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Negotiation Factors and Culture in Trade Negotiations

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ABSTRACT

This study specially explored perceived importance of factors affecting international trade negotiations such as environmental factors, process measures and outcome measures and compared the cultural differences in non-verbal factors in international trade negotiations. In order to find out cultural differences in negotiations, three different culture groups of Korean, Chinese and European negotiators participated in international trade negotiation experiments. Results demonstrated that Korean negotiators interrupted more than Chinese and European negotiators. European negotiators used more facial gazing and touching strategies in trade negotiations.

Keywords: environmental factors, outcome measures, process measures, trade negotiation

Ⅰ. Introduction

Negotiation across cultures is occurring more often today than ever before. In whatever else goes on during a negotiation, parties attempt to manage their differences and reach agreements through exchanges of messages that make up sequences of moves and counter-moves. Negotiation is a critical business process as it is necessary whenever people are dependent on one another for accomplishing objectives. National cultural differences in negotiation behavior have been catalogued.

In international business negotiations, cultural differences are inevitable between negotiators from different countries. Cultural values can influence international business negotiations in significant and unexpected ways from the first to the last stage of a negotiation. The diversity of values of partners results in different approaches used in the negotiation process and variable expected outcomes. Successful international business negotiation is not guaranteed by practical negotiation tips only. In fact, it would be more useful for negotiators if the most critical success factors of international business negotiations in a particular culture could be identified in advance.

Increasing globalization has resulted in an increased volume of face-to-face negotiations between members of different cultures. Expatriate managers are often required to negotiate with host country residents on a variety of issues such as securing resources, arranging for transportation of goods, and securing and maintaining an effective workforce.

Culture has a profound impact on how people in the marketplace perceive and behave. The level of aggregation of this conduct, however, has always been somewhat problematic. In the realm of international

marketing, culture has been typically visualized at the national level. However, operationalization within the national context has been difficult because of a wide divergence of definitions, each reflecting different paradigms from varying disciplines.

Many studies on international business negotiations conclude that people of different cultures use signify-cantly different negotiation approaches. These different approaches include communication style used, persuasion strategies employed and protocols followed. While negotiation studies emphasize possible differences in the way conflict is viewed and managed, little attention had been paid to differences in reacting to cross-cultural conflicts in negotiations. Yet, the handling of conflict is critical to any effective cross-cultural negotiations. How the parties respond to conflict also depends on a number of factors including the nature of the conflict, the cultural orientation of the individuals and the affiliation of the parties. It is clear that how the parties perceive, respond to and choose to resolve conflicts is critical to the success of any long-term business relationship. The purpose of this study is to present some factors affecting international trade negotiations and to compare cultural differences among Korean, Chinese and European business negotiators by analyzing their negotiation behaviors.

Ⅱ. Negotiation Variables

2.1. Environmental Factors

Grumperz (1979) suggests that humans, while interacting, also provide stylistic signals for interpret-tation of verbal communications through the use of what he calls contextualization cues. An example of a contextualization cue might be a rise in tone of voice to indicate or underline an important point. Grumperz and his associates have also found that contextualization cues vary across cultures. They are behaviors learned in the course of the individual's socialization. Further, he suggests that differences in these cues are often the cause of misunderstandings which can have serious consequences in cross-cultural interactions.

Elements of conversational form that have been found to vary across cultures are legion. For example, Graham (1985) reports Brazilian negotiators appear to have more aggressive conversation than Japanese or American negotiators. In simulated negotiations, Brazilians used the words 'no' and 'you' more frequently, the former providing a negative tone, the latter providing a presumptuous tone vis-a-vis the Japanese and American behaviors. The Brazilian nonverbal behaviors also differed from the Japanese and Americans; no silent periods and far more interruptions and facial gazing occurred.

A variety of situational factors might act as determinants of outcomes of business negotiations: for example, company goals, location, and number of parties. Culture has been a difficult concept to deal with in any consistent, scientific way. A culture is a configuration of learned behaviors and results of behavior whose component parts are shared and transmitted by the members of a particular society (Linton, 1945). The important part of the definition for present research is the idea that behaviors are shared by members of a particular culture. According to Spiro (1950), members of a given society behave in uniform and predictable ways. In addition to bargaining behaviors being consistent within cultures, several authors have suggested that negotiations processes differ across cultures.

2.2. Process Measures

Representational communications involve the transmission of information whereas instrumental communications involve influencing another party. Representational communications can be regarded as a problem-solving approach. It involves an emphasis on questions and getting information from a counterpart about needs and preferences. The focus is on cooperation and an integrative approach whereby the needs of both parties are honestly discussed and eventually satisfied. Therefore, it can be defined concisely as a set of negotiation behaviors that are cooperative, integrative and information-exchange-oriented.

Attractiveness, Power and Credibility might also be conceived of as the three classic source characteristics in communication models. Some researchers suggest "the relationship between attraction to a source (like, dislike, friendly feelings, etc.) and attitude change has received scant attention. Rubin and Brown (1975) conclude that interpersonal attraction enhances negotiating outcomes. Therefore, to the extent that a person receives rewards from a relationship with someone a negotiator perceives as attractive, that person will be more satisfied with the negotiation outcome. In this study, rather than characteristics ascribed to sources of communication, these variables are considered descriptors of negotiation strategies. These variables are measured through ratings of both participants in the negotiation games.

Impression Formation Accuracy has also been conceived as an individual characteristic or ability. It is believed that a strong relationship between salesperson performance and abilities to perceive both a customer's beliefs about products and importance weights for product attributes. Impression formation accuracy is treated as a measure of the efficiency of the interaction rather than an individual characteristic.

The problem-solving approach (PSA) for business negotiation is defined as a set of negotiation behaviors that are cooperative, integrative, and information exchange-oriented. PSA involves an emphasis on questions and getting information from clients about their needs and preferences. The problem solving approach in negotiations involves first an emphasis on questions and getting information from clients about their needs and preferences. Second, once the client's requirements and circumstances are fully understood, then the negotiator accommodates the offering to the client's needs. The focus is on cooperation and an integrative approach, wherein the needs of both parties are honestly discussed and eventually satisfied. A PSA can be concisely defined as a set of negotiation behaviors which are cooperative, integrative and information-exchange oriented. Such strategies tend to maximize the number of alternative solutions considered, thus allowing negotiators to optimize outcomes. The relationship between a problem-solving approach and negotiation outcome has been frequently investigated during the last twenty years. Different researchers have used various labels for the PSA concept (e.g., integrative bargaining strategies-Walton & McKersie (1965); cooperative orientation -Rubin & Brown (1975); Williams (1983); Problem-solving orientation-Pruitt & Lewis (1975), Murray (1986)). Most of findings have been relatively consistent. Generally, the PSA has been found to positively influence negotiation outcomes. Graham (1986) investigated relationships between the PSA and a negotiator's individual profit and their bargaining partner's satisfaction. Consistent with several studies reviewed by Rubin and Brown (1975), statistically significant relationships were discovered between a negotiator's PSA and the negotiator's individual profit. Negotiators who encourage partners to provide information about themselves and their needs and preferences can be expected to achieve more favorable negotiation outcomes. Rubin and Brown (1975) and Weitz (1979) suggest the importance of adjusting one's negotiating tactics according to one's impressions of the opponent's negotiation style. Specially, Weitz suggests that adaptive behavior will enhance negotia-ting effectiveness. Rubin and Brown posit high adaptability coupled with cooperativeness will favor higher negotiation outcomes.

In addition to the negotiating strategies, interpersonal attractions such as like or dislike and friendly or unfriendly feelings can strongly influence current negotiation outcomes and the success of future transactions. Simons, Berkowitz and Moyer (1970) suggest the relationship between attraction to a source such as like or dislike, friendly or unfriendly feeling and attitude change has received scant attention. Rubin and Brown (1975) conclude in their review of the negotiation literature that generally interpersonal attraction enhances negotiating outcomes. A negotiating partner's satisfaction has been found to be positively related to a negotiator's attractiveness for business people from France and Germany (Campbell et al,

1988), from America, Taiwan, Japan and Korea (Grahametal, 1988).

In the very relevant field of buyer/seller interactions, Evans' (1963) similarity hypothesis posits that the more similar individuals are in buyer/seller relationships, the more favorable will be the outcome and the more likely a sale. Mathews, Wilson and Monoky (1972) argue that perceived similarity results in more cooperation between the buyer and seller. Attraction is the mechanism through which similarity affects these outcomes.

It should be noted that interpersonal attraction might be conceived as an exogenous construct-determined before negotiations begin as a part of the combination of the negotiator's characteristics. It may also be argued that attraction is a consequence of the negotiation. However, attraction is regarded as a process-related construct.

There is an abundance of studies in the negotiation literature that focuses on the fundamental assumption that personal parameters or negotiators' characteristics are relevant to negotiation processes and outcomes (Barry & Friedman, 1998). Someone with a trusting nature tends to give credence to the honesty of statements of others until or unless reasons are provided for disbelief. In negotiation, trust relates to how they expect their partners to behave and respond (Fells, 1983).

In the cross-cultural negotiation literature, duration of the negotiation is described as a key aspect of the process. For example, Tung (1982) and Van Zandt (1970) report that negotiations with the Chinese and Japanese are exasperatingly long from the perspective of most American negotiators. Pruitt (1981) discusses at great length the pervasive influence of time on negotiations. That is, a time limit affects the qualities of the aspirations, concession making, and negotiation satisfaction. Although time limits per se are not varied in this study, negotiators from different cultures may have different expectations about appropriate durations which may in turn influence behaviors.

Silent periods are operationally defined as gaps in conversations lasting 10 seconds or more in duration. The time period of ten seconds was selected somewhat arbitrarily, but it is a long enough period of silence to appear unnatural to most observers. The tapes were searched for gaps in conversations of ten seconds or more. The ten seconds time period, while somewhat arbitrary, is a long enough silence to appear unnatural to most American observers.

The concept of interactional synchrony, the unconscious coordination of verbal and nonverbal behaviors of 2 or more participants in a conversation, was discussed at length by Graham (1980). It is the number of conversational overlaps or interruptions during a conversation. Conversational overlaps are defined as periods when both speakers are talking at the same time, or when the conversational contribution of one speaker overlaps that of the other speaker. One possible measure of this construct is the number of conversational overlaps or interruptions during a conversation. Identification of such overlaps is independent of the verbal content of the interactions.

Facial gazing is defined as the percentage of time a negotiator gazes at the face of partner. Many researchers have found significant relationships between facial gazing and outcomes of negotiations (Lewis & Fry, 1977). Moreover, several authors have suggested differences in facial gazing behaviors across cultures (Argyle & Cook, 1976).

Touching means that a negotiator touches another negotiation partner with the exception of beginning and ending handshakes. It is the number of times negotiators touch their partners (excluding beginning and ending handshakes). Graham (1985) reports Brazilian businesspeople touch one another during simulated negotiations while Japanese and American negotiators do not.

2.3. Outcome Measures

Researchers often find outcomes of business negotiations difficult to measure and to compare. Various studies have used sale versus no sale, an obvious measure of negotiating effectiveness (e.g. Pennington, 1968), profits obtained by negotiators (e.g.

Rubun & Brown, 1975), and a combination of individual and joint profits (Clopton, 1984). Beyond profits, negotiator's satisfaction is an important measure of success, especially if partners desire a continued relationship. Given the dual importance of task accomplishment (profit) and relationship building (satisfaction), especially in international negotiations, the present study uses both as outcomes.

Ⅲ. Cultural Difference in Nonverbal Behavior

The participants in the experiment were 10 Chinese, 10 Korean and 10 European Students who are majoring in international business and Korean businessmen are undergraduate students majoring international commerce at Paichai University in Korea. This section deals with nonverbal aspects of videotaped interactions. The rhythms of the conversations are discussed examining silent periods and conversational overlaps. Next, facial gazing and touching during negotiations are presented.

3.1. Silent Periods

Silent periods are operationally defined as gaps in conversations 10 seconds or more in duration. The time period of 10 seconds was selected somewhat arbitrarily, but it is long enough period of silence to appear unnatural to most observers. The tapes were searched for gaps in conversations of 10 seconds or more. Silent periods occurred more frequently in the Korean negotiators' interactions (5.1 per 30minutes) than either the Chinese or European negotiators. Negotiators from a low context culture such as Europe tend to regard the silence of a high context culture such as Korea as a rejection, which is not a rejection in a real sense by their standards.

3.2. Conversational Overlaps

The concept of interactional synchrony, the unconscious coordination of verbal and nonverbal behaviors of 2 or more participants in a conversation, was discussed at length by Graham (1980). It is the number of conversational overlaps or interruptions during a conversation. Conversational overlaps are defined as periods when both speakers are talking at the same time, or when the conversational contribution of one speaker overlaps that of the other speaker. The number of overlaps (interruptions) by each participant was totaled and divided by the time of negotiation to arrive at values which may be compared across interactions. According to Table 1, Korean negotiators interrupted more than Chinese or European negotiators.

3.3. Facial Gazing

Facial gazing is defined as the percentage of time a negotiator gazes at the face of partner. Randomly selected, 10-minute videotape excerpts of each of the interactions served as data here. The author recoded the time each participant spent gazing at his/her partner's face during 10 minutes. According to Table 1, European negotiators spent considerably more time gazing at negotiation partners than either Korean or Chinese negotiators.

Table 1. Comparison of Patterns of Nonverbal Negotiation Behavior

Nonverbal Negotiation Behavior	Korean	Chinese	European
Silent Periods(average number of silence for more than 10 seconds during 30 minutes)	5.1	3.5	2.8
Conversational Overlaps(average number of conversational overlaps during 30 minutes)	30.8	26.4	5.8
Facial gazing(average number of gazing)	1.1	1.1	7.6
Touch(number of touch)	2.5	3.0	0.0

3.4. Touching

Touching means that negotiator touches another negotiation partner except for beginning and ending handshakes. Except for European negotiators, Korean and Chinese negotiators seldom touch their partners except for handshakes.

Ⅳ. Conclusions

The purpose of this study has been to find out basic factors affecting international business negotiations and to suggest some strategic implications for business negotiators. With the advancement of globalization, intercultural business negotiations become more and more important as a marketing strategy. The role of business negotiators is extremely important in order to achieve successful international business negotiations.

In order to achieve agreement in international business negotiations, negotiators are required to manage cultural differences between the parties concerned in addition to the complexity of domestic negotiations. Because such a large variety of cultural factors exist among nations, it is critical for negotiators to identify the kind of problem-solving approaches that are most appropriate for each intercultural negotiator. Understanding cultural differences is vital for successful intercultural negotiations. An objective measurement of culture is important to overcome misunderstanding caused by stereotyping and prejudice about other cultures.

As for nonverbal negotiation behaviors, Korean negotiators tend to use more silent periods than the rest of two groups. Also, Korean negotiators interrupted more than Chinese and European negotiators. European negotiators used more ‘facial gazing’ and ‘touching’ strategies in negotiation. However, there are study limitations as follows; the most important consideration is the validity of the principal outcome measure, individual profit. Kelly’s negotiation game and such measures have been used in other studies, but how well the game represents actual business negotiations is problematic. Much of the evidence supplied for accepting and rejecting hypotheses is based on self-reports and judgements of participants. Also, small sample sizes do not allow for tests of statistical significance. The negotiator should understand the cultural background specifically regarding business negotiation. Negotiators can ask more questions in their negotiations. Sometimes, it’s smart to be a little bit dumb in business negotiations.

The more the negotiators ask questions, the more information they can get and they can exchange more information. Also, using a silent strategy can be necessary, and aggressive influence tactics such as warnings and threats, particularly those emphasized with expressions of emotions, may be used in negotiations in a very restrictive way.

Cooperatives and educational institutions should take advantage of current research to develop training programs on cultural differences in not only verbal communication but non-verbal communication for better trade negotiation results.

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Is the Agrochemical Industry Traversing the Organic Route? Insights and Directions for a Philippine Agrochemical Trading Company

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ABSTRACT

This paper explores the strengths, weaknesses, challenges and opportunities of a Philippine agrochemical trading company as it thrives within its broader macro-environment. In an era of climate change adaptation and ailing global economies, agrochemical companies within the food chain face even greater barriers to survival and competitiveness. The study revealed that the agrochemical industry has made baby steps in encouraging farmers to adopt the natural or organic way of farming through the use of biopesticides and biofertilizers as a response to climate change but price-sensitive farmers appear indifferent to the use of biopesticides and biofertilizer and readily switch suppliers depending on product prices as well as the promotional activities done by agrochemical trading companies. These suggest that agrochemical usage will continue to dominate global agriculture in the next couple of years while biologicals in organic agriculture will account for a minimal percentage despite the trend toward sustainable agriculture. To be sustainable, it is suggested that agrochemical trading companies introduce new brands for each product type, formulate a customer retention strategy for its dealers and independent business partners and pursue a market penetration strategy to widen the customer base as they track their moves against a changing global agrochemical industry.

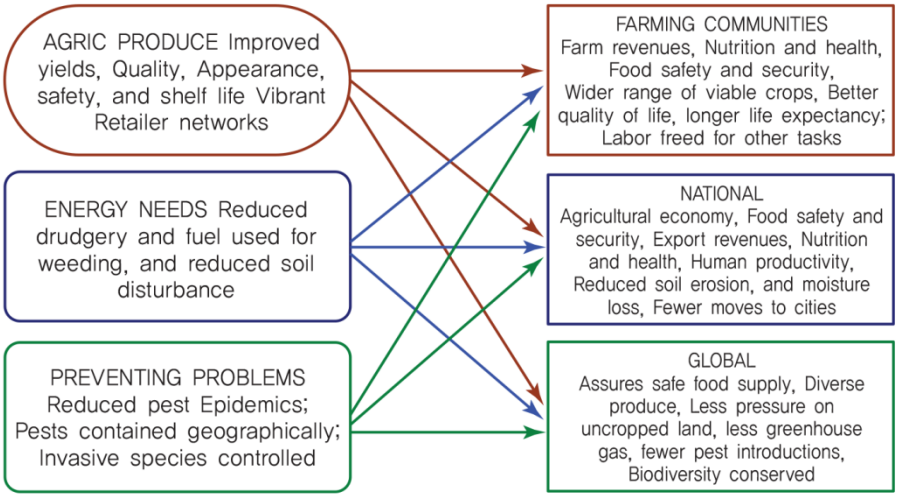
Keywords: agrochemical industry, biopesticides, climate change adaptation, organic agriculture, sustainability

Ⅰ. Introduction

Agrochemicals, also known as crop protection products, are those products or substances which are used to effectively and actively manage the agricultural ecosystem. Agrochemical products include pesticides, herbicides, insecticides, and fungicides. Synthetic fertilizers, hormones and other chemical growth agents as well as concentrated stores of raw animal manure may also be included in the list of agrochemical products. These products can be classified into four categories: inorganic pesticides, organic pesticides and pre-emergent and post-emergent herbicides. These chemicals play a vital role in controlling and restraining the damaging attacks of pests, weeds, fungi, diseases and other undesirable pests which pose serious threats to global crop production. The benefits offered by agrochemical products are two-fold: the

control of certain pests and diseases to improve crop productivity and indirectly, poverty alleviation (Fertilizer and Pesticide Authority, 2012).

Fig 1. Benefits of Pesticides to Control Human and Livestock Disease Vectors and Nuisance Organisms



Source: Cooper and Dobson as cited in Cuyson, S. (2007)

Pesticide products, when used properly, can give benefits not only to the community but to the whole society as shown in Fig 1**.** Problems which most farmers complain about like fast-growing weeds and threats to crop productivity can be resolved through the application of herbicide. The application would reduce cost of labor and fuel, specifically for large plantations. Safety for the environment and human health is also emphasized. Careful regulatory policies are implemented by the FPA so that the environment and human health would not be at risk.

Although chemical-based, crop protection products have contributed time and again toward increasing farmers' incomes because these products prevent massive crop losses caused by pests and diseases. Due to the need to efficiently meet demand, farmers and other agribusiness entities have to constantly rely on crop-protecting chemical products since it only takes a short period to harvest crops with the help of these products (Tirado, 2008). Agrochemical products, as well as the widespread use of irrigation, have largely contributed to the increase in agricultural production. On the other hand, health concerns have caused a negative perception of agrochemicals since over-utilization of these products have caused problems such as toxicity of the soil, pollution and food poisoning.

Established multinational companies involved in the agrochemical industry as well as local companies are pressured to effectively address the agricultural trend of shifting to organic farming and developing more environmentally-friendly products. In addition, there are government policies to which they must align their objectives with societal welfare in mind. Non-government organizations (NGOs) and environmental groups such as Greenpeace have been actively making their moves against crop protection companies. With this scenario, players in the industry are bound to strategize on how to improve product safety to defend themselves from the actions of such groups in the interest of sustainability.

