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Master's Thesis

**Analysis on the Effectiveness of
the Korea's Preferential Tariff Scheme
for Least Developed Countries**

한국 최빈개도국 특혜관세제도의 효과성 연구

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**Graduate School of International Studies
Seoul National University
International Commerce Major**

Eunji Park

한국 최빈개도국 특혜관세제도의 효과성 연구

지도교수 김 종 섭

이 논문을 국제학석사학위논문으로 제출함

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국제학과 국제통상전공
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박은지의 국제학석사학위논문을 인준함

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위 원 장 _____ 이 영 섭 _____



부위원장 _____ 안 덕 근 _____



위 원 _____ 김 종 섭 _____



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The undersigned, appointed by

**The Graduate School of International Studies
Seoul National University**

Have examined the thesis entitled

**Analysis on the Effectiveness of
the Korea's Preferential Tariff Scheme
for Least Developed Countries**

Presented by **Eunji Park**

Candidate for the degree of Master of International Studies and hereby certify
that it is worthy of acceptance

Committee Chair



Rhee, Yeongseop

Committee Vice Chair

Dukgeun Ahn

Ahn, Dukgeun

Thesis Advisor

Chongsup Kim

Kim, Chongsup

Abstract

Korea has implemented the Preferential Tariff Scheme for LDCs since 2000 in accordance with the efforts of the International Society to promote trade in LDCs. This study aims to examine the effectiveness of the Korean Scheme which little attention has been devoted to so far.

Since the initiation of the Scheme, Korea's import from LDCs has been increasing but LDCs' share in Korea's import is still very limited. To take a closer look at the effectiveness, intensive margin and extensive margin are analyzed in the descriptive analysis together with utilization rates, utility rates and application rates. In the econometric analysis, drawing upon the Triple Difference Model, the study finds out that the Scheme had positive impacts on the imports from LDCs, especially from Asian LDCs.

Based on those descriptive and econometric analyses, the study provides insight into the ways to enhance the effectiveness. Especially, recommendations on the product coverage, rules of origin and administrative regulations are underlined to make the Scheme more effective.

Keyword: LDCs, Korea's Preferential Tariff Scheme for LDCs, Utilization Rates,
Triple Difference Model

Student Number: 2016-28377

초 록

한국은 최빈개도국의 무역 확대를 위한 국제사회의 노력에 발맞추고자 2000년부터 최빈개도국 특혜관세제도를 시행하고 있다. 국내에서는 동 제도에 대한 연구가 부족한 실정이므로, 본 연구는 서술적·실증적 분석을 통해 한국 제도의 효과성을 검증해보고자 한다.

한국의 최빈개도국 수입액은 동 제도 시행 이후 점차 증가하는 추세이나 그 비중은 여전히 미미한 실정이다. 따라서 좀 더 면밀한 분석을 위해 특혜 마진, 수입 창출, 특혜 활용률 등과 같은 지표들을 분석하는 서술적 분석을 수행하였다. 또한, 실증 분석에서는 삼중차모형을 활용하여 동 제도가 최빈개도국으로부터의 수입 증가, 특히 아시아 최빈개도국으로부터의 수입 증가에 유의미한 영향을 미쳤음을 검증하였다.

다각도의 분석에 근거하여 본 연구는 한국 제도의 효과성 개선을 위한 몇 가지 정책 제언을 제시한다. 특히, 특혜 품목 범위, 원산지 규정 및 행정절차의 개선에 특별한 관심이 요구된다.

키워드: 최빈개발도상국, 한국 최빈개도국 특혜관세제도, 삼중차모형, 특혜 마진, 특혜 활용률

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I. Introduction

1.1. Research Questions

International society has been trying to integrate developing countries into the world trade system as they are not in a favorable condition as developed countries are. One of its efforts is to give a special treatment to developing countries in trade, for instance, by lowering tariff rates for products originating from them. Meanwhile, there have been additional efforts to devise a preferential system specially designed for Least Developed Countries (LDCs) which necessitate more favorable treatment than other developing countries do.

In this background, Korea had attempted to make a preferential trade system for LDCs as well, which resulted in the Korea's Preferential Tariff Scheme for LDCs (the Scheme) in 2000. As of now, Korea allows duty-free and quota-free market access to almost 90% of products originating from LDCs and Korea's imports from them has been increasing. Nevertheless, the percentage that LDCs account for in Korea's import is still very low compared to other developing countries, which makes the effectiveness of the Scheme ambiguous.

Thus, the present research question emerged from the question "Is the preferential tariff scheme for LDCs effective?" When answering this question, it is important to bear in mind that "effectiveness" can be measured with various factors according to which factor one might put more weight on. With this consideration in mind,

this research will consider several facets such as trade value, intensive and extensive margin, utilization, utility and application rates to comprehensively evaluate the effectiveness. Additionally, an econometric analysis will be employed as well to figure out whether the Scheme was statistically effective in increasing Korea's import from LDCs and whether the effectiveness differs by region (Asia vs Non-Asia) or type of products (agricultural vs non-agricultural goods).

At the end, this research will address the question of how to improve the effectiveness of the Scheme. Although Korea has amended regulations of the Scheme several times to cover more products or to relieve rules of origin, there are still some aspects that can be further enhanced. As this Scheme has attracted little attention in Korea, there has been minimal research about it. Thus, a closer look at other trade agreements like FTAs or foreign cases may be helpful to find out good exemplars.

1.2. Literature Review

There have been a few efforts to analyze the Korea's Preferential Tariff Scheme for LDCs in accordance with each phase of its development – i) Around the initiation of the Scheme, ii) After the Hong Kong Ministerial Conference in 2005, and iii) After the expansion of product coverage in 2008.

The first study on the Scheme was conducted by Kim (2000) after Korea had finished the legislation of the Scheme. He compared Korea's regulations with those of

other countries and suggested some recommendations such as expanding product coverage and harmonizing and simplifying rules of origin.

Meanwhile, two other studies were published after the Hong Kong Ministerial Conference in 2005 which prompted an expansion of trade preference for LDCs. Cheung and Lee (2005), by using the Computed General Equilibrium Model (CGE Model), predicted potential welfare effects of Korea and LDCs in case Korea expands the product coverage. They concluded that Korea could expand the coverage of manufacturing goods by adopting a Negative List System, whereas, a Positive List System¹ would be appropriate in case of agricultural goods in order not to harm the domestic farm market. Though, they also mentioned that the welfare effects of both Korea and LDCs would be minimized when imports of agricultural goods are excessively restricted. As to determining agricultural goods which would be newly added to the Scheme, Lim and Shin (2007) proposed primary and supplementary criteria which could minimize negative impacts on the domestic farm industry.

Later, Korea expanded the product coverage of the Scheme by a considerable amount in 2008, of which Cho and Kim (2010) provided an extensive summary. They also provided helpful recommendations regarding rules of origin and product coverage. In addition, Cho (2011) focused on the utilization rates of the Scheme, arguing that the Scheme was being utilized for only limited products by limited countries despite the

¹ ‘Positive list system’ means that only the items on the list can benefit from a preference, whereas, ‘Negative list system’ means that all of the items except those on the list can benefit from a preference.

massive expansion of product coverage in 2008. Meanwhile, the most recent study done by Kim (2016) posed the position that Korea should relax regulations on submitting the certificate of origin when Korean importers claim a zero-tariff preference of the Scheme.

The existing literature on the Korean Scheme mainly focused on a qualitative approach to analyze the effectiveness. In other words, relatively few studies have been devoted to a quantitative or econometric analysis. Fortunately, there have been some econometric analyses in other countries although some of their findings are contradictory to each other. Most foreign studies dealt with preferential systems for LDCs together with the Generalized System of Preference (GSP) which grant preferences to developing countries as well as LDCs.

Ozden and Reinhardt (2003) conducted an empirical study with the data from 1976 to 2000 and found out that being in a GSP status is not helpful to developing countries since they get reluctant to going towards trade liberalization so that they can keep benefitting from the preference. Further evidence to support this view could be adduced from Herz and Wagner (2011) who, by using the Gravity Model, found out that GSP has negative effects on the developing countries' exports to developed countries in the long run. They argue, given this distortive nature of GSP, it must be replaced by reciprocal agreements.

Gil-Pareja, Llorca-Vivero, and Martinez-Serrano (2014) stand in opposition to the authors above. They conducted an empirical study of period 1990-2008 by using the Gravity Model and found out positive results in most non-reciprocal trade agreements

including GSP of US, EU, Canada, Japan, Norway, Switzerland and Turkey as well as EBA² and ACP³ of EU. However, in case of the AGOA⁴ of US, positive effects were not captured.

Meanwhile, some researchers attempted to examine the effectiveness of preferential trade systems by using another methodology which is called Triple Difference Model (DDD Model). Especially, Frazer and Biesebroeck (2010) laid the groundwork for the adaptation of the DDD Model to the tariff system. Compared to the Gravity Model, DDD Model has an advantage of analyzing preferential tariffs by product level. That is, it can differentiate items covered by the system and those not by using a dummy variable to each of the products. In contrast, most studies adopting the Gravity Model used a dummy variable to a country, thus, they can't separate covered items from those not.

