean lump	432	864
Seoul soybean-processed foods cooperative	Tofu	227	454
Seoul Kyongin beancurd manufacture cooperation	Tofu	163	326
Total		10,000	20,000

Source: ASA-IM Korea, 2012

The company's major source of export to Japan is natto. According to the ASA-IM Japan, the top 7 natto companies share about 80% of the natto market in Japan. Table 9 shows the top 7 companies' share in the natto market.

Table 9: Top 7 Natto Processing Companies in Japan

Soy food processors	Share
Takano Foods	35%
Mizkan	20%
Azuma	5%
Yamada	5%
Taishi	5%
Marukin	5%
Marumiya	5%
Total	80%

Source: Japan Natto Cooperative Society Federation, 2010

Although the company is relatively dominant in the South Korean and Japanese market, they still want to expand their business area in these countries. Since China has a large potential demand in the food-grade soybean market, Exporter A is studying this market and will attempt to develop new business contracts with Chinese importers.

In Chapter 3 we will discuss the three countries' market situation; in Chapter 4 the import demand of these countries is analyzed. In the conclusion, Chapter 5, Exporter A's future strategy will be suggested.

2.5. Assessing the Top 3 Target Markets

2.5.1. Soybean Market Overview by Countries

China, Japan, and South Korea, which are located in Eastern Asia, need more and more agricultural products because of their developing life style. During 2011, those three countries accounted for 63% of soybean, 7% of soybean meal, and 22% of soybean oil U.S. exports, which means they import soybeans from the U.S. but they import soybean meal and soybean oil mostly from South America (UDSA, 2012). Table 10 provides the information about the three countries' share of the U.S. soybean exports.

Table 10: China, Japan, and South Korea's Market Share of U.S. Soybeans in 2011

Item	Quantity (MT) Total	Total share	China share	Japan share	South Korea share
Soybeans	23,109,197	62%	56%	5%	2%
Soybean meal	596,949	7%	0%	4%	3%
Soybean oil	143,126	22%	15%	1%	5%

Source: USDA, 2012

2.5.1.1. China

The Central Intelligence Agency (CIA, 2011) estimates China to be the 2nd largest economy country in the World. In China, growth of population and increased demand for pork and seed oil lead to international demand and consumption for soybeans. Although the Chinese market has more uncertainty and a different business culture, it is the most attractive market in terms of agricultural products.

China is the greatest buyer in the world while they are the world's 4th biggest soybean production country. 85% of all soybeans are crushed for soybean meal and oil. Figure 3 and Figure 4 shows total soybean supply and consumption in China.

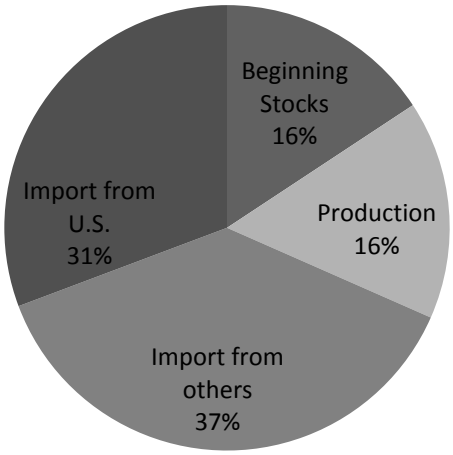

Figure 3: China's Soybean Supply in 2011 (1000MT; 1000Ha)

Source: USDA PSD Table, 2012

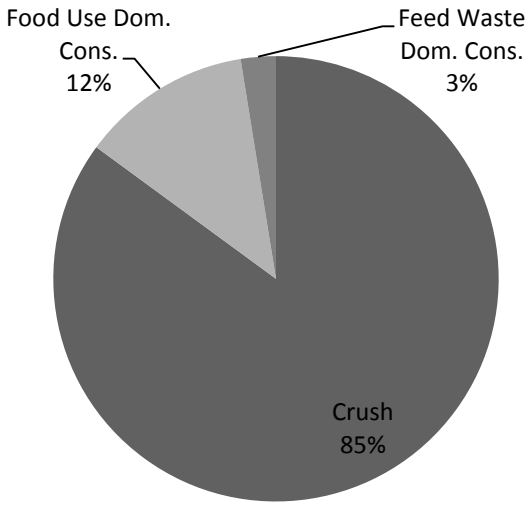

Figure 4: China's Domestic Consumption of Soybeans in 2011 (1000MT; 1000Ha)

Source: USDA PSD Table, 2012

Although China was the second largest importer following EU, China, who now is the first soybean importer in the world, imports almost 60% of the world's soybean products. In 2011, China imported 56% of the U.S. soybeans, 64% of Brazilian soybeans, and 82% of Argentine soybeans (UN-COMTRADE, 2011).

2.5.1.2. Japan

As a world 3rd largest individual economy, Japan continues to represent on one of the best customer for the U.S. agricultural exporters. For agricultural products, Japan is the 4th largest market for the U.S. follows to Canada, China and Mexico. (Central Intelligence Agency, 2011)

Japan is the traditional customer for US soybeans. Japan and Korea use soybeans as food more portion than other countries. Figure 5 and Figure 6 shows total soybean supply and consumption in Japan.

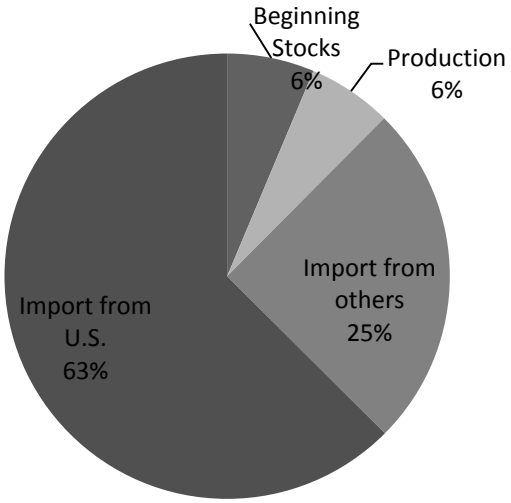

Figure 5: Japan's Soybean Supply in 2011 (1000MT; 1000Ha)

Source: USDA PSD Table, 2012

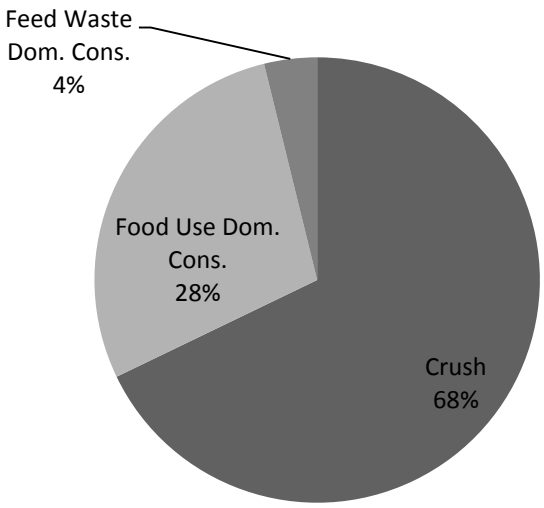

Figure 6: Japan's Domestic Consumption of Soybeans in 2011 (1000MT; 1000Ha)

Source: USDA PSD Table, 2012

In 2011, there was tremendous disaster in Japan which makes even domestic buyers avoid agricultural products from Northeast region of Japan because of worry about radioactivity (ASA Japan, 2012). This is the reason why there are more needs for soybeans from other countries.