Phil-Agrochemicals Trading (not the real name) is a nationwide distributor of generic agrochemical products located in Southern Luzon, Philippines. Its distribution network includes dealers, independent business partners (IBPs) and wholesalers. The market may be skeptical about the efficacy of generic agrochemical brands, but

this small company strives to be more responsible for their products through continuous research on ways to improve their products and demonstrate such efficacy in crop protection. Knowing their products may have detrimental effects for the farmers if not properly used, the company conducts seminars or farmers' group meetings on the safe use of their products. They also give protective gear such as masks and gloves to the farmer participants. Products which are traded by this company are manufactured by several suppliers in the Philippines such as AgChem Manufacturing Corporation, Radisson Agrochemical Corporation and Kemistar Corporation. These manufacturing compa-nies are members of the Crop Protection Association of the Philippines (CPAP), one of the leading crop protection chemical associations in the country. Phil-Agrochemicals Trading also imports agrochemicals (specifically insecticides) from Bharat Agro Chemicals in India and China Xiamen Top using Import & Export Co. Ltd. from China. About 10% of their total inventory comes from imported insecticides. Currently, Phil-Agrochemicals Trading, which also distributes products of its sister company, has fifteen pesticide products and two plant nutrition products in its inventory pipeline.

With the stiff competition in the Philippine agrochemical industry brought about even more by the institution of Republic Act No. 10068 (also known as the Organic Act of 2010), the company has to find ways to better strategize so as to gain customer trust, encourage continued patronage and improve overall company performance. The company has about eight direct competitors.

This paper aims to present an overview of the agrochemical industry; compare the firm's operational and functional strategies with the practices in the industry; identify and assess the problems and opportunities pertaining to these strategies and compare these with its competitors' strategies; and suggest solutions to the problems or strategies to take advantage of opportunities in view of the challenges of going organic and the overall demand for the greening of agriculture.

II. Methodology

Primary data for this exploratory research were gathered from surveys and interviews with four company officers/personnel, 60 farmers, five independent business partners and five dealers as well as an actual apprenticeship at Phil-Agrochemical Trading over a two-month period by the major author. Secondary data were obtained from printed sources found at several government institutions such as the Crop Protection Association of the Philippines (CPAP) and the Fertilizer and Pesticide Authority (FPA), company files, and other printed or online publications and unpublished special problem reports at the College of Economics and Management library. Descriptive analysis combined with a comparative competitor analysis and a SWOT analysis was used in this research.

Ⅲ. Review of Literature

Zhang et al. (2011) identified three phases in the history of pesticides and its application: (1) the first phase, which covered the period before the 1870s, saw the use of natural pesticides (such as sulfur in ancient Greece) as a pest control measure; (2) the second phase from the 1870s to 1945, saw the advent of inorganic synthetic pesticides and the use of natural materials and inorganic compounds; and (3) the third phase (from 1945 onwards) marked the era of organic synthetic pesticides (e.g., DDT, 2,4-D and later, HCH, dieldrin). Since then, humans synthesized most pesticides which were later referred to as chemical pesticides. It was during the third phase (the era of organic synthetic pesticides) when there was a boost in agricultural productivity which became a moving force for the advancement of human civilization.

During the earlier portion of the third phase, three kinds of insecticides were used: carbamated insecticides, organophosphorus insecticides and organochlorined insecticides. This was soon followed by the development of herbicides and fungicides. As seen in Table 1, herbicide use increased from 20% in 1960 to 48% in 2005. Herbicides comprised almost half of total pesticide consumption in 2005 (Zhang et al., 2011).

Table 1. Changes of Pesticide Consumption Worldwide

CATEGORY	1960		1970		1980		1990		2000		2005	
	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%
Insecticides	310	36.5	1002	37.1	4025	34.7	7655	29	7559	27.9	7798	25
Herbicides	170	20	939	34.8	4756	14	11625	44	12885	47.5	14971	48
Fungicides & Bactericides	340	40	599	22.2	2181	18.8	5545	21	5306	19.6	7486	24
Others	30	3.5	159	5.9	638	5.5	1575	6	1354	5	936	3
Total	850	100	2700	100	11600	100	26400	100	27104	100	31191	100

Note: Sales in millions USD
Source: Xu (1997); http://www.docin.com/p-55305172.html as cited in Zhang et al. (2011).

According to the Food and Agriculture Organization of the United Nations (FAO), fertilizer and pesticide use in the Philippines between 1961 and 2005 increased by 1000% and 325%, respectively. This was caused by the widespread use of irrigation, agrochemicals, and new seeds in the country. However, crop yield only increased by a small amount even though agrochemical products were used. This was mainly attributed to excessive and inappropriate use of chemical-based products in farming, causing land degradation and losses in soil fertility.

Ⅳ. Overview of the Industry

4.1. Global Agrochemical Industry

Dussal (2011) stated that the world agrochemical industry was valued at USD 134 billion in 2010. It is expected to grow at a CAGR of 11% to reach USD 225 billion by 2015. The Asia Pacific region led the global agrochemical and fertilizer consumption, accounting for 40%, followed by North America with 32%. The top ten global players include Bayer, Syngenta, Potash Corp, Agrium and Mosaic, which constitute around 90% of the world market share.

Pesticide sales remained relatively constant over the 1990s between USD 270 to 300 billion. From 2007 to 2008, herbicides ranked first in the three major categories of pesticides (insecticides, fungicides/ bactericides, and herbicides) in terms of sales. The fungicides/bactericides ranked second. Europe is now the top consumer of pesticides in the world, followed by Asia. Specific countries which largely use pesticides are China, the United States, France, Brazil and Japan. Most of the pesticides worldwide are used for fruit and vegetable crops. In developed countries, pesticides, mainly herbicides, are primarily used for maize. Since the 1980s, there have been hundreds of thousands of pesticides developed worldwide, including biopesticides (Zhang et al., 2011).

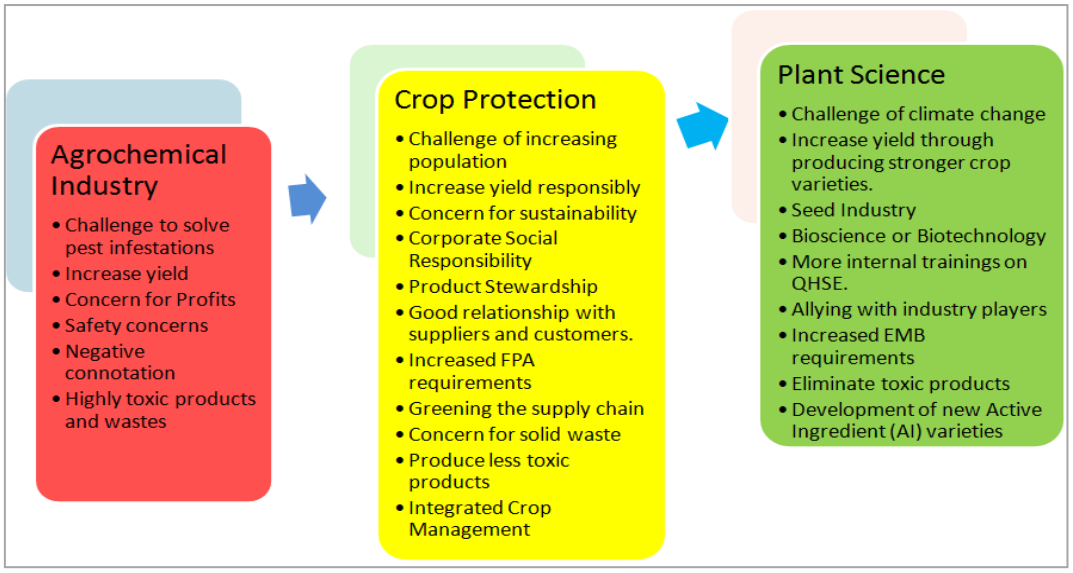
According to the U.S. Environmental Agency, "biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. For example, canola oil and baking soda have pesticide applications and are considered biopesticides. At the end of 2001, there were approximately 195 registered biopesticide active ingredients and 780 products. Biopesticides fall into three major classes:

a. Microbial pesticides consist of a microorganism (e.g., a bacterium, fungus, virus or protozoan) as the active ingredient. Microbial pesticides can control many different kinds of pests, although each separate active ingredient is relatively specific for its target pest(s). For example, there are fungi that control certain weeds, and other fungi that kill specific insects.
b. The most widely used microbial pesticides are subspecies and strains of *Bacillus thuringiensis*, or Bt. Each strain of this bacterium produces a different mix of proteins and specifically kills one or a few

related species of insect larvae. While some Bt's control moth larvae found on plants, other Bt's are specific for larvae of flies and mosquitoes. The target insect species are determined by whether the particular Bt produces a protein that can bind to a larval gut receptor, thereby causing the insect larvae to starve.

c. Plant-Incorporated-Protectants (PIPs) are pesticide substances that plants produce from genetic material that has been added to the plant. For example, scientists can take the gene from the Bt pesticide protein and introduce the gene into the plant's own genetic material. Then the plant, instead of the Bt bacterium, manufactures the substance that destroys the pest. The protein and its genetic material, but not the plant itself, are regulated by EPA.

Fig 2. Distinguishing Factors for the Paradigm Shift in the Crop Protection Industry



Source: Balayan (2010).

d. Biochemical pesticides are naturally occurring substances that control pests by non-toxic mechanisms. Conventional pesticides, by contrast, are generally synthetic materials that directly kill or disable the pest. Biochemical pesticides include substances, such as insect sex pheromones, which interfere with mating, as well as various scented plant extracts that attract insect pests to traps. Because it is sometimes difficult to determine whether a substance meets the criteria for classification as a biochemical pesticide, the EPA has established a special committee to make such decisions.

4.2. The Philippine Crop Protection Industry

According to the *Samahan sa Pilipinas ng mga Industriyang Kimika (SPIK)* or Chemical Industries Association of the Philippines in 2008, the utilization of crop-protecting chemicals is still prevalent among Filipino farmers. In the country, the most extensively used pesticides are insecticides, which account for 51% of the total market; herbicides comprise 21%; fungicides, 14%, and the remaining other types of pesticides, 14%. These chemicals are used for crops such as rice (about 3.3 million hectares of plantation area), corn (3.2 million hectares), pineapple (67,000 hectares), and banana (25,000 hectares).

Because of the greater challenge faced by the players, there has been a progressive shift in the industry from what is commonly known as an agrochemical industry to a crop protection industry and now to a plant science industry as shown in Fig 2. The shift to a plant science industry is believed to deliver products that would give better solutions to crop problems and technologies that would lead to sustainability. As of now, the multinational companies or the CropLife members are the ones which are already in the third phase (Balayan, 2010). The generic companies are still in phase 2 (crop protection) but on their way to shift to phase 3 (plant science).

The Philippine crop protection industry is comprised of firms engaged in the formulation, manufacture, distribution, repackaging, importation and exportation of chemical pesticides. It has always been dominated by transnational agrochemical companies which are members of CropLife International such as Bayer CropScience, Syngenta Philippines, Du Pont, Dow Agro. These companies operate and manufacture their own agrochemical products. These companies focus more on the assurance of the safety of their products. Moreover, they are now more responsible about the flow of their products up through the disposal phase. Hence, they practice product stewardship. In 2008, the FPA has listed about 300 firms operating in the country. Other players in the industry would include local companies such as the members of the Crop Protection Association of the Philippines (CPAP) and other generic product-making companies.

As shown in Table 2, there has been an increasing demand for pesticides in the country, although a continuous campaign against these products is done by the NGOs. An increase in Philippine importation of pesticides is due to the fact that perceived sustainability cannot be achieved without the help of these agrochemical products. The country is highly dependent on importation due to the limited resources available in the country for formulators and manufacturers. Active ingredients are also imported by the major industry players. Local production is limited to formulation of imported technical materials except for 2,4-D.

Table 2. Value of Imports of Pesticides in the Philippines (in USD 1000's)

Item	2006	2007	2008	2009	2010
Insecticides	39658	49152	65022	68873	51371
Fungicides	46751	40741	32109	26914	28648
Herbicides	22236	22793	21954	11715	5031
Disinfectants, etc.	10388	13033	30741	53249	85043
Total	119033	125719	149826	160751	170093

Source: FAO (2010).

On the other hand, exports of pesticides by the Philippines show minimal levels, making the country a net importer of pesticides (Table 3).

Table 3. Value of Exports of Pesticides in the Philippines (in USD 1000's)

Item	2006	2007	2008	2009	2010
Insecticides	1335	2938	1547	1508	1928
Fungicides	-	-	1	15	132
Herbicides	1	262	400	81	27
Disinfectants, etc.	312	1199	915	1256	740
Total	1649	4399	2863	2859	2826

Source: FAO (2010).

4.3. Foreseen Trends in Global Pesticide Production and Consumption

The trend nowadays is organic agriculture which is seen also as sustainable agriculture. Thus, the ongoing deterioration in the natural environment had Zhang et al. (2011) saying that biopesticides are the wave of the future. Such pesticides must be highly efficient, non-toxic and environment-friendly. Biopesticides, according to Yang (2001), have the following advantages:

a. a positive control effect on pests, safe to humans and animals, and no pollution
b. no residuals
c. strong specificity to target pests, safe to natural enemies and beneficial organisms
d. raw materials and active ingredients are natural products which helps to ensure sustainable development
e. they can be modified by means of modern biotechnology and fermentation processes to improve performance and enhance quality
f. pest resistance is difficult to generate

Over 100 kinds of biopesticides exist at present worldwide with about 30 types of biopesticides commercially produced (Xu, 2008). Countries such as Mexico, the United States and Canada dominate global biopesticide usage, accounting for 44%. The total world biopesticide consumption can be broken down into 20% (Europe), 13% (Asia), 11% (Oceania), 9% (Latin America), and 3% (Carribean and Africa) (Qin & Kong, 2006). As for China, the biopesticide industry has been expanding since the 1990s from 10% to 20% annually such that by 2006, total biopesticides consumption reached 145,000 tons, accounting for 10% of total sales. It is anticipated that biopesticides will replace up to 20% of chemical pesticide consumption in China in the years ahead.

Since safer products are what consumers are demanding, companies such as United Farm Technologies, Nuso Agro Science and Dow Agro started selling and manufacturing safer pesticides called biopesticides. These products are derived from natural materials. Biopesticides constitute about 2% of the global agrochemical market (Dussal, 2011). In Monsanto's pipeline are agricultural biological or biopesticides produced using what they call the Bio-Direct Technology, which involves using molecules found in nature expected to be developed for use in topically applied crop protection and other products (Monsanto, 2012). Moreover, Bayer CropScience recently acquired AquaQuest, a U.S.-based supplier of innovative biological pest management solutions based on natural microorganisms, for USD 500 million in its bid to build a leading technology platform for green products (Bayer, 2012).

Ⅴ. Results and Discussion

5.1. Compliance by Phil-Agrochemical Trading with FPA Requirements

The FPA requirements relative to product labeling were all met by the Phil-Agrochemical Trading. These include a statement of composition, registration or provisional permit number, name and address of company, the product's common name, net contents, directions for use, suitable indication of hazards, instructions on decontamination and safe disposal of used containers, the lot number and date of formulation, the FPA registration number, re-entry period after application, triple rinse logo, a person to contact in case of emergency and safety instructions.

5.2. Comparison of Phil-Agrochemical Trading's Activities with CPAP Activities

Four types of activities are carried out by CPAP members: product stewardship, agromedical training/ information education campaign, aerial spraying seminars and farmers' meetings. Phil-Agrochemical Trading has yet to apply for CPAP membership. A comparison of its activities with CPAP activities revealed that only farmers' meetings are done by the firm.

5.3. Comparison of Phil-Agrochemical Trading's Operations with Top Competitors

Table 4 presents a summary comparison of Phil-Agrochemical Trading's operations with two of its top competitors: CyBERTH Philippines, Inc. and PhilAgrow, Inc.

CyBERTH Philippines, Inc. was established in 1999 and is engaged in trading pesticides and fertilizers in the country. However, they trade more pesticide products as fertilizer is more expensive. The company's product portfolio includes 24 registered products categorized as insecticides, herbicides, fungicides, molluscicides or plant growth regulators. The major crops where these products can be used are rice, corn, vegetables, and mangos. The company's operations cover the research and development of new products, importation and local purchase of the technical and inert materials of a particular product, formulation, warehousing and supply of finished products to its distributors. This company continuously searches for better products.

PhilAgrow Inc. started operations in 2006 and is an importer/distributor of chemical pesticides such as insecticides, molluscicides, fungicides, herbicides, nematicides and specialties. It has 18 FPA-registered products.

Table 4. Summary Comparison of Phil-Agrochemical Trading with Two Top Competitors

Points for Comparison	Phil-Agrochemical Trading*	CyBERTH Philippines Inc.	PhilAgrow, Inc.
Product Lines	14 FPA registered products	24 FPA registered products	18 FPA registered products
Product Variety	Herbicides,insecticides, molluscicides, fungicides, fertilizer	Herbicides, insecticides, molluscicides, fungicides, fertilizer	Insecticides, molluscicides fungicide, herbicides, nematicides, specialties
Promotional Activities	Farmers meetings, caravans, raffle promos, provision of protective gears	Farmers meetings, raffle promos, provision of protective gears	Farmers meetings, raffle promos, provision of protective gears
Target Market	General trade market, plantation businesses, small farmers (below 2ha and 2ha and above)	General trade market, plantation businesses, small farmers below 2 ha and 2 ha and above)	General trade market, plantation businesses, small farmers below 2 ha and 2 ha and above)
Location Scope	Domestic	Domestic	Domestic
Facilities (e.g. warehouse, transportation)	Rented (Outsourced production)	Owned	Research facility
Provision of training to employees	-	Yes	Yes

Note: Firm name was disguised upon firm's request.

Among the points for comparison, it can be seen that Phil-Agrochemical Trading has the least number of product lines at 14 FPA-registered products vis-à-vis CyBERTH Philippines, Inc. with 24 FPA-registered products and PhilAgro, Inc. with 18 FPA-registered products. In terms of product variety, Phil-Agrochemical Trading and CyBERTH Philippines, Inc. have 5 types of products while PhilAgrow has 6 types. All firms carry out the same promotional activities, have the same target market and location scope/coverage. Facilities of Phil-Agrochemical Trading are rented while those for CyBERTH Philippines, Inc. are owned. PhilAgrow, Inc. has its own research facility. Only CyBERTH Philippines, Inc. and Phil-Agrow, Inc. provide training to employees.

5.4. Farmer Survey Results

Sixty farmers surveyed had about 11-15 years of farming experience, primarily grew rice, operated small farms (1-5 hectares) and were customers of Phil-

Agrochemical Trading for five years or less. The majority (over 91%) bought pesticides from other distributors because of lower prices and availability of preferred agrochemicals. On a scale of 1 to 7 with 7 being the highest rating, most farmers rated Phil-Agrochemical Trading a "4." Suggestions given by the farmers to the firm included lowering the product prices and increasing promotional activities to encourage customer retention and continued patronage.

5.5. Assessment of Strengths, Weaknesses, Opportunities and Threats

Fig. 3 shows a SWOT Matrix where Phil-Agrochemical Trading's strengths are matched with its opportunities and then with its threats while its weaknesses are matched with its opportunities and then with its threats to generate possible strategy alternatives for the firm to become sustainable. Such strategies include the introduction of new brands per product type, creation of a customer retention strategy for its dealers and IBPs and pursuing market penetration.

Fig. 3. SWOT Matrix

	External	**Opportunities**	**Threats**
Internal		(1) Training programs and seminars are conducted by institutions such as FPA and CPAP. (2) The openness of farmers to new knowledge in crop production. (3) The bright prospects for the plant science industry towards the attainment of food security. (4) Increasing trend towards the production of biopesticides. (5) Availability of funding agencies. (6) The support of government and NGOs for organic farming.	(7) The negative perception on the use of chemical pesticides and fertilizers. (8) Small farmers are highly sensitive to pesticide prices. (9) Increasing competition in the industry due to increasing number of new entrants. (10) The effects of climate change on the industry. (11) Products of the industry are not highly differentiated. (12) Prices of inputs for the manufacture of pesticides are volatile.
Strengths 1. The firm has suppliers which are members of CPAP. 2. The firm has its BOD as distributors. 3. They do not distribute Category I pesticide. 4. The company has developed partnership with the dealers of organic fertilizers		Introduction of different brands for each type of pesticide (S1, S2 and O1, O5)	Market Penetration (S1, S3 and T1, T3, T6)
Weaknesses 1. . Lack of warehousing facilities. 2. Weak brand recognition. 3. Non-commitment of dealers and IBPs. 4. Experiences stock-outs of products. 5. The company does not have well-established customer relationships		Creation of customer retention strategy for the dealers and IBPs (W2, W3, W5 and O1, O2, O3)	Creation of customer retention strategy for the dealers and IBPs (W2, W3, W4 and T1, T2, T3, T6)

5.6. Insights and Directions

It is apparent that though the agrochemical industry has taken action in traversing the organic route toward

sustainability, it has only taken small steps in that direction. Even if customers are clamoring for safe food and in spite of the trend towards organic agriculture and sustainability, most farmers remain indifferent toward using biopesticides and other biologicals in farming on account of their sensitivity to input prices and demand for more promotional activities. Thus, in the next couple of years, it is expected that agrochemicals of a synthetic nature will continue to dominate the global agrochemical industry in terms of usage and market share. Such a trend is expected to spill over to Asia, including the Philippines, as transnational companies take in a sizeable share of the market.

