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**Assessing Agricultural Trade Comparative Advantage of Myanmar
and Its Main Competitors**

Findings from UN Comtrade

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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ABSTRACT

This paper aims to provide a better understanding of Myanmar's agricultural export performance against its competitors in different regions and determine the policy actions for improving Myanmar's export performance. The normalized revealed comparative advantage (NRCA) index is computed to compare the agricultural competitiveness between Myanmar and its competitors from 2007 to 2016. The results show that: 1) Myanmar's agricultural export sector enjoys comparative advantage in the global market, but it is not competitive when compared with its major competitors; 2) Myanmar reveals a high level of NRCAs in black gram & pigeon peas, natural rubber, sesame seeds, rice, and frozen fish, while it has low NRCAs in crustaceans and dried fruits; and reveals no comparative advantage in bananas, fish fillets, maize, nuts, and watermelon in certain years. Three major policy implications are drawn, including diversifying Myanmar's export portfolio, strengthening export promotion and development, and attracting foreign direct investment to upgrade the cross-border value chain. [EconLit citations: Q17]

Keywords: Agricultural Export, Competitiveness, Revealed Comparative Advantage, Myanmar

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1. INTRODUCTION

Myanmar has been gaining continuous attention from the international community recently. With the gross domestic product (GDP) growth rate of 6.5% in 2016 (World Bank 2017), Myanmar is one of the world fastest growing economies (Kim and Thunt 2017). Agriculture is the backbone of Myanmar's economy, contributing to 37.8% of the (GDP, 70% of employment, and 27.5% of total exports earnings (FAO 2017). Myanmar's agricultural products are mainly land and labor intensive products, such as rice, pulses and beans, maize, sesame, fruits and vegetables (ADB 2013; Sri Lanka, EDB 2014; Embassy of the Republic of the Union of Myanmar 2017). However, Myanmar's agriculture sector has substantial unexploited potential to underpin its economic development (Raitzer, Wong, and Samson 2015). Agricultural exports were only US\$2.02 billion in 2016, compared with neighboring Viet Nam's exports of US\$19.64 billion in the same year (UN Comtrade 2017). With vast land in three different agroecological zones (i.e., the delta and coastal zone, the dry zone, and the hill regions), abundant water, low-cost labor resources, as well as a location close to two large markets in India and China, Myanmar's agricultural can become more competitive and has immense potential for growth.

Tight control over agricultural marketing, trading, and pricing during the socialist period (1962-1987) resulted in poor agricultural trade performance (Fujita and Okamoto 2006). The agricultural trading sector gradually developed after the movement to a more open economy in 1988 (Soe 2004; ADB 2012). Furthermore, Myanmar's government has introduced significant political and economic reforms in liberalizing agricultural trading

since 2011 (Raitzer, Wong, and Samson 2015), including the opening to global trade, encouraging foreign direct investment, and deepening agricultural policy reforms. In particular, the government is aiming to promote agricultural exports and pursue an exported-oriented strategy for agriculture (ADB 2013) by diversifying markets abroad and improving the quality of exported products (ADB 2012). Additional significant reforms have also come through the removal or reduction of export taxes, restrictive license requirements, and fixed exchange rates (Tun, Kennedy, and Nischan 2015). Furthermore, in 2016, the Vice Minister of Agriculture, Livestock, and Irrigation (MOALI) called for a change in Myanmar's national strategy in developing and managing its agri-food export sector, aiming to fuel agricultural export as embodied in the 2015 National Export Strategy.

The purpose of this paper is to provide a better understanding of Myanmar's agricultural export performance against its competitors in different regions and determine what actions should be taken to improve Myanmar's export performance to achieve more stable export earnings. The specific objectives are 1) to examine Myanmar agricultural export patterns including export destination, value, and trends; 2) to compare the normalized revealed comparative advantages (NRCAs) of Myanmar and its major competitors; and 3) to develop policy recommendations for enhancing Myanmar agricultural exports competitiveness.

2. RELATED LITERATURE REVIEW

Understanding the competitiveness of Myanmar in agricultural export sectors is essential for developing export policies. Comparative advantage describes the tendency for countries to export commodities for which they are relatively more competitive over the rest of the world and is considered vital to export competitiveness. It is widely used in the international trade to evaluate patterns of trade specialization and export competitiveness in a given sector (Bhattacharyya 2011; Startienė and Remeikienė 2014; Kilduff and Chi 2007).

Export competitiveness can be broadly defined and measured by the revealed comparative advantage (RCA) index. The RCA index is based on the economic efficiency of an industry, revealing a country's weak and strong export sectors and providing implications for trade policy. Additionally, RCA is easily calculated and widely used, and therefore, provides a simple way to evaluate a country's trade policy (Startienė and Remeikienė 2014). Researchers have utilized the RCA index to analyze the comparative advantage among countries/regions in various sectors including agriculture, manufacture, and industry. Table 2.1 summarizes a number of examples of research that utilizes the RCA index to analyze the competitiveness of certain countries or regions in international trade. There are several ways of using the RCA indices in analyzing trade performance including a) comparing the calculated value with the RCA neutral point, b) comparing given sectors by using the calculated index score, and c) directly comparing the calculated index values (Sanidas and Shin 2010; Yu and Qi 2015; Ferto and Hubbard 2002; Kalafsky and Graves 2016; Chandran and Sudarsan 2012).