By using the dataset extended from 1998 to 2006, Frazer and Biesebroeck demonstrated that the AGOA had a positive impact on the imports of US from Sub-Saharan African countries, both in agricultural sector and manufacturing one including apparel industry, which brings about a contrast to the aforementioned findings of Gil-Pareja, Llorca-Vivero, and Martinez-Serrano (2014). Later, Ito (2013) applied the same

² Everything But Arms (EBA): EU's preferential tariff system which grants duty-free quota-free market access to all products originating from LDCs except armaments

³ Africa Caribbean Pacific (ACP): EU's preferential tariff system for developing countries in Africa, Caribbean and Pacific region

⁴ African Growth and Opportunity Act (AGOA): US's preferential tariff system for countries in Sub-Saharan Africa

methodology to his study which analyzed the effectiveness of the Japanese preferential tariff scheme for LDCs. He also found that the Japanese scheme had robust positive effects on Japan's imports from LDCs. The study by Thelle et al. (2015) was informed by Frazer and Biesebroeck as well. Their findings support that EU's non-reciprocal preferences were positive to developing countries as well as LDCs.

1.3. Research Methodology

This research sets out two main goals – to examine the effectiveness of the Scheme and to find out policy recommendations for its improvement.

For the first goal – to examine the effectiveness of the Scheme, three approaches are employed. First of all, trade value will be considered as one pillar of the effectiveness. In detail, absolute import values and their trend before and after the introduction of the Scheme, the percentage of LDCs and their composition in Korea's import will be dealt with. Additionally, export values will be presented as well in that they are indicators which show Korea's intimacy with LDCs in trade.

Secondly, a descriptive analysis will be used to examine the effectiveness. In this analysis, several figures such as intensive and extensive margin, utilization, utility and application rates will be presented. Intensive margin will show how much preference is relatively given to LDCs compared to other countries while extensive margin refers to how many products are newly traded after the Scheme. Meanwhile, utilization rates can

be used to check whether the Scheme is being sufficiently utilized by LDCs. Similarly, utility rates represent how much import from LDCs is actually benefitted by the Scheme while application rates show how much import is covered by the Scheme. More detailed information and calculation will be provided in the Section 4.2.3. Additionally, it should be noted that these three rates are mainly informed by Cho and Kim (2010) who calculated those rates from 2000 to 2008.

Next, a more precise examination will be conducted with an econometric analysis by using dataset of UN Comtrade. It encompasses Korea's import data from the world for 20 years (1997-2016) with respect to all commodities by HS 6-digit code. With these massive data, this research will adopt the Triple Difference Model (DDD Model) which was previously used in the studies of Frazer and Biesebroeck (2010) and Ito (2013). A detailed in-depth explanation regarding the model will be offered in the Section 4.3.1.

Meanwhile, for the second goal of the research – to find out policy recommendations for the Scheme, referring to good policy examples in other countries may be useful. In addition, Korea's current regulations applied to Free Trade Agreements (FTAs) will be used as a comparison as well since the regulations applied to FTAs are usually more relaxed than others.

II. Trade Preferences for LDCs

2.1. Least Developed Countries

Least Developed Countries (LDCs) refer to those countries which are economically and socially underdeveloped due to their structural, historical or geographical backgrounds. The United Nations (UN) has started to designate LDCs since 1971 with the motivation that those countries need a special treatment from the international community.

The list of LDCs is reviewed each 3 years by the United Nations Economic and Social Council with the advice from the Committee for Development Policy (CDP). For a country to be recognized as a LDC three criteria must be met at the same time: low-income, human assets weakness and economic vulnerability. Low-income criterion considers three years' average value of Gross National Income (GNI) per capita while specially devised indicators such as Human Assets Indicator (HAI) and Economic Vulnerability Indicator (EVI) are used for the human assets and economic vulnerability criteria respectively. Meanwhile, criteria for graduation from the category of LDCs are tougher than those for inclusion in order to ensure a country's graduation to be permanent and sustainable. The criteria for inclusion and graduation are indicated in the **Annex 1**.

As of 2018, 47 countries are recognized as LDCs whose list is indicated in the **Table 1**. Currently most of the LDCs are located in Africa (33 countries) while 9 countries belong to Asia, 4 countries to Oceania and only 1 country belongs to the

Caribbean. Among these countries Angola and Vanuatu are in a preparatory process for graduation which will take four or five years.

Table 1. List of LDCs (as of 2018)

Region	Least Developed Countries
Caribbean (1)	Haiti
Oceania (4)	Kiribati, Solomon Islands, Tuvalu, Vanuatu
Asia (9)	Afghanistan, Bangladesh, Bhutan, Cambodia, Lao People's Democratic Republic, Myanmar, Nepal, Timor-Leste, Yemen
Africa (33)	Angola, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Togo, Uganda, United Republic of Tanzania, Zambia

Source: website of the UNCTAD

2.2. International Discussions to Promote LDCs' Trade

In the world where a significant disparity exists between developed and developing countries, “development” of developing countries has been the most important agenda. Especially, the importance of international trade in developing countries’ economic growth has been reiterated many times since much has been said about the role of trade in increasing employment, developing export industries and satisfying consumers.

Nevertheless, given harsh conditions that developing countries face, for instance,

poverty, diseases, natural catastrophe, wars etc., it is not easy for them to successfully participate in global trade. In this regard, there has been overall agreement as to the necessity of international support for developing countries' successful integration in the global trade system. It is not surprising because the obstacles that developing countries suffer from are partly rooted in the colonial history or other reasons such as climate change caused from the industrialization of developed world. Thus, it is not unreasonable to say that developed countries should share a common responsibility.

It was in 1968 that the first attempt to promote developing countries' trade was made. The "Resolution 21" adopted in the meeting of the United Nations Conference on Trade and Development (UNCTAD) requested "*preferential or free entry of exports of manufactures and semi-manufactures of developing countries to the developed countries*" (UNCTAD 1968), which was developed into the Generalized System of Preference (GSP).

However, there was a legal restriction that non-reciprocal trade agreements violated the GATT Article I - Most Favoured Nation (MFN). Thus, as a temporary solution, a waiver for ten years on the MFN principle was admitted, which was based on the GATT Article XXV:5. It continued until 1979 Tokyo Round when a permanent legal basis "Enabling Clause" was adopted. It articulates "*notwithstanding the provisions of Article I of the General Agreement, contracting parties may accord differential and more favorable treatment to developing countries, without according such treatment to other contracting parties.*" (GATT 1979)

Meanwhile, the GATT Article XXXVI provides another legal background for preferences given to “less-developed countries”. The main points of this Article can be summarized as follows: It recognizes i)a poor and vulnerable condition of developing countries, ii)the importance of trade in their economic growth and development, iii)a need for member countries’ individual or joint efforts to promote trade in developing countries and iv)the necessity of non-reciprocal preference measure for them. Especially, the fourth point has a significance in that it permits a non-reciprocal concession.

GATT Article XXXVI:8. *“The developed contracting parties do not expect reciprocity for commitments made by them in trade negotiations to reduce or remove tariffs and other barriers to the trade of less-developed contracting parties.”* (GATT 1947)

Despite the establishment of legal basis for non-reciprocal treatment and special arrangement for LDCs, preferential tariffs had been granted to only a small number of products by few countries. Hence, in order to arouse attention again, the members of WTO reached an agreement on the implementation plans for supporting LDCs in the 1996 Singapore Round. Later in the 2001 Doha Round, granting a duty-free quota-free (DFQF) market access to LDCs was reiterated again.

The Sixth WTO Ministerial Conference at Hong Kong in 2005 was another important juncture that made concrete and specific plans for a prompt implementation of trade preferences for LDCs. In the Hong Kong Ministerial Declaration, *“developed-country Members, and developing-country Members declaring themselves in a position*

to do so, agree to implement duty-free and quota-free market access for products originating from LDCs” (WTO 2005). Developed countries agreed to provide a DFQF access for all products by 2008 or they had to guarantee it at least for 97% of products, whereas, developing countries had more flexibility in implementing it.

2.3. Preferential Tariff Scheme for LDCs

As a result of international efforts to promote the trade of LDCs, now 23 countries implement a preferential tariff system for LDCs. As shown in the Table 2. **List of Preference-Giving Countries for LDCs**Table 2, some of them (13 countries) grant preferences both to developing countries and LDCs under the system of GSP while others (10 countries) without GSP give preferences through a system specific for LDCs.

Table 2. List of Preference-Giving Countries for LDCs

Type	Preference-Giving Countries
GSP (13)	EU(1971), Japan(1971), Norway(1971), Switzerland(1972), New Zealand(1972), Australia(1974), Canada(1974), USA(1976), Iceland(2002), Turkey(2002), Russian Federation(2010), Kazakhstan(2010), Armenia(2016)
LDC-specific (10)	Korea(2000), Morocco(2001), Taiwan(2003), Tajikistan(2003), Kyrgyz Republic(2006), India(2008), China(2010), Chile(2014), Thailand(2015), Montenegro(2017)

Source: WTO PTA Database

Among the countries with GSP, eight advanced countries – EU, Japan, Norway, Switzerland, New Zealand, Australia, Canada, USA – implemented it from the 1970s when the UNCTAD urged the implementation of preferential system for developing countries. They grant preferences not only to LDCs but also to developing countries although the depth and extent of preference given to them is not as favorable as it is to LDCs. Later in the 2000s, other countries also started to implement a preferential system either by GSP or by a specific scheme for LDCs. Notably, most of them were developing countries – Korea was also considered as a developing country when it first implemented the Scheme in 2000.