2.5.1.3. South Korea

CIA estimated South Korea as the world's 13th largest individual economy.(CIA, 2011) It has most traditional food which added soybean made seasoning paste, and many kinds of soybean made products such as, tofu, soybean sprouts, soy milk are consumed by local consumers. Figure 7 and Figure 8 shows total soybean supply and consumption in South Korea.

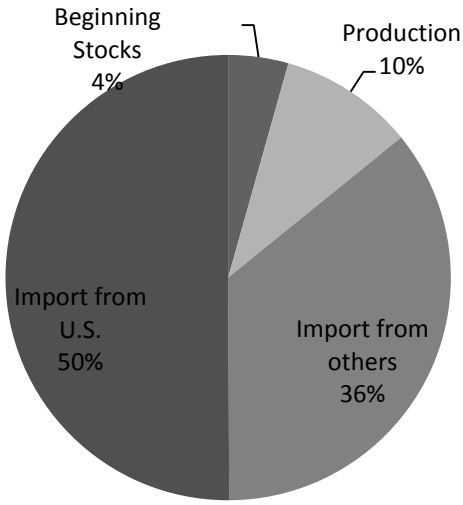

Figure 7: South Korea's Soybean Supply in 2011 (1000MT; 1000Ha)

Source: USDA PSD Table, 2012

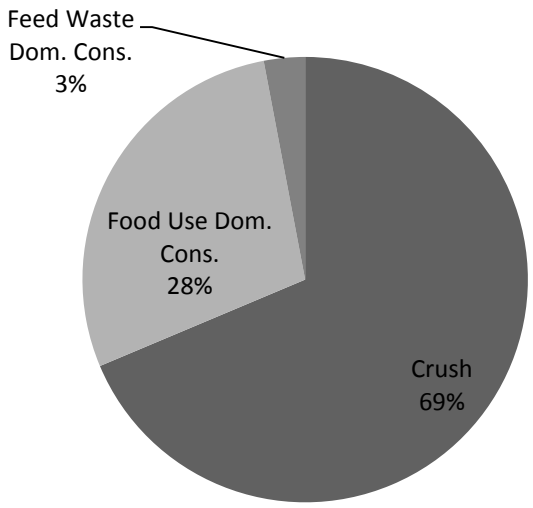

Figure 8: South Korea's Domestic Consumption of Soybeans in 2011 (1000MT; 1000Ha)

Source: USDA PSD Table, 2012

Korea is the fifth largest market for U.S. agricultural industry. And there are ongoing less barrier and tariffs since implementation of the Korea-U.S. Free Trade Agreement (U.S. Agricultural Trade Office [ATO] Korea, 2010).

2.5.2. Tariff and Tax Analysis

There was one significant result from Uruguay Round Agreement of Agriculture that removes nontariff barriers and adopts only tariffs. There are two tariffs for agricultural importing goods, a base tariff and a bound tariff. The bound tariff is the most-favored-nation tariff rate that enforceable under Article II of General Agreement on Tariffs and Trade (GATT). If a country makes its tariff more than a bound tariff, the opposite country can obtain the right to retaliate for the compensating value. According to the USDA Uruguay Round tariff reduction and tariff-rate quotas, which tires two types of tariffs that a in-quota tariff is charged from the quota volume and over-quota tariff is charged from out of quota volume. Table 11 shows the countries' different tariff criteria for importing soybeans.

Table 11: Soybean Tariffs for the Three Countries

Country	Item number	Description of products	Base rate of duty	Bound rate of duty
China	1201.00.0000	Soya-bean	150%	114%
	1208.10.0000	Soya bean meals	40%	36%
	1507.10.00	Soya-bean oil (crude oil)	160%	121.6%
	1507.90.00	Soya-bean oil (other)	160%	121.6%
Japan	1201.00.0000	Soya-bean	0%	0%
	1208.10.0000	Soya bean meals	7.0%	4.2%
	1507.10.00	Soya-bean oil (crude oil)	17yen/kg	8.5yen/kg
	1507.90.00	Soya-bean oil (other)	20.7yen/kg	10.4yen/kg
South Korea	1201.00.0000	Soya-bean	541.0% or 1,062won/kg, whichever is the greater	487.0% or 956won/kg, whichever is the greater
	1208.10.0000	Soya bean meals	35.5%	27%
	1507.10.00	Soya-bean oil (crude oil)	30%	5.4%
	1507.90.1000	Soya-bean oil (Refined oil)	30%	5.4%
	1507.90.9000	Soya-bean oil (other)	35.5%	27%

Source: USDA FAS Online, 2011

According to the U.S. Food and Drug Administration, U.S. doesn't require labeling of GMO products, while other countries, such as EU(0.9%), Brazil(1%), China(0%), South Korea(3%), Japan(5%) has mandatory labeling requirement. When it comes to food grade products, these requirements are an invisible barrier for U.S. soybean export because

consumers from these countries have a strong tendency for non-GMO products. (Gruere and Rao, 2007)

Tariff rate quotas (TRQ) for certain agricultural products introduced into China when they join the WTO in 2001. According to the USDA, most state controlled trading companies have TRQ share that include 150% base rate and 114% bound rate of duty. Government authorities distribute the remainder of TRQ to other applicants who have import history for significant volume. According to Tuan et al. (2004) Soybeans need to be certified from Chinese Ministry of Agriculture, and import permits are still needed for each shipment. Chinese officials assume that US soybeans are not guaranteed for zero percent GMO.