Table 2.1: Related Literature Utilized Revealed Comparative Advantage Index for Analysis

Country/Region	Method	Year	Commodities	Conclusion	Author
Regional and Central and East European	Revealed comparative advantage	1992-1997	Agriculture products	Oceania, South America, the Caribbean, and Africa had a relative revealed comparative export advantage in agricultural products, while Asia countries showed comparative export disadvantage. The North American Free Trade Agreement (NAFTA) countries and Europe had neither a marked relative revealed comparative export advantage nor a disadvantage.	Bojnec (2001)
Hungarian	Balassa revealed comparative advantage; relative trade advantage; revealed competitiveness	1992-1998	Agri-food products	In spite of the significant changes in Hungarian's agriculture during the 1990s, the pattern of revealed comparative advantage has remained fairly stable. Hungary has revealed comparative advantages for eleven of the 22 aggregated product groups.	Ferto and Hubbard (2002)
China	Revealed comparative advantage	2000-2006	Agriculture products	Wood related products were showing the highest comparative advantages while vegetables, roots and tubers were showing improved export competitiveness between 2000 and 2006.	N. M. Aung (2009)
India and Association of Southeast Asian Nations (ASEAN) countries	Revealed comparative advantage and trade intensity index	1990-2007	Fishery sector	Revealed comparative advantage at commodity group level showed that there was trade complementarity between India and ASEAN to be exploited which can enhance bilateral trade.	Chandran and Sudarsan (2012)
Lithuanian	Revealed comparative advantage index and revealed symmetric comparative advantage index	2007–2011	Industrial products	Food, chemicals, wood and textile manufactures in Lithuanian took the strongest competitive positions in global markets during the period of 2007–2011.	Startienė and Remeikienė (2014)
China and Central and Eastern European countries	Revealed comparative advantage; Trade complementarity index; Intra-Industry trade index	2013	Agricultural products	There was a big difference in the comparative advantage of agricultural product export of China and five Central and Eastern European (CEE) countries. China and CEE countries should further bring out their comparative advantages and adjust product structure of exports to achieving mutual benefit in the bilateral trade.	Yu and Qi (2015)
Southern states in the United States	Revealed comparative advantage	1995-2013	Manufacturing	Revealed comparative advantage value varied significantly within the southern region between 1995 and 2013. All seven of the states with above-parity revealed comparative advantages in 2013 trended upward in export intensities.	Kalafsky and Graves (2016)

Despite that utilizing RCA analysis over the past decades, there is little existing literature measuring comparative advantages in the agricultural export sector of Myanmar. Additionally, when analyzing the competitiveness in Myanmar's agricultural export trade, most of the studies choose only limited products (e.g., rice, pulses, fish, etc.) and its neighboring countries (e.g., India, Viet Nam) as the competitors for analysis. Estudillo and Fujimura (2015) explored the degrees of comparative advantage of Viet Nam and Myanmar in rice production and exporting. They found that although both countries enjoyed a comparative advantage in rice exporting, Viet Nam is superior to Myanmar in the degree of comparative advantage, however, Myanmar has the ability to further release its potential in rice export. N. W. Aung (2009) calculated the RCAs of Myanmar's major agricultural commodities through 2000-2006, aiming to explore which commodities should be targeted for export to increase economic development. This research indicated that Myanmar was still dependent on exporting natural resources rather than value-added products leading to the recommendation to seek technical assistance from neighboring countries and major trade partners. Kim and Thunt (2017) also utilized the RCA index to explore Myanmar's export competitiveness in different industries. The result revealed that Myanmar had RCAs in most primary commodities such as the natural resources, agriculture, fishery, and livestock sectors, but the RCAs were in decline from 2010 to 2015.

Moreover, except for the RCA index, there are some other indices for analyzing the comparative advantage in the international trade. For example, 1) trade-cum-production indices containing both trade and production variables, e.g. Lafay index (LI) (Lafay, 1992); 2)