To survive and compete in the industry, agrochemical trading companies must employ a number of strategies such as introduce new brands for each product type, formulate a customer retention strategy for its dealers and IBPs and pursue market penetration. Lastly, in the case of Phil-Agrochemical Trading, the firm should consider CPAP membership and carry out product stewardship, agromedical training/information education campaign and aerial spraying seminars to enhance its competitiveness in the agrochemical industry.

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A Study on the Dependency on Japan and the Competitiveness of Gear Boxes

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ABSTRACT

From the trade deficit with Japan in 2012 of 25.57 billion USD, the trade surplus of material and components industry was 22.23 billion USD in deficit. 87% of such trade deficit with Japan came from the material and components industry.

This study is to focus on the competitiveness index of absolute inferiority in automobile components as of 2012 and 'gear box and other components' that are over the trade for each amount of the automobile components with Japan.

Keywords: competitiveness index(CI), dependence on Japan, gear box industry, trade deficit against Japan

Ⅰ. Introduction

As of 2012, Korea accomplished overall exports of 547.87 billion USD and imports of 519.58 billion USD, and as a result, the trade surplus accomplished a surplus of 28.29 billion USD. If this is limited to the material and components industry, the global exports and imports were 253.41 billion USD and 162.49 billion USD, respectively, and as a result, the trade surplus recorded a surplus of 90.92 billion USD that the trade surplus exceeded 60 billion USD. To put it differently, the present vast trade surplus mainly came from the trade surplus of the material and components industry.

In the meantime, the trade surplus with Japan (2012) recorded a deficit of 25.57 billion USD. It was less than the trade deficit with Japan for the previous year, 2011 (28.64 billion USD), but it was attributable to the decreasing imports from Japan from the exchange rate with strong Yen and weak Won currency. The vast scale of the trade deficit with Japan did not happen overnight.

For this background, the vulnerability of the domestic material and components industry was the greatest cause for the aforementioned. From the trade deficit with Japan in 2012 of 25.57 billion USD, the trade surplus of material and components industry was 22.23 billion USD in deficit. 87% of such trade deficit with Japan came from the material and components industry.

This study is to focus on the competitiveness index (-0.91) of absolute inferiority in automobile components as of 2012 and 'gear box and other components (8708-40-0000)' that are over the trade for each amount of automobile components with Japan. Through the foregoing, the purpose is to analyze the

trend of export and import competitiveness on the material and components industry with Japan and lead a responsible strategy for improving the trade deficit with Japan.

Ⅱ. Trade Surplus and Status

Looking into the global export and import scale of ‘gear box and other components’ (2012), exports reached 2.528,801,000 Dollars and imports 1,568,670,000 Dollars; as a result, the trade surplus reached 1,471,934,000 Dollars. Looking into the export and import scale with Japan on this item for the same year, it recorded the export of 23.79 billion USD and import of 491.028 million USD; as a result, the trade deficit recorded 467.238 million USD.

On the other hand, the scale of trade deficit (－470 million USD) with Japan for ‘gear box and other components’ was applicable for 1.8% of the entire trade deficit with Japan (－25.57 billion USD) and 2.1% of trade deficit with Japan for material and components (－22.33 billion USD).

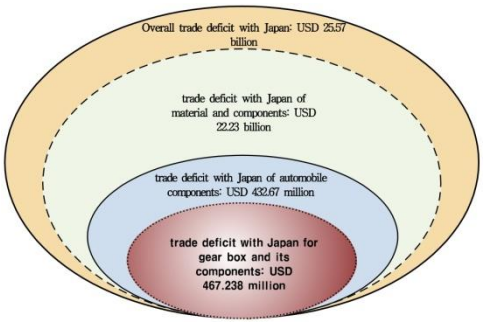
Also, looking only at the trade surplus with Japan for automobile components (－430 million USD), the trade deficit of ‘gear box and other components’ took a high ratio applicable for 115.9% that the status of these item could be shown.

Therefore, relief from the trade deficit with Japan by domestic automobile components industry could be concluded as impossible without an improvement in the trade deficit of the ‘gear box and other components’.

For reference, from the costs of a completed car, the ratio for the gear box is known to be around 7-8%. As such, a gear box with a high ratio of production cost also has the longest quality assurance limit in that it is the core item for a high added-value to measure the competitiveness of a complete car.

As shown through the comparison with other indices under the following Fig. 1, the import scale with Japan for the ‘gear box and other components’ is very high. Furthermore, the import dependence of Japan has declined from 80.1% in 1988, 77.0% in 1998, 59.7% in 2008, and 46.5% as of 2012, but the import dependency on Japan may be assessed as high.

Fig. 1. Ratio of Gear Box in the Trade Deficit with Japan (2012)



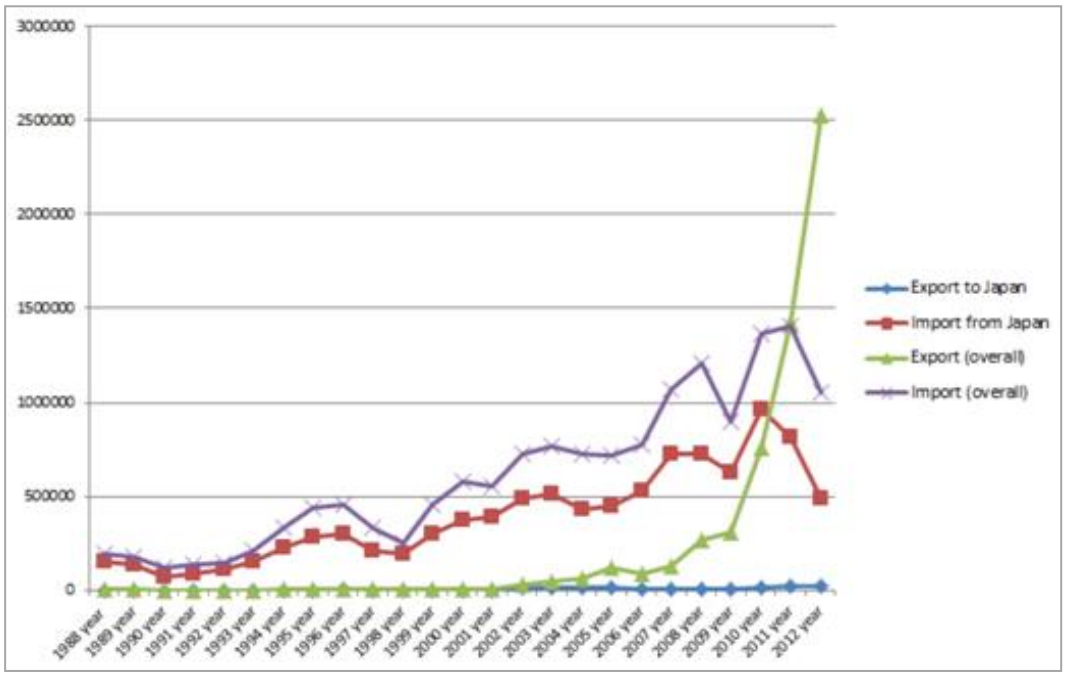
Source: Prepared by the author by facilitating the Korea International Trade Association (2013).

The global export of this item has clear trend of increase in recent days. The trend of increase has been significantly moderated from 2.52 million USD in 1988 to 9 million USD in 2000. However, it began with 28.65 million USD in 2002 to leap to 67.04 million USD in 2004, 91.8 million USD in 2006, 270.79 million USD in 2008 and 759.42 million USD in 2010, and it increased to 1 billion 423.4 million USD in 2011, twice that of the previous year. As of 2012, it has drastically increased to 2,528,801,000 Dollars, over 1 billion USD from the previous year that exports has shown dramatic increase since 2009.

In spite of that, the exports to Japan of this item were USD 970,000 in 1988, USD 910,000 in 1998, 9.42 million USD in 2008 and 23.79 million USD as of 2012; it has seen very little increase for a quarter of a century.

On the other hand, imports from Japan were 155.06 million USD in 1988, 194.02 million USD in 1998, 723.44 million USD in 2008 and 965.669 million USD in 2010, but it has plummeted to record 491.028 million USD as of 2012. Compared to 2010, imports from Japan dropped less than a half.

Fig 2. Trend of Exports and Imports (1988~2012) of Gear Boxes (8708-40-0000)



Source: Prepared by the author by facilitating the Korea International Trade Association (2013).

The trade deficit in automobile components with Japan to this point has been pointed out with a cause of importation in highly functional and high-tech components impossible for domestic development. However, according to the interview survey result on the recent domestic automobile industry, gear boxes imported from Japan are mainly for large commercial vehicles that are made for productivity purposes in Korea.

Ⅲ. Price per Weight on Export and Import Items

In order to consider the problems in ‘gear box and other components’ in detail, the price per weight price of export and import items are analyzed for each price.

Following is a brief summary of the export and import scales and the status of gear boxes to Japan. As is well known in the case of Japan, the status of gear box exports and imports were an item with overwhelmingly excessive exports. Based on 2011, exports were 1.33 trillion Yen (approximately 18 trillion won) with 128 export countries. On the other hand, the imports were only 60.6 billion Yen (approximately 800 billion won).

The weight price of Japan for gear boxes is approximately 1,880 Yen/kg for the gear boxes with a high price imported as compared to the export product price of 1,500 Yen/kg. In particular, the weight price for the import item from the first import subject country, the Netherlands, was 7,380 Yen/kg, which was overwhelmingly higher than the second country, the US, of 1,270 Yen/kg. Also, the weight price of export items from the US and Europe was around 1,500 Yen/kg, but the import item price was 2,000 Yen/kg or higher.

Table 1. Amount per Kg for Global Export and Import of Gear Boxes

Year	Export			Import		
	Amount (USD 1,000)	Weight (kg)	USD/kg	mount (USD 1,000)	Weight (kg)	USD/kg
2005	119,947	9,259,951	13.0	714,512	45,342,883	15.8
2006	91,804	8,512,492	10.8	778,889	52,223,376	14.9
2007	127,074	12,051,377	10.5	1,066,938	72,512,561	14.7
2008	270,795	21,068,540	12.9	1,212,621	72,940,221	16.6
2009	307,779	25,239,366	12.2	900,597	53,010,625	17.0
2010	759,422	58,236,825	13.0	1,362,034	81,828,230	16.6
2011	1,423,403	106,723,042	13.3	1,405,309	78,567,171	17.9
2012	2,528,801	180,077,148	14.0	1,056,867	59,809,776	17.7
A total of 8 years	Average weight price		12.46	Average weight price		16.40

Source: Prepared by the author by facilitating the Korea International Trade Association (2013).

On the other hand, the weight price of imported items from Korea was less than 1,000 Yen/kg for the gear box, an affordable price. This fact could be affirmed by the result calculated through facilitation of the statistical data of Korea International Trade Association by the author.

In 2010 and 2012, the global weight price of export items of Korea's 'gear box and other components (8708-40-0000)' was 13.0 Dollar/kg and 14.0 Dollar/kg, respectively; the import item price for the same year was 16.6 Dollar/kg and 17.7 Dollar/kg, respectively. There was a difference in weight price of 3 Dollar/kg or more between items of export and import (Table 1).

Looking into the trend of the 8-year period from 2005 to 2012, the weight price of import items was higher than the export items. The average weight price of global export items for this item for the 8-year period was 12.46 Dollar/kg while the average weight price for the import item was 16.40 Dollar/kg; there was a unit price difference of 4 Dollar/kg.

Thereafter, the weight price of the export item to Japan for the above items in 2010 and 2012 was 8.1 Dollar/kg and 7.4 Dollar/kg, respectively, while the import item price was 15.8 Dollar/kg and 16.0 Dollar/kg, respectively; there was a two times weight price difference between the export and import items (Table 2). Looking into the period of 2005 - 2012 for the above, the import items to Japan had a higher weight price than the export items. In addition, the average weight price of the export items for 8 years was 11.05 Dollar/kg while the average weight price of the import item was 15.09 Dollar/kg; there was approximately 4 Dollar/kg or more of price difference.

In addition, the export amounts to Japan for 2010 and 2012 were 8.1 Dollar/kg and 7.4 Dollar/kg. It declined 4 Dollar/kg or more compared to 2009, which is considered as attributable to diverse types of gear boxes exported with a drastic increase of exports to Japan in these two periods.

Characteristics of export and import items to the world and Japan on the gear box and other components (8708-40-0000) have a higher average weight price in export and import to Japan than the export and import items to the world have a higher average weight price than the import items to Japan.

Furthermore, when comparing the weight price for exports and imports to the world and Japan on this item, the import items were higher than the export items. To interpret it differently, it is proof that the export of the gear box had lower added value than the imported items.

Table 2. Amount per Kg for Exports and Imports of Gear Boxes with Japan

Year	Export			Import		
	Amount (USD 1,000)	Weight (kg)	USD/kg	mount (USD 1,000)	Weight (kg)	USD/kg
2005	14,004	1,010,821	13.9	444,022	29,443,945	15.1
2006	10,124	805,067	12.6	531,454	38,286,910	13.9
2007	10,180	845,554	12.0	725,042	55,581,305	13.0
2008	9,420	708,144	13.3	723,444	49,337,793	14.7
2009	9,235	743,895	12.4	628,173	39,923,189	15.7
2010	11,075	1,361,065	8.1	965,669	61,103,817	15.8
2011	19,866	2,284,696	8.7	812,394	49,161,068	16.5
2012	23,790	3,225,976	7.4	491,028	30,683,013	16.0
A total of 8 years	Average weight price		11.05	Average weight price		15.09

Source: Prepared by the author by facilitating the Korea International Trade Association (2013).

Ⅳ. Conclusions

The following is the summary of contents shown through the analysis of the ‘gear box and other components’.

First, the above items have shown a drastic increasing trend for global export after 2009, but export to Japan was still in a minimal increasing trend, close to horizontal line, even as of 2012.

Second, characteristics of export and import items to the world and Japan showed a higher average weight price of export items to Japan than the export items to the world, and the import items from the world had a higher average weight price than the import items from Japan. Also, when comparing the export and import weight prices with the world and Japan for the above item, the import items had a higher rate than the export items. To put it differently, the export of gear boxes was proven to have lower added value than the import items.

Lastly, a brief mention was made on the direction of the ‘gear box and other components’.

The recent assembly processing technology has become standardized globally while the material and components technology have been monopolized by some advanced countries, including Japan. Because of the foregoing, the foreign currency earned from the global market was turned over to Japan and the added value for Korean industry has not been significant at all. Furthermore, if the import of core material and components, such as, ‘gear box and other components’, is dependent on a specific country, there is possible subordination in the industrial structure with a high possibility of losing the initiative in production and price.

Purchasing core material and components from Japan was inevitable in the economic growth process of Korea in the past, but the time has come to make a great change in the domestic industry.

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The Nature of Competition in an Indian Market: Focusing on the Volume Zone

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ABSTRACT

Emerging countries are playing a growing role in the world economy. It is a role that is expected to be even greater in the future. The recent global financial and economic crisis has further emphasized the stagnation of most developed economics and taken prominence in emerging economics. In particular, China and India play a significant role as global markets. Henceforth, it is estimated that the Indian volume zone will expand rapidly and steadily. On the other hand, Japan and other developed economies tend to be sluggish. Therefore, Japanese multinational corporations may have to target Indian volume zone consumers. To do so, they are required to change their strategy, management and production systems to compete with local and international rivals in the market because the nature of the competition is totally different in an Indian market than other developed country. However, definitions of the volume zone differ among research institutions, researchers, countries and urban and local areas, which creates considerable differences in the size of markets. Thus, in this paper, the literature review summaries and compares the definitions of the volume zone first. Second, this paper tries to Fig out the most important part of the volume zone which has a key role in making a business strategy. Third, differences between developed markets and the Indian market are examined, and the nature of competition in the Indian market is argued. Finally, the main argument and implication are stated.

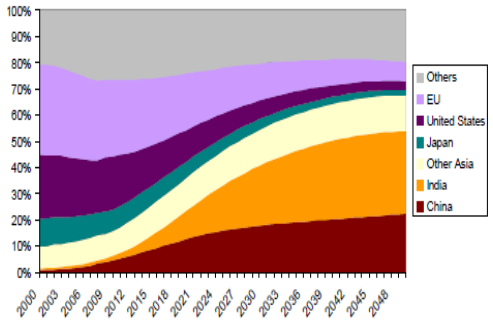
Keywords: competition, developed market, emerging market, Indian market, strategy, volume zone

Ⅰ. Introduction

There is very significant global interest in the Indian economy. Along with China, Brazil, Indonesia, and a few other countries, India promises great potential of growth in the next few years and decades. The future of the Indian economy is thus a significant concern among the global financial and business community, economic policy-makers and managers, multilateral financial institutions, economists and other academics as well as investors and consumers in India. The significant global interest in India is not surprising. It is well known that - on a purchasing power parity basis – India is already, at over USD four trillion of GDP, the fourth largest economy in the world; very close to the size of the Japanese economy, the third largest. In the next 15 to 18 years this size is expected to grow, as per various studies and estimates, four to five times. As a result, many foreign investors and a majority of global companies and businesses are making a beeline for the Indian market, which

promises a booming volume zone[5] of a few hundred million consumers (Fig. 1), expanding steadily in the next few decades.

Fig. 1. Shares of Global Middle Consumption, 2000-2050



Source: Kharas (2010)

On the other hand, advanced economies, including Japan, are slowing down; Japan has been in a long recession with a real GDP growth rate of 3.9% in 2010. It underlines the world economy shift from developed nations with their huge populations, rising household incomes, and expansion of consumer goods and service markets toward the emerging economies.[6]

From these perspectives, the expansion of the Indian volume zone has attracted considerable attention. Many Japanese firms have already adjusted their strategy, management and production systems in order to compete with the Indian volume zone. However, there are no official definitions of volume zone[7], and these definitions differ among research institutions, researchers, countries, and urban and local areas. This creates considerable differences in the size of volume zone markets. Thus, the literature review summarizes and compares the definitions of volume zone arguements. After identifying the important part of the volume zone (what is the volume zone, what is the trend of the volume zone etc.), this paper argues the differences between developed markets and the Indian market, which is very useful in knowing the nature of competition in the Indian market. Finally, the main argument and implications are stated.

1.1. Definitions of Volume Zone

There are various definitions of volume zone based on annual household disposal income, annual household income, and expenditure. Since the definition of volume zone is not standardized with each country's factors, it remains uncertain. Thus, we need to define and examine the Indian volume zone which is most important in order to Fig out a business strategy.

1.2. Annual Household Disposable Income

The Ministry of Economy, Trade and Industry (2010), Aoshima, Kubota and Sakamoto (2009), Japan research institute (2010), Mizuho Research Institute (2010), and Yanagawa and Mori (2010) defined the Asian volume zone, including that of India, as comprising people whose annual household disposable incomes range between $5,000 and $35,000 (upper middle class $15,001-35,000; lower middle class $5,001-$15,000; lower class $1,000-$5,000; the poor up to $1,000) and the rich as those whose annual household disposable incomes exceed $35,000. On the other hand, India's National Council of Applied Economic Research (NCAER report 2005/2006) defined the Indian volume zone as comprising people whose annual household disposable incomes range between $22,320 and $4,444 (Rs1,000,000-Rs200,000 at 2001/2002 price).

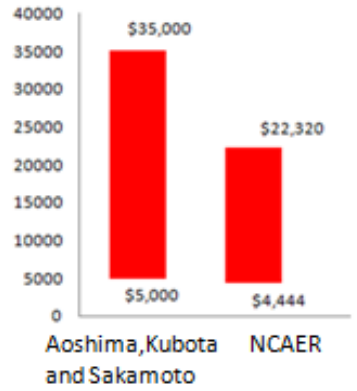
Comparing these two definitions of volume zone (Fig. 2), the former defines that the annual household disposal incomes of people in the volume zone tends to be higher at $5,001 to $35,000, and the latter defines that the incomes of people in the volume zone tends to be lower at $4,444 to $22,320.

[5] It is also called middle class, middle income class, and middle income. In this paper the middle class is identified as volume zone.