Meanwhile, each scheme varies considerably in the contents of preferential schemes. As there is no such regulation that stipulates detailed contents of the preference, each country has a freedom in determining beneficiaries, covered products, rules of origin and other regulations. Some preference-giving countries require special conditions for a country to get a beneficiary eligibility. In case of the EU Everything But Arms (EBA), which is under the system of EU GSP, beneficiary countries are bound to complying with human rights and labor right conventions. Similarly, US African Growth and Opportunity Act (AGOA)⁵ also requires beneficiaries to promote democracy, protect human rights and worker rights, and not to engage in terrorism. If a country violates one of these obligations, the eligibility status can be withdrawn.

⁵ Although AGOA is a system designed for countries in Sub-Saharan Africa, not for LDCs, a majority of its beneficiaries are LDCs.

III. Korea's Preferential Tariff Scheme for LDCs

3.1. Historical Development of the Scheme

Korea's preferential tariff scheme for LDCs started from January 1st in 2000 as a result of the international discussions such as the Singapore Round in 1996 to support and promote the trade of LDCs. After the initiation, the Scheme was amended several times to ensure higher effectiveness and efficiency of it.

As to beneficiary countries, the Scheme follows the list of LDCs determined and announced by the UN, thus 48 countries received benefits in 2000. Later in 2002 and 2007 Senegal and Timor-Leste were newly added to the beneficiary list as UN entitled them as LDCs. In contrast, some countries were excluded from the preference since they had graduated from the LDCs as a result of the amelioration of economic and social situations. Accordingly, Cape Verde, Maldives and Samoa were excluded from the beneficiary list of the Scheme in 2009, 2012 and 2015 respectively. Meanwhile, in 2015, South Sudan was newly added to the list after it had been acknowledged by the UN as an independent country from Sudan.

Furthermore, several amendments were made to expand the scope of the products covered by the Scheme. At the beginning, the product coverage ratio remained at a very low level – 1.8%⁶. However, as a result of the 2005 Hong Kong Ministerial

⁶ Product coverage ratio based on HS 6-digit

Declaration which urged member countries to provide LDCs with preferential tariffs at least to 97% of the products, Korea also attempted to expand the product coverage that had been considered too low. Thus, at the Ministerial Meeting on International Economic Affairs in November 2007, Korea announced that it would gradually expand the product coverage in accordance with the international discussions. Consequently, in 2008, Korea expanded the ratio up to 75% and subsequently, product coverage was expanded by 5% each year⁷ and finally it reached 95% in 2012.

Meanwhile, there had been criticism about the rules of origin that required the content of the raw materials which are not originated from the exporting country or Korea should not exceed 50 percent of the FOB price of the final product. It means that at least a half of the raw materials must be sourced from the exporting country or Korea – Regional Value Contents (RVC) 50%. Though, the problem was that many LDCs found it difficult to prove the origin of materials due to a lack of system or accounting knowledge even though they actually sourced materials from the exporting country. In addition, the standard of RVC 50% was considered too tough when it was compared to other countries' standard. Taking these into account, Korea relaxed the rules of origin in 2012 from RVC 50% to RVC 40% (the content of the raw materials which are not originated from the exporting country or Korea should not exceed 60 percent of the FOB price of the final product).

⁷ Product coverage ratio based on HS 6-digit: 75% (2008), 80% (2009), 85% (2010), 90% (2011), 95% (2012)

3.2. Current Law and Regulation

The Article 76 of the Customs Act “Standards for Application of General Preferential Tariffs” regulates the General System of Preference (GSP) although Korea doesn't implement it yet. In the Article 76 (3) of the same Act, Korea's preferential tariff scheme for LDCs is stipulated as well, allowing preferential treatment for the poorest developing countries designated by Presidential Decree.

Article 76 (3) of the Customs Act With respect to goods from developing countries prescribed by Presidential Decree among developing countries designated as the poorest developing countries in accordance with a resolution of the United Nations General Assembly, priority may be given to the poorest developing countries over other developing countries subject to preferential tariff in granting the general preferential tariff.

More details of the scheme are stipulated in the Presidential Decree of “Regulations on Providing Preferential Tariff Treatment to Least Developed Countries”. First of all, the Decree specifies the beneficiary countries (Article 2), products subject to the preference and their tariff rates (Article 3). In principle, if a product is subject to the Scheme, duty-free and quota-free preference is given. However, in case of Minimum Market Access (MMA) certain quota can be set. The Article 3 “Goods subject to Preferential Tariffs and Tariff Rates” stipulates that “*preferential tariff rates may be applied to the goods with a minimum market access quantity set in accordance with the Regulations on Tariff Concessions in the Framework of the World Trade Organization*

Agreement, Etc., to the extent of such quantity.”

Meanwhile, there is a regulation to protect the domestic industry that could be harmed by imports from LDCs, which is specified in the Article 4 “Relief of Domestic Industrial Damage”.

Article 4 (1) of the Regulations on Providing Preferential Tariff Treatment to Least Developed Countries *Where importation of specific goods increases among goods subject to preferential tariff, and causes or is likely to cause serious damage to the domestic industry producing the same goods or goods that directly compete with such specific goods, and therefore it is necessary to prevent such damage, the head of a relevant central administrative agency or an interested party may request the Minister of Strategy and Finance to suspend applying a preferential tariff to the relevant goods.*

Lastly, the Article 5 “Provisions on Country of Origin” specifies the rules of origin that are necessary to claim the preference. The first criterion is “Wholly Obtained” which means “*goods shall be wholly produced in or obtained from the exporting country.*” Usually primary goods such as raw materials, agricultural goods, animals and marine products can be wholly obtained. Besides, non-primary goods such as used goods, waste and scrap can be another example of it. Though, given the reality, a majority of products are not wholly obtained from only one country.

Thus, the second criterion provides rules for goods which are not wholly obtained in the exporting country. It requires the value of foreign materials shall be less than 60%, stating that “*In cases of goods finally manufactured or processed in the*

territory of the exporting country with raw materials produced in countries other than the exporting country or of undetermined countries of origin, a preferential tariff shall apply only where the price of the relevant raw materials does not exceed 60 percent of the FOB price of the final product.”

As to the administrative procedure, according to the Article 5 (4) “*any person who wishes to be accorded preferential tariff treatment shall submit a certificate of origin in a required form, issued by the exporting government, or by an institution designated by the government, of the exporting country.*” Although the Decree encompasses general regulations about the rules of origin, some details are missing to implement it. Thus, all other matters not expressed in the Decree must be referred to the Article 236 of the Enforcement Decree of the Customs Act.

3.3. Beneficiaries and Covered Products

Currently Korea provides DFQF market access to 48 countries that are designated as LDCs by the UN. (See the **Table 1.**) It should be noted that some of those beneficiaries can claim other preferences such as Global System of Trade Preferences (GSTP)⁸, Asian Pacific Trade Agreements (APTA)⁹ or FTAs. Bangladesh, Myanmar,

⁸ GSTP is a preferential tariff system among developing countries under the framework of UNCTAD, which came into effect in 1989.

⁹ APTA is a trade agreement which was known as the Bangkok Agreement whose members are Bangladesh, China, India, Laos, Mongolia, Sri Lanka and Korea.

Guinea, Mozambique, Sudan and Tanzania are members of the GSTP while Bangladesh and Laos belong to the APTA. Cambodia, Laos and Myanmar are members of the KOR-ASEAN FTA. Except these countries, the other beneficiaries face MFN rates when entering into the Korean market in case preferences of the LDC Scheme are not relevant.

As to product coverage, Korea significantly expanded the scope of treated items from 2008 to 2012. As a result, the percentage of coverage reached 90% as indicated in the **Table 3¹⁰**. LDCs get a duty-free preference in 11,000 tariff lines out of 12,232 among which 2,028 lines were already duty-free at the MFN level. Even though the overall coverage rate is quite high, a sharp contrast is drawn between agricultural and non-agricultural goods. Notably, openness in the agricultural sector (59%) is significantly lower than that in the non-agricultural one (95%).

Table 3. Coverage Rate of the Korea's Preferential Tariff Scheme for LDCs

	All products	Agricultural goods	Non-agricultural goods	Unit: Tariff lines
LDC duty-free	11,000	1,024	9,976	
① MFN duty-free	2,028	93	1,935	
② duty-free by the Scheme	8,972	931	8,041	
Total	12,232	1,726	10,506	
% of LDC duty-free (LDC duty-free / Total)	90%	59%	95%	

Source: WTO PTA Database

Note: calculated with HS 10-digit data

¹⁰ The product coverage rates provided in the Section 3.3.1. are different from those of the Table 3 in that the former one is calculated with HS 6-digit code while the latter one is based on HS 10-digit code.

IV. Effectiveness of the Korea's Preferential Tariff Scheme for LDC

4.1. Trade Value

4.1.1. Overall Trade

The **Table 4** demonstrates Korea's trade pattern with LDCs between 1997 and 2016. If a country has ever been designated as LDC, the country was considered into the calculation such that the data includes Korea's trade value with 51 countries. It can be easily noticed that both imports and exports show an increasing trend over time despite some fluctuations. Meanwhile, exports always exceed imports, which means a trade surplus to Korea and vice versa to LDCs.