export-only indices containing only export variables, e.g. symmetric RCA index (SI) (Dalum, Laursen, and Villumsen 1998), weighted RCA index (WI) (Proudman and Redding, 2000), and additive RCA index (AI) (Hoen and Oosterhaven, 2006); and 3) indices using hypothetical situation such as comparative-advantage-neutral point, e.g. normalized RCA index (NI) (Yu, Cai, and Leung 2009). Each of the indices has pros and cons, thus it is important to well understand the properties of the indices and properly use them. Table 2.2 presented the statistical properties of the six indices with the different perspective such as the neutral point, symmetry, and comparability cross-sector, country, and over-time, etc. According to the summary, the NI has more favorable features as an RCA index than the others. Especially, its stable means across space and time, comparability across the country and time, and the independence from the selected country can be very helpful in analyzing the trade competitiveness and specialization. However, rarely research utilize NRCA index assessing Myanmar's comparative advantage of the agricultural export sector and its competitors. The only literature comes from the Myanmar, Ministry of Commerce, Department of Trade Promotion (2018) report, calculating the NRCA score for Myanmar in rice, seeds, fisheries and crustaceans, and rubber from 2002-04 and 2009-11, suggesting a relatively high level of productivity in these prioritized sectors. However, no NRCA score is calculated or analyzed for Myanmar's competitors in the global market, thus there is also no comparison for the comparative advantage between Myanmar and its competitors for given agricultural commodities for better understanding Myanmar's agricultural export situation across the years, or for developing further recommendations for Myanmar's agricultural

sector for enhancing the agricultural competitiveness.

Table 2.2: Statistical Properties of the Six Indices

Index	BI	LI	SI	WI	AI	NI
Comparative advantage neutral point	1	0	0	1	0	0
Independence from reference group of countries	X	X	X	X	X	√
Symmetry	X	√	√	X	√	√
Comparability cross-sector	X	?	X	X	X	√
Comparability cross-country	X	?	X	√	√	√
Comparability over-time	X	√	X	X	?	√

Source: Sanidas and Shin, 2010

Note: BI = Balassa's RCA index; LI = Lafay index; SI = symmetric RCA index; WI = weighted RCA index; AI = additive RCA index; NI = normalized RCA index.

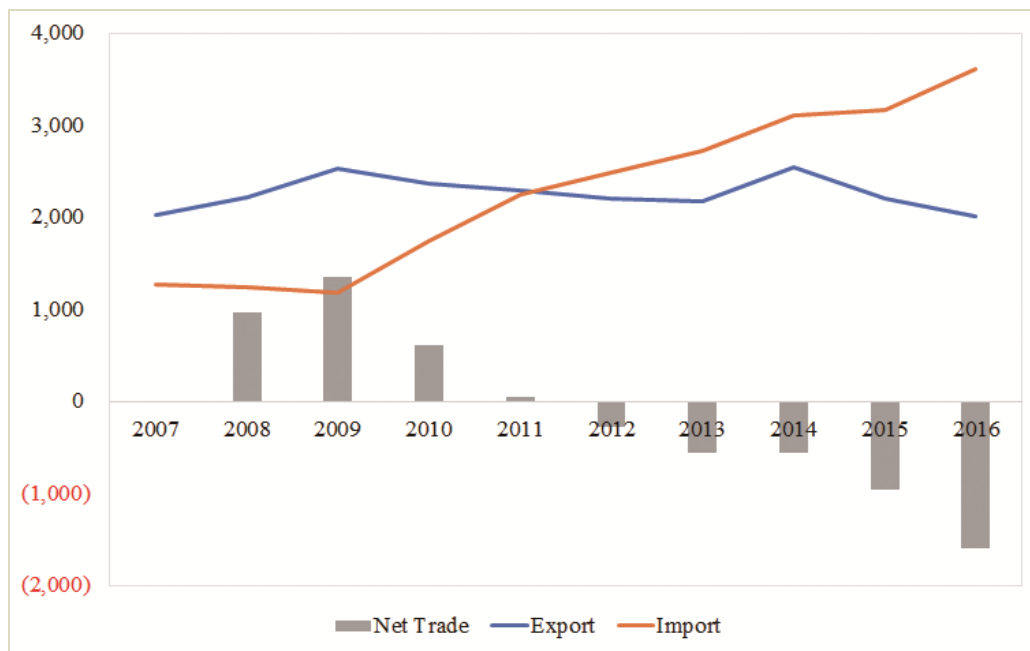
3. DATA SOURCE AND AGRICULTURE EXPORT PATTERN IN MYANMAR

Agricultural exports in Myanmar are underdeveloped with reliance on exporting primary goods. Myanmar's reformed policy agenda to promote exports went into effect in 2011 and we are interested in comparing the trade value and trends before and after the reforms. To do so, we utilize data collected from 2007 to 2016 in the United Nations (UN) Comtrade "Harmonized Commodity Description and Coding System" (HS) to examine trade values and trends pre and post reform (UN Comtrade 2017).

The UN Comtrade database provides accurate and disaggregated trade statistics, containing annual imports and exports statistics for more than 160 reporting countries or areas (USITC 2015). The products can be broken into around 5,000 sub-commodities with detailed descriptions. There are three concerns in the database. Firstly, the exports reported by one country may not exactly coincide with imports reported by its trading partner (UN Comtrade 2017). Secondly, in UN Comtrade, Myanmar's export data is not reported, therefore, we use partners' import value as Myanmar's export value. Thirdly, the UN Comtrade database doesn't include unofficial trade data (Gaulier and Zignago 2010).