6 The countries and consumers team 2010

7 Eric D et al. (2007), Kharas (2011)

Fig. 2. Definitions of Volume Zone by Annual Household Disposable Income

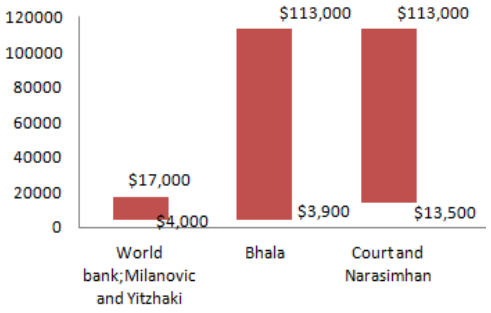


1.3. Annual Household Incomes

First, the World Bank (2007) and Milanovic and Yitzhaki (2002) defined the global volume zone as those with annual household incomes between the mean incomes of Brazil and Italy; that is, an annual per capita income of approximately $4,000-$17,000 (at 2000 purchasing power parity (PPP)). Second, Bhala (2009) adopted an absolute approach definition, with an annual per capita income of $3,900-$113,000 in PPP terms. Third, Court and Narasimhan (2010) divided the consumers of developing countries, including India, into the following classes on the basis of their annual household incomes: global class, $113,000 and above; upper middle class, $56,500-$113,000; middle class, $22,500-$56,499; lower middle class, $13,500-$22,499; and deprived class below $13,500. From this distribution, the middle class is defined as those with an annual household income of $13,500-$113,000 in PPP terms.

In order to compare these definitions, Fig. 3 presents the minimum and maximum annual incomes that were specified by various researchers. Bhala (2009) specified the minimum annual income as $3,900, which is much lower than that specified in other definitions.

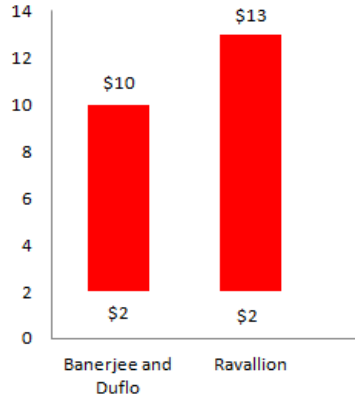
Fig. 3. Definitions of Volume Zone by Annual Household Income



1.4. Expenditure

Some researchers defined the volume zone on the basis of expenditures. In 2007, Banerjee and Duflo (2007) defined it on the basis of per capita expenditure between $2-$4/day. In 2008, they defined the global volume zone on the basis of per capita expenditure of $2-$10/day in 1993 PPP (Banerjee & Duflo 2008). On the other hand, Ravallion (2010) defined it on the basis of per capita expenditure between $2-$13/ day. Both of these expenditure based definitions are used only in emerging economies.

Fig. 4. Definitions of Volume Zone by Expenditure



These two definitions also show differences since the higher bound is $10/day and $13/day. In summary, the volume zone is defined differently on the basis of various standards, locations, and economies. Owing to its complexity and variety, the volume zone consumers' jobs, incomes, consumptions, lifestyles, and subjective

consciousness of the levels of society must also be considered for defining the Indian volume zone.

Ⅱ. Catching the Trend

In order to consider the differences between the definitions of volume zone, this paper argues about most important part of the volume zone to make a better strategy in business. The management team in business must know about the volume zone, but $3,900 or $4,000 (Fig. 3) in annual household income does not make a vast difference in its strategy and consumers lifestyle. In relation to the poor by associating it with an ability to choose to spend time and money on something other than survival, consider the volume zone in the case of Indian markets where estimates range from 30 million to approximately 300 million people.

The volume zone is not (yet) the biggest segment of India's overall population. Given all the attention focused on India's middle class in recent years, it is important to keep a proper perspective on its size and potential purchasing power. Even using the most generous estimates of the group's size, the volume zone comprises less than 30 percent of the population. Thus, the rich and the poor combined far outweigh the Indian middle class. The importance of the middle class lies in the fact that it is the fastest growing segment of the population. Evidence shows that as income increases, the amount and variety of this discretionary spending increases. For corporations, the middle class in India thus presents significant business opportunities. The sales growth of consumer goods such as televisions and mobile phones to the middle class has already been established. Given the tremendous growth potential, an increasing number of products are being geared towards the volume zone population. In the transport industry, which has traditionally been dominated by rail travel, newer cars like the Tata Nano (which retails for a little over USD 3,000) and low-cost airlines have enabled the volume zone population to be increasingly mobile. The growth of the volume zone and the economic growth of India are in a virtuous cycle. Rising incomes lead to more consumption, which in turn leads to higher economic growth, then more employment opportunities and subsequently higher wages and the circle starts again. Thus, as the volume zone grows and continues to increase domestic demand, the economy will also continue to grow. Regardless of which definition is correct and certain, it is important to keep a proper perspective on the potential of the volume zone. The volume zone in India has generated tremendous interest from the media and multinational corporations are looking for a new market demographic.

Ⅲ. Developed Markets and the Indian Market

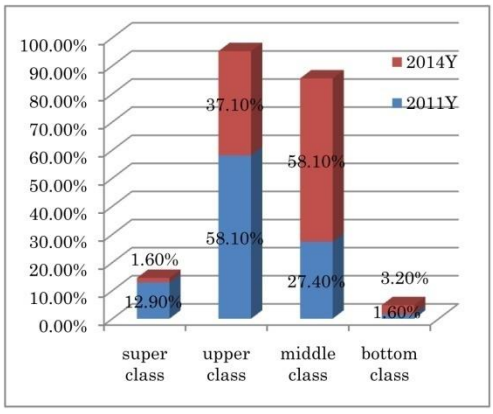
In recent years, India's market growth has outstripped the developed markets. In the 80s, GDP growth in developed nations and India was essentially the same. Between 2000 and 2010, average growth in the Indian market rose to the point where it was three times higher. Besides this, India has corruption, less infrastructure, fare of terrorism and etc. which are abnormal in a developed country.

Consumers in India tend to be more ethnocentric than those in developed ones. Products from the western hemisphere are seen by Indian cultures as carrying western values that might harm their society as well as the local workforce. In developed countries, price, quality, durability and other product-related aspects are the major factors that influence buying decisions. Consumers in India tend to be less individualistic than in developed ones. They care more for a larger local community and like to be identified as part of it. Advertising which exhibits local values and traditions has a greater impact on consumers of India whereas the more individualistic consumers from developed countries are more influenced by advertising where the product differentiates itself specifically from other products in the market.

These are the common differences between the Indian market and developed markets. Besides these, there are lots of differences between Indian markets and developed markets.

A survey held by the Graduate School of Asian and International Business strategy[8] in October 2011 on the title of "Entry Strategy of the Japanese Firms in India and China" shows that Japanese firms in India are going to change their target from the upper (wealthy) class to the Volume Zone (Fig. 5). In 2011, 58.1 percent of the Japanese firms replied that they are targeting upper class customers in India. By the way, the survey shows only 27.4 percent of firms were targeting the upper class after 3 years (2014) and more firms targeted the middle class. Thus, we can understand the Japanese strategies are shifting from the upper class to the Volume Zone.

Fig. 5. Shifting Strategy in India



Ⅳ. Conclusion

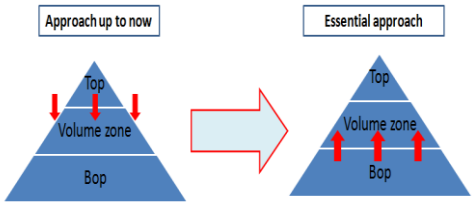
Thus, it is clear that the Indian volume zone is expanding and Japanese companies are shifting their strategy from the upper class to the volume zone. The problem is the presence of Japanese companies in the Indian market where Japanese companies are dominated by Korean and European-American companies.

According to Shintaku and Amano (2009), developed countries' firms have more strong technology and find it more difficult to target the volume zone of emerging markets and to adopt the strategy locally. There is no room to think about if the strong technology of a company is harmful for its strategy in emerging markets. The problem is how to approach the volume zone and this is important. Specially, the volume zone comes from the lower class and companies should know their lifestyle and behavior. If firms understand the value of money for the volume zone, they can easily shift their strategy too. This helps them succeed in the Indian volume zone.

Finally, the conclusion of this paper presents the hypothesis for further research about how to approach the volume zone of India. The hypothesis is (Fig. 6) "To compete successfully in the Indian volume zone, firms need to catch the trend of the volume zone and educate customers, construct market infrastructure, train management personnel and understand the abilities of the supply side are essential. This is why they need to cultivate their resources at a lower level than they are targeted (volume zone).

This paper cannot include the case study and cannot examine the strategy. That will be further researched by this author in the future.

Fig. 6. Possible Way to Succeed in the Volume Zone of India



[8] Principle of Asia University, Dr.Ikejima Masahiro leads the survey.

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Analysis of Public Health Expenditures on Leading Causes of Morbidity in the Philippines

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ABSTRACT

Provision of public goods and services is one of the major roles of the government in an economy. Some of the public goods and services that are being provided cause negative effects while others create positive externalities. One evident case of such is the market for health care. Aware of its role to provide health care to the people, governments are even more challenged with the remarkable growth of the demand for health care. Furthermore, there are market failures existing in the health care sector. Given that, the paper examined the effects of public spending on health care, specifically on the principal causes of morbidity in the Philippines. Aside from public spending, the paper also took into account private health spending in the analysis. The study employed a pooled ordinary least squares regression model. Results showed that the increase in government spending significantly reduce the number of tuberculosis cases in the Philippines. On the other hand, results for diarrhea indicated that public spending and number of diarrhea cases are positively related. The findings imply that although an increase in public health expenditures can have a significant impact on the number of cases of diseases, lowering tuberculosis cases for instance, the study can be further extended by valuing as well the other benefits that can be derived from a prevented sickness resulting from an increase in public health expenditures.

Keywords: health care, morbidity, positive externalities, public goods, public health expenditures

Ⅰ. Introduction

Economics texts suggest different extents to which the government can intervene in market activities. Classical economists advocate that the main, and in some instances only, role of the government is to ensure peace and order in the economy, i.e. ensuring property rights are properly defined and laws and policies are well-enforced. Keynesian economists, on the other hand, believe that the government has a significant role as Keynes demonstrated during the Great Depression. At present, different economies adopt different blends of the two extreme cases. However, common to all economies is the need for government intervention in the presence of market failures and missing markets given that the government can do better than the market, i.e. such intervention will not lead to government failures resulting in further inefficiencies.

It is a known fact that one of the major roles of the government in an economy is the provision of public goods. Paying no attention to it would result in under-

provision of such goods or worse, not being provided at all due to the free-rider problem. Another widely acceptable role of the government is to provide goods or services that create a positive externality to the society. These goods or services are usually socially underprovided since the individual, in his/her own private desire to maximize utility, doesn't consider the beneficial effects to the society of such activities. Examples of such services are education and health care. This paper will provide a general overview of the global demand for health care then focus on the role of the government in health care provision in the Philippines.

Ⅱ. Global Demand for Health Care

The concern for health is a global phenomenon. Despite the costs of health care services, the demand for health care is growing everywhere in the world. The surge of aging and chronic illnesses in the developed countries and the shooting requirements of the rising middle class, accompanied by the 'diseases of prosperity' in the developing countries, are all driving demand. Global pandemics that threaten the world, as well as environmental changes that cause dramatic health care challenges, are also adding up in the demand for health care services.

The rising demand for health care is evidenced by the increased spending on health services. The world's total health expenditure as a percentage of Gross Domestic Product (GDP) grew by 15%, from 8.2 in 2000 to 9.4 in 2009 (Table 1). The American region posted the highest growth in health expenditure as a percentage of GDP, at 26%, while the South East Asian region showed the least at 2%. The growing expenditure on health services are born from both the public and private. Public spending on health care is at least about 50% for most of the countries. The spending has likewise grown by two percentage points in excess of GDP growth across all Organization for Economic Co-operation and Development (OECD) countries for almost 50 years, and is expected to be more than a fifth of GDP by 2050 if the current trend persists (Drouin et al., 2008). As a result, government health agencies, together with patients and health care companies, particularly in developing economies, are alarmed with the growth of health care spending. Given its current share of health care expenditures, the government is confronted with other increasing demands of its people, such as education, defense, and pensions, aside from demand for health care and the escalating prices of health services.

Table 1. Health Expenditure Ratios, 2000 and 2009

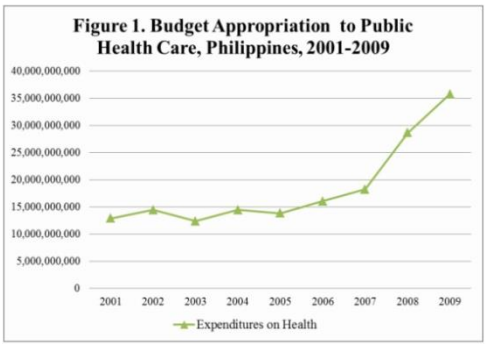
Region	Total expenditure on health as % of gross domestic product		General government expenditure on health as % of total expenditure on health		Private expenditure on health as % of total expenditure on health		General government expenditure on health as % of total government expenditure		External resources for health as % of total expenditure on health		Social security expenditure on health as % of general government expenditure on health	
	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009
African Region	5.5	6.5	43.9	49.3	56.1	50.7	8.2	9.6	6.5	10.2	7.9	7.0
Region of the Americas	11.4	14.4	45.1	49.3	54.9	50.7	14.5	16.9	0.1	0.1	31.7	72.0
South-East Asia Region	3.7	3.8	31.9	37.1	68.9	62.9	4.4	4.9	0.9	1.6	13.3	14.4
European Region	8.0	9.3	73.9	74.9	26.1	24.8	14.0	14.6	0.1	0.1	52.2	49.5
Eastern Mediterranean Region	4.2	4.7	47.2	50.9	52.8	49.1	6.9	7.1	1.0	1.1	18.4	19.4
Western Pacific Region	6.0	6.5	63.9	64.4	36.1	35.6	13.8	14.4	0.2	0.2	68.1	68.6
Global	8.2	9.4	56.3	59.1	43.7	40.8	13.3	14.3	0.3	0.4	45.1	59.5

Source: World Health Organization (2012).

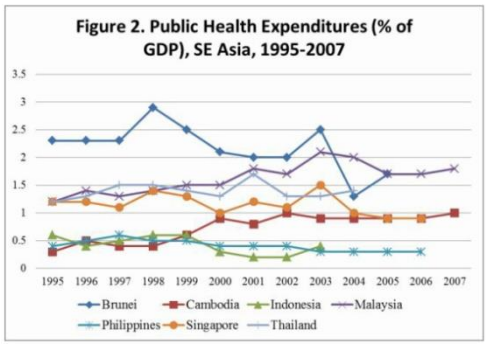
Moreover, health care expenditures are signify-cantly associated with improved health outcomes, with public health care expenditure having a larger impact (Navignon et al., 2012). Hence, health care expenditures are vital to improving the health status of the society. Relatedly, Hurley (2000) stated that "the market failures that pervade the health care sector create an important role both for non-market institutions and for normative economic analysis to help sort the "good" policies from the "bad". Thus, from a public policy perspective, it is valuable to know how a policy variable like public expenditures on health care affects the principal causes of morbidity rates.

Ⅲ. Status of Public Health Expenditures in the Philippines

Public health expenditures include current and capital spending from government budgets, external borrowing and grants, and social health insurance funds (HDR, 2007). Although Fig 1 shows that the budget allocated for public health care in the Philippines is increasing in the past few years, Fig 2 shows that compared to other Southeast Asian countries, the Philippines is actually way behind in terms of public health care spending as percent of GDP. As a matter of fact, according to the Human Development Report (2007), the Philippines is one of the countries around the world with the lowest percentage (% of GDP) spent on public health expenditure at 1.4%. This current condition would have a significant impact on the health and, ultimately, the over-all productivity of the members of society. For instance, the results of the study of Granlund (2006) indicated that public expenditures on health care have an effect on the number of absence days of individuals. Furthermore, the results showed a positive causality between health care expenditures and the health of the society (Granlund, 2006).



Sources: Department of Budget and Management (2001-2009).



Source: Asian Development Bank. (2008).

Since the budget for health is much less in the Philippines as compared to most countries (and can be safely assumed to be inadequate), the paper would want to look at the impact on morbidity incidences from increasing the current public spending on health. Though the study will just be limited to measuring the impact on morbidity, the results can then be used to derive the value to society of higher public expenditures in terms of less people afflicted or infected by various diseases. Unlike in the situation where the public health care expenditure is already sufficient (or optimal), it will be much easier to estimate the external cost of inadequate public health expenditure by measuring the forgone benefits (say, it resulted to an absence) from those people who were infected. In addition, the results of the study could be used to measure the externalities valued in terms of cost savings if the spread of the disease was prevented.

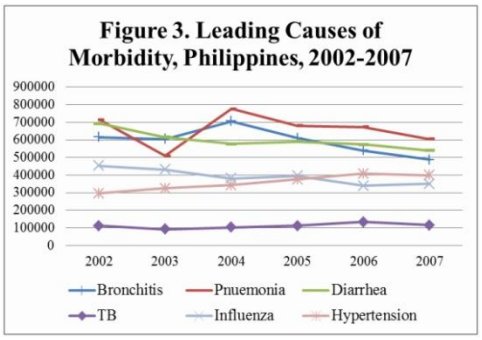
Ⅳ. Leading Causes of Morbidity in the Philippines

Morbidity may be referred as the state of poor health, the degree or severity of a health condition or an incidence of a disease. In the case of the Philippines, the leading cause of morbidity is pneumonia with an incidence rate of 718 (per 100,000 population). Table 2 shows the top ten leading causes of morbidity in 2007 while Fig. 3 shows the trend in the number of cases in the past few years for the major causes of morbidity.

Table 2. Ten Leading Causes of Morbidity, Philippines, 2007

Disease	Number of cases	Rate per 100,000 population
ALRI and Pneumonia	605,471	718
Acute Watery Diarrhea	539,701	640
Bronchitis/Bronchiolitis	487,302	577.8
Hypertension	398,538	472.6
Influenza	349,609	414.6
TB Respiratory	114,714	136
Diseases of the Heart	31,331	37.2
Dengue Fever	23,773	28.2
Malaria	23,207	27.5
Chickenpox	23,090	27.4

Source: Department of Health (2002).



Source: Department of Health (2002-2007).

From Fig. 1 and Fig. 3, it seems that the increasing public health care expenditures didn't lead to a significant decrease in the leading causes of morbidity in the past few years. However, we cannot conclude this immediately since there are other factors affecting the number of cases like private health care expenditures and population growth. These other variables would be considered later in analyzing the impact of public health care expenditures on the number of cases.

Ⅴ. Characteristics of Health Care

According to Hurley (2000), health care is distinct from other commodities because of health care having a combination of features that is only present individually in other commodities. Most of these characteristics result in market failure or missing markets causing inefficiencies like in the presence of externalities, information asymmetry and uncertainty. In each of these characteristics, the government may be able to minimize the inefficiencies resulting from these market failures through public expenditures on health care (which can be looked at as the policy variable of the government). This somehow justifies the need for government intervention on health care as a response to these characteristics of health care.

Though it is desirable to be able to disaggregate public health expenditure as an answer to each of these characteristics of health care, it will not be easy as policies on public health care usually answer the inefficiency problem as a whole. Thus, the study would focus on the rationale for public health care expenditure as it provides a positive externality to the society.

5.1. Health as a Merit Good

A merit good is a good or service that is regarded as desirable by the society such that the government intervenes in its provision. The idea is that these goods and services provide positive externality to the society and, if left to individuals, would tend to be under-provided. Thus, the government can intervene to correct this under-provision. Common examples of these merit goods are spending on public services such as public education and public health care.

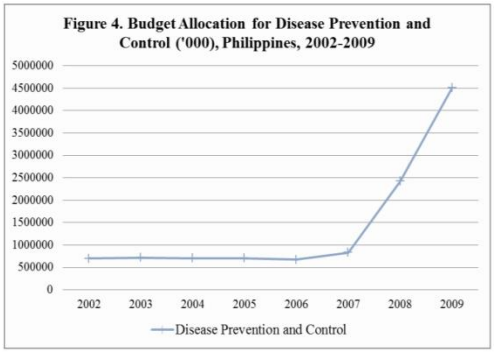
In general, the external benefits from health care can be looked at in various ways. According to Hurley (2000), people may derive external benefit from knowing that others receive the needed health care

services and not just any health care that a person can afford. In addition, the externality from health care can be looked at as the measure of joy (or prevention of pity) caused by seeing a healthy person rather than a sick one. The problem, however, with this valuation of the externality is that such joy or pity cannot be easily quantified.

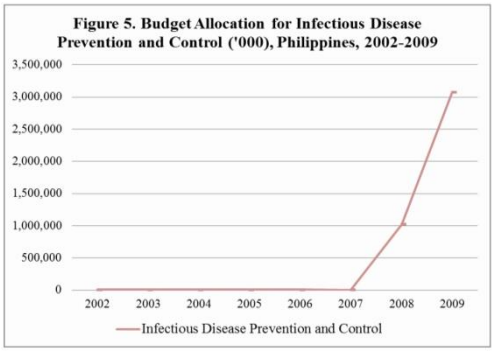
An alternative way of looking at the positive externality provided by the adequate (optimal) amount of spending on public health would be the cost savings from those who would have been affected if such public health expenditures were not adequate (optimal). The obstacle though is finding these cost savings if the optimal amount of health expenditures is already in place. This is because one cannot predict who among the millions or billions of people would have been externally affected if the existing public health expenditures were not in place. In the case of countries where public health expenditure is still inadequate, we can analyze the cost savings by looking at the effect of an increase in public health expenditures on the people who are currently experiencing diseases which may have been prevented if the optimal level of expenditure was in place.