In Japan, there is no tariff protection for soybeans. However they have GMO mandatory labeling for those contain more than 5% GMO soybeans but not to soybean oil and meal. (Hamamoto et al., 2002)

South Korea has a Free Trade Agreement with the USA. According to the Jo (2012), country director of ASA-IM Korea, there are four ways to import soybeans from other countries. The most favorable way is under the Korea and the U.S. (Korus) FTA trade with zero tariff rate for IP soybeans for food use. Another way is trade by Agro-Fisheries and Foods Trade Corporation (aT) which is run by the government. Imports by private trade with aT is also possible. However, there is a 5% import duty. The most disadvantageous way is by private trade which has a 487% bound rate of duty. 3% or more GMO soybeans must be labeled. Table 12 shows the IP soybean import schedule in Korus FTA

For Exporter A, the Korean and Japanese soybean markets are easier to enter with less risk because of their relatively loose restriction for GMO products compared with the Chinese market.

Table 12: Korea's IP Soybean for Food Use Zero Tariff Rate Quota Schedule

2012(1st year)	2013(2nd year)	2014(3rd year)	From 2015
10,000 MT	20,000 MT	25,000 MT	3% increase perpetually

Source: USDA, FAS, 2007

2.6. Future Strategies

Many companies perform a SWOT analysis to examine the Strengths, Weaknesses, Opportunities, and Threats of their business to improve the strategic position. Excellent strategy denotes ensuring a fit between the internal business characteristics, such as strengths and weaknesses, and outside factors that you cannot control, such as opportunities and threats (Andrews, 1987).

2.6.1. Strengths

Exporter A has strong business networks in South Korea and Japan which are difficult to be obtained by other companies in the U.S. Those countries pay more premiums and import a large amount of specialty soybeans for human consumption. Exporter A has been doing business with the Japanese trading company for a decade and they have strong relationships which are critical in Asian market, which means they are customer oriented. Moreover, there are several employees are bilingual, so they can effectively conduct an in-depth market research and develop relationships with buyers in South Korea and Japan. Also, Exporter A successfully transformed from brokerage firm into an exporter that has its

own processing and packaging facilities and warehouses. Therefore they use less on export expenses because they don't need an outside brokerage company.

2.6.2. Weaknesses

Since its comparatively small size, Exporter A couldn't have an advantage over economies of scale which refer to the cost advantage a company get due to a large size. Also, they transformed its business in 2009 so it hasn't enough time to have enough accumulated experiences on processing facilities as well as well-organized system. As workers often improve their performance, organizations can also improve and learn.

2.6.3. Opportunities

As stated previously, Exporter A has lots of customers that make soy-food in South Korea and Japan. Since South Korea has implemented U.S.-Korea FTA, there will be less and less barriers and more and more demand for non-GMO soybeans in the future. Also, the great japan earthquake makes Japanese buyers avoid the agricultural products from Northeast region where is the major area of soybean production. Thus, Japanese soy-food companies need to import soybeans for human consumption more.

Moreover, China's fast-growing economy increases standard of living which accelerates their meat and oil consumption, both need import of oil seeds. Also, the population growth increases demand of soy-food which is known as healthy food in East Asian countries.

2.6.4. Threats

In the future, there will be more competition in the food-grade soybean market. U.S. companies' awareness of the market opportunity in food-grade soybean industry makes them to involve and research more in East Asian market. Several big soybean exporters and

processors are very interested in this market, and some of them already have a local branches or agents in those countries.

2.6.5. Company's Future Strategies

Exporter A has successfully expanded its business from brokerage company to corporate company, and they have bilingual employees and strong networks in Japan and South Korea. Moreover, the food-grade soybean market's import demand is increasing in the East Asian countries, especially in China. This suggests that they should keep ensure the Korean and Japanese market and expand the Chinese market.

However, Exporter A is confronted by difficulties, such as inexperience in processing facilities, cost-ineffectiveness and threats from the big companies' participating in the food-grade soybean industry. Therefore, they should keep expanding their processing and packaging facilities to have economies of scale which refer to the cost advantage. They can also have more full-time employees rather than part-time workers or interns so that their knowledge and experiences can be maintained effectively.

CHAPTER 3. IMPORT DEMAND FORECAST

3.1. Research Objective

This chapter examines the soybean import demands for each of the three countries, China, Japan, and South Korea, in an effort to forecast future demand. The objective is to forecast the import demand for seven years from 2011 to 2017 for the three countries. This will give us an idea of soybean export opportunities in East Asia. The soybean demand for food use is also discussed to estimate how large opportunities the U.S. exporters can have. Because of lack of the data for food grade soybeans import quantities, total imports and soybean usages for human consumption data are used instead. Historical annual data that refers to the U.S. soybean price, GDP, GDP per capita, household consumption, domestic soybean use and production, and population, covering 1971 to 2010 is analyzed for this study.

3.2. Literature Review

It is obvious that the price of import and income elasticity can highly affect effectiveness of international policy. Therefore, many economists, researchers, and policy makers tried to investigate the trade relationships. Nelson and Plosser (1982) pointed out that most of the time series are not stationary by empirical testing. Also, Goldstein and Khan (1985) proposed that international trade relationships are exposed to change over the time periods because of economic development, international trade policies, or exchange rate, which can affect demand and supply relationships. Trade relationships are not very steady over time because of the variables such as price of soybeans, GDP, income, and government policy.

Houthakker & Magee (1969) stated that while there is special attention on price elasticities in international trade, it has been understood that income elasticities are important as well, especially in developing countries. Consequently, Chacholiades & Johnson (1978) asserted that trade balance moves over time rely strongly on a country's income elasticity of import demand and on the rest of the world's income elasticity of the country's export demand. In a two-country model, although the prices and the income growth are constant in both countries, trade balance between them still changes over time because the respective income elasticity of each country's export demand is different.

Khan (1974) proposed that the variable of price has significant effect on import demand in developing countries. The estimated elasticities of prices incline to have much greater numbers than is generally assumed to be in the case of developing countries. In addition, the estimates in Khan (1974) are justified when annual data are adopted.

Bahmani-Oskooee (1986) estimated import and export demand functions for a sample of developing countries. He argued that both effective exchange rate and income have significant effects on imports in Brazil, Israel, and Greece. However, income and relative prices are major determinants of import demand in South Korea, Thailand, and South Africa. Import and export reactions move quicker when exchange rates make changes in international prices rather than relative prices in local currency. This study also shows that international trades are more sensitive to changes in the relative prices rather than in the exchange rates.

Tokarick (2010) stated that import demand elasticity can be estimated by production theory. For instance, the derivative of GDP functions related to an output price derives the supply function by adoption of Hotelling's lemma. Kee et al. (2008) mentioned

that the demand function can be derived similarly. Kohli (1991) used the GDP function approach to evaluate elasticity. In the study, imports can be assumed as intermediate input because imports arise in the production sector such as retail services and wholesale market.