The value of Myanmar's agricultural imports steadily grew from 2009 to 2016, while the export value is comparatively stable throughout the period (Figure 3.1). Moreover, Myanmar shift from a net export to a net import with trade deficit after 2011, and the trade deficit grows larger through 2011 to 2016. The imports products are mainly from consumer-ready and preprocessed intermediate goods which require further processing or value-added technology on the commodities.

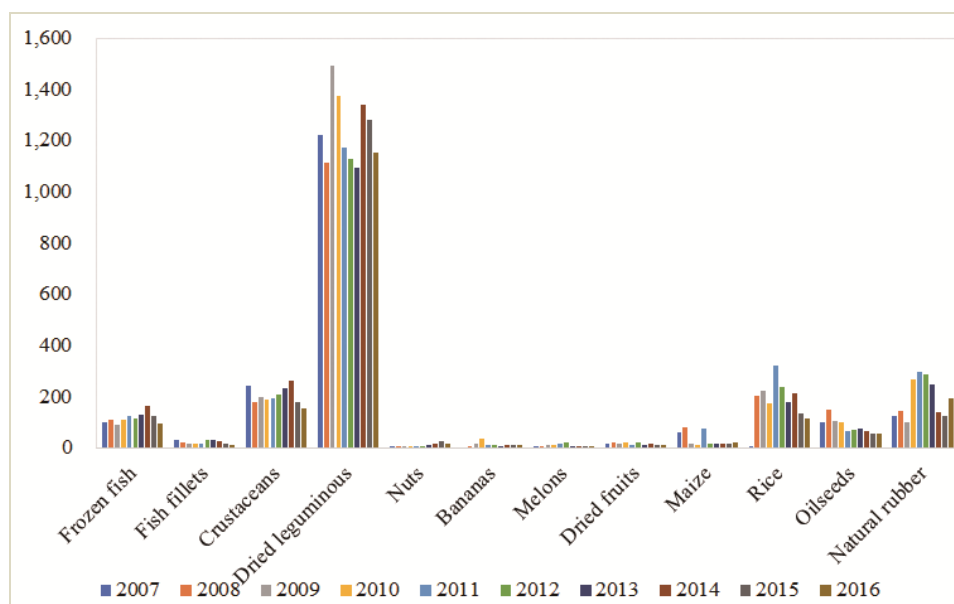
Figure 3.1: Myanmar Agricultural Trade Value (US\$ million), 2007-2016



Source: UN Comtrade. 2017.

To understand Myanmar's agricultural trade performance, the top export commodities are selected for further analysis. First, we select the top nine exported commodities by 2-digit HS code, and second, under these selected commodities, we choose the top 1 or 2 exported commodities by 4-digit or 6-digit HS code. According to UN Comtrade, Myanmar exports a range of commodities but these are dominated by dried legumes, natural rubber, crustaceans, rice and frozen fish (Figure 3.2). Myanmar's agricultural trade partners are mainly concentrated in the Asia Region especially India, China, Thailand, Japan, and Malaysia (Table 3.1).

Figure 3.2: Myanmar's Agricultural Exports by Commodity (US\$ million)



Source: UN Comtrade. 2017.

Table 3.1: Export Destinations of Myanmar's Agricultural Products in 2016

HS Code	Commodity	Export Destinations			
071331 & 071336	Black gram & pigeon peas	India (82.29%)	Malaysia (3.56%)	Indonesia (3.53%)	Sri Lanka (2.53%)
4001	Natural rubber	China (74.41%)	Malaysia (17.92%)	Japan (3.94%)	Korea (3.37%)
0306	Crustaceans	Japan (33.41%)	China, Hong Kong SAR (17.39%)	China (17.08%)	USA (11.67%)
1006	Rice	China (31.13%)	Belgium (16.41%)	France (8.65%)	Germany (8.30%)
0303	Frozen fish	UK (33.67%)	Malaysia (15.48%)	USA (14.72%)	UAE (11.33%)
120740	Sesame seeds	Japan (53.01%)	Other Asia (25.91%)	China (18.6%)	Singapore (1.65%)
0304	Fish fillets	Japan (26.74%)	Malaysia (23.82%)	Korea (17.44%)	UK (14.66%)
0813	Dried fruits	China (80.23%)	Pakistan (10.91%)	Malaysia (8.48%)	UAE (0.27%)
080711	Watermelons	China (92.04%)	Malaysia (4.17%)	China, Hong Kong SAR (3.69%)	Russia (0.10%)
1005	Maize	China (94.4%)	Philippines (3.95%)	Singapore (0.91%)	Other Asia, nes (0.74%)
0803	Bananas	China (99.91%)	Korea (0.08%)	Singapore (0.01%)	
0802	Nuts	India (97.46%)	Pakistan (0.98%)	Australia (0.42%)	UK (0.38%)

Source: UN Comtrade. 2017.

Note: SAR = Special Administrative Region; UAE = United Arab Emirates; UK = United Kingdom; USA = United States.