5.2. Prevention versus Cure

It is important to consider that the positive externalities from having optimal health expenditures can be realized if such expenditures may have prevented the spread of a communicable disease. Thus, if most of the health expenditures were rather used for cures, then these positive externalities, as we defined earlier, would not be realized to the fullest. It is still important to take note that cures also result in a positive externality since it prevents the further spreading of the disease given the carrier of the disease is cured as soon as possible. The government expenditures on disease prevention and control and for infectious disease prevention and control are exhibited in Fig. 4 and Fig. 5.



Sources: Department of Budget and Management (2002-2009).



Sources: Department of Budget and Management (2002-2009).

Note that the sudden increase in the budget allocated in both Figs during the 2008 and 2009 was due to the Intensified Disease Prevention and Control program introduced during 2008. This almost doubled or tripled the budget allocation to these items as compared to years before 2008. It is then desirable to be able to see the impact of this significant increase in the public health expenditures on the number of cases; however, the data on the number of cases for 2008 is not yet available.

5.3. Communicable versus Non-communicable Diseases

Externalities provided by the adequate amount of spending needed for health care is more apparent in the presence of communicable diseases. In addition to the general external effects discussed earlier, communicable diseases have additional external effects via the probability of a healthy person being infected by the

person carrying a communicable disease. Public health expenditure may then lower this possibility of infection to healthy people by providing health care for people who cannot afford the needed medication.

The situation under communicable diseases somehow distorts the utility maximization problem of individuals since the presence of a sick person implies a higher chance of being sick also and thus lowers the utility of the individual. This external effect, as pointed out earlier, would cause inefficiency if not recognized. Even though the benefits from societal prevention and cure of communicable diseases are known, the problem changes to what we know as the free-rider problem if individuals are left alone to solve the problem.

As we all know, voluntary contribution would not solve the problem due to the free-rider problem. Free-riding would be evident since contribution to prevention doesn't assure the contributor that he will be the one that will be saved from the disease, i.e. with the prevention measures, we assume that the infected individuals will be much less but this doesn't specifically tell who these individuals are. Since this is the case, a person may claim that he doesn't need prevention measures anyway since with or without the prevention measure, his final state will just be the same (i.e. two extreme cases, very healthy that in the end, he will be healthy or very vulnerable that he/she will always be affected anyway). It is likewise possible that people, rather than donate, may just choose to put this prevention contribution into private health expenditures by buying vitamins that give additional protection or immunity. This is the reason why public health expenditure is essential in the case of communicable diseases.

We can then expect a more significant impact of higher public expenditures on health care on the number of communicable diseases as compared to non-communicable diseases because of the additional benefits from prevented infection. Also, we can expect that public expenditures on health will have a lower impact as compared to private health expenditures on non-communicable diseases. The paper would then verify these hypotheses.

VI. Sources of Data and Analytical Procedure

6.1. Sources of Data

The data used in the study were from various national survey results gathered by various departments and agencies of the government. Data for the leading causes of morbidity and the number of cases every year were taken from the Field Health Service Information System (FHSIS) Annual Report. The FHSIS Annual Report reflects the activities and health program accomplishments of the Department of Health in the Philippines for a given year and serves as a reference for planning and decision-making at the local and national levels (FHSIS, 2004). The FHSIS also contains statistics on health systems, health status, health services coverage, and notifiable diseases in the Philippines. For the purposes of this study, the data utilized were the number of cases per region and per year of the leading causes of morbidity in the Philippines such as bronchitis, tuberculosis, influenza, hypertension and diarrhea.

Data on Philippine government health care expenditures were taken from the National Expenditure Program (NEP). The NEP is an annual publication by the Department of Budget and Management that contains the details of the government's proposed program and intended to assist Congress in the review and deliberation of the proposed national budget for the legislation of the annual appropriations measures for the succeeding fiscal year (NEP, 2003). Annual and per region data on public health expenditures were elicited from the national government budget allocated to the Department of Health. Though it is desirable to be able to split the expenditures into preventive and curative measures, the available data did not have such information at the regional level.

Data on household (private) expenditures for health care were obtained from the Family Income and

Expenditure Survey (FIES). The FIES is a nationwide survey of households undertaken every three years by the National Statistics Office that contains data on family income and expenditure, such as levels of consumption by item of expenditure as well as sources of income in cash and in kind and provides information on the levels of living and disparities in income of Filipino families (FIES, 2006). The study utilized regional data on the average household expenditure on medical care. Data on the population per region were also taken from the FHSIS Annual Report while data on the number of households were taken from the FIES.

6.2. Analytical Procedure

As stated above, it is not enough to just look at the trends of morbidity cases and public expenditure to be able to assess the impact of the latter to the former. There are other variables such as private health expenditures and population at that period of time that may also significantly affect the number of cases. The paper used a pooled ordinary least squares regression model to analyze the impact of public health care expenditures on the number of cases for the major causes of morbidity in the Philippines from 2002-2006 across regions.. The model is given by:

$$cases = f(pop, privexp, pubexp)$$

where: pop – regional population

privexp – average household expenditures on health

pubexp – public health expenditures (‘000)

It is hypothesized that there is a positive relationship between the number of cases and population. On the other hand, a negative relationship between both private and public expenditures and the number of cases is expected.

Ⅶ. Results and Implications

7.1. Results and Discussion

Results from the empirical models of the different morbidity causes are reported in Tables 3 and 4. Notice that only the results for tuberculosis and diarrhea were reported since neither public nor private expenditures on health were able to explain the variation in the number of cases for bronchitis, pneumonia, influenza and hypertension.

Table 3. Regression Results for Tuberculosis Cases

variable	Coefficient	standard error	p-value
pop**	0.0018028	0.0001077	0.000
privexp*	-0.6158907	0.2659049	0.023
pubexp*	-0.0059089	0.0024357	0.018
constant	2103.315	812.9887	0.012

Note: ** highly significant at 1%, * significant at 5%.

7.1.1. Tuberculosis

The regression result showed that the model is significant and was able to explain 87% of the variation in tuberculosis cases based on the computed adjusted R-squared. Public and private expenditures on health care were found to be significant (at 5%) in explaining the variation in the number of tuberculosis cases while population was found to be highly significant (at 1%). The results conform to the hypotheses that an increase in both public and private spending on health care would result to a decline in the number of tuberculosis cases. Also, an increase in the population results in an increase in the number of cases, which was also expected.

Estimates showed that, on the average, an increase in the population by 555 increases the number of tuberculosis cases by one. Results also showed that an increase in public health expenditures decreases the number of tuberculosis cases. Specifically, the estimated coefficient implies that, on the average, an increase in public health expenditures by PhP169,236 would lead to a one unit decrease in the number of tuberculosis cases. With the PhP16 billion total budget for health in 2006 (PhP154 million of which was allocated for tuberculosis prevention and control), an additional 1% increase in government health expenditures would approximately reduce the number of tuberculosis cases also by 1% for the same year at the

country level. In addition, estimates showed that an increase in the average household private expenditure on health by PhP1.62 would result in a unit decline of tuberculosis cases. The value seems low at first glance, but this translates to a total of PhP1.66 million spending on health for the household sector from the 17.4 million Filipino families across 17 regions in 2006 necessary to reduce tuberculosis cases by one. Interestingly, public health expenditure seems to be less costly in terms of preventing tuberculosis cases in the country. This is due to the fact that majority of tuberculosis cases are experienced by poorer households that rely more on public health care rather than private health care which they cannot afford. Public health expenditures are also ideal for tuberculosis cases because of the ancillary benefits these provide by preventing the spread of this communicable disease among the population.

Table 4. Regression Results for Diarrhea Cases

variable	coefficient	standard error	p-value
pop**	0.0073148	0.0007181	0.000
privexp**	-5.919509	1.773756	0.001
pubexp*	0.0385644	0.0162475	0.020
constant	9123.934	5423.155	0.097

Note: ** highly significant at 1%, * significant at 5%.

7.1.2. Diarrhea

The regression result showed that the model is significant and was able to explain 70% of the variation in diarrhea cases based on the computed adjusted R-squared. Public expenditures on health care were found to be significant (at 5%) in explaining the variation in the number of diarrhea cases while population and private expenditures on health care were found to be highly significant (at 1%). The results conform to the hypothesis that an increase private spending on health care would result in a decline in the number of diarrhea cases while an increase in the population results to an increase in the number of cases. However, public health care expenditure and the number of diarrhea cases were found to be positively related. One possible explanation for this result is that public expenditure on health may be more oriented to communicable diseases than non-communicable diseases, i.e. compared with the results of tuberculosis. In addition, there are other significant factors that may be affecting the prevalence of diarrhea which are not incorporated in the public health care expenditures, say the availability of or access to safe drinking water, among others.

Nevertheless, results showed that an increase in the average household private expenditure on health by PhP0.17, or equivalently a total of PhP0.174 million spending on health for the household sector, would result in a unit decrease in the number of diarrhea cases. Estimates also showed that, on the average, an increase in the population by 137 increases the number of diarrhea cases by one in the country. Results also showed that an increase in public health expenditures decreases the number of tuberculosis cases.

7.2. Conclusions, Implications, and Further Studies

The result of the study showed that public expenditures on health care have a significant effect on the number of tuberculosis cases in the Philippines. Although results for the other cases show that public expenditure failed to explain the variation in the number of cases, it may be attributed to the unavailability of disaggregated data allocated for specific diseases in each region. This then can be considered as the limitation of the study. Nonetheless, the results of the study can be used to provide a rationale for the abrupt increase in the spending for disease prevention and control for 2008 and 2009.

As pointed out earlier, the result of the study can be further extended by valuing the benefits that can be derived from a prevented sickness resulting from an increase in public health expenditures. The benefits may include the loss income from being absent because of the disease and the prevented private expenditures to prevent the disease. Of course, the general external effects of being healthy or seeing a healthy person may also be included as part of these benefits. These non-marketed goods, which are

common to the health sector, can be measured using contingent valuation methods such as willingness-to-pay (Hurley, 2000). Knowing these benefits, one can then do a cost-benefit analysis of an increase in public expenditure on health care. Thus, if the net benefits that can be derived from a prevention of a tuberculosis case is higher than PhP169,236, which is the cost of preventing it, then it is rational for the government to pursue an increase in public health care expenditure.

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Analysis of the Interests of Conceiving a Free Trade Agreement between China and South Korea

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ABSTRACT

Based on the "Starting Joint Minister Statement on free trade agreement between China and South Korea", the article explains the basic ideas of this agreement. It shows that there are some distinctive differences between the statement and the theoretical study on interests. China pays more attention to the diplomatic significance rather than in trade. While South Korea aims to guarantee its investment benefits by this agreement, both stations try to protect their producers' benefits. Finally, this paper using the model GTAP (Global Trade Analysis Project), puts forward two sets of simulation schemes and forecasts the economic effects of the Free Trade Zones from the macroeconomics and welfare effects, trade effects and industry effects.

Keywords: analysis of benefits, China-South Korea, free trade agreement construction

Ⅰ. Introduction

Minister of Commerce Chen Deming and South Korean Trade Minister Park Tae-ho attended the China-ROK Trade Ministers Meeting in Beijing on May 2nd, 2012, and announced the official initiation of China-ROK Free Trade Agreement negotiations on the Ministers' Joint Statement (referred to as "Statement" as following). From the Free Trade Agreement (FTA) we can see the basic ideas of the interest demands of the Statement.

The statement explains the basic ideas of the FTA, which includes trade in goods, services, investment and other fields. The interest demands reflected in the Statement includes two aspects, trade and investment. From the perspective of trade benefits, the two countries agreed that levels of trade liberalization in good and service trades should go beyond those promised levels in the WTO. However, there are some sensitive product issues in the goods trade, which include lists of generally sensitive and highly sensitive products. From the perspective of investment benefits, the level and scope of liberalization were defined according to both countries' investment arrangement at present and in future. Meanwhile, the overseas processing zones should be involved in China-ROK FTA.

Table 1. MFN Tariff Levels of China and South Korea in Product Category (%)

Category of products	China			Korea		
	Average tax rate	Free tax rate	Maximum Tax rate	Average tax rate	Free tax rate	Maximum Tax rate
Livestock products	14.8	10.1	25	22.1	2.4	89
Milk products	12.0	0	20	67.5	0	176
Fruit & Vegetable	14.8	5.9	30	57.4	0.2	887
Coffee & Green tea	14.7	0	32	53.9	0	514
Grain	24.3	3.4	65	134.5	0.3	800
Oilseed, animal fat & oil	11.0	5.3	30	37.0	4.1	630
Sugar & Sweet	27.4	0	50	16.8	12.5	243
Drinks & Cigarette	22.3	2.2	65	31.7	0	270
Cotton	15.2	0	40	0.0	100.0	0
Other agricultural products	11.4	9.4	38	16.1	18.3	754
Fish and its products	10.9	6.3	23	16.1	0.7	50
Minerals & Metals	7.4	8.7	50	4.6	26.9	8
Petro	4.8	20.0	9	4.1	10.7	8
Chemistry	6.6	1.6	47	5.7	6.7	321
Wood & Paper	4.4	35.3	20	2.2	67.5	10
Textile	9.6	0	38	9.1	1.5	13
Cloth	16.0	0	25	12.6	0	13
Leather & Shoes	13.2	0.6	25	7.9	2.6	16
Non-electrical machinery	8.0	9.0	35	6.0	22.6	13
Electronic machinery	8.3	24.0	35	6.2	21.4	13
Transportation equipment	11.5	0.8	45	5.5	26.8	10
Other products	11.9	9.6	35	6.7	16.0	13

Source: World Trade Organization (n.d.)

The level of goods liberalization of the two countries can be judged from WTO *World Customs Data 2011*. In 2010, the simple average MFN tariffs on agricultural and non-agricultural product imports were 15.6 and 8.7 respectively, while the simple average MFN rates applied to Korea on agricultural and non-agricultural products exports were 16.4 and 8.8. The simple average MFN tariffs on Korean agricultural products and non-agricultural products import were 48.5 and 6.6, while the MFN rates applied to China on its agricultural products and non-agricultural products export were 52.1 and 6.6. The MFN import tariff rate of China and Korea, divided by product category, is given via Table 1.

Via Table 1, we can see that South Korea paid more attention to protecting agricultural products (tax rate 48.5%) than industrial products (tax rate 6.6%). There's a more than 40 percent difference in the simple average MFN tariff. On China's part, there's no big difference between agricultural product protection (15.6%) and industrial product protection (8.7%), the gap of the simple average MFN tariff between these is less than 10 percent. Meanwhile, South Korea's protection on agricultural products (48.5%) is much higher than China's (16.4%). As for industrial product protection, there is a gap between China (15.6%) and South Korea (6.6%), but the gap in industrial (9% or so) is not as big as that shown in agricultural products with a tax rate gap 42%.

From above, it shows that the profit that China benefits from the FTA mainly depends on the degree of liberalization of agricultural products of South Korea. If this is the important part of South Korea's sensitive products, then the attitude expressed in the joint statement "beyond goods liberalization level of WTO commitments" has not displayed real significant trade interests.

In other words, the previous various theoretical insights on the China-Korea FTA are not the same as the benefit idea implied in the statement.

Ⅱ. Literature Review

With regard to the interests in the FTA negotiations between China and South Korea, Chinese scholars are generally optimistic about the economic and trade effects of the bilateral free trade agreement. Xue Jing-xiao and Zhang Bo-wei (2004) believed that China's GDP would grow if China and South Korea were to establish a free trade area. Huang Peng and Wang Jian-xin (2010) analyze the potential effect of applying GTAP in constructing a free trade zone between China and South Korea, which indicates that after the fulfillment of the China-ROK FTA, the two countries' GDP and components such as consumption, investment, government expenditure and so on, compared to the base period, all experienced positive growth. South Korea obtains a greater benefit with a growth rate of 2.07%, while China's only 0.18%. Song Jingen (2011), on the basis of a traditional trade gravity model, studied the effects on trade after the two countries signed the free trade agreement. The results show that China and South Korea's agreement played a strong role in promoting the trade of both countries and the total volume of trade would increase nearly 60%. He suggests that both countries should pay attention to the opportunities brought by the agreement when they are protecting their sensitive sectors. Li Xiao-feng and Gui Jia-yue (2009), based on partial equilibrium, estimates the effects of the establishment of the China-ROK Free Trade Zone on bilateral trade flows from the industrial level. The simulated results show that if China and Korea do not established a free trade zone, to a larger extent, trade between China and South Korea would be heavily influenced by the trade diversion from the Korea-US Free Trade Zone. If the two countries establish a free trade zone, it will be more conducive to the development of comparative advantages of both countries.

Analysis of academic research on China-ROK free trade agreements has a more rigorous theoretical condition, namely the import tariffs of all goods should be canceled in the China-ROK FTZ. Before the implementation of the FTZ, the higher the tariff is, the greater the increase of imports caused by the tariff reductions will be. From the perspective of exports, before the completion of a bilateral free trade zone, the higher the tariff of partner country is, the greater the exporter's export growth will be after establishment.

The joint statement announced by the ministers of China and the ROK showed that, on the one hand, the level of liberalization of trade in goods should transcend their level of commitment in the WTO. On the other hand, the problems of sensitive products should be a concern. A longer transitional period, partial concessions and exceptions should be used to handle sensitive product issues. It is not known which products are arranged for a longer transition period, partial concessions or exceptions, but it will greatly reduce the expected trade benefits by theoretical study because the theoretical results used free trade and tariff barrier elimination as a precondition. Meanwhile, when both countries regard their disadvantaged industries as sensitive products to go beyond the commitment level in the WTO, as agreed in the joint statement, will be quite limited in the scope. Thus, the domains of free trade will be relatively small.

Professor Yorizumi Watanabe (2009) of Keio University in Japan analyzed the historical significance of the FTA among China, Japan and South Korea and pointed out that China makes free trade agreement policies for three reasons on foreign affairs and commercial intercourse. First, in maintaining the double-digit rapid development in economy, China has become the "world factory" and it is imperative to ensure the market of related industries. Second, China has become a world power, so it needs to show Southeast Asian countries an image of a "good partner" so as to avoid being seen as a threat. Third, by means of drawing those overseas Chinese who have engaged in long-term economic activities in the neighboring countries, China formed the "Greater China Rim" and turned it into China's powerful "periphery".

The interpretation of the motives of China's making of free trade agreement policies by Professor Watanabe made people feel that China's interest

demand consists of two aspects: commercial intercourse and diplomacy. However, regardless of the relationship of bilabial trade between China and Japan or between China and South Korea, China's advantages in industry are mainly on textiles, clothing, leather, shoes and other products, but the tariff rates of China's MFN of such goods are higher than those of South Korea and Japan. Meanwhile, the Chinese mainland's "world factory" status is a product of the processing trade. China has been acting the role of assembling and integration in the East Asian labor division system, and the commodities in bilateral trade between Sino-Korea and Sino-Japan are mainly constituted by the intermediate input products. This means that China's participation in the construction of the FTZ with Japan and South Korea is not to ensure the market of related industry, and thus its trade interests are far less than the diplomatic interests which Professor Watanabe referred to. Economists of South Korea predict that the FTZ has a very large impact on the Korean economy while there is a relatively small impact on China. For China, the strategic goal of the China and South Korea FTZ is greater than economic significance, while for South Korea, the motivation of getting economic interests is stronger. China promoted the China-ROK FTZ in order to ensure a dominant position within the East Asian region, which cannot only impact America who took advantage of allies in Asia to constrain China, but also rely on the regional group to enhance China's status in the international political situation and the multilateral system (Zheng Zhi-shu , 2009).

The interest that South Korea obtained from the China-ROK FTA depends on the degree of liberalization of Chinese industrial products. If Chinese industrial products constitute a major part of the sensitive products in China, the trade interest of South Korea would not be significant. So the motives of South Korea negotiating bilateral free trade agreements with China does not come from trade, but from the following that will be discussed in the third part of the international investment interests.

Ⅲ. The Benefit Analysis

3.1. The balance of Investment Interests and Trade Interests

Before China and the ROK passed the "the Associate Ministerial Statement of Starting China-Korea Free Trade Agreement Negotiations", China, Japan and the ROK held investment agreement negotiations in Beijing, reached an agreement on all the remaining issues in the investment agreement and drafted the agreement on March 21st, 2012. Three parties said they would soon complete their internal procedures so as to sign the agreement as soon as possible.