Masuda & Goldsmith (2009) predicted the world soybean production will be increased by 2.2% annually until 2030 using an exponential smoothing model. Yamaura (2011) analyzed the market power of Japanese non-GM soybean importers and U.S. exporters. Song (2009) researched market power of China's soybean import market.

However, there was no research for future import demands for China, Japan, and South Korea related to local U.S. exporters. This paper will analyze import demands for these three countries and forecast their import demand for seven years in the future.

The USDA (2009) provides 10-year projections for soybean through 2018 but only focuses on U.S. agriculture. Food and Agricultural Policy Research Institute (FAPRI, 2011) provided projections for international soybean imports for the three countries.

The contribution of the three-country model is helping for U.S. exporter make a marketing decision as well as gives an outlook for the international soybean market.

3.3. Methodology and Model

This study focuses on import demand analysis which is based on the demand theory. The foundation of demand model is explained for this section. In the following section, the topics for neoclassical consumer demand theory is described. After that, import demand model is discussed.

3.3.1. Import Demand Model

Generally, the import demand model contains import demand quantity, as dependent variable, and import price and income (GDP), as independent variable. Since the

effectiveness of government trade policy rely heavily on the extent of their elasticities. Many economists pointed out that import demand is a function of relative prices and income (Murray and Ginmam (1976), Goldstein and Khan (1985), Hooper and Marquez (1993)).

Since import demand elasticity is important in trade theory, many economists have given serious attentions to the estimation of it. Like other demand models, the import demand model also has a conceptual relation that quantity demand and price are assumed to be inverse (Murray & Ginman, 1984).

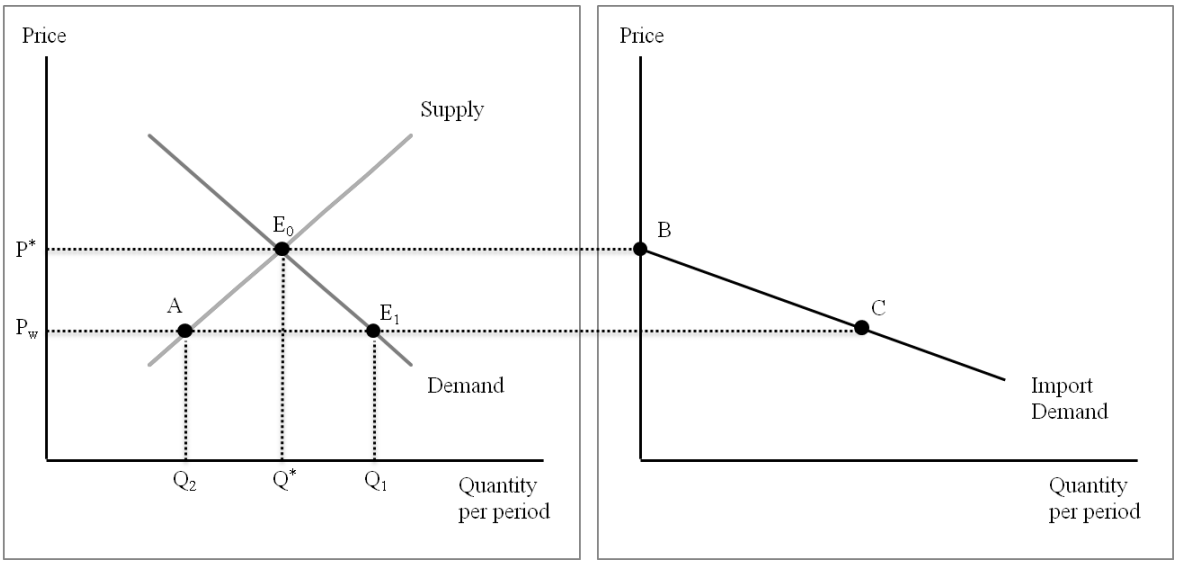

Figure 9: Import Demand and Supply

The import demand equation can be calculated by subtracting the domestic production from the domestic demand. Figure 9 explains the domestic demand and supply curves for soybeans. The domestic equilibrium price of shoes would be P^* and quantity would be Q^*. If world soybean prices, P_w, are less than the domestic price, P^*, then consumers would like to buy imported soybeans, which cause more import demand for soybeans. While domestic producer's supply quantity will drop to Q_2, soybean demand

increases to Q_1. The amount of $Q_1 - Q_2$ is needed for domestic consumption, which should be imported from international market place. Then, the market equilibrium moves from E_0 to E_1 (Nicholson & Snyder, 2011).

Import demand in time *t*, M_t, is derived from subtracting domestic supply, DS_t, from domestic demand, DD_t, in the given variable of income or activity, X and Y. This can be represented as follows:

$$DD_t = f_1(P, Y)$$

$$DS_t = f_1(P, Z)$$

$$M_t = DD_t - DS_t$$

Then, we can derive the following equation:

$$M_t = f_1(P, Y) - f_1(P, Z)$$

which can be specified as:

$$M_t = f(P, Y, Z)$$

Ordinary Least Squares is used extensively in regression analysis because it is intuitively appealing and mathematically much simpler than other methods. OLS has very attractive statistical properties so that it can be one of the most powerful methods of regression analysis.

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \cdots + \beta_k X_{ki} + u_i$$

In this case, *Y* is the dependent variable, X_k is the explanatory variable, *u* is the stochastic disturbance term, and *i* the *i*th observation. β_1 is the intercept term and β_k is the partial regression coefficient.

By using OLS, empirical model for soybean import demand in the given country *i* and time *t* can be expressed as follows:

$$lnM_t^i = a_1 + a_2 lnP_t^i + a_3 lnEXR_t^i + a_4 lnGDP_t^i + a_5 WTO_t^i + e_t$$

where,

lnM_t^i = Natural log of soybean import demand (Metric Tons)

lnP_t^i = Natural log of world soybean price (local currency per Metric Tons)

$lnEXR_t^i$ = Natural log of exchange rate (local currency per to USD)

$lnGDP_t^i$ = GDP per capita (USD)

WTO_t^i = WTO participation (Dummy variable)

A greater world soybean price and exchange rate would bring less demand and import quantity. A greater GDP per capita would bring more oil and meat for human consumption, which causes more import demand for soybeans. When exchange rate is higher than usual, soybean import prices will increase with respect to their local currency. Therefore, import demand for soybean will decrease.