Dried legumes (e.g., black gram, pigeon peas, dried chickpeas, small red beans, kidney beans, and cowpeas, etc.) are Myanmar's largest agricultural export by value (Table 3.2). Myanmar is one of the world's largest producers of beans and pulses, accounting for 28 percent of the total sown area (World Bank 2017) of the country. Other high volume producers include Canada, India, Australia, and Tanzania (Myanmar Inside 2015). However, the export value of dried legumes has fluctuated greatly over the past ten years. There was a tremendous decline in dried leguminous export value from 2009 to 2011, mainly because of the decreasing export volume to India. India is the largest buyer of dried legumes from Myanmar, accounting for 65%-83% of Myanmar's total dried legumes export over the past ten years partly because of the ease of procurement, short delivery time, and high domestic demand (Myanmar Inside 2015). Nevertheless, the concentration of dried legume exports to India makes Myanmar's pulses and bean sector vulnerable to India's import and policy changes.

Table 3.2: Export Value and Commodity Share of Agricultural Products from 2007 to 2016 (US\$ million and %)

HS Code	Commodity	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
0303	Frozen fish	99.03 (1.04%)	109.13 (1.10%)	92.48 (1.02%)	108.93 (1.18%)	124.33 (1.11%)	112.49 (1.00%)	131.82 (0.97%)	165.29 (0.58%)	125.43 (0.87%)	95.05 (0.82%)
0304	Fish fillets	30.88 (0.32%)	23.51 (0.24%)	16.13 (0.18%)	18.47 (0.20%)	15.08 (0.13%)	30.12 (0.27%)	30.81 (0.23%)	27.48 (0.10%)	14.88 (0.10%)	12.71 (0.11%)
0306	Crustaceans	241.88 (2.54%)	179.34 (1.80%)	200.67 (2.21%)	189.72 (2.06%)	192.54 (1.71%)	207.98 (1.85%)	230.72 (1.70%)	264.32 (0.93%)	177.63 (1.23%)	156.14 (1.35%)
0713	Dried legumes	1220.95 (12.82%)	1113.87 (11.19%)	1494.03 (16.45%)	1375.48 (14.93%)	1170.96 (10.42%)	1126.81 (10.05%)	1095.33 (8.06%)	1338.38 (4.72%)	1281.52 (8.90%)	1151.97 (9.97%)
0802	Nuts	5.43 (0.06%)	1.64 (0.02%)	2.65 (0.03%)	6.63 (0.07%)	4.34 (0.04%)	4.51 (0.04%)	9.14 (0.07%)	16.45 (0.06%)	24.19 (0.17%)	16.87 (0.15%)
0803	Bananas	0.00 (0.00%)	0.83 (0.01%)	15.69 (0.17%)	33.87 (0.37%)	10.67 (0.09%)	10.59 (0.09%)	8.93 (0.07%)	11.56 (0.04%)	12.57 (0.09%)	9.89 (0.09%)
0807	Melons	0.67 (0.01%)	8.00 (0.08%)	10.88 (0.12%)	10.01 (0.11%)	15.83 (0.14%)	20.45 (0.18%)	7.36 (0.05%)	0.86 (0.00%)	0.95 (0.01%)	0.65 (0.01%)
0813	Dried fruits	17.31 (0.18%)	20.40 (0.20%)	18.25 (0.20%)	19.26 (0.21%)	11.70 (0.10%)	20.57 (0.18%)	10.01 (0.07%)	15.34 (0.05%)	13.73 (0.10%)	10.91 (0.09%)
1005	Maize	58.28 (0.61%)	78.00 (0.78%)	17.31 (0.19%)	9.29 (0.10%)	73.51 (0.65%)	16.96 (0.15%)	16.07 (0.12%)	15.10 (0.05%)	14.19 (0.10%)	20.42 (0.18%)
1006	Rice	5.46 (0.06%)	203.08 (2.04%)	223.41 (2.46%)	174.29 (1.89%)	319.14 (2.84%)	237.63 (2.12%)	178.45 (1.31%)	215.42 (0.76%)	132.72 (0.92%)	113.15 (0.98%)
1207	Oilseeds	99.97 (1.05%)	148.78 (1.49%)	104.73 (1.15%)	97.68 (1.06%)	63.64 (0.57%)	70.53 (0.63%)	74.00 (0.54%)	64.16 (0.23%)	53.74 (0.37%)	55.62 (0.48%)
4001	Natural rubber	122.94 (1.29%)	145.47 (1.46%)	102.48 (1.13%)	269.41 (2.92%)	295.21 (2.63%)	285.96 (2.55%)	246.45 (1.81%)	141.41 (0.50%)	125.24 (0.87%)	194.13 (1.68%)

Source: UN Comtrade. 2017

Natural rubber is the second largest export commodity in Myanmar, accounting for 1.6% of total world rubber exports (Win 2016). Most of the exports went to China and Malaysia in 2016 (Table 3.1). The export trend of natural rubber export is bell-shaped. The trade value climbed from 2007 to 2011, and then started to decrease till 2015, but bounced back in 2016 with the value of US\$194.13 million. This sector helps to utilize underemployed labor resources since it needs intensive labor resource (N. W. Aung 2009). However, the rubber exported by Myanmar is low quality and therefore the price of Myanmar's rubber is far lower than the world standard rubber price (Win 2013).