From the view of the sequence of time, the successful termination of negotiations on investment agreements among China, Japan and ROK preceded the starting of negotiations on a bilateral FTA between China and ROK. This indicates that, relative to the free trade agreement, the three countries are more concerned about investment agreements, or that South Korea is keener on the investment issues among the three countries or between the two countries. South Korean President Lee Myung-bak said that in the investment agreements among the three countries, the dispute settlement mechanism was included between the investors and the host country, which can provide legal protection for investors if they suffer a loss on investment in the host country.

Meanwhile, the joint statements of two countries also made clear the important position of investment in the FTA. In the area of investment, for proper handling of issues related to bilateral investment between the two countries, they will confirm the level and scope of liberalization and take the current and future bilateral investment-related arrangements into account.

When the international economic integration has developed both in scope and in depth from trade to international production, many bilateral and regional free trade agreements reflected the feature of the trade and investment integration, such as the North American Free Trade Agreement. In most cases, the

countries that are dominant in international investment will make use of the form of the FTZ to protect its interests of overseas investments from losses.

In terms of the structure of bilateral trade in goods between China and ROK, Korea's exports to China mainly consist of productive goods. Table 2 shows, classified by BEC, the imports and exports of China's trade in goods to the ROK.

Table 2 shows that during the 13 years from 1998 to 2010, among the types of Chinese and South Korean BEC commodities, the following conclusions can be made according to the changing of exports and imports of capital goods, intermediate goods and consumer goods.

First, the imports and exports of intermediate goods in the cargo trade between China and the ROK come in on top. According to the SNA's three basic categories of goods, the annual average import and export composition ratio of intermediate goods, capital goods and consumer goods trade between China and Korea were respectively 72.2%, 16.4% and 11.2%. Relative to capital goods and consumer goods, the exceeding ratio balances of intermediate goods trade value are respectively 56 and 60 percentage points.

Table 2. China & South Korea Goods Trade Structure 1995-2010 (Classified by BEC)

(Unit: Hundred Million Dollars)

	Intermediate Goods Exports	Intermediate Goods Imports	Consumer Goods Exports	Consumer Goods Imports	Capital Goods Exports	Capital Goods Imports
1995	50	85	14	4	3	13
1998	43	134	12	5	8	11
1999	51	154	17	5	10	13
2000	73	204	25	6	15	22
2001	72	200	33	6	19	28
2002	90	217	43	7	22	61
2003	118	311	51	7	31	108
2004	167	455	61	11	49	153
2005	226	590	66	13	58	161
2006	296	702	83	15	65	173
2007	388	797	94	18	81	213
2008	508	869	96	19	132	223
2009	321	784	76	15	135	212
2010	421	1051	97	24	166	289

Source: United Nations Statistics Division (n.d.).

From the composition of exports and imports, among all of China's exports to South Korea, the annual average rates of intermediate goods, capital goods and consumer goods were respectively 64.2%, 20.2% and 15.5%. The rates of these three types of goods in China's annual imports from South Korea were respectively 80.3%, 17.4% and 2.2%. For intermediate goods, the proportion of China's exports to South Korea is less than that of imports from South Korea and the balance is up more than ten percentage points.

Second, the proportion of the goods used for production in the cargo trade is much higher than that of the consumption part. In Economics, capital is defined as the products that are produced by the economic system itself and used as input factors so as to further produce more products and labor service.

According to the basic principles of economics, capital goods and intermediate goods, with the characteristics of production, can be considered inputs for the production of capital goods. Statistics show that the sum of annual import and export proportion is nearly 88.6%, leaving less than 12% to consumer goods. The very low proportion of consumer goods trade between China and South Korea shows us the

basic characteristics of the internationalization of production behind the commodity trade structure.

Regarding Chinese goods exported to South Korea, the annual average proportion of goods which had entered the production process was 79.8% and continued to rise from 78.4% in 1995 to 81.1% in 2005, and to 85.7% in 2010.

Meanwhile, the goods that China imported from South Korea have a higher proportion for production use, and the annual average is almost up to 97.9%. In 1995 the share was 95.6%, and since 2003, its share has always remained above 98%.

The proportion (approximately 98%) of China's imports of productive goods from Korea is 18% higher than that (about 80%) of China's exports, indicating that the degree of China's dependence on South Korea is higher than South Korea on China.

Central Bank of Korea (June 14, 2011) released the "2010 South Korean Current Account Balance", which said that the export growth of semiconductors, machinery, precision machinery and other goods are increasing significantly, and the trade surplus to China of such goods is increasing from $36.97 billion to $51.04 billion.

The formation of this kind of trade structure, to a large extent, can be explained reasonably by South Korea's direct investment in China. From the perspective of the trade of intermediate goods, Li Xian-zhu (2010), Ye Jing-yi and Wang Pei (2005) explained the trade imbalance between China and South Korea. When analyzing the Korean chronic surplus phenomenon in long term, they pointed out that one of the reasons is that there are many Korean investment enterprises in China and most are processing companies required to purchase a large number of Korean raw materials and accessories for processing. The import of the raw materials and accessories required by China's processing trade is mentioned above; that is, Chinese importation of intermediate goods by BEC classification. Some scholars explained the trade imbalance from the point of capital goods trade that South Korea has a competitive advantage in the production of capital goods that when coupled with the adjacent location is conducive to reduce transportation costs, and thus South Korea has become one of the main countries for China to get capital goods from for processing trade, which expanded the size of imports from Korea. (Zhao Fang & Li Ji, 2010).

Statistics show that, from 1998 to 2010, among the foreign direct investments divided by countries and geographical areas, Japan and South Korea have always been China's major source countries for foreign investment. Except those years of the financial crisis (1998, 2008-2009), the proportion of Japan and South Korea's direct investment in China accounted for 13% - 20%. For example, in 2005, South Korea's direct investment was up to 5,168,340,000 U.S. dollars, accounting for 8.6% of China's total $60,324,590,000's absorption of foreign investment. Japan's direct investments were 6,529,770,000 U.S. dollars, accounting for 10.82%.

South Korea's direct investment is mainly in the manufacturing industry. By 2005, South Korean investment in China is mainly focused on the manufacturing and assembly of electronic appliances, textiles and clothing, leasing and business services, food and beverage and retail industries, among which manufacturing accounted for dominance (Yang Li & Zhou Wenfeng, 2008). However, in the manufacturing sector, the investment structure of South Korea has a tendency of changing from the consumer goods industry including fiber clothing, food manufacturing, leather, footwear and others to capital goods industries including electronic communications, petrochemical, alloy, machinery and equipment and others. (Zang Xin, Dong Rongrong, & Cui Yan, 2006).

In order to protect the interests of foreign investment, one of the conditions that Japan and South Korea agreed to in the China-Japan-Korea FTZ negotiation was the signing of "CJK investment agreements." The tripartite negotiations started in 2007, with content that included all the important aspects contained in the international investment agreements, including such clauses as the definition of investment, scope of application, MFNT, national treatment,

expropriation, transfer, subrogation, taxes, general exceptions and dispute resolution.

3.2. The Balance of the Interests of Producers and Consumers

According to the Yonhap News Agency, on January 12th, 2012, the foreign minister of South Korean Park Taeho said at a press conference held in the central government office that China, as a big country, made a lot of people worried that Korea's agriculture might be pounded. South Korea was not going to allow massive Chinese agricultural products into South Korea. Before starting the China-ROK FTA negotiations, the Korean Government would fully listen to the views of different fields.

Table 3. The Share of South Korea's Agriculture in the National Economy 1998-2010

(%)

	Agricultural Labor	Manufacturing Labor	Labor Services	Agricultural Output	Manufacturing Output	Services Output
1998	0.19	24.05	40.81	3.36	45.11	40.44
1999	0.19	24.06	40.81	3.28	46.45	40.15
2000	0.17	24.53	40.87	2.97	47.36	40.15
2001	0.17	24.21	40.79	2.87	45.57	41.82
2002	0.16	23.23	41.03	2.62	44.90	42.82
2003	0.16	23.16	39.89	2.43	44.80	42.41
2004	0.14	23.06	38.84	2.39	47.27	40.34
2005	0.15	22.78	37.95	2.19	47.94	40.13
2006	0.14	21.65	34.68	2.09	48.01	40.32
2007	0.14	20.92	34.5	1.95	48.18	40.33
2008	0.12	20.12	34.44	1.84	50.64	38.33
2009	0.13	19.44	34.84	1.94	49.60	39.12
2010	0.13	19.09	34.84	1.78	52.11	37.39

Source: Database provided by Korea's Banks

Compared with the manufacturing and service industries, the proportion of South Korea's agriculture is not so significant in the national economy. The proportion of employees in the total economic activity decreased from 0.19% in 1998 down to 0.13% in 2010 and the proportion of the total value of agricultural production in GDP decreased from 3.36% in 1998 down to 1.78% in 2010. If the China-ROK FTA finally regarded the South Korea's agriculture as sensitive products and put it outside the free trade, it is no doubt that this is only to protect the benefits of very few agricultural producers by sacrificing the interests of many other consumers.

Let us observe the issues of Chinese sensitive products. Chinese Commerce Minister Chen Deming said that the sensitive products taken into account in the process of negotiation were related to agriculture in Korea and China's petrochemical, electronics, machinery and other fields.

Not completely identical to the situation of South Korea's agriculture in the national economy from 1998 to 2010, the ratio of employees in Chinese petrochemical, electronics and mechanical industries among the country's total employment is not high, but there is a rising trend. In 1998, Chinese petrochemical and machinery industry employment accounted for 0.88% and 1.57% respectively of the country's total employment. In 2010, this proportion respectively rose to 1.54% and 3.88%.

Similarly, the ratio of the petrochemical and mechanical fields in GDP also showed an increasing trend and its share enlarged. In 1998, the ratios were 13.5% and 21.3%. In 2010, the ratios respectively increased to 61.4% and 117.3%.

Table 4 shows that China's petrochemical and machinery industries are growing and developing rapidly. From the production value's movements of ratio in GDP, we can see that from 1998 to 2010 these

two sectors in initial stages accounted for 34.8% of GDP and by 2005, 64.1 %.

Chinese petrochemical products cover a wide range of sectors. In China's Statistical Yearbook, they included the petroleum processing and coking industry, chemical materials and products manufacturing, chemical fiber manufacturing, rubber and plastic products industry. Electronic and mechanical fields are statistically included in machinery and equipment, involving manufacturing industries in common equipment, special equipment, transportation equipment, electrical machinery and equipment, electronic and communications equipment, instrument and apparatus, and office machinery.

Table 4. The Share of Chinese Petrochemical and Machinery Industries' in the National Economy 1998-2010

(%)

	Petrochemical Industry Labor Proportion	Machinery Industry Labor Proportion	Petrochemical Industrial/GDP	Machinery Industrial/GDP
1998	0.88	1.57	13.5	21.3
1999	0.81	1.45	13.9	22.2
2000	0.74	1.33	16.0	24.0
2001	0.68	1.24	15.5	25.3
2002	0.65	1.21	15.8	28.2
2003	0.98	1.91	17.8	34.0
2004	1.01	2.09	22.4	42.3
2005	1.13	2.44	23.0	41.1
2006	1.19	2.66	48.3	88.3
2007	1.27	2.96	55.4	102.8
2008	1.41	3.44	60.8	111.9
2009	1.43	3.44	54.7	105.9
2010	1.54	3.88	61.4	117.3

Source: ChinaStatistics (2011).

China's petrochemical and machinery accounted for a high ratio in GDP. The number of the labor force in these two industries was not big and their sum share is no more than 6% (5.42% in 2005) in the whole national economy. Thinking about it another way, from the perspective of proportion of factors, Zhan Boming and others (2010) observed and analyzed China's industrial enterprises' inclination in investment. They found that investment made by state-owned petrochemical and machinery enterprises have capital intensive investment tendencies and the investment of the three-kind investment enterprises in these two industries are: petrochemical capital intensive, while labor-intensive industries including machinery and transportation equipment manufacturing, electronic and communication equipment manufacturing. The fact means that the idea of separating the Chinese petrochemical and machinery from the China - Korea Free Trade Agreement negotiations are to protect those investors' interests at the expense of the interests of numerous consumers.

If the Chinese petrochemical products and machinery products are to be put outside the China-Korea Free Trade Agreement as sensitive products and South Korea's agricultural sector is also separated from China-Korea free trade agreement, then we can say such a bilateral free trade agreement almost has no sense of free trade.

Ⅳ. Simulation Analysis of the Economic Effects of China-Korea FTA

A GTAP model is used in this part to predict the economic effects if the China-Korea free trade zone is established.

4.1. Basic Structure of the Model

The GTAP model was developed by Professor Tomas W. Hertel of Purdue University as a multi-

national and multi-sector general equilibrium model, and it has been widely used in trade policy analysis. In the GTAP model framework, first sub-models that can detail description of each country's (or region's) production, consumption, government spending and so on are created, and then the various sub-models are combined into a multi-national and multi-sector general equilibrium model through international merchandise trade relations. When using this model framework for policy simulation, it can also be used to explore the changes that the policy brings in each nation and sector's production, import and export, commodity prices, supply and demand factors, elements of remuneration, GDP and the level of social welfare.

4.2. Basic Assumptions

4.2.1. Conditions of Factors

There are five different types of elements in the model: land, capital, skilled labor, unskilled labor and natural resources. A GTAP model assumes that the market is perfectly competitive, the scale of production unchanged, and each product produced by using nested constant coefficient to replace elasticity equation. The intermediate inputs consist of domestic and foreign products through constant coefficient instead of elasticity equation. The products (domestic and import goods) of different regions are non-homogeneous, and therefore cannot be replaced with each other. In the factor market, land among departments is not completely mobile, so the price of land for different uses is different while the labor in the country is allowed to flow freely. Each country has only one account, to which all the income tax and endowments are accumulated. Then, through the Cobb-Douglas Utility Function, income is divided into private consumption, savings and government consumption by a fixed proportion. In a GTAP model, there are two imaginary international departments, which are *International Bank* and *International Traffic*. Each country's savings are accumulated to an *International Bank*, being allocated among countries according to the rate of capital return. The *International Traffic Department* can balance the differences between CIF and FOB, and link the world through bilateral trade.

4.2.2. Conditions of Behavioral Agents

There are three kinds of typical behavior agents in the model: private departments, government departments and firms.

4.2.2.1. Behavior of Private Department

In private expenditure, the private sector consumption expenditure has the nature of non-homothetic order and should include the impact of population growth; the private department sets levels by using a CDE Utility Function on a per capita basis. Private department behavior equation:

① *Private Household Utility:*

$$yp(r) = ppriv(r) + UELASPRIV(r) * up(r) + pop(r)$$

② *CompoSITC Demand:*

$$qp(i, r) - pop(r) = \sum_{k \in TRAD} [EP(i, k, r) * pp(k, r)] + EY(i, r) * [yp(r) - pop(r)] * pop(r)$$

③ *CompoSITC Tradeable:*

$$pp(i, s) = PMSHR(i, s) * ppm(i, s) + [1 - PMSHR(i, s)] * ppd(i, s)$$
$$qpm(i, s) = qp(i, s) + ESUBD(i) * [pp(i, s) - ppm(i, s)]$$
$$qpd(i, s) = qp(i, s) + ESUBD(i) * [pp(i, s) - ppd(i, s)]$$

In these equations, yp (r) stands for the regional units of the private sector household expenditure of r region; ppriv (r) stands for the price index of private sector household unit consumption expenditure of r region; UELAS stands for the relative utility costs and elasticity; pop (r) stands for the population of r region; qp (i, r) stands for the demands of i product in r regional private department unit; EP (i, k, r) stands for the cross-price flexibility between i's demands and k's price in r regional household unit; EY (i, r) stands for the demand of composite commodity i in r regional household unit; pp (i, s) stands for the demand price of integrated trade commodity i in a private household unit of s region; PMSHR (i, s) stands for the share that

the total imports in the private sector demand for domestic products of s region; ESUBD (i) stands for the elasticity of substitution between domestic and imported good i; ppd (i, s) stands for the demand price of commodity i in s regional private department unit; qpd (i, s) stands for the demand of the national product i in s regional private department unit; ppm (i, s) stands for the demand price for import integrated trade commodity i in s regional private department unit; qpm (i, s) stands for the import demand of product i in s regional private department unit.

4.2.2.2. Behavior of Government Department

The total government expenditure allocates between the various commodities via using a Cobb-Douglas Utility Function. This makes the government expenditure on various commodities of their total remains constant. In an open system, the government's demands can be divided into domestic products and imported products, and both of the products form an integrated product through the CES Function. Government department action equation:

① *Government Utility:*

$$yg(r) - pop(r) = pgov(r) + ug(r)$$

② *Demand for CompoSITC Goods:*

$$pgov(r) = \sum_{i \in TRAD\_COMM} [VGA(i, r)/GOVEXP(r)] * pg(i, r)$$

$$qg(i, r) - pop(r) = ug(r) - [pg(i, r) - pgov(r)]$$

$$pg(i, s) = GMSHR(i, s) * pgm(i, s) + [1 - GMSHR(i, s)] * pgd(i, s)$$

$$qgm(i, s) = qg(i, s) + ESUBD(i) * [pg(i, s) - pgm(i, s)]$$

$$qgd(i, s) = qg(i, s) + ESUBD(i) * [pg(i, s) - pgd(i, s)]$$

③ *CompoSITC Tradeable:*

In these equations, yg (r) stands for the regional government expenditure of r region; pop (r) stands for population of r region; pgov (r) stands for the consumption expenditures price index of government departments in r region; ug (r) stands for the average capital expenditure utility level per people from the government spending in r region; VGA (i, r) stands for the expenditure buying i goods in r regional government departments; GOVEXP (r) stands for the consumer spending in r regional government departments; pg (i, r) stands for the demand price of comprehensive trade i product in r regional government departments; qg (i, r) stands for the demand of i goods in r regional government departments; GMSHR (i, s) stands for the government department's share of demand for national products in total imports in s region; pgd (i, s) stands for the demand price of domestic integrated i good in s regional government departments; qgd (i, s) stands for the demand of domestic i product in s regional government departments; pgm (i, s) stands for the demand price of imported comprehensive trade i good in s regional government departments; qgm (i, s) stands for the imported demands of i product in s regional government departments; ESUBD (i) stands for the elasticity of substitution between domestic goods and imported goods.

4.2.2.3. Behavior of the Firm

GTAP model assumes that manufacturers use *Tree Structure* in the production function. Firms' main inputs can be divided into the original inputs and intermediate inputs. Suppose the production function has the characteristics of divisibility and fixed scale compensation. Under the divisibility assumption, firms' decisions on the most appropriate volume of original input is not influenced by the changing of intermediate input price, and quite reverse is true. Meanwhile, under the assumption of fixed scale compensation, the proportion of factor input of firms will not be influenced by the changes in production volume either.

On the top of Tree Structure, it shows firms' decisions of demand between intermediate inputs and integrated original inputs. Under the assumption of the *Leontief Function*, it shows a fixed proportional relationship between the intermediate input and original comprehensive input and total output. This is common in general design of CGE model, of which the main advantage is that it can reduce the number of parameters needed to estimate in the model significantly. The bottom left part of the *Tree* describes the

relationship between the original investment and production.

Assume that the relationship between the original input and the production is CES *Function*, and the elasticity of substitution between different original elements is equal. Accordingly sum up the original inputs in order to obtain the *Aggregate Primary Input*. At the bottom right part of the Tree Structure it shows the relationship between the intermediate input and production, which consists of two sides. First is the substitution relationship between the domestic products and comprehensive imported products, assuming both compose into integrated intermediate goods through *CES Function*. Second is the substitution relationship among different sources of imported intermediate goods, assuming which are also integrated through the *CES Function*. Behavior of Firm equation:

① *CompoSITC Intermediate Nest:*

$$pf(i,\ j,\ r) = FMSHR(i,\ j,\ r) * pfm(i,\ j,\ s) + [1 - FMSHR(i,\ j,\ r)] * pfd(i,\ j,\ r)]$$
$$qfm(i,\ j,\ s) = qf(i,\ j,\ s) - ESUBD\ (i) * [pfm(i,\ j,\ s) - pf(i,\ j,\ s)]$$
$$qfd(i,\ j,\ s) = qf(i,\ j,\ s) - ESUBD\ (i) * [pfd(i,\ j,\ s) - pf(i,\ j,\ s)]$$

② *Value—added Nest:*

$$pva(j,\ r) = \sum_{k \in ENDW} SVA(k,\ j,\ r) * [pfe(k,\ j,\ r) - afe(k,\ j,\ r)]$$
$$qfe(i,\ j,\ r) + afe(i,\ j,\ r) = qva(j,\ r) - ESUBVA(j)\ * [pfe(i,\ j,\ r) - afe(i,\ j,\ r) - pva(j,\ r)]$$

③ *Total Output Nest:*

$$qva(j,\ r) = - ava(j,\ r) + qo(j,\ r) - ao(j,\ r) - ESUBT(j)\ * [pva(j,\ r) - ava(j,\ r) - ps(j,\ r) - ao(j,\ r)]$$
$$qf(i,\ j,\ r) = - af(i,\ j,\ r) + qo(j,\ r) - ao(j,\ r) - ESUBT(j)\ * [pf(i,\ j,\ r) - af(i,\ j,\ r) - ps(j,\ r) - ao(j,\ r)]$$

In these equations, pf (i, j, r) and qf (i, j, r) stands for the price and demand of i product while producing j good in r region; af (i, j, r) stands for the technological change of original feature i in j industry of r region; FMSHR (i, j, r) stands for the share that r region's total imports among the demand for domestic comprehensive products; pfm (i, j, s) stands for the demand price of integrated commodity i in j industry of s region; qfm (i, j, s) stands for the firms' total demands of imports; pfd (i, j, r) stands for the demand price of domestic comprehensive commodity i in j industry of r region; qfd (i , j, s) stands for the firms' demand for domestic products; ESUBD (i) stands for the elasticity of substitution between domestic and imported goods; pva (j, r) stands for the added-value price of producing j good in r region; qva (j, r) stands for the added-value of j industry in r region; ava (j, r) stands for the technological changes of the added-value in j industry of r region; SVA (k, j, r) stands for the share of added-value product i in j industry of r region; pfe (i, j, r) stands for the price of original element i which needed to produce j product of r region; qfe (i, j, r) stands for the demand of original element i which needed to produce j product of r region; afe (i, j, r) stands for the technological changes of original element i in j industry of r region; ESUBVA (j) stands for the elasticity of substitution between original elements during the added-value production in j industry; qo (j, r) stands for the output of j department of r region; ao (j, r) stands for the technological changes of output in j department of r region; ps (j, r) stands for the supply price of j product in r region; ESUBT (j) stands for the elasticity of substitution of intermediate inputs while producing j product.