Table 4. Korea's Trade with LDCs (1997-2016)

Unit: million \$

	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
IM	1,013	494 (-51%)	1,295 (162%)	1,689 (30%)	885 (-48%)	909 (3%)	812 (-11%)	868 (7%)	1,010 (16%)	1,646 (63%)
EX	2,937	2,560 (-13%)	2,327 (-9%)	2,460 (6%)	3,026 (23%)	2,587 (-14%)	2,801 (8%)	4,826 (72%)	4,839 (0%)	5,845 (21%)
	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16
IM	1,729 (5%)	1,683 (-3%)	1,696 (1%)	2,448 (44%)	3,261 (33%)	3,357 (3%)	4,351 (30%)	5,833 (34%)	3,826 (-34%)	3,261 (-15%)
EX	4,705 (-20%)	6,798 (44%)	8,100 (19%)	9,698 (20%)	11,941 (23%)	9,205 (-23%)	9,238 (0%)	9,429 (2%)	7,449 (-21%)	8,592 (15%)

Source: calculated by the author using data from UN Comtrade

Note: Parentheses means a percentage change compared to the previous year.

The trend of Korea's trade with LDCs can be better conceptualized according to the **Figure 1**. Especially, the year of interest is 2000 and 2008 in which the Scheme for LDCs was initiated and expanded respectively. Right after the initiation of the preference system in 2000 Korea's imports from LDCs increased but soon it decreased and stagnated for several years. As already mentioned, the products covered by the Scheme at the initial stage were very few such that significant impacts on the actual trade pattern were hard to expect. On the contrary, import value rapidly increased after 2010, which might be interpreted as the effects of the expansion of the Scheme which occurred from 2008 to 2012.

Figure 1. Korea's Trade with LDCs (1997-2016)



Source: calculated by the author using data from UN Comtrade

Though, Korea's imports from LDCs plummeted by a considerable amount in recent two years – 2015 and 2016. The drop in 2015 was largely derived from Yemen. In that year, imports from Yemen declined by 2,031 million \$, mainly from the imports of natural gas, oil (both crude and not crude) and coal. In 2016, Equatorial Guinea recorded a decrease of 439 million \$, especially in crude oil and natural gas. Imports from Yemen also decreased by 345 million \$, mainly from the imports associated with gas, oil and corns.

4.1.2. Import from LDCs

Even though the overall trend of Korea's imports from LDCs supports a positive role of the Scheme, the relative importance of LDCs in Korea's imports seems still very thin. It can be easily captured by the share of imports from LDCs in Korea's total imports, indicated in the **Table 5**. For 20 years of the analyzed period, imports from 51 LDCs haven't been able to take up even 1% except three years (1999, 2000, 2014). Thus, from the perspective of LDCs' share in Korea's imports, the effectiveness of the Scheme seems ambiguous.

Table 5. LDCs' Share in Korea's Total Imports (1997-2016)

'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
0.7%	0.5%	1.1%	1.1%	0.6%	0.6%	0.5%	0.4%	0.4%	0.5%
'07	'08	'09	'10	'11	'12	'13	'14	'15	'16
0.5%	0.4%	0.5%	0.6%	0.6%	0.6%	0.8%	1.1%	0.9%	0.8%

Source: calculated by the author using data from UN Comtrade

Korea's major import partners from LDCs are listed in the **Table 6**. When estimated with the average import value for 20 years (1997-2016), Yemen is the biggest partner of Korea. It is not hard to guess that Korea imports a huge amount of natural resources such as natural gas and oil from that country. As to the regional distribution of the top-listed partners, four countries in the list – Yemen, Myanmar, Bangladesh and Cambodia – are located in Asia. It is highly probable that Korea has a more intimate trade relationship with Asian countries due to its geographical and cultural intimacy with them.

Meanwhile, the right column depicts the average import value for recent 5 years. The composition of partners is not much different from the 20-Year Average except the fact that Timor-Leste has recently stood out as an important partner of Korea.

Table 6. Korea's Major LDC Partners in Import

20-Year Average (1997-2016)			5-Year Average (2012-2016)			Unit: million \$
1	Yemen	556	1	Yemen	1,107	
2	Equatorial Guinea	263	2	Myanmar	477	
3	Zambia	232	3	Equatorial Guinea	458	
4	Angola	197	4	Zambia	321	
5	Myanmar	175	5	Bangladesh	320	
6	Bangladesh	135	6	Dem. Rep. Congo	300	
7	Guinea	108	7	Guinea	205	
8	Dem. Rep. Congo	89	8	Cambodia	183	
9	Cambodia	56	9	Angola	148	
10	Niger	51	10	Timor-Leste	78	

Source: calculated by the author using data from UN Comtrade

Major commodities that Korea imports from LDCs are presented in the **Table 7**, which is listed according to the average value for recent five years (2012-2016). It is no wonder that Korea mainly imports natural resources such as natural gas, petroleum oils, copper and nickel. In addition, it can be noticed that fish and apparel products are another major product Korea imports.

Table 7. Korea's Major Import Commodities from LDCs

No.	HS Code	Commodity	Unit: million \$
			Import Value
1	271111	Natural gas	1,261
2	270900	Petroleum oils (crude)	592
3	740311	Copper cathodes	565
4	620193	Men's jackets and similar articles	119
5	030379	Frozen fish	75
6	620293	Women's jackets and similar articles	72
7	271000	Petroleum oils (not crude)	69
8	750210	Raw nickel	66
9	410431	Bovine and equine leather	63
10	620342	Men's trousers of cotton	58

Source: calculated by the author using data from UN Comtrade

Note: Import value is an average value of 5 years (2012-2016). HS Code of version 1996.

4.1.3. Export to LDCs

LDCs' share in Korea's exports retains a similarity with the case of imports in that LDCs don't take up much proportion in it. Though, as illustrated in the **Table 8**, the share in exports has been over 1.5 % in general, which is better than that of imports.

Table 8. LDCs' Share in Korea's Total Exports (1997-2016)

'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
2.2%	1.9%	1.6%	1.4%	2.0%	1.6%	1.4%	1.9%	1.7%	1.8%
'07	'08	'09	'10	'11	'12	'13	'14	'15	'16
1.3%	1.6%	2.2%	2.1%	2.2%	1.7%	1.7%	1.6%	1.4%	1.7%

Source: calculated by the author using data from UN Comtrade

Korea's major LDC partners in export are listed in the **Table 9**. Liberia, Bangladesh, Angola, Myanmar, Cambodia, Yemen, Tanzania and Laos are robust destinations of Korean products. The left and right columns are not much different except the inclusion of Sudan and Senegal in recent 5 years. When seeing the geographical distribution of them, six countries – Bangladesh, Myanmar, Cambodia, Yemen, Afghanistan and Laos – are located in Asia.

Table 9. Korea's Major LDC Partners in Export

20-Year Average (1997-2016)			5-Year Average (2012-2016)			Unit: million \$
1	Liberia	2,702	1	Liberia	3,045	
2	Bangladesh	912	2	Bangladesh	1,298	
3	Angola	685	3	Angola	1,174	
4	Myanmar	403	4	Myanmar	851	
5	Cambodia	290	5	Cambodia	618	
6	Yemen	116	6	Tanzania	202	
7	Tanzania	83	7	Yemen	194	
8	Afghanistan	78	8	Laos	161	
9	Laos	66	9	Sudan	151	
10	Ethiopia	63	10	Senegal	131	

Source: calculated by the author using data from UN Comtrade

4.2. Descriptive Analysis

4.2.1. Intensive Margin

Preference margin can be defined as the gap between the tariff rates that beneficiary countries face and the rates that non-beneficiaries face. It is a useful tool to assess the actual benefits that LDCs can get from the preference scheme compared to others. However, the calculation of preference margin is technically quite tricky in that every country faces different tariff rates due to the existence of various trade agreements.

Thus, as an alternative to calculating each tariff rates that individual country faces, a comparison with MFN rates and Asia-Pacific Trade Agreement (APTA) rates will be employed. The former one would be the baseline of comparison since most LDCs would face the MFN rates if there was no preference system for them. The latter one would be an advanced level of comparison in that two of the LDCs – Bangladesh and Laos – can claim lower tariffs through it.

The **Table 10** demonstrates the preference margin of the Scheme in 2017 compared with the MFN rates. As they were calculated with simple averages, not with weighted averages, they cannot reflect relative weights of each line. Meanwhile, the lines corresponding to ‘MFN is NA’ were not used in the calculation since they are not ad-valorem duties but specific duties which are calculated as a specific amount per unit.

As shown in the table, preference margin of the LDC Scheme compared to MFN applied rates is 8.28%. LDCs are enjoying DFQF market access in 11,224 tariff lines out

of 12,440 among which 2,060 lines have been already duty-free at the MFN level. Thus, preference margin can be calculated in the remaining 9,124 lines. Meanwhile, with respect to the 1,216 lines which are not covered by the current Scheme, LDCs are bound to 68.79% of average tariff rates, which seems quite high.