Myanmar has a long coastline with 2,832 kilometers, providing a very good base for the fishery sector (Haggblade, Boughton, and Denning 2013). The fishery sector plays an important role in the international export market for foreign exchange earnings (FAO 2012). Frozen fish, fish fillets and other fish meat, and crustaceans are the major export products in this sector. Crustaceans (e.g., lobster, shrimp, pawn, and crab) account for the highest export share in the fishery sector, with an export value of US\$143.99 million in 2016. Japan stands as an important importer of Myanmar's crustaceans, followed by China, Hong Kong Special Administrative Region (SAR); China; and the United States (USA). Frozen fish (e.g., salmon, trout, tilapias, catfish, eels, and plaice) is mainly exported to the United Kingdom (UK), Malaysia, the USA, and the United Arab Emirates, with an export value of US\$87.51 million in 2016. The export value of frozen fish was the highest in 2014 and then decreased in 2015 and 2016. Fish fillets are mainly exported to Japan, Malaysia, Korea, and the UK, with the highest export value of US\$30.88 million in 2007. However, one limitation of export potential of the fishery sector may be the lack of a capital market, insufficient facilities such as ice plants, cold storage, canning factories and fish-meal plants (N. W. Aung 2009).

Rice is the most important agricultural commodity of Myanmar and is the primary staple food. Myanmar was the largest rice exporter in the 1950s (before General Ne Win seized power in 1962) (Raslan 2017) though in recent years Myanmar has faced challenges of low productivity (with the average paddy yields of only 2.5 tons per hectare). Although Myanmar faces strong competition from Thailand,

Viet Nam, and Cambodia, rice is also one of the major sectors prioritized by the Myanmar National Export Strategy (2015), aiming to fuel the country's sustainable development through export promotion (World Bank 2017). In addition, the demand for the higher-quality rice has put pressure on Myanmar's rice sector, which has been focused on low-quality export markets. This necessitates that Myanmar focus on improving quality (e.g., developing the high-quality rice like "Paw San" variety) for new market opportunities (World Bank 2017). The export value of rice has decreased since 2011 from US\$319.14 million to US\$113.15 million in 2016. The sharp export drop in 2015 was mainly because of the widespread flood that decreased rice production in Myanmar (Win and Aung 2015; FAO 2015). The top four export destinations for Myanmar's rice include China, Belgium, France, and Germany. China imports mainly semi-/wholly milled rice and broken rice; France and Germany import mainly husked (brown) rice and semi-/wholly milled rice; and Belgium mainly imports husked (brown) rice and broken rice. The World Bank predicted there are good market prospects to accommodate higher rice exports from Myanmar over the next 10-15 years. China is becoming a large net importer of Myanmar rice, and the European Union (EU) has opened its markets for duty-free imports from Myanmar. However, Myanmar's rice price fluctuates more profoundly than its neighbor countries.

China is also Myanmar's biggest buyer of maize. In 2016, Myanmar exported US\$20.42 million worth of maize to the world, 94.4% of which went to China with other small amounts going to the Philippines and Singapore. However, Chinese officials have recently conducted more rigorous inspections since 2016, pushing Myanmar to pay more attention to the quality of maize exports and encouraging the country to diversify trade partners (USDA 2016). Myanmar's maize export value was comparatively stable and low after 2011. The Myanmar government may want to provide technical assistance, as well as providing subsidies to farmers to develop this sector (USDA 2016).

Myanmar is a significant producer of oilseeds. Oilseeds cover around 20% of total crop area and are important crop with higher margins than rice (Wijnands et al. 2014). However, oilseed's export value decreased from US\$99.97 million in 2012 to US\$55.62 million in 2016. The top export destinations

include Japan, China, Thailand, and India. According to the FAO (2014) data, the oilseed sector of Myanmar is heavily regulated on all levels of the chain, resulting in severe distortions (Wijnands et al. 2014). In addition, amongst all the oilseed crops, sesame oilseed is the most important one, occupying 47% of the oilseed sown area, and the export value accounts for 80% of total oilseed exportation.

Edible fruit and nuts are also vital sectors in agricultural trade in Myanmar. Approximately 97 percent of nuts (e.g., almonds, walnuts, hazelnuts, chestnuts, pistachios, and macadamia, etc.) are exported to India. Other export destinations include Pakistan, Australia, and the UK. China is Myanmar's biggest buyer of bananas, melons and papaws, and dried fruit. In addition, these edible fruit and nuts products are also exported to other Asia counties like Singapore, Malaysia, Pakistan, etc. For example, bananas are also exported to the Rep. of Korea and Singapore; melons and papaws are exported to Singapore; Malaysia; and China, Hong Kong SAR; dried fruit are exported to Pakistan, Malaysia, and the United Arab Emirates. The nuts' export value went steadily up from 2012 to 2016. Export value of melons increased from US\$0.67 million in 2007 to US\$20.45 in 2012. However, the trade value declined to US\$0.65 million in 2016. Dried fruit exports fluctuate but have generally decreased, while the export value of bananas was stable after 2011.