3.4. Data Description

The data used are the twenty years annual data from 1991 to 2010 for China. Forty years of annual data from 1971 to 2010 are used for Japan and South Korea. Soybean import demand data for China, Japan, and South Korea are provided by FAOSTAT, 2013. World soybean price and GDP per capita is provided by the World Bank, 2013. The countries' participation in the WTO is the dummy variable. The forecast of world soybean prices is provided from World Bank, 2013. GDP per capita forecast data are from the International Monetary Fund (IMF), 2012. This paper concentrates on estimating import demand for seven years in the future as well as how import demand forecasts compare with soybean demands used for food in China, Japan, and South Korea.

3.5. Empirical Results

Since this study use the time series data, it might have autocorrelation or heteroscedasticity. When the scatter of the errors is different, varying depending on the value of one or more of the independent variables, the error terms are heteroskedastic. The presence of heteroscedasticity can cause misleading conclusions that the OLS estimators are inefficient. Autocorrelation, a relationship between values separated from each other by a given time lag, can violate the ordinary least squares' assumption so the OLS estimators are inefficient (Gujarati & Porter, 1999).

So this study includes the Durbin-Watson (DW) test to evaluate the autocorrelation. It tests the null hypothesis against the alternative hypothesis as follows:

H_0 = the errors are uncorrelated

H_1 = the errors are correlated.

Also, Auto Regressive Conditional Heteroskedasticity (ARCH) test is included to evaluate a potential heteroscedasticity. It tests the null hypothesis against the alternative hypothesis as follows:

H_0 = Series of residuals exhibits no conditional heteroscedasticity

H_1 = Series of residuals exhibits conditional heteroscedasticity

A methodology to test for the lag length of ARCH errors using the Lagrange multiplier test was proposed by Engle (Engle, 1982).

DW tests indicated that the errors are correlated which means it reject the null hypothesis in Korean and Japanese model. So, this paper used auto-regressive method to fit an auto-regressive model and to correct the regression estimates for autocorrelation. The DW test results are presented in Table 13.

The ARCH tests show that it cannot reject the null hypothesis that there is no heteroscedasticity for any model; the test results are presented in Table 14.

Table 13: Durbin-Watson Statistics

Country	DW	Pr < DW	Pr > DW
China	1.6584	0.0596	0.9404
Japan	1.0227	<.0001	1.0000
South Korea	1.3954	<.0001	1.0000

Table 14: ARCH Test

Country	Q	Pr > Q	LM[1)]	Pr > LM
China	1.8570	0.1730	1.5962	0.2064
Japan	0.4637	0.4959	0.2423	0.6225
South Korea	1.6803	0.1949	1.3440	0.2463

[1)]LM: Lagrange multiplier

In the results, T-value determines whether the null hypothesis should be rejected or not. If the null hypothesis is rejected, the regression coefficient is statistically different from zero which means the independent variable has effect on dependent variable.

In China, the coefficient of GDP per capita has positive effect on the import demand and it is significant, which is to be expected. Because GDP per capita is another way of measuring income, as income increases, livestock demand is also increased, which makes more soybean demand for feed. Soybean price has negative effect on the import demand because higher world soybean price causes less import demand for China. WTO

participation is marginally significant and has positive effect on the import demand. Exchange rate is not significant indicating it has no effect on the import demand.

R^2 is 0.9661 indicating that 96.6% of the variation in dependent variable is explained by the independent variables. Table 15 shows the analysis of Chinese import demand.

Table 15: Chinese Soybean Demand Analysis

Variable	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	7.68577	4.22625	1.82	0.0890
lnP_t^C	-0.93024	0.46894	-1.98	0.0659
$lnEXR_t^C$	0.53054	0.73004	0.73	0.4786
$lnGDP_t^C$	2.07825	0.23649	8.79	<.0001
WTO_t^C	0.35100	0.23613	1.49	0.1579
R^2	0. 9661			
Number of Observations	20			

In Japan, the coefficient of the soybean price is negative and it is marginally significant. The coefficient of the year square is a small negative value. The exchange rate, WTO participation and GDP per capita are positively related to import demand and significant. R^2 is 0.7528 indicating that 75.3% of the variation in dependent variable is explained by the independent variables. Table 16 shows the result of Japanese soybean demand analysis.

Table 16: Japanese Soybean Demand Analysis

Variable	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	8.19869	2.57571	3.18	0.0031
lnP_t^J	-0.12578	0.07765	-1.62	0.1145
$lnEXR_t^J$	0.20554	0.11497	1.79	0.0827
$lnGDP_t^J$	0.74204	0.19491	3.81	0.0006
WTO_t^J	0.09780	0.05195	1.88	0.0683
$lnYEARSQ_t^J$	-0.00043582	0.00009419	-4.63	<.0001
R^2	0.7528			
Number of Observations	40			

In South Korea, coefficient of the soybean price in local currency and WTO participation are negative. 1997 Asian financial crisis may negatively affect the variable of WTO participation from 1995. The GDP per capita and the exchange rate positively impact soybean imports in South Korea. R^2 is 0.8511 indicating that 85.1% of the variation in dependent variable is explained by the independent variables.

Table 17: Korean Soybean Demand Analysis

Variable	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	8.82977	5.96193	1.48	0.1475
lnP_t^C	-1.32051	0.33243	-3.97	0.0003
$lnEXR_t^C$	1.22486	0.67199	1.82	0.0769
$lnGDP_t^C$	1.50936	0.26154	5.77	<.0001
WTO_t^C	-0.72059	0.30872	-2.33	0.0255
R^2	0.8511			
Number of Observations	40			

3.6. Import Forecast

Import forecasts are estimated based on the import models from the empirical results and the forecast data which has same metric values. The forecast of world soybean prices is provided from World Bank, 2013. GDP per capita forecast data are from the International Monetary Fund (IMF), 2012.

Based on the expected independent variables, there is a huge increase in Chinese demand of about 81%, from 57,005,718 MT in 2010 to 103,306,496 MT in 2017. Japan's soybean import quantity is expected to decrease from 3,455,633 MT in 2010 to 3,009,031 MT in 2017. South Korea's soybean import demand is expected to increase from 1,225,886 MT in 2010 to 1,570,121 MT in 2017. Figures 10, 11, and 12 illustrate the soybean demand forecast for China, Japan, and South Korea.