4.2.3. Equilibrium Condition

A GTAP model assumes a regional household unit includes a private department and government department to determine the consumer behavior and savings behavior of the private department and government department in the country or region. The Model can be divided into a *Closed System* and an *Open System*. Without the government intervention in a *Closed System*, the income of regional household unit comes from the reward of selling its own elements to the firm. Firm's incomes come from the purchase of each household's expenditure, and every manufacturer also makes money by selling their intermediate goods. All economic behavior expenditures and incomes are equal. Balance of a single country Closed System is established by the accounting identities and market equilibrium formula. In an *Open System*, due to the

joining of foreign departments, the government expenditure and the private spending in local regional department will be divided into two parts, buying domestic products and imported products. Furthermore, some parts of firm's intermediate raw materials may also be imported, and its products are sold both domestically and abroad.

Regional household units' behaviors are basically determined by *Aggregate Utility Function*, which consists of government expenditure, private spending and savings. It is assumed the per capita *Cobb-Douglas Utility Function* is adopted, and this regional household unit pursues the utility maximum of a household unit. As a result of using the *Cobb-Douglas Utility Function*, the proportion of three kinds of current consumptions that were mentioned above is fixed.

4.3. The Analysis Method and the Simulation Program

This article uses the seventh edition GTAP model, which includes 113 countries and 57 sectors. In the model, the author combines 113 countries or regions into three regions: China, Korea, and other parts of the world. 57 industry sectors will be divided into 10 kinds of product groups: 1) food and crops; 2) livestock and meat products; 3) forest, rivers, coal, natural gas and other minerals; 4) processed foods; 5) Textiles and clothing; 6) light manufacturing; 7) heavy industry; 8) Utilities and construction; 9) Transportation and communication; 10) other services.

In order to fully investigate the effects of trade liberalization, this paper intends to respectively measure the economic effects of a free trade zone under two kinds of tax reductions: program one simulates a "zero tariff base scenario" under the condition that both China and Korea have a full range cancellation of goods trade tariffs; In program 2, considering the protection of its sensitive industry, with the exceptions of Korea's high tariffs on food and crop departments, and the exception of China's industrial sector (light manufacturing and heavy industry) , other department tariff reductions will be by half.

4.4. Simulation and Results of Analysis

4.4.1. Economic and Welfare Effects

According to model calculation results (shown in table 5), we can see from the aspects of GDP growth. In program one, after the completion of the China-Korea free trade zone, GDP in both China and Korea show growth compared to the base period. Korea benefits more with a GDP increase of 13.9 billion dollars and a growth rate of 2.06%; China only increases 2.5 billion dollars, and the growth rate is 0.15%. In program two, the GDP of both China and Korea shows growth compared with the base period too, respectively rising 7.4% and $540 million, considerably less than the GDP growth in program one with full exemption of import tariffs. This is because program two still has different levels of trade protection, which leads to inefficient allocation of resources. After the establishment of a free trade zone in the program one and program two countries with larger benefits are different: Korea benefits more in program one; China benefits more in program two. This is because the two countries have the same tax reduction in program one. Because the trade barriers between Korea and the other countries in the world are lower, and according to the customs alliance theory, the lower the trade barriers between the Customs Alliance member countries and other countries in the world are, the establishment of a customs alliance is less likely to cause more costly trade transfers. Under the condition of full reduction and exemption of tariffs and zero tariffs, China may show a bigger trade transfer effect, thus Korea benefits more. In program two, because of the protection for the sensitive food and crop industry, the allocation of resources is less efficient in Korea.

From the point of changes in the country's welfare, total welfare increases 4.964 billion dollars in Korea in program one, while China reduces 653 million dollars. Korea's welfare increase is mainly caused by the improved resource distribution efficiency and trade conditions; China's entire welfare reduction is because of the larger trade diversion effect. In program two,

both two countries' welfare increases with China's growth of 189 million dollars and Korea's 65 million dollars. Compared to program one, the increasing volume of Korea's welfare significantly drops largely because of Korea's high tariffs on food and crop protection which results in a lower efficiency of resource allocation.

From the view of other regions in the world, either in program one or program two, the GDP and welfare decline at different degrees. This means establishing a free trade zone, no matter what level of tax reduction, is conducive to economic growth for member countries; but this will bring adverse changes for those regions excluded in the free trade zone.

From the above analysis, the establishment of China-Korean free trade zone will promote the growth of the national economy and social welfare regardless of what level of tax reduction, but for other regions in the world it will bring a negative adverse change.

Table 5. Changes of the Economy and Welfare in Different Programs (%)

	Program One			Program Two		
	Change of GDP	Change Rate of GDP	Welfare (million of U.S. dollars)	Change of GDP	Change Rate of GDP	Welfare (million of U.S. dollars)
China	2505.1	0.15	-653.03	741.18	0.05	189.41
Korea	13902.3	2.06	4963.85	543.28	0.08	164.97
Other regions in the world	-27722.5	-0.07	-4212.3	-3801.94	-0.01	-153.70

Source: Compiled according to the result of Rung TAP operation

4.4.2. Trade Effects

According to the results of the model calculation (shown in Table 6), it shows whether canceling all import tariffs on goods or protecting part of industry by cancellation of part of tariffs, the bilateral trade has an increase. The exports and imports of other regions in the world experienced varying degrees of reduction. China's total economic output is larger, so the establishment of a China-Korea FTZ has less impact on China's import and export level as on Korea's. The tax reduction level in program two is not as large as in program one and in program two some industries are protected. So, compared to the program one, trade barriers cause lower efficiency in resource distribution, and the impact on imports and exports is smaller than in program one.

From the terms of the changes in trade, either in program one or program two, the China-Korea free trade zone improves the members' trade condition to some degree. Specifically, Korea benefits more. This is because Korea has more open trade liberalization, whose tariffs on main trade products have been reduced to a very low level. According to the customs alliance theory, the lower the trade barriers between the Customs Alliance member countries and other regions in the world is, the establishment of a customs alliance is less likely to cause more costly trade transfers, so the establishment of a China-Korea free trade zone has little impact on Korea's trade transfer and Korea benefits more from the changes in trade condition than China.

For the other regions in the world, under both kinds of tax reduction and exemption programs, there are different degrees of reduction in import and export trade conditions, indicating that although the establishment of a free trade zone can increase imports and exports and improve trade conditions for member countries, it can cause an adverse trade effect for the non-member countries elsewhere in the world.

Through the above analysis we can see that, after the establishment of China-Korea free trade zone, regardless of the extent of tax reduction and exemption, it will promote the imports and exports, and foreign trade conditions within the zone, but may cause adverse trade effects on other regions outside it.

Table 6. Changes of Trade Effects in Different Program (%)

	Program one			Program two		
	Export	Import	Trade Condition	Export	Import	Trade Condition
China	1.81	2.29	0.05	0.16	0.21	0.02
Korea	2.44	5.64	1.4	0.28	0.46	0.05
The rest of the world	-0.02	-0.1	-0.04	-0.0018	-0.006	-0.003

Source: compiled according to the result of Rung TAP operation

4.4.3. Industry Effects

According to the model calculation results (shown in Table 7), shown in program one, establishing the free trade zone has a great impact on specific industry sectors in China and Korea. China's sectors with increased output mainly concentrate in the primary sector products, among which the agricultural sector takes the largest increase reaching 2.68%, while the industrial sectors (light manufacturing and heavy industries) decrease slightly. In general, China's sector output changes, but the rate of change is not large. In contrast, there is a big difference in sector output changes between departments in Korea. Because of the restriction of resources, geography, population and other natural endowments, sectors with reduced output in Korea are concentrated in the primary sector, particularly in the agricultural sector with a significant reduction of 20.09%, much greater than the changes in other sectors. Sectors with output increases concentrate in the industrial product sectors, among which textiles and clothing sector are the most outstanding, with a 9.27% increase. The other regions in the world have a slight growth in light manufacturing, but the outputs of other sectors experience different degrees of decline.

In program two, every country protects its weak industries and the tax reductions are less than in program one. The change rates in industry output of the two countries is not big, except for China's textile and clothing industry, which has a slight rise, other changes all decline compared to program one. Although in program two China's protection of light manufacturing and heavy industry help to slow the decrease of industrial output, we can see from Table 7 that China 's output of these two industries still declines, indicating that to enhance the level of industrial development , trade protection is not always feasible. It is fundamental to work hard on solving problems such as low-end industrial structure, low technology in production, lack of innovation, and etc. Korea's protection of agriculture shows a better effect; the output change rate of Korea's food and crop industry decreased from 20.09% to 0.04%. Due to Korea's protection of agricultural products, China's increased output in food and crop industry changes from 2.68% up to 0.161%.

Through the above analysis, it can be concluded that after the establishment of a China-Korea free trade zone, regardless the degrees of tax reduction and exemption, the output will be improved with the optimization and upgrading of industries. For the other regions in the world, it brings adverse impacts.

Table7. The Output Changes of Sub-sectors in Program One and Program Two **(**%)

	Program one			Program two		
	China	Korea	Other regions	China	Korea	Other regions
Food and Crop	2.68	-20.09	-0.35	0.161	-0.04	-0.008
Livestock and meat products	0.56	-0.12	-0.09	0.114	-0.15	-0.009
Forest, rivers, and coal	0.31	-1.44	-0.04	0.137	-0.27	-0.027
Natural gas and other minerals						
Processed foods	1.14	-0.95	-0.11	0.479	-0.82	-0.019
Textile and clothing	0.04	9.27	-0.32	0.274	5.34	-0.233
Light manufacturing	-0.36	0.34	0.01	-0.05	-0.17	0.007
Heavy industries	-0.25	1.62	-0.03	-0.08	-0.18	0.015

Public utilities, construction	0.38	4.12	-0.09	0.042	0.23	-0.006
Transport and communications	0.09	1.55	-0.04	0.02	0.06	-0.005
Other services	0.1	2.47	-0.06	0.037	0.11	-0.005

Source: compiled according to the result of Rung TAP operation

Ⅴ. Conclusions

Based on the "Starting Joint Minister Statement on free trade agreement between China and South Korea", the article explains the basic ideas of this agreement. Through the analysis of the investment interests and trade interests of China and Korea, it finds that intermediate import and export products in China and Korea trade rank first and the goods trade in production is considerably higher than that in consumption. This formation of structure of goods trade can be reasonably explained by Korea's direct investment in China. Through the analysis of producers' interests and the consumers in China and Korea, it finds that if China and Korea reach a free trade agreement that excludes Korea's agriculture from free trade as a sensitive product, it will sacrifice the majority of consumers' interests and only protects the interests of minor agricultural producers. If China's petrochemical and machinery are separated from China-Korea free trade agreement negotiations, it will also sacrifice the majority of consumers' interests and only protect the investors' interests. Therefore, it shows firstly the insight on interests is significantly different between the declaration and theoretical research. Secondly, China's diplomatic interests are bigger than its trade significance and Korea protects its investment interests in China through trade agreements. Thirdly, both countries are trying to protect their producers' interests through trade agreements.

Finally, this paper uses the global trade analysis project (Global Trade Analysis Project, GTAP) model and proposes "full abolition of trade in goods tariffs between China and Korea" and "Korea's exceptions on its high tariff food and crop sectors, China's exceptions on industrial sector (light manufacturing and heavy industry), and tariffs on other sectors reduced by half." It predicts the economic benefits of China-Korean free trade zone by two sets of simulation programs, from three aspects: macroeconomic and welfare effects, trade effects, as well as industry effects. It finds that after the establishment of a China-Korean free trade zone, regardless the level of tax reduction, it will promote the growth of the national economy and improve the social welfare and import and export. Trade conditions and output will be improved with industrial optimization and upgrading of industries in two countries. For the other regions in the world, it will bring negative and adverse changes.

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Stock Market Development and Economic Growth: the Case of the Philippine Stock Market

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ABSTRACT

The general objective of this study is to analyze the level of stock market development of the Philippine Stock Exchange, as reflected by its liquidity position, and its implications to economic growth in the Philippines. Stock market liquidity was analyzed through its three liquidity measurements: turnover ratio, total value of traded shares ratio, and the market size ratio. This study used Ordinary Least Squares (OLS) in analyzing the relationship between stock market liquidity and economic growth using quarterly data from 1996 to 2012. Stock market liquidity, as measured by the growth in value of traded shares and the growth in market size, is significantly related to the growth of the economy after controlling for variables such as inflation, which lagged by one period, growth in foreign direct investment and openness to trade. Further analysis showed that the growth in market size causes economic growth. However, the determinant of the growth in value of traded shares does not exhibit Granger causality, but is proven to have a long run relationship as shown from the results of the Error Correction Model.

Keywords: economic growth, Philippine stock exchange, stock market development, stock market liquidity

Ⅰ. Introduction

Financial markets and intermediaries play a significant role in the growth of the economy by improving financial efficiency that would in turn provide better allocation of resources. As savers or lenders hold current consumption for future expenditure, borrowers desire current consumption or investment that would eventually yield higher returns in the future. These institutions are responsible for maintaining a healthy monetary economy in the country as they mobilize and convert savings into funds and channel them to borrowers or investors to further allocate them to more productive investments (Mishkin, 2006). An efficient, stable, and vibrant stock market is essential to the development of the financial sector. Stock markets are responsible for the expansion of a company's capital by allowing stocks or shares to be sold or traded in public.

Kanasro, Jalbani and Junejo (2009) stated that stock markets play a crucial role in capital mobilization and provide secondary markets for the investors and financial institutions to buy and sell securities. A stock market is considered to be liquid when large transactions are executed with only a small impact on prices of securities. Stock market liquidity is thus considered a good tool to measure the efficiency of a stock market. A market's stability is also determined

through the liquidity of its securities or the ease at which these securities are bought or sold in the market.

The Philippine Stock Exchange (PSE), the sole stock market of the Philippines, was established on December 23, 1993 when the respective founders of both the Manila Stock Exchange (MSE) and the Makati Stock Exchange (MKSE) decided to combine the two exchanges to further develop a more efficient capital market. During the past decade, the PSE has been robust in terms of the daily value traded. Both foreign and domestic market capitalization, which is the measure of the size of listed companies in the stock market, has been increasing since 2002. In January 2013, the Philippine Stock Exchange index (PSEi), the indicator used to measure the performance of active and highly capitalized listed Philippine companies in the PSE, breached the 6000 level, an all-time high in Philippine stock market history.

The general objective of the study is to analyze the liquidity of the Philippine stock market and its implications for economic growth. Liquidity is important as it is an aspect of a stock market that is necessary for the traders to interact. Specifically, the study aims to measure the liquidity of the Philippine stock market and evaluate its trends for the given period, determine the linkages between stock market liquidity and growth of the economy and determine the causality between stock market development and economic growth in the Philippines.

The paper is organized as follows: The next two sections review the related literature followed by the analytical and empirical framework. The fourth section discusses the results while the last section provides the conclusion.

Ⅱ. Review of Related Literature

2.1. Stock Market Development as a Determinant of Economic Growth

Several studies have been conducted on the relevance of stock market development to economic growth. As cited by Petros (n.d.), the stock market provides the fulcrum for capital market activities and it is often cited as a barometer of business direction. An active stock market may be relied upon to measure changes in general economic activities using the stock market index (Obadan, 1995). According to Petros (n.d.), directly or indirectly, a stock market, through its specific services, can contribute to economic growth. Mobilization of savings, creation of liquidity, risk diversification, improved dissemination and acquisition of information, and enhanced incentive for corporate control are functions that are notably significant, thus by improving the efficiency and effectiveness of these functions, it can amplify the economic growth rate.

Tapitan (2012) highlighted the role of financial intermediaries as a prerequisite for economic growth as they play an important role in technological progress. The financial system affects capital accumulation by altering the saving or by reallocating savings among different capital producing technologies. The key assumption is that better technology is produced as a by-product of capital investment.

Capital investments are important in boosting the growth of the country's economy. As cited by Nagaishi (1999), Levine (1997) identified two channels in which financial markets or intermediaries affect economic growth: through capital accumulation and technological innovation. In 1999, Garcia and Liu (1999) identified three main channels through which financial markets and intermediaries may affect economic growth. The first is by stimulating savings. Financial markets or intermediaries provide savers with a relatively higher yield. McKinnon (1973) and Shaw (1973) (as cited by Garcia & Liu, 1999) claimed that financial deepening improves not only productivity of capital but also the saving rate and, therefore, investment and growth. Second, this can be done by reducing information and transactions costs because we know that high transaction costs would definitely have a negative effect on trading for these discourage people from transacting thus affecting one's profit. Lastly, by promoting an efficient allocation of investment, the allocation of resources is improved.

2.2. Stock Market Liquidity

Stahel (2004) (as cited by Benić & Frani, 2008) argues that due to stock market integration, investors would tend to move their capital to where they expect higher returns on their investments. Von Wyss (2004) (as cited by Benić & Frani) defined four aspects or dimensions of financial market liquidity: the trading time, tightness, depth, and resiliency. These dimensions of liquidity may be presented with five different levels of liquidity: 1) the ability to trade at all, 2) the ability to buy or to sell a certain amount of an asset with an influence on the quoted price, 3) the ability to buy or to sell a certain amount of an asset without any influence on the quoted price, 4) the ability to buy and to sell an asset at about the same price at the same time, and 5) the ability to execute a transaction from points two to four immediately.

Sarr and Lybek (2002) claim that illiquid markets are more of a symptom rather than a cause of inadequate market functioning. They posit that in order to foster liquid financial markets, sound and transparent economic policies with appropriately designed trading, clearing, and settlement systems as well as appropriate intervention policies of the central bank, which can help contain systematic risk, are the only sustainable solution.

Levine and Zervos (1998) investigated whether measures of stock market liquidity, size, volatility, and integration with world capital markets are robustly correlated with current and future rates of economic growth, capital accumulation, productivity improvements, and saving rates. They used data on 49 countries from the period 1976 to 1993. They evaluated whether the stock market indicators together with banking development are correlated with the growth indicators. Stock market development indicators include the size, in which capitalization is measured by the value of listed domestic shares on domestic exchanges divided by GDP; the liquidity, which is measured by the turnover ratio and the value traded ratio. Using the international capital asset pricing model (CAPM) and international arbitrage pricing theory (APT), they concluded that stock market liquidity and banking development are both positively and robustly correlated with contemporaneous and future rates of economic growth, capital accumulation, and productivity growth. Also, both a stock market and banks provide different financial services that could actually help the economy as a whole. On the other hand, based on their study, they find no support that these indicators reduce private savings rate or hinder long run growth.

Levine (1996) tested the liquidity of stock markets for 38 countries (1976-1993) that include both Industrial and developing countries. Three measurements for liquidity were used: the total value of shares traded on a country's stock exchanges as a share of GDP; the value of traded shares as a percentage of total market capitalization or the turnover ratio; and the value-traded-ratio divided by stock price volatility. He claimed that a liquid market should be able to handle heavy trading without large price swings. Thus, empirically, stock market size and volatility do not matter but the ease of which shares can be traded. The results suggest that stock market liquidity helps forecast economic growth even after accounting for a variety of nonfinancial factors that influence economic growth. Stock market liquidity is still a reliable indicator of future long term growth after controlling for inflation, fiscal policy, political stability, education, the efficiency of the legal system, exchange rate policy, and openness to international trade.