In summary, the top exported products are concentrated on primary agricultural products, while there is a lack of value-added products. In addition, the foreign trade is highly dependent on certain Asian countries such as China and India. This makes Myanmar's exports vulnerable to partner's trade policy or external shocks. Appropriate measures should be taken to diversify export commodities and destinations.

4. METHOD: AN APPLICATION OF THE NORMALIZED REVEALED COMPARATIVE ADVANTAGE INDEX

Although the Balassa Revealed Comparative Advantage (BRCA) index is useful in assessing whether or not a country has comparative advantage in a certain commodity (Balassa 1965), its magnitude has neither the ordinal property nor the cardinal property (Hillman 1980; Yeats 1985, Yu, Cai, and Leung 2009). Additionally, the BRCA index has asymmetric property. This index has a lower bound of 0 with 1 being the comparative advantage-neutral point, while its upper bound in general is from 1 to $+\infty$, implying the same BRCA score might suggest different levels of comparative advantage for different countries or commodities. Yu, Cai, and Leung (2009) demonstrated that the NRCA index is capable of revealing the extent of comparative advantage more precisely and consistently than BRCA. NRCA not only successfully solves the asymmetric issues but also can be compared across the commodity, country and time. Furthermore, the NRCA index has a stable mean across space and time, and the independent aggregation level can be helpful in analyzing trade specialization (Yu, Cai, and Leung 2009; Sanidas and Shin 2010).

The NRCA method generated by Yu, Cai, and Leung (2009) is utilized to compare the competitiveness between Myanmar and its competitors in agricultural export industries. The key to the derivation of the NRCA index is the comparative-advantage-neutral point. Under the situation of comparative-advantage-neutral, country j 's export of commodity i would be equal to $E^j E_i / E^W$. Country j 's actual export of commodity j in the real world would be E_i^j , and the difference would be stated as

$$\Delta E_i^j = E_i^j - E^j E_i / E^W$$

Normalizing ΔE_i^j by the world export market, E , the NRCA index is obtained as follows:

$$NRCA_{ij} = (E_i^j / E^W) - (E^j E_i / E^W E^W)$$

Where E_i^j refers to county j 's export of product i ; E^j is the total exports of country j ; E_i refers to world export of product i ; E^W tells of total world export. An NRCA value greater than zero indicates that a country reveals comparative advantage in a particular product, while a value of less than zero indicates a

revealed comparative disadvantage (Yu, Cai, and Leung 2009). An increasing NRCA value is interpreted as a country gaining advantage in that product, relative to the world market. Additionally, a higher NRCA value indicates higher comparative advantage. Since the NRCA index is normalized by the size of world total exports and typically is a huge number compared with a country's trade sector, the numeric value is usually very small. Yu, Cai, and Leung (2009) recommended to scale them by 10,000. Additionally, all trade values are deflated to 2016 prices with the consumer price index (CPI) from the World Bank.¹

To identify Myanmar's agricultural exporting competitors, the following procedures are applied. First, we select the top exported commodities by 4 or 6-digit HS code. Second, for each of the exported products, we find the top four export destinations of Myanmar. Third, for each of these export destinations, we find other leading exporters of the same commodity to the four selected countries and then choose competitors from these countries. There are several rules in choosing the competitors: 1) we choose Asian countries as the priority; 2) if the non-Asian countries are one of the top exporters to Myanmar's biggest export destinations, or if the non-Asian countries are one of the top four exporters for more than one target destination, we will also take it as the competitor. The selected commodity, export destinations, and competitors of Myanmar are shown in Table 4.1.

¹ The CPI index at the world level is the average of the CPI indexes of all the countries.