Table 10. Preference Margin of All Products (Comparison with MFN)

Duties	No. of Lines	Simple Averages of Tariff		
		LDC	MFN	Difference
All Tariff Lines	12,440	6.72	12.79	6.07
LDC Dutiable	1,216	68.79	68.79	0
LDC Duty-free	11,224	0	6.73	6.73
LDC = MFN	2,060	0	0	0
LDC < MFN	9,124	0	8.28	8.28
MFN is NA	40	0	-	-

Source: WTO Tariff Analysis Online

Note: As of 2017 (HS 2017, 10-digit)

Similarly, the **Table 11** demonstrates preference margins compared with the APTA rates. On average, LDCs benefit from 7.83% of margin with respect to 9,024 tariff lines which are duty-free only in the LDC Scheme. Though, it is quite surprising that LDCs face higher tariff rates than APTA members in some cases. Actually, LDCs are bound to higher rates than APTA members by 19.79% in 63 lines. Specifically, agricultural goods, food products and clothing are included in those lines – such as fish, flowers, coffee, tea, beans, bread, vegetables, fruit, nuts and other edible parts of plants, jams, fruit juices and vegetable juices, crude oil, women's coats etc. – most of them are principal products in which LDCs have a comparative advantage in exports.

Table 11. Preference Margin of All Products (Comparison with APTA)

Duties	No. of Lines	Simple Averages of Tariff		
		LDC	APTA	Difference
All Tariff Lines	12,440	6.72	12.3	5.58
LDC Dutiable	1,216	68.79	67.76	-1.03
LDC = APTA	1,153	70.76	70.76	0
LDC > APTA	63	32.67	12.88	-19.79
LDC Duty-free	11,224	0	6.29	6.29
LDC = APTA	2,160	0	0	0
LDC < APTA	9,024	0	7.83	7.83
APTA is NA	40	0	-	-

Source: WTO Tariff Analysis Online

Note: As of 2017 (HS 2017, 10-digit)

Meanwhile, it would be meaningful to take a look at the preference margins by the type of products as well. The margins of agricultural goods compared to MFN rates can be conceptualized according to the **Table 12**. In sum, LDCs enjoy a 14.56% of preference margin in 932 tariff lines to which duty-free access is granted only by the LDC Scheme. Nevertheless, it must be mentioned that there are still 652 lines to which LDCs face duties whose average reaches 116.75%.

Table 12. Preference Margin of Agricultural Goods (Comparison with MFN)

Duties	No. of Lines	Simple Averages of Tariff		
		LDC	MFN	Difference
All Tariff Lines	1,690	45.04	53.07	8.03
LDC Dutiable	652	116.75	116.75	0
LDC Duty-free	1,038	0	13.07	13.07
LDC = MFN	96	0	0	0
LDC < MFN	932	0	14.56	14.56
MFN is NA	10	0	-	-

Source: WTO Tariff Analysis Online

Note: As of 2016 (HS2012, 10-digit)

A comparison of agricultural goods with the APTA members is depicted in the **Table 13**. According to it the preference margin that LDCs benefit from is 14.43% with respect to 932 tariff lines. However, in case of 9 lines (cut flowers and flower buds, coffee, tea, locust beans, seaweeds and other algae, sugar beet and sugar cane), LDCs face 141.58% of tariff rates on average, which is 116.4% higher than those for the APTA members.

Table 13. Preference Margin of Agricultural Goods (Comparison with APTA)

Duties	No. of Lines	Simple Averages of Tariff		
		LDC	APTA	Difference
All Tariff Lines	1,690	45.04	52.38	7.34
LDC Dutiable	652	116.75	115.14	-1.61
LDC = APTA	643	116.4	116.4	0
LDC > APTA	9	141.58	25.18	-116.4
LDC Duty-free	1,038	0	12.96	12.96
LDC = APTA	96	0	0	0
LDC < APTA	932	0	14.43	14.43
APTA is NA	10	0	-	-

Source: WTO Tariff Analysis Online

Note: As of 2016 (HS2012, 10-digit)

In case of non-agricultural goods, the preference margin exists at 7.66% compared to MFN rates as indicated in the **Table 14**. When compared to the figures of agricultural goods (14.56%), the margin of non-agricultural goods is much lower. Although the general level of tariffs is lower in the non-agricultural sector, a higher margin exists in the agricultural sector. Thus, some might postulate the effects of the preferential tariff could be higher in the agricultural goods, which will be tested in the Section 4.3.2.

Table 14. Preference Margin of Non-Agricultural Goods (Comparison with MFN)

Duties	No. of Lines	Simple Averages of Tariff		
		LDC	MFN	Difference
All Tariff Lines	10,605	0.62	6.56	5.94
LDC Dutiable	488	13.5	13.5	0
LDC Duty-free	10,117	0	6.22	6.22
LDC = MFN	1,867	0	0	0
LDC < MFN	8,219	0	7.66	7.66
MFN is NA	31	0	-	-

Source: WTO Tariff Analysis Online

Note: As of 2016 (HS2012, 10-digit)

When compared with the APTA members, LDCs enjoy 7.28% of favored condition in the export of non-agricultural products like the **Table 15**. However, LDCs face even higher tariff rates than the APTA members do in 20 lines including fish, crude oil and clothing. It implies that there exists discrimination among LDCs, in this case, between the APTA members (Bangladesh and Laos) and the others. In case KOR-ASEAN FTA is considered, this discrimination would get more severe.

Table 15. Preference Margin of Non-Agricultural Goods (Comparison with APTA)

Duties	No. of Lines	Simple Averages of Tariff		
		LDC	APTA	Difference
All Tariff Lines	10,605	0.62	6.26	5.64
LDC Dutiable	488	13.5	13.4	-0.1
LDC = APTA	468	13.69	13.69	0
LDC > APTA	20	9.15	6.67	-2.48
LDC Duty-free	10,117	0	5.91	5.91
LDC = APTA	1,868	0	0	0
LDC < APTA	8,218	0	7.28	7.28
APTA is NA	31	0	-	-

Source: WTO Tariff Analysis Online

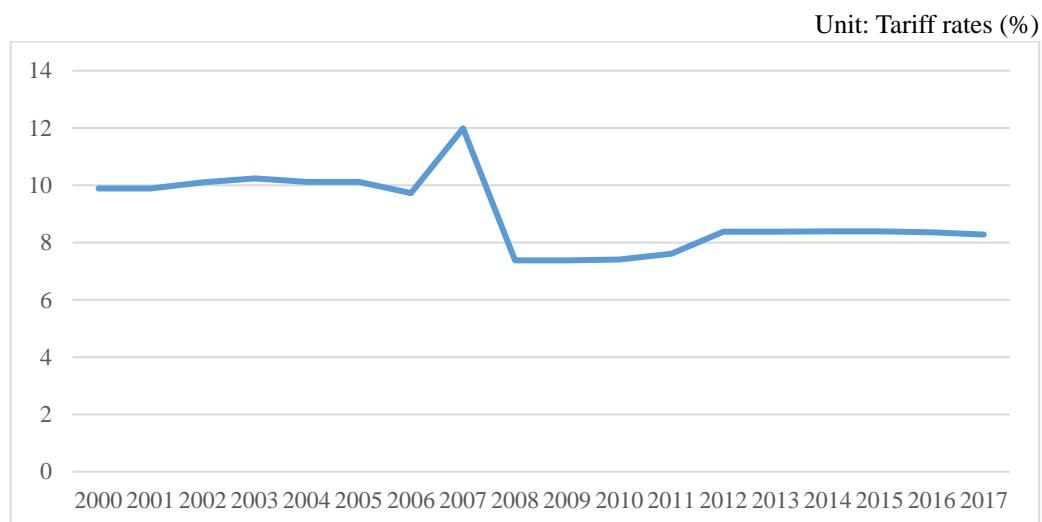
Note: As of 2016 (HS2012, 10-digit)

A historical record of the preference margin of the Scheme compared to MFN rates is portrayed in the **Figure 2**. The products used in the calculation are given duty-free access by the LDC Scheme but not from the MFN-level.

When the Scheme was first initiated in 2000, LDCs could enjoy almost 10% of margin compared to MFN rates and it was enhanced by 2% in 2007, which might be caused from a change in MFN rates. However, when the product coverage was enormously expanded in 2008, the margin rather decreased to under 8%. Since then, overall preference margin has constantly lingered on around 8%.

Though, it must be noted that the relative benefits of the LDC Scheme would be lower than the preference margin presented here, given a variety of trade agreements that Korea have with non-LDCs.