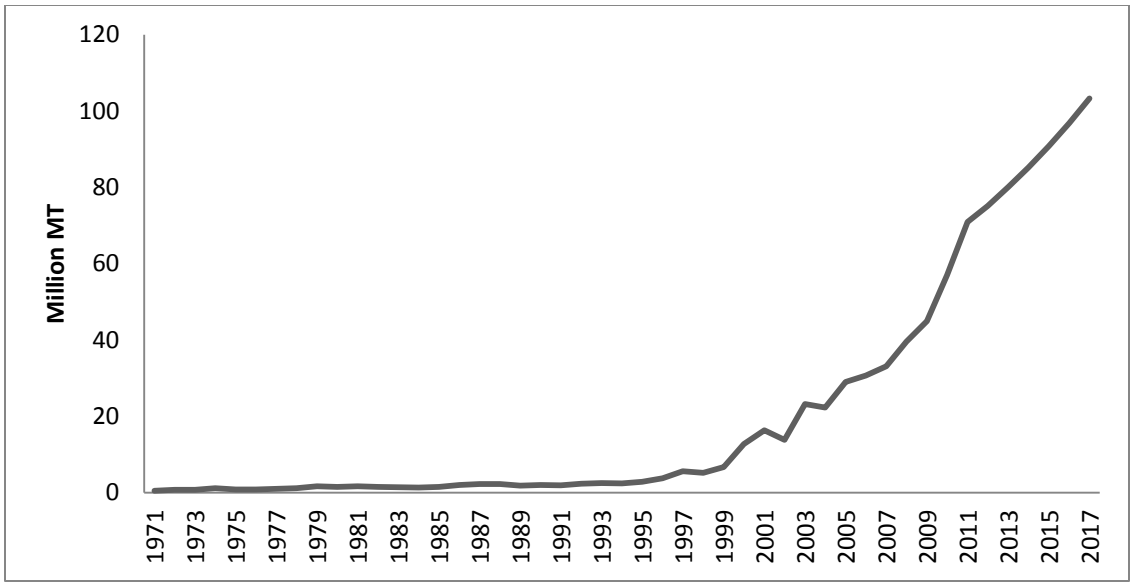

Figure 10: Soybean Import Forecast for China (MT)

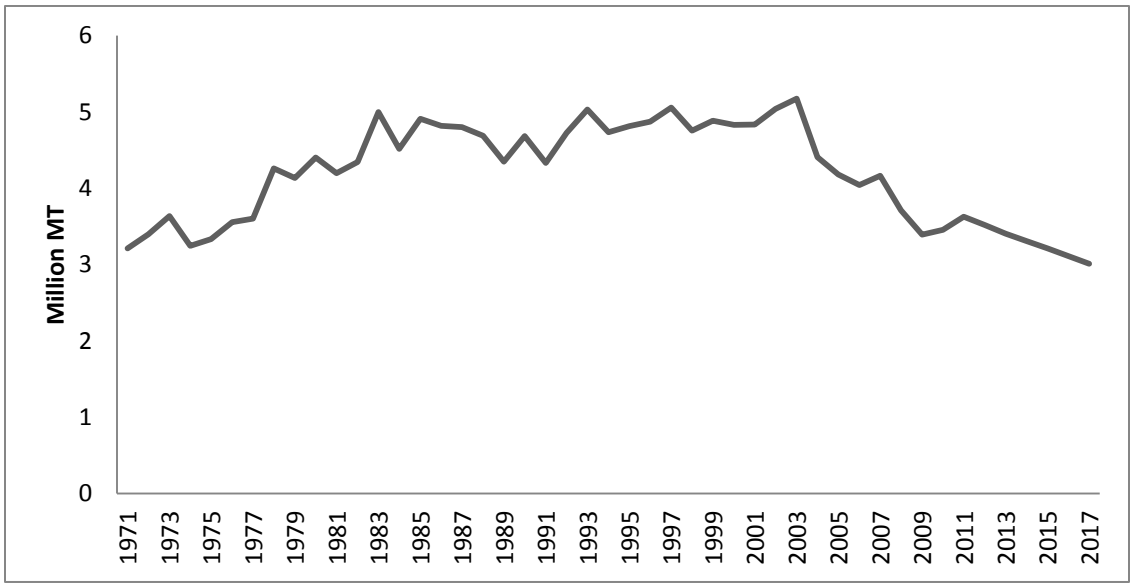

Figure 11: Soybean Import Forecast for Japan (MT)

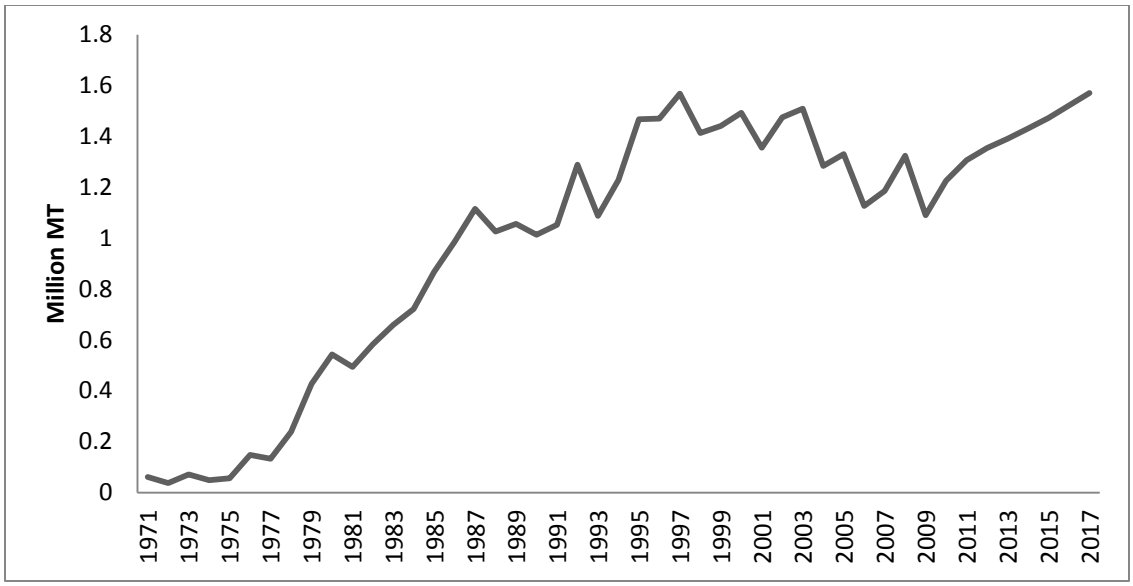

Figure 12: Soybean Import Forecast for South Korea (MT)

Exporter A should spend more effort in developing their China business because China's soybean market demand is likely to be very attractive in the near future. Exporter A's participation in trade missions and conferences in the China to develop contacts will likely improve their market opportunities. China's soybean demand for food use is also likely to be very large amount in the near future. Figure 13 shows the forecast of soybeans for food use.

The Japanese and Korean soybean markets appear to be less appealing based upon the forecast. However, Food grade soybean importers in Japan and Korea are more willing to pay higher premium prices for soybeans for human consumption. That is why Exporter A is selling their soybeans to these countries.