Table 4.1: Selected Commodity, Export Destinations, and Competitors of Myanmar

HS Code	Commodity	Export Destinations	Competitors for Each Export Destination	Competitors
071331 & 071360	Black gram & Pigeon peas	India (82.29%), Malaysia (3.56%), Indonesia (3.53%), Sri Lanka (2.53%)	To India: Myanmar, United Rep. of Tanzania, Mozambique, Sudan To Malaysia: Myanmar, Australia, Thailand, China To Indonesia: Myanmar, Ethiopia, Australia, Thailand To Sri Lanka: Myanmar, Australia, India, Thailand	Australia, China, India, Thailand, United Rep. of Tanzania
0303	Fish; frozen	UK (33.67%), Malaysia (15.48%), USA (14.72%), United Arab Emirates (11.33%)	To UK: Norway, Myanmar, France, Netherlands To Malaysia: China, Viet Nam, Indonesia, Japan To USA: China, Canada, Korea, other Asia To United Arab Emirates: other Asia, Myanmar, India, Indonesia	China, India, Indonesia, Japan, Norway, Viet Nam
0304	Fish fillets and other fish meat (whether or not minced); fresh, chilled, or frozen	Japan (26.74%), Malaysia (23.82%), Korea (17.44%), UK (14.66%)	To Japan: Norway, USA, Chile, China To Malaysia: Viet Nam, Indonesia, China, USA To Korea: Viet Nam, USA, Russian Federation, China To UK: Iceland, China, Germany, Russian Federation	China, Indonesia, Norway, Russian Federation, USA, Viet Nam
0306	Crustaceans	Japan (33.41%), China, Hong Kong SAR (17.39%), China (17.08%), USA (11.67%)	To Japan: Russian Federation, Viet Nam, India, Indonesia To China: Canada, USA, New Zealand, Argentina To China, Hong Kong SAR: China, Viet Nam, Australia, USA To USA: India, Canada, Indonesia, Ecuador	Canada, China, India, Indonesia, Russian Federation, USA, Viet Nam
1005	Maize (Corn)	China (94.40%), Philippines (3.95%), Singapore (0.91%), Other Asia, nes (0.74)	To China: Ukraine, USA, Lao People's Dem. Rep., Myanmar To Philippines: Thailand, Argentina, Brazil, USA To Singapore: Malaysia, Pakistan, USA, Indonesia	Indonesia, Lao People's Dem. Rep, Malaysia, Thailand, Ukraine, USA
1006	Rice	China (31.13%), Belgium (16.41), France (8.65%), Germany (8.30%)	To China: Viet Nam, Thailand, Pakistan, Cambodia To Belgium: Spain, Italy, Netherlands, Pakistan To France: Italy, Thailand, Cambodia, Spain To Germany: Italy, Belgium, Netherlands, Cambodia	Cambodia, Italy, Pakistan, Spain, Thailand, Viet Nam

HS Code	Commodity	Export Destinations	Competitors for Each Export Destination	Competitors
120740	Sesame seeds	Japan (53.01%), Other Asia, nes (25.91), China (18.6%), Singapore (1.65%), Rep. of Korea (0.59%)	To Japan: Nigeria, Paraguay, United Rep. of Tanzania, Myanmar Other Asia: India, Myanmar, Thailand, Sri Lanka To China: Ethiopia, Nigeria, Sudan, United Rep. of Tanzania Singapore: India, Mexico, Nigeria, Myanmar	India, Nigeria, Sri Lanka, Thailand, United Rep. of Tanzania
0802	Nuts (excluding coconuts, Brazils and cashew nuts)	India (97.46%), Pakistan (0.98%), Australia (0.42%), UK (0.38%)	To India: USA, Iran, Australia, Sri Lanka To Pakistan: Indonesia, USA, Iran, Afghanistan To Australia: USA, Turkey, Areas, nes, China To UK: USA, Germany, Spain, Italy	China, Indonesia, Iran, Sri Lanka, USA
0803	Bananas, including plantains	China (99.91%), Rep of Korea (0.08%), Singapore (0.01%)	To China: Philippines, Ecuador, Thailand, Viet Nam To Rep of Korea: Philippines, Ecuador, Guatemala, Peru Singapore: Philippines, Malaysia, Ecuador, Mexico	Ecuador, Malaysia, Philippines, Thailand
080711	Watermelons	China (92.04%), Malaysia (4.17%), China, Hong Kong SAR (3.69%), Russian Federation (0.10%)	To China: Viet Nam, Myanmar, Malaysia To Malaysia: Thailand, Rep. of Korea, Australia, China To China, Hong Kong SAR: Malaysia, China, Japan, Philippines To Russian Federation: Iran, Brazil, Turkey, China	China, Japan, Malaysia, Philippines, Rep. of Korea, Thailand, Viet Nam
0813	Fruit, dried; mixtures of nuts or dried fruits of this chapter	China (80.23%), Pakistan (10.91%), Malaysia (8.48%), United Arab Emirates (0.27%)	To China: Thailand, Myanmar, USA, Chile To Pakistan: India, Indonesia, Afghanistan, Myanmar To Malaysia: Indonesia, Thailand, China, India To United Arab Emirates: Thailand, India, Turkey, USA	China, India, Indonesia, Thailand, USA
4001	Natural rubber, balata, gutta-percha, guayule, chicle and similar gums	China (74.41%), Malaysia (17.92), Japan (3.94%), Rep of Korea (3.37%)	To China: Thailand, Malaysia, Indonesia, Viet Nam To Malaysia: Thailand, Cote d'Ivoire, Viet Nam, Philippines To Japan: Indonesia, Thailand, Viet Nam, Malaysia To Rep of Korea: Indonesia, Thailand, Viet Nam, Malaysia	Indonesia, Malaysia, Philippines, Thailand, Viet Nam