Figure 2. Preference Margin of Treated Products (2001-2017)



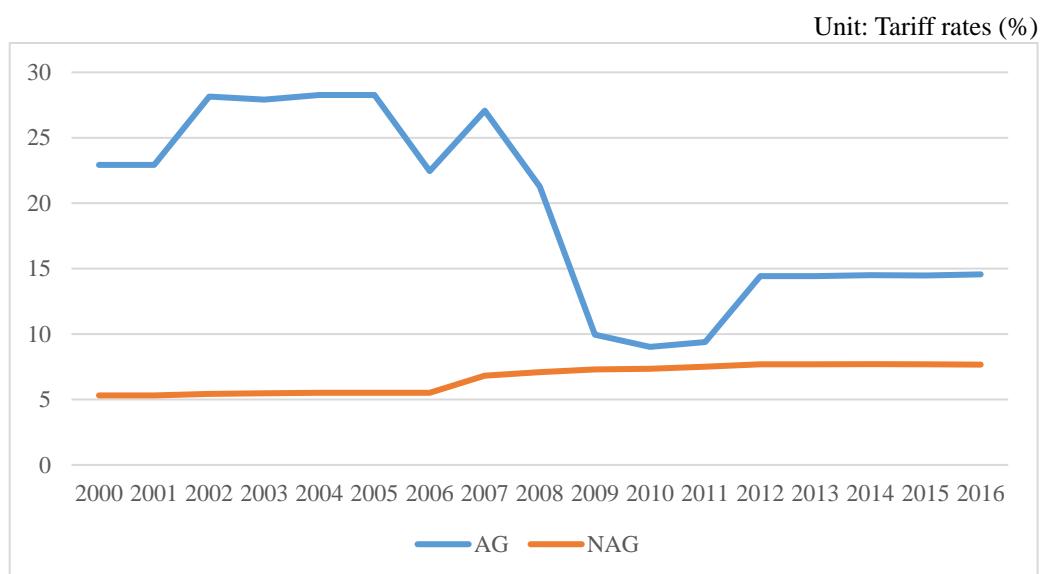
Source: made by the author using data from WTO Tariff Analysis Online

Figure 3 demonstrates preference margins of the Scheme by product types.

During the whole time period, agricultural goods have been enjoying much higher margin than non-agricultural goods. As Korea imposes a high level of tariff rates on the agricultural goods, non-LDCs have to face relatively higher tariff rates than LDCs. In contrast, Korea has substantially lowered a level of MFN rates in the non-agricultural sector, it resulted in a lower preference margin than agricultural sector.

Meanwhile, preference margin of the agricultural goods rapidly declined in 2008 when the product coverage was expanded. This is because the preference margin has to naturally drop when the products having tariff rates not much different from the MFN rates are added to the calculation. Though, margins of the non-agricultural goods haven't changed much and remained at 8% since 2007.

Figure 3. Preference Margin of Treated Products by Type (2000-2016)



Source: made by the author using data from WTO Tariff Analysis Online

4.2.2. Extensive Margin

Extensive margin refers to how much import has been newly created after the implementation of the preferential Scheme. As indicated in the **Table 16**, Korea's imports from LDCs occurred in total 2,640 tariff lines for twenty years (1997-2016). Among the 2,454 lines which are currently covered by the Scheme, imports of 803 lines were newly created after the Scheme. That is to say, 33% of the products subject to the Scheme hadn't been imported before but started to be traded after the Scheme. Thus, it would be plausible to say that the Scheme might have affected Korean importers to change their behavior into importing commodities of the LDCs.

Meanwhile, even in the tariff lines which are not covered by the Scheme, import creation occurred. Products belonging to 41 tariff lines were newly imported after 2008 although they were not given DFQF treatment. Hence, it would not be unreasonable to assume that the Scheme has had a positive effect on creating new trade both in treated and non-treated items.

Table 16. Extensive Margin of the Scheme

	Already Imported (A)	Newly Imported (B)	Sum (A+B)	Share (B / A+B)	Unit: Tariff lines
Covered Products	1,651	803	2,454	33%	
Not-Covered Products	145	41	186	22%	
Total	1,796	844	2,640	32%	

Source: calculated by the author using data from UN Comtrade
Note: HS 6-digit (HS 1996 version)

The field of industries where new imports from LDCs were created is indicated in the **Annex 2**. The industry of machineries experienced the biggest import creation. Likewise, import creation of textile, base metals and chemical industries were substantial as well. Notably, import creation of the products not treated by the Scheme mainly occurred in the agricultural sector.

4.2.3. Utilization, Utility and Application Rates

Although an extensive coverage of products and high preference margins are crucial to the effectiveness of the Scheme, it is also significant whether the Scheme is being well utilized. Sometimes Korean importers fail to claim a preference despite the existence of preferential system due to a lack of required documents, a delay in submitting documents or other various reasons.

In this regard, a closer look at the utilization of the Scheme is required, which will be analyzed with utilization rates. At the same time, utility rates and application rates will be dealt with together and their calculation formula are presented below according to the study by Cho and Kim (2010).

$$\text{Utilization rates} = \frac{\text{Total import value of the benefitted items}}{\text{Total import value of the covered items}}$$

$$\text{Utility rates} = \frac{\text{Total import value of the benefitted items}}{\text{Total import value}}$$

$$Application\ rates = \frac{Total\ import\ value\ of\ the\ covered\ items}{Total\ import\ value}$$

First, utilization rates indicate how frequently the Scheme is being utilized. That is to say, if a commodity is subject to the Scheme, it measures how much import was taking place by claiming that preference. Utility rates capture how much import is getting benefits from the Scheme with regard to all imports. Application rates measure how much import is covered by the Scheme. It can be considered as a product coverage rate which is calculated with import values, not with tariff lines. The summary of those rates from 2010 to 2015 is presented in the **Table 17** and the division between agricultural and non-agricultural goods is also provided.

Table 17. Utilization, Utility and Application Rates (2010-2015)

Type	2010	2011	2012	2013	2014	2015
Utilization Rates	All	80%	65%	79%	78%	80%
	AG	79%	57%	73%	88%	72%
	NAG	80%	65%	80%	77%	80%
Utility Rates	All	65%	58%	71%	66%	64%
	AG	49%	34%	50%	52%	36%
	NAG	66%	59%	72%	66%	65%
Application Rates	All	82%	88%	90%	84%	80%
	AG	62%	59%	68%	59%	50%
	NAG	83%	89%	91%	86%	82%

Source: WTO PTA Database

Note 1: All(All products), AG(Agricultural goods), NAG(Non-Agricultural goods)

Note 2: In the calculation of utility rates and application rates, MFN duty-free entries were excluded from the value of total import.

All in all, utilization rates have been around 70-80%. It is plausible to say that utilization of the Scheme has been improving, compared to the past records calculated by Cho and Kim (2010) in the **Annex 3**. Though, it is also true that some imports are taking place without claiming preferences of the Scheme. Instead, they enter into the Korean market by paying tariffs or by claiming other trade preferences. In case of the former scenario, it can be assumed that some barriers keep importers from using it, whereas, the latter case implies that using other preferences is easier and less complicated than utilizing the Scheme.

Utility rates have to be lower than utilization rates since they take total import value – not the value of covered items – as a denominator. From 2010 to 2015 they remained around 55-70%, which is comparably higher than the past rates in the **Annex 3**. Though, it can be still inferred that the remaining portion of 30-45% is either not covered by the Scheme or not utilized. Thus, there is a room for enhancing the current Scheme either by expanding product coverage or promoting higher utilization. Meanwhile, utility rates are higher in non-agricultural goods than agricultural goods.

Application rates had been very low until 2007 (See the **Annex 3**.) because only a few products were treated by the Scheme at that time. However, the rates rapidly increased over 70% when the product coverage was significantly expanded in 2008 and it has been maintained around 80%. However, in spite of the enhancement of application rates, a further expansion of product coverage is still required since the remaining part (around 20%) of the application rates is not yet covered by the Scheme.

4.3. Econometric Analysis

4.3.1. Triple Difference Model for Assessing Policy Effectiveness

Triple Difference Model (DDD Model) was originated from the Difference in Differences Model (DD Model) which is a useful methodology for evaluating policy effectiveness. DD Model has been employed in various fields of study and it has been used to assess the effects of preferential tariff systems as well. According to the DD Model, when a preferential tariff is given to LDCs, the effectiveness of it can be assessed by looking at the difference between LDCs (experiment group) and Non-LDCs (control group) before and after the scheme. When expressing this into equation, the effectiveness of the scheme equals to $DD = (D_1 - D_2)$ which is “Difference in Differences”.

$$\left. \begin{array}{l} D_1 = Y_{LDC.Post} - Y_{LDC.Pre} \\ D_2 = Y_{NonLDC.Post} - Y_{NonLDC.Pre} \end{array} \right\} \quad DD = (D_1 - D_2) = Policy\ Effects$$

* Y = import value

The regression formula of the DD Model is expressed like below. D_{group} is a dummy variable which takes the value “1” if a country belongs to the experiment group (LDCs) while it takes “0” in case of the control group (Non-LDCs). $D_{InEffect}$ is a time-variant dummy variable which changes from “0” to “1” when the policy is in effect. Here, β_3 is the DD estimator which is the coefficient of interest.

$$Y = \beta_0 + \beta_1 D_{group} + \beta_2 D_{InEffect} + \beta_3 D_{group} D_{InEffect} + \varepsilon$$

However, DD model has some shortages. First of all, it cannot address the endogeneity problem as pointed out by Frazer and Biesebroeck (2010) and Ito (2013). In case of the Korean Scheme for LDCs, LDC-status is exogenously given by the UN but tariff lines applied to the treatment are not exogenously chosen, resulting in the endogeneity issue. Another shortage of the DD Model is that it is tricky to conduct a product-level analysis with it. As only some portion of the products are covered by the Scheme, it is needed to differentiate the effects on treated items from non-treated ones.