Also, Soybean for food use in South Korea and Japan is comparatively higher than other countries. This is the reason why Exporter A keeps their business and makes an effort towards these markets. Figure 14 shows the ratio of the food-use to the total-use of soybeans.

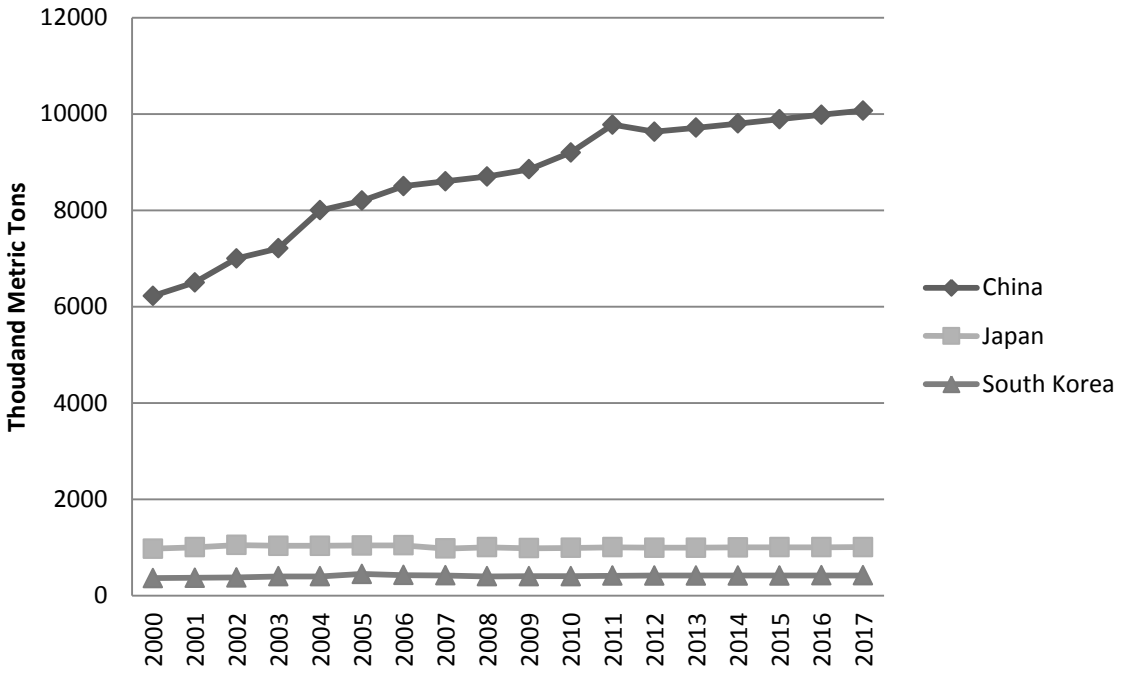

Figure 13: Forecast of Soybeans for Food Use

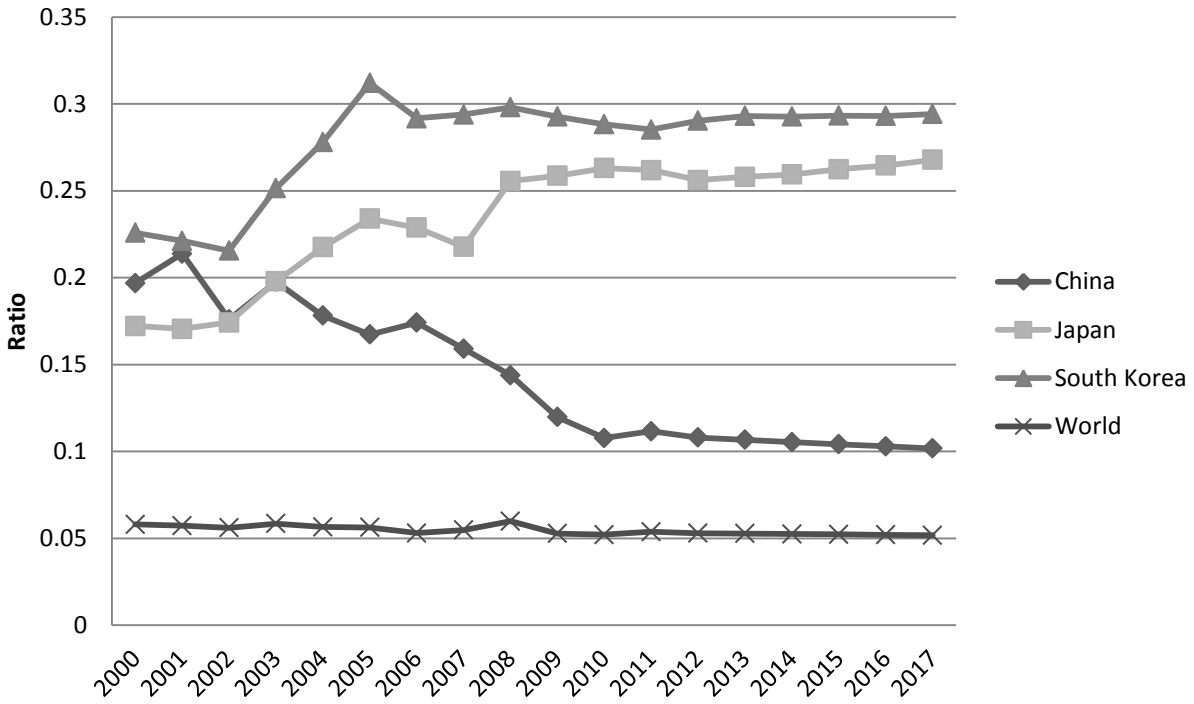

Figure 14: Soybeans for Food Use to Total-Use Ratio

CHAPTER 4. CONCLUSION

This paper estimates future soybean import demands for China, Japan, and South Korea and examines the major determinants of import demand.

Our results indicate that China's soybean import demand will remarkably increase compared with Japan's and South Korea's. This suggests that U.S. soybean exporters should put in more effort to expand their percentage of the Chinese soybean market. However, U.S. exporters, in addition to others in the food soybean industry, currently exports a large amount of soybeans to Japan and South Korea because the buyers from these countries are willing to pay higher premium on food-grade soybeans that have met their requirements. Thus, U.S. soybean exporters will want to continue selling their soybeans to Korean and Japanese soybean markets.

Since large international food and agribusiness companies have a tendency that they don't regard a food-grade soybean market as important as a commodity soybean market due to its meticulous process, small business exporters get involved in this small-size market. There are several reasons small business exporters themselves have not enough strength to invest or jump into the new market.