Ⅲ. Analytical and Empirical Framework

Stock markets contribute in easing financial activities as well as guiding the country's firms and investors to allocate their funds efficiently. Levine (1996) showed that countries that had more liquid stock markets enjoyed both faster rates of capital accumulation and greater productivity gains. Stock markets, through creation of liquidity, affect economic activity by less risky investment in equity markets which allows savers to acquire assets and quickly sell

them. As Fig 1 shows, liquid markets improve capital allocation that would in turn enhance growth in the economy.

Levine (2003) identified three core sources of theoretically ambiguous relationships between economic growth and stock market liquidity. He first stated that stock market liquidity lowers the risk of investing in longer-run, higher return projects, and in consequence fosters a growth-accelerating reallocation of capital. The lower risk, however, affects savings and capital accumulation rates ambiguously, so that aggregate growth will slow if savings rate fall enough. Second, the cost of investing in the long run is lower. Higher rate of return on savings affects savings and capital accumulation rates ambiguously, so that growth will fall if capital accumulation rates fall enough. Finally, stock market liquidity affects incentives for investors to undertake the costly processes of researching and monitoring firms and managers ambiguously. Liquidity will affect growth positively if stock market liquidity encourages agents to evaluate and exert corporate control.

3.1. Measures of Stock Market Liquidity

The study adopted two measurements of liquidity used by Kanasro et al. (2009) to determine the efficiency of the Philippine stock market through liquidity of its shares. Stock market liquidity is hypothesized to be:

$$SML = f(TVTS, MSIZE) \quad (1)$$

Where:

SML -- Stock Market Liquidity
TVTS -- Total Value of Traded Shares Ratio
MSIZE -- Market Size Ratio

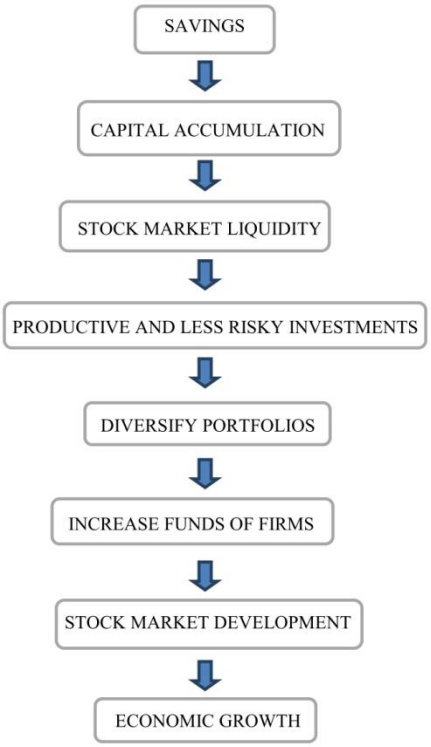
The Total Value of Traded Shares Ratio (TVTS) measures the value of equity transactions relative to the size of the economy. The formula for computing the total value of traded shares ratio is as follows:

$$TVTS = \frac{\text{Total Value of Traded Shares}}{\text{Gross Domestic Product}} \quad (2)$$

The Market Size Ratio (MSIZE) measures the size of the Philippine Stock Exchange in accordance with the market capitalization as the ratio of GDP of the Philippines during the sample period.

$$MSIZE = \frac{\text{Gross Domestic Product}}{\text{Market Capitalization}} \quad (3)$$

Fig. 1. Schematic Diagram for Stock Market Liquidity and Economic Growth (Levine, 1996)



3.2. Empirical Model

To analyze the relationship between the liquidity of the Philippine Stock Exchange (PSE) and economic growth in the Philippines, the two measures for stock market liquidity in logarithm form were regressed to the logarithm of Gross Domestic Product (LNGDP) together with the other factors that influence economic

growth using Ordinary Least Squares (OLS). This study also adopted the regression model of Levine (2003), Nurudeen (2009), and Mohtadi and Agarwal (n.d.). The model directly examined the relationship between stock market liquidity and economic growth. The regression model is as follows:

$$LNGDP = \beta_0 + \beta_1 LN(TVTS) + \beta_2 LN(MSIZE) + \beta_3 LN(OPEN) + \beta_4 LN(FDI) + \beta_4 (INFLAG) + \mu \quad (4)$$

Where:

LNGDP − growth in Gross Domestic Product

LNTVTS − growth in Total Value of Traded Shares Ratio

LNMSIZE − growth in Market Size Ratio

LNOPEN − growth in Openness to Trade

LNFDI − growth in Foreign Direct Investment

INFLAG − Inflation Rate lagged by one period

β − parameter of the indicators

μ − the error term

The variables in the model above are defined as follows: LNGDP refers to economic growth, and it is measured as the logarithm of the real GDP. The LNTVTS is the growth in Total Value of Traded Shares Ratio and it is measured by dividing the total value of traded shares with the gross domestic product and transformed to its natural logarithm. The LNMSIZE is the growth in Market Size Ratio measured by dividing the gross domestic product to the market capitalization and transformed to its natural logarithm. LNOPEN refers to the growth in openness to trade and it is measured by tariff revenues, which is measured by tariff rate multiplied by imports, divided by the sum of imports and exports and transformed to its natural logarithm. LNFDI refers to growth in foreign direct investment; INFLAG is the inflation rate lagged by one period; and μ is the error term.

It is hypothesized that an increase in the growth in total value of traded shares and market size should increase the growth of the economy. The variables LNOPEN, LNFDI, INFLAG were used as control variables to gauge the strength of the correlation between stock market liquidity and economic growth for the given period. The inflation rate, lagged by one period (INFLAG), is the percentage rate of the change in the general changes in the price level, thus it measures the monetary instability that negatively affects economic performance. Its lagged effect was assigned to serve as a proxy for expected future inflation. Foreign direct investment (FDI) was expected to augment savings and increase the rates of capital accumulation, giving a positive relationship to economic growth. Openness to trade (OPEN) refers to the openness to international trade of the economy, as trade openness fosters competition in global markets, it was expected that its growth will have a positive relationship with economic growth.

Ⅳ. Results and Discussion

This study used a simple Ordinary Least Squares (OLS) method to determine and further analyze the relationship between the level of stock market development, as proxied by liquidity position of the Philippine stock market, and economic growth. It also attempted to provide evidence on the existence of a long run relationship between stock market development and economic growth through the use of the Granger Causality test.

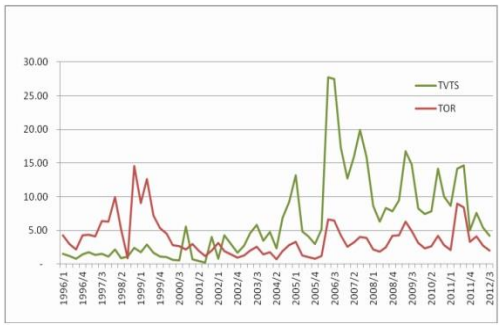
4.1. Liquidity of the Philippine Stock Exchange

The Turnover Ratio measures the value of equity transactions relative to the market size. A high turnover is an indicator of low transaction cost (Levine & Zervos, 1998). The turnover position of the Philippine Stock Exchange has experienced fluctuations. The Ramos administration (1992-1998) experienced a steady growth in the economy during which the Philippines Stock Exchange (PSE) was unified. However, due to the 1997 Asian financial crisis, its performance declined. Under the administration of

Estrada, a decline in the performance in the PSE can be seen. From a 12.62% turnover ratio in 1999, it declined to 2.18% in 2000 due to poor governance and economic policies that affected the confidence among potential investors. The economic reforms and policies under the Arroyo administration improved growth in the economy, giving stock market significant inflows, gaining back investors' confidence. Due to different problems that the economy experienced, coupled with the global crisis, as shown in Fig 2, the trend continued to be volatile. The average turnover ratio of PSE is 3.80% during the sample period.

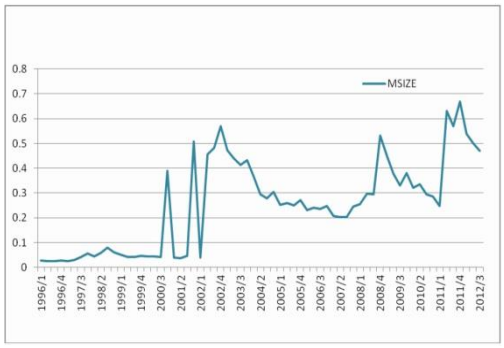
The Total Value of Traded Shares Ratio (TVTS) measures the value of equity transactions relative to the size of the economy. There are significant jumps in the liquidity (total value of shares traded to GDP) in the last six years. Its TVTS ratio has grown to almost 28%. The overall average liquidity during the sample period is 6.5%.

Fig. 2. Liquidity at Philippine Stock Exchange (PSE) using Turnover Ratio (TOR) and Total Value of Traded Shares (TVTS)



The Market Size (MSIZE) measures the size of the Philippine Stock Exchange in accordance with the market capitalization as the ratio of GDP of the Philippines during the sample period. As shown in Fig 3, the size of the PSE remained very small from the year 1996-1999 which had about 3-5% until 2000 when it increased to almost 40%. The 1997 Asian financial crisis caused instability in the financial sector, and only a few companies' securities were listed. The overall average size of the market has remained only 25.4% of GDP which seemed to be low in comparison with other developing markets. Since the unification of the Makati Stock Exchange and the Manila Stock Exchange in 1993, the Philippine Stock Exchange has remained relatively small. As of May 2012, there are 344 listed companies in the PSE.

Fig. 3. Liquidity at the Philippine Stock Exchange using Market Size (MSIZE)



4.2. Regression Results

The study used 67 observations from the first quarter of 1996 to the third quarter of 2012. Three variables were found to be significant using the Ordinary Least Squares (OLS) method. These variables were the growth in total value of traded shares (LNTVTS), growth in market size (LNMSIZE), growth in openness to trade (LNOPEN). The turnover ratio was not used as a determinant of liquidity as Levine and Zervos (1996) states that the turnover ratio measures trading of firm's equities relative to the size of the market and does not satisfy the degree in which liquidity services on a macroeconomic scale. Thus, it would not be providing significant liquidity to the economy as a whole. Therefore, a large stock market is not necessarily a liquid market.

The Durbin-Watson and Breusch-Godfrey tests were used to test for the presence of autocorrelation. Having found to have positive autocorrelation, the Cochrane-Orcutt Transformation was used as a remedy to minimize the autocorrelation problem. Table 1 shows the regression results after the Cochrane-Orcutt Transformation.

From Table 1, results show that the effect of growth on the total value of traded shares and the growth of the market size on economic growth is positive and statistically significant at the 1% level. The control variables which are the growth of openness to trade and growth of foreign direct investment also have the expected signs which are positive; however, these variables are not significant even at the 10% level. The results also show that the variable of inflation lagged by one period is negatively related to economic growth and significant at the 10% level.

Table 1. Cochrane-Orcutt Transformation Regression Results

Variable	Coefficient	Std. Error	t-statistic	Probability
LNTVTS	0.134***	0.037	3.62	0.001
LNMSIZE	0.826***	0.046	18.00	0.000
INFLAG	-0.025*	0.013	-1.96	0.055
LNOPEN	0.269^{NS}	0.240	1.12	0.268
LNFDI	0.009^{NS}	0.009	1.00	0.322
_cons	8.062	0.646	12.48	0.000

R^2 = 0.9488 Prob > F = 0.000
Adjusted R2 =0.9445 DW Statistic
(transformed) = 2.005368

Notes: 1. *** significant at 1% level of significance.
2. ** significant at 5% level of significance.
3. * significant at 10% level of significance.
4. Values were rounded off to three decimal places.

Stock markets contribute to economic development by enhancing the liquidity of capital investments (Levine, 1997). Moreover, by increasing the quantity and productivity through improved allocation of capital as well as reducing the need to hold liquid balances, a liquid stock market would augment economic growth. The results showed that the relationship between the growth of market size (MSIZE) and economic growth is positive and significant in explaining economic growth in the Philippines as it was used as a proxy for liquidity. The coefficient 0.826 implies that a 1% increase in growth of market size would lead to an increase of 0.826% in the growth of GDP. The result provides proof that the size of the Philippine Stock Exchange (PSE) during the given period determines the ability of the market to mobilize savings, improve the quality and quantity of investment and accelerate economic growth, since the role of the PSE is to bring companies together to raise capital through securities.

The other measure for liquidity has a positive and significant effect on economic growth. The growth in total value of traded shares (LNTVTS) has a coefficient of 0.134 implying that a 1% increase in the growth of total value of traded shares will increase economic growth by 0.134 %. Since the growth of TVTS measures the trading of firm's equity as a share of GDP, its liquidity therefore positively reflects on an economy-wide basis (Levine & Zervos, 1996).

Inflation (INFLAG), which was lagged by one period, conforms to economic theory by having a negative relationship with economic growth, since it affects economic performance through monetary instability. It has a coefficient of -0.025 which is statistically significant at 10% level. This means that a 1% increase in the inflation rate leads to a decrease in the growth of GDP by 0.025%.

The coefficient of the growth in openness to trade (OPEN) conforms to the standard economic theory since it is positively related to economic growth, even if it was used as a control variable. The coefficient of 0.269 implies that over the study period, a 1% increase in the degree of trade openness leads to approximately 0.269% increase in growth of GDP. Also, there is a positive relationship between the growth of foreign direct investment (FDI) and economic growth, since FDI helps to supply long-term capital with new technologies, managerial and marketing capabilities that would in turn augment economic growth through employment, increasing managerial skills, diffusing technologies and fostering innovations (Asiedu, 2002 as cited by Adhikary, 2011). The coefficient of 0.009 implies that over the study period, a 1% increase in the degree foreign direct investment would lead to 0.009% increase in growth of GDP.

However, results for openness to trade and foreign direct investment in the model proved to be statistically

insignificant after using these as control variables along with the stock market liquidity measurements.

The explanatory power or the goodness of fit of the model as measured by the R-squared is at 0.9488, which means that 95% can be explained by the model and it has a very strong fit. The value indicates that economic growth in the Philippines is adequately explained by the model for the period between the first quarter of 1996 to the third quarter of 2012, or that 95% of the variation in the growth of economic activities is explained by the independent variables. Moreover, the relationship between liquidity and growth remains strong even after controlling for inflation, foreign direct investment, and openness to trade. Thus, raising stock market liquidity may independently produce substantial growth.

4.3. Long Run Relationship and Causality

4.3.1.Test for Stationarity

One of the conditions in order to test Granger Causality between the two variables is through its stationarity. It is important to know if the variable is stationary or does not have a unit root or if the variable is nonstationary or the variable contains a unit root. The variables LNTVTS, LNMSIZE, and LNGDP were not stationary in their respective level forms. Thus, for testing of the unit roots, the Augmented Dickey Fuller (ADF) test was used for the two measurements of stock market liquidity which are the LNTVTS and LNMSIZE, and the proxy for economic growth, LNGDP. The ADF includes the additional lagged terms which can be examined by the Akaike Information Criterion (AIC), to ensure that the errors are uncorrelated. If the variable is nonstationary at level form, but stationary after first differencing, the variable is integrated of order 1 and has a unit root. Using the said test, variables LNTVTS, LNMSIZE, and LNGDP are stationary after first differencing. The results for stationarity are shown in Table 2.

Table 2. Stationarity Test Results

Variables	Level Form P-value	First Difference P-value
LNGDP	0.5891 lags (4)	0.0015** lags (4)
LNTVTS	0.6311 lags (4)	0.000*** lags (3)
LNMSIZE	0.3335 lags (4)	0.0039** lags (4)

Notes: 1. *** significant at 1% level of significance.
2. ** significant at 5% level of significance.

4.3.2. Test for Cointegration

Since the stationarity of the variables have been established, the cointegration of the indicators of stock market development and economic growth were tested. The results for the Cointegrating Regression Dickey Fuller Test are shown in Table 3.

Table 3. Cointegrating Regression Dickey Fuller Test Results

Regressed Variables	P-value
LNTVTS and LNGDP	0.0250**
LNMSIZE and LNGDP	0.0545**

Note: ** significant at 5% level of significance.

The regression results suggest that LNTVTS is cointegrated with LNGDP. Thus, LNTVTS has a long-run relationship with LNGDP, which means LNTVTS share a common stochastic drift or a common trend with LNGDP. The results also suggest that LNMSIZE is also cointegrated with LNGDP because the error term is stationary.

4.3.3. Granger Causality

Granger Causality can only be tested if variables are stationary and variables are cointegrated. It is used to establish whether a uni-directional or bi-directional relationship exists between stock market development and economic growth. Results showed that LNTVTS and LNMSIZE are both stationary and cointegrated with LNGDP. Table 4 shows the optimal number of lags used in each determinant through Akaike Information Criterion. Table 5 shows the result of the Granger Causality test.

Table 4. Akaike Information Criterion

	LNGDP	LNTVTS	LNMSIZE
Lags	AIC	AIC	AIC
0	2.12598	2.37417	2.15782
1	1.68524	2.22582	1.81308
2	1.64703	2.23876	1.79562
3	1.4775	2.14879*	1.72127
4	1.4659*	2.16273	1.67974*

Note: * indicates the optimal number of lags.

The results of the Granger Causality tests indicated that there is a unidirectional causality between stock market liquidity, using the growth in the market size as proxy, and economic growth. However, results show that there is no causality between growth in total value of traded shares and economic growth. Growth in total value of traded shares and economic growth may have a long-run relationship since they are cointegrated but they do not exhibit Granger causality.

Table 5. Granger Causality Test Results

Variable	Computed Statistic	F Tabular Value	Granger Causality
LNTVTS to LNGDP	0.93^{NS}	0.4532	No
LNGDP to LNTVTS	0.38^{NS}	0.7660	No
LNMSIZE to LNGDP	3.47**	0.0136	Yes
LNGDP to LNMSIZE	0.37^{NS}	0.8293	No

Notes: 1. ** significant at 5% level of significance.
2. NS - indicates insignificance.

Since the variables LNTVTS and LNGDP were found to be cointegrated, an Error Correction Model (ECM) was specified to test for the speed of adjustment in the said determinants when one of these variables experiences a shock. Table 6 shows the Error Correction Method results for LNTVTS and LNGDP.

Table 6. Error Correction Method Results

Variables	Speed of Adjustment
LNTVTS and LNGDP	-0.143817**

Note: ** significant at 5% level of significance.

It can be observed from the results that LNTVTS as the measure of stock market liquidity and LNGDP for economic growth have the coefficient of the error correction term with a negative sign and it is statistically significant at the 5% level of significance. Thus, the significance of the error correction mechanism supports cointegration and suggests the existence of a long-run equilibrium relationship between economic growth and stock market development determinant, LNTVTS. In other words, the coefficient of the error correction term which measures the speed of adjustment back to equilibrium whenever the system is experiencing a shock indicates that it would take 6.953 ≈ 7 quarters for a variable to adjust whenever one experiences a shock.

Ⅴ. Summary and Conclusion

This research work studies stock market development and its implications to economic growth by analyzing the relationship between the stock market measurements for liquidity and GDP growth in the Philippines. The specific objectives of the study were to measure the liquidity of the Philippine stock market and evaluate its trends for the given period; determine the linkages between stock market liquidity and growth of the economy; and to determine the causality between stock market development and economic growth.

Using Ordinary Least Squares (OLS) method for the time series data covering the period of the first quarter of 1996 to the third quarter of 2012, it was shown that the role of the stock market is essential to economic growth in a developing country like the Philippines. The two measures used for liquidity, the growth in total value of traded shares and the growth in market size, were both positively related to economic growth and statistically significant. However, results for the growth in openness to trade and foreign direct investment in the model proved to be statistically insignificant after using it as control variables along with the stock market liquidity measures. Inflation, on

the other hand, which was lagged by one period, conforms to theoretical conventions by having a negative relationship to economic growth, since it affects economic performance because of monetary instability. About 95% of the variation in economic growth is explained by the independent variables. Moreover, the relationship between liquidity and growth remains strong even after controlling for inflation, foreign direct investment, and openness to trade. Thus, raising stock market liquidity may independently produce substantial growth.

In assessing the relationship between stock market development and economic growth, it empirically proved that the measure of economic growth (LNGDP) and all of the determinants for stock market liquidity – LNTVTS and LNMSIZE were both stationary and cointegrated. For the case of the Philippines, there is a unidirectional causality between stock market liquidity, using the growth in the market size as proxy, and economic growth. For LNTVTS, stock market liquidity does not "Granger cause" economic growth and vice versa. Since the two indicators have a long run relationship, the results of the Error Correction Model suggest that there is an adjustment in stock market liquidity, as proxied by growth in total value of traded shares, and economic growth whenever one of the indicators experiences a shock.

Admittedly, the study only tested a portion of the financial side: the stock market's liquidity. Other important determinants of stock market development such as price volatility, elasticity in trading, corporate governance could also be incorporated to give more robust results. There are a wide variety of factors that can affect economic growth both on the financial and real sectors of the economy which needs to be taken into consideration. The empirical results indicate that the potential of the Philippines Stock Exchange in fostering growth in the country should further be explored.

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