Meanwhile, the Triple Difference Model is an upgraded version which overcame the limitations of the DD Model. Its basic concept is not much different from the previous one but it can better address the endogeneity issue. Also, it can conduct product-level analysis by adding the difference between products covered by the Scheme (Y^{Cov}) and those not covered (Y^{Not}), as expressed below.

$$\begin{aligned}
 D_1 &= Y^{Cov}_{LDC.Post} - Y^{Cov}_{LDC.Pre} \\
 D_2 &= Y^{Not}_{LDC.Post} - Y^{Not}_{LDC.Pre} \\
 D_3 &= Y^{Cov}_{NonLDC.Post} - Y^{Cov}_{NonLDC.Pre} \\
 D_4 &= Y^{Not}_{NonLDC.Post} - Y^{Not}_{NonLDC.Pre}
 \end{aligned}
 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} DD_1 = (D_1 - D_2) \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} DDD
 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} DD_2 = (D_3 - D_4)$$

* Y = import value

DD_1 refers to the difference between covered products and not-covered ones after the introduction of the Scheme in LDCs. Similarly, DD_2 means the difference between covered products and not-covered ones after the Scheme in Non-LDCs.

Consequently, the difference between DD_1 and DD_2 becomes the effectiveness of the Scheme : $DDD = (DD_1 - DD_2)$.

Meanwhile, the regression formula of the DDD Model is presented below. D_{group} and $D_{InEffect}$ are dummy variables as already explained in the DD Model. The newly added variable $D_{products}$ is also dummy variable which takes the value “1” if a product is treated by the Scheme while it takes “0” if it is not covered by the treatment. Summing up, D_{group} and $D_{products}$ are time-invariant dummy variables, whereas, $D_{InEffect}$ is a time-variant dummy which is switched to “1” from the year when policy is adopted. In this model, β_7 is the DDD estimator which is the coefficient of interest. It captures the effectiveness of the Scheme when all of the variables take “1” at the same time ($D_{group} = 1$, $D_{InEffect} = 1$, $D_{products} = 1$).

$$\begin{aligned} Y = & \beta_0 + \beta_1 D_{group} + \beta_2 D_{InEffect} + \beta_3 D_{products} \\ & + \beta_4 D_{group} D_{InEffect} + \beta_5 D_{InEffect} D_{products} + \beta_6 D_{products} D_{group} \\ & + \beta_7 D_{group} D_{InEffect} D_{products} + \varepsilon \end{aligned}$$

However, the above equation is too restrictive in that it doesn't consider the heterogeneity of countries and products in the base-level of import. Thus, the following unrestrictive specification presented by Frazer and Bieseboeck (2010) will be used as an alternative.

$$\begin{aligned} Y = & \beta_7 D_{group} D_{InEffect} D_{products} \\ & + country/product + product/year + country/year + \varepsilon \end{aligned}$$

In this specification, interactive fixed effects of country/product, product/year and country/year are added. Once these fixed effects are taken, all other variables are absorbed into them and only the DDD estimator – β_7 – remains as a result.

Meanwhile, to conduct the triple-difference analysis, a massive amount of data must be collected. The data for the analysis is retrieved from the UN Comtrade and it covers Korea's import value from the world including 51 LDCs¹¹ for 20 years (1997-2016). The data is based on the HS code 6-digit of the version 1996. Thus, the lists of the treated items published by the Korean government are changed into the version of HS 1996 for harmonization.

Additionally, it must be mentioned that the products which were given the preference in 2000 are excluded in the analysis. This is in order to ensure reliability of data in setting the reference year which divides pre and post policy. In the DDD Model, a reference year is necessary to examine the difference between before and after the policy. However, in case of the Korean Scheme, there are six reference years - 2000, 2008, 2009, 2010, 2011 and 2012. What is concerned is that the year 2000 is quite long before the others and not sequential. Thus, 2000 is excluded from a reference year and it would not be an issue given the fact that only 87 tariff lines (HS 6-digit) were granted in 2000. Meanwhile, in case of the products not treated by the Scheme, the reference year will be 2008 in which the expansion of product coverage was the biggest.

¹¹ If a country has ever been designated as a LDC, it is considered as a beneficiary, irrespective of the current beneficiary list.

4.3.2. Result of Regression

As already mentioned in the Section 1.1., this study aims to examine the effectiveness of the Korea's Preferential Tariff Scheme for LDCs and figure out whether there is any distinction between regions or between types of products. In the **Table 18**, the outcomes to these questions are provided.

Table 18. Main Results of the DDD Model Regression

Dependent variable: ln_import	(1)	(2)	(3)
LDC_Treated_InEffect	0.1175* (1.67)	-0.1477 (-1.01)	0.1058 (1.49)
AsianLDC_Treated_InEffect		0.3402** (2.06)	
LDC_AgriTreated_InEffect			0.2626 (1.21)
Country-Year Fixed Effect	Yes		
Product-Year Fixed Effect	Yes		
Country-Product Fixed Effect	Yes		
Adjusted R-square	0.7437		
Number of Observations	1,374,109		

Parentheses: t statistics

Significance level: * p < 0.10, ** p < 0.05, *** p < 0.01

Source: calculated by author

The result of the baseline analysis is indicated in the column (1) which reveals that the Korean LDC Scheme had positive impacts on the imports from LDCs. That is to say, a statistically significant increase in import was observed once a preference was given to a product originating from LDCs. Meanwhile, according to the column (2), it can be noticed that the impacts of the Scheme were positive only in Asian LDCs,

whereas, LDCs outside Asia are not revealing any significant effects. Next, the column (3) presents that there is no apparent distinction between agricultural and non-agricultural products.

For additional information, supplementary results of the regression are provided in the **Annex 4**. It was conducted to see if the preference erosion hampers the effectiveness of the Scheme. As already observed in the **Figure 2**, preference margin that LDCs enjoy has lingered on 8% since 2008 but the actual margin is lower than that when considering Korea's FTAs with developing countries that compete with LDCs in the Korean market. Thus, it can be speculated that the effects of the LDC Scheme have been declining as time passes – that is, as preference erosion is intensified as a result of the signing of FTAs with developing countries.

According to the column (1) of the **Annex 4**, this assumption seems probable. The results show that the effect of the Scheme was significantly positive in the third year from the initiation of preference but it soon decreased and the effect got negative from the seventh year. However, on closer inspection of the column (2) which introduces Asian dummies, it was revealed that those results were not derived from the preference erosion but from the regional differences of the LDCs. Asian LDCs showed positive effects regardless of how many years preference has been given, whereas, Non-Asian LDCs (mostly in Africa) revealed negative effects throughout the time.

V. Policy Recommendations

5.1. Product Coverage

One of the ways to improve the effectiveness of the Korea's preferential tariff scheme for LDCs is to further expand the product coverage of it. Especially, granting a preference to the products in which LDCs have a comparative advantage is of significance. Despite the expansion of the Scheme since 2008, Korea's product coverage rate is still at the lower level than other countries. In addition, still many products in which LDCs have a competitiveness are not treated by the Scheme.

The **Table 19** presents product coverage rates of the preference-giving countries. As is well known, advanced countries in Europe and Oceania reveal a high rate of product coverage, among which Australia, New Zealand, Norway and Switzerland have a rate of 100%. Meanwhile, it is quite surprising that even developing countries such as Kyrgyz Republic, Chile, China and India have a higher rate than Korea does.

Table 19. Product Coverage Rate of Preferential Tariff Scheme for LDCs (by Country)

Country	All Products	Agricultural	Non-agricultural
Australia (2017)	100.0%	100.0%	100.0%
New Zealand (2017)	100.0%	100.0%	100.0%
Norway (2017)	100.0%	100.0%	100.0%
Switzerland (2018)	100.0%	100.0%	100.0%
Kyrgyz Republic (2013)	99.9%	99.8%	99.9%
Chile (2017)	99.5%	97.2%	100.0%
EU (2018)	98.9%	95.8%	99.8%
Canada (2017)	98.6%	91.8%	100.0%

Japan (2017)	97.8%	96.4%	98.2%
China (2017)	96.6%	93.5%	97.1%
India (2016)	94.1%	77.0%	96.7%
Iceland(2017)	91.8%	63.2%	100.0%
Korea (2017)	89.9%	59.3%	95.0%
US AGOA(2017)	84.1%	86.2%	83.7%
US (2017)	82.3%	85.4%	81.7%
Turkey (2016)	80.5%	19.8%	92.9%
Taiwan (2017)	30.8%	23.2%	32.3%
Morocco (2017)	1.3%	5.9%	0.6%

Source: calculated by the author based on the data from WTO PTA Database

Note1: calculated with tariff lines

Note2: parenthesis means the year of analysis

The contrast between Korea and other countries is enhanced by the openness in the agricultural sector. All other countries except Turkey, Taiwan and Morocco have a higher rate of openness than Korea in the agricultural sector. In case of the US GSP and US AGOA, the overall coverage rates of them are lower than that of Korea but their openness in the agricultural products is higher. It is true that not only Korea but also other countries have protected their agricultural sectors. Though, like the case of EU EBA¹², a tendency of allowing access to agricultural market has kept strengthening.

Meanwhile, although Korea is more generous in the non-agricultural sector than in the agricultural one, the coverage ratio of it is still lower than other countries except US, Turkey, Taiwan and Morocco. Thus, in the non-agricultural sector as well, it is imperative to ensure more access to the products that LDCs have a comparative

¹² EU didn't include banana, rice and sugar at the initial stage of the EBA but they were finally added to the list – banana in 2006, rice and sugar in 2009.

advantage.