First of all, exporters of non-GMO soybeans are often small companies, thus they have difficulties with IP procedures important for exporting for food-grade soybeans. IP procedure costs more than commercial soybeans. Customers want certificates for IP procedure as well as visiting inspections, which cost the exporters a large amount of money. Moreover, for different requirements from each importer, exporters should pay from their own expense, such as a phytosanitary certificate because sometimes it doesn't have to be the same with national requirements and importers' requirements.

Second, it is difficult to make the first business contract with customers from other countries because those customers may not trust exporters with whom they have not met. So they should make more effort to expand their busines

We have to take the results with caution because there are omitted variables. This study includes the data from 1971 to 2010, which have not been updated for recent years. Therefore, the forecasts may be less significant rather than up-to-date forecasts. We recommend further research with updated data and using non-GMO soybean data specifically so that they actually reflect food-grade import demands.

REFERENCES

Andrews, K. R., & David, D. K. (1987). The concept of corporate strategy.

Bangsund, D. A., Olson, F. E., & Leistritz, F. L. (2011). Economic Contribution of the Soybean Industry to the North Dakota Economy. Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University. Gujarati, D. (1978). N., 1995. Basic Econometrics.

Besanko, D., Dranove, D., Shanley, M., & Schaefer, S. (2009). Economics of strategy. Wiley.

Chacholiades, M. (1978). International trade theory and policy. New York: McGraw-Hill.

Durbin, J., & Watson, G. S. (1971). Testing for serial correlation in least squares regression. III. Biometrika, 58(1), 1-19.

Warner, D., & Kreinin, M. E. (1983). Determinants of international trade flows. The Review of Economics and Statistics, 65(1), 96-104.

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Econometrica: Journal of the Econometric Society, 987-1007.

Gruère, G. P., & Rao, S. R. (2007). A review of international labeling policies of genetically modified food to evaluate India's proposed rule. Gujarati, D. (1978). N., 1995. Basic Econometrics.

Gujarati, D. (1978). N., 1995. Basic Econometrics.

Gujarati, D. N., & Madsen, J. B. (1998). Basic econometrics. Journal of Applied Econometrics, 13(2), 209-212.

Gujarati, D. N., & Porter, D. C. (1999). Essentials of econometrics.

Hamamoto, T., Dyck, J., & Stout, J. (2002). Oilseed policies in Japan. Electronic Outlook Report, OCS-1102-01, Economic Research Service, US Department of Agriculture, Washington DC, December. Gujarati, D. (1978). N., 1995. Basic Econometrics.

Johnson, H. G. (1955). Economic Expansion and International Trade 1. The Manchester School, 23(2), 95-112.

Houthakker, H. S., & Magee, S. P. (1969). Income and price elasticities in world trade. The Review of Economics and Statistics, 51(2), 111-125.

Khan, M. S. (1974). Import and Export Demand in Developing Countries (Demande à l'importation et l'exportation dans les pays en développement)(La demanda de importación y de exportación en los países en desarrollo). Staff Papers-International Monetary Fund, 678-693.

Macaulay, S. (1963). Non-contractual relations in business: A preliminary study. American sociological review, 55-67.

Murray, T., & Ginman, P. J. (1976). An empirical examination of the traditional aggregate import demand model. The Review of Economics and Statistics, 58(1), 75-80.

Thursby, J., & Thursby, M. (1984). How reliable are simple, single equation specifications of import demand?. The Review of Economics and Statistics, 120-128.

Tokarick, S. (2010). A method for calculating export supply and import demand elasticities. International Monetary Fund.

Yamaura, K. (2011). Market Power of The Japanese Non-GM Soybean Import Market: The US Exporters vs. Japanese Importers. Asian Journal of Agriculture and Rural Development, 1(2), 80-89.

Masuda, T., & Goldsmith, P. D. (2009). World soybean production: area harvested, yield, and long-term projections. International Food and Agribusiness Management Review, 12(4), 143-162.

Song, B., Marchant, M. A., Reed, M. R., & Xu, S. (2009). Competitive Analysis and Market Power of China's Soybean Import Market. International Food and Agribusiness Management Review, 12(1), 21-42.

Lee, C., & Herbek, J. (2004). Specialty Soybean Production and Management in Kentucky.[Accessed November 23, 2010]. Plant and Soil Sciences, University of Kentucky.

Bahmani-Oskooee, M. (1986). Determinants of international trade flows: the case of developing countries. Journal of Development Economics, 20(1), 107-123.

Tuan, F. C., Fang, C., & Cao, Z. (2004). China's soybean imports expected to grow despite short-term disruptions. USDA, Economic Research Service. Gujarati, D. (1978). N., 1995. Basic Econometrics.

U.S. Soybean Export Council. (2008). How the global oilseed and grain trade works. Retrieved from http://www.soyatech.com/userfiles/file/tradeflow_manual(1).pdf

U.S. Soybean Export Council. (2012). Buyer's guide. Retrieved from http://www.ussec.org/resources/buyers-guide/

Naeve, S., Orf, J., & Miller-Garvin, J. (2011). 2010 analysis of the U.S. non-gmo food soybean variety pipeline. Retrieved from http://soybase.org/meeting_presentations/soybean_breeders_workshop/SBW_2011/Naeve.pdf

Nicholson, W., & Snyder, C. M. (2011). Microeconomic theory: basic principles and extensions. South-Western Pub.

United States Soybean Export Council. (2012). US IP Food grade soybean system. U.S. IP food bean workshop, Seoul, South Korea: Paul Burke, Regional director, North Asia.

Masako, M. (2010). Japanese Fermented soyfoods market trends and innovation 3rd soy symposium and fermented soyfood seminar and workshop, August 3, 2010.

U.S. Department of Agriculture, Economic Research Service. PS&D Online. Retrieved from http://www.fas.usda.gov/psdonline/

U.S. Department of Agriculture, World Agricultural Supply and Demand Estimates. Retrieved from http://www.usda.gov/oce/commodity/wasde/

U.S. Department of Agriculture, Office of the Chief Economist. Retrieved from http://www.usda.gov/oce/commodity/

U.S. Department of Agriculture, Economic Research Service. Retrieved from http://www.ers.usda.gov/

American Soybean Association-IM Korea. Retrieved from http://www.asa-im.or.kr/trade/trade01.php

UN-Comtrade, data base. Retrieved from http://comtrade.un.org/db/

Central Intelligence Agency, world factbook. Retrieved from https://www.cia.gov/library/publications/the-world-factbook/

U.S. Agricultural Trade Office Korea. Retrieved from http://www.atoseoul.com/