Above all, expansion of product coverage has a significance given the fact that the relative benefits of the LDC Scheme keep decreasing. As Korea has lowered a general level of MFN rates and signed several FTAs with developing countries, the intensive margin of the LDC Scheme is declining. Thus, it would be reasonable to say that expanding the product coverage is the only way to grant substantial preference for LDCs.

5.2. Rules of Origin

As mentioned earlier, promoting higher utilization of the Scheme is crucial to the effectiveness of the Scheme. One of the plausible ways to increase utilization rates is to relax the rules of origin. Korea already has a history of loosening the rules of origin when it changed the past RVC 50% standard into the RVC 40% in 2012. Though, when referring to the rules of other countries, the current standard could be even more relaxed. Many countries have adopted more generous rules, for instance, US allows the rules of RVC 35% in the AGOA system except apparel products.

In addition, a combination of different rules of origins can be another way to loosen the rules of origin. Korea adopts only one standard for the rules of origin, that is, the “Value Content Rules”. It has an advantage in that the rule is simple and easy to understand. However, this one-size-fits-all standard has shortcomings of not being able

to consider the differences in each product and in each country. For instance, to some products, it is more relevant to apply “Tariff Shift Rules” or “Specified Process Rules” rather than value content rules. Besides, to some exporting firms in LDCs, complying with the value content rules is quite demanding due to their different ways of sourcing or accounting systems. Thus, allowing a combination of different rules of origin in case of necessity would be very helpful for the efficient utilization of the Scheme. In case of the EU GSP, EU provides an alternative standard for the qualification of the rules of origin, in case a country faces difficulty in complying with one standard. For instance, if an exporting firm finds it difficult to apply the value content rules, it can use the tariff shift rules as an alternative, which would promote the utilization of preference.

Introducing an accumulation clause is another way to relax the rules of origin. In the Korean Scheme, accumulation of materials is allowed only when the materials are sourced from Korea. Though, given the objective of the Scheme to promote the trade of LDCs, allowing accumulation of the materials sourced from other LDCs into the calculation of regional value content would be helpful to promote the trade between LDCs. As UNCTAD (2017) pointed out, accumulation would be especially useful to small countries with limited domestic production resources. If they can't rely on the accumulation clause, complying with the value content rules would be very demanding. Actually, there are some countries that already adopted the accumulation clause. For instance, in the AGOA system, US allows third-party inputs which are bound to a certain cap.

5.3. Administrative Procedures

To ensure higher utilization of the Scheme, it is also important to make administrative procedures associated with the Scheme more efficient. Especially, improvement of the regulations on the origin certification and the submission of documents after custom clearance is underlined.

For an exporting company to be qualified for the preference, it should demonstrate and verify the fact that they complied with the required origin criteria. In this process, Korea requires a “third-party certification” by a government agency or authorized private entity. Though, in countries where the administrative system is not well equipped, getting the certification takes a lot of time and cost. Then, it results in a late submission of certificates and Korean importers fail to claim preferences.

One way to address this problem is to allow “self-certification” but it seems not probable when considering the lack of accounting system in LDCs. Instead, “authorized traders” could be regarded as an alternative. Authorized traders are not required to get a certification from other agencies once they are “authorized” as reliable traders by the importing country. Thus, it could reduce time and cost spent in getting a certificate for origin. Actually, this system is being utilized in the KOR-EU FTA and also in the EU GSP. Thus, it seems also probable that Korea allows this system for companies with a sound accounting system and reliable supply records.

In addition, allowing a late submission of the certificate of origin would be

useful to Korean importers as well. Sometimes, cargos arrive at the importing country earlier than the certificate of origin which is required to claim preference of trade agreements. In this case, to prevent importers from failing to get the benefits of preferential tariffs, it is allowed to finish the customs clearance first and later claim a preference within a year.

Unfortunately, this convenience is only available in FTAs and it is not yet introduced in the LDC Scheme. In many LDCs, their administrative systems are not well developed and the late submission of documents is quite frequent. Hence, allowing a late submission of documents after clearance would make Korean importers not reluctant to trade with LDCs.

VI. Conclusion

This study has attempted to examine the effectiveness of the Korea's Preferential Tariff Scheme for LDCs which was implemented from 2000. After providing a basic summary of the Scheme, the study analyzed the trend of Korea's trade with LDCs, revealing that Korea's import from LDCs has been increasing since the initiation of the Scheme. Though, it was also mentioned that LDCs' share in Korea's imports is still very limited.

In the descriptive analysis, it was stated that LDCs are enjoying preference margin from the Scheme, especially in agricultural goods. However, Korea's signing of FTAs with other developing countries brings down the actual preference margin of the Scheme. Meanwhile, it is quite inspiring that import creation occurred remarkably after the Scheme. In addition, utilization rates, utility rates and application rates have been improved in general, compared to the past.

In the econometric analysis, the study adopted the Triple Difference Estimator as a methodology for regression. According to the result, the Scheme had positive impacts on the imports from LDCs and the effects in the Asian LDCs stood out. Meanwhile, no significant distinction was observed between agricultural and non-agricultural goods.

Having analyzed the effectiveness of the Scheme from various perspectives, the study provided some policy recommendations to enhance the effectiveness. Above

all, expansion of product coverage was emphasized in that Korea's coverage rate is comparably lower than those of other countries. Additionally, recommendations on the rules of origin and administrative regulations of the Scheme were also underlined.

After all, the conclusion to be drawn here is that more attention should be devoted to the Scheme since there has been little attention to it in Korea. In addition, Korea must attempt to elaborate the rules and regulations of the Scheme to enhance the effectiveness. It is to be hoped that this research will serve as a foundation for future work to make this Scheme more effective.

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ANNEXES

Annex 1. Criteria for Inclusion and Graduation of LDCs

Criteria			Incl.	Grad.
Income		GNI per capita (average of 3 years)	\$1,025	\$1,230
Human Assets Indicator (HAI)	Health Index	under-five mortality rate	60	66
		% of undernourished population		
		maternal mortality ratio		
	Education Index	gross secondary school enrolment ratio		
		adult literacy ratio		
Economic Vulnerability Indicator (EVI)	Exposure Index	Population	36	32
		Remoteness		
		merchandise export concentration		
		% of agriculture, hunting, forestry and fishing in GDP		
		% of population in low elevated coastal zones		
	Shock Index	instability of exports of goods and services		
		victims of natural disasters		
		instability of agricultural production		

Source: website of the UN

Annex 2. Categories of the Newly Created Imports

Product Type	Covered	Not-Covered
Live animals, animal products	10	7
Vegetable products	33	24
Animals or vegetable fats and oils, prepared	43	9
Mineral products	35	
Products of the chemical or allied industries	91	1
Plastics and rubber	42	
Raw hides and skins, leather, fur skins	7	
Wood, pulp of wood	33	
Textile and textile articles	123	
Footwear, hats, wigs, articles made of stone, Ceramics	38	
Base metals	105	
Machineries, electrical machinery, sound recorders and reproducers, television and parts	156	
Vehicles, aircraft, vessels and associated transport equipment	20	
Optical, photographic instruments and apparatus, watches, musical instruments	38	
Arms and ammunition, miscellaneous manufactured articles, works of art	29	
Sum of Tariff Lines	803	41

Source: calculated by the author using data from UN Comtrade

Annex 3. Utilization, Utility, Application Rates (2000-2008)

Type	2000	2001	2002	2003	2004	2005	2006	2007	2008
Utilization Rates	25%	22%	24%	59%	69%	82%	87%	96%	29%
Utility Rates	1%	1%	1%	11%	19%	26%	16%	41%	21%
Application Rates	4%	5%	5%	19%	27%	32%	19%	43%	72%

Source: Cho and Kim (2010)

Annex 4. Supplementary Results of the DDD Model Regression

Dependent variable: ln_import	(1)	(2)
Year 1	0.0176 (0.22)	-0.2806 (-1.58)
Year 2	0.1295 (1.49)	-0.0172 (-0.09)
Year 3	0.2000** (2.12)	-0.0875 (-0.45)
Year 4	0.0769 (0.75)	-0.2002 (-0.98)
Year 5	0.0119 (0.11)	-0.3254 (-1.51)
Year 6	-0.0733 (-0.60)	-0.2832 (-1.19)
Year 7	-0.2298* (-1.70)	-0.5882** (-2.25)
Year 8	-0.3702** (-2.45)	-0.6771** (-2.34)
Year 9	-0.6715*** (-3.77)	-0.7838** (-2.33)
Year 1_Asia		0.3751* (1.90)
Year 2_Asia		0.1963 (0.95)
Year 3_Asia		0.3753* (1.70)
Year 4_Asia		0.3642 (1.57)
Year 5_Asia		0.4471* (1.81)
Year 6_Asia		0.2868 (1.05)
Year 7_Asia		0.4690 (1.56)
Year 8_Asia		0.4047 (1.21)
Year 9_Asia		0.1628 (0.42)
Country-Year Fixed Effect		Yes
Product-Year Fixed Effect		Yes
Country-Product Fixed Effect		Yes
Adjusted R-square		0.7437
Number of Observations		1,374,109

Parentheses: t statistics

Significance level: * p < 0.10, ** p < 0.05, *** p < 0.01

Source: calculated by author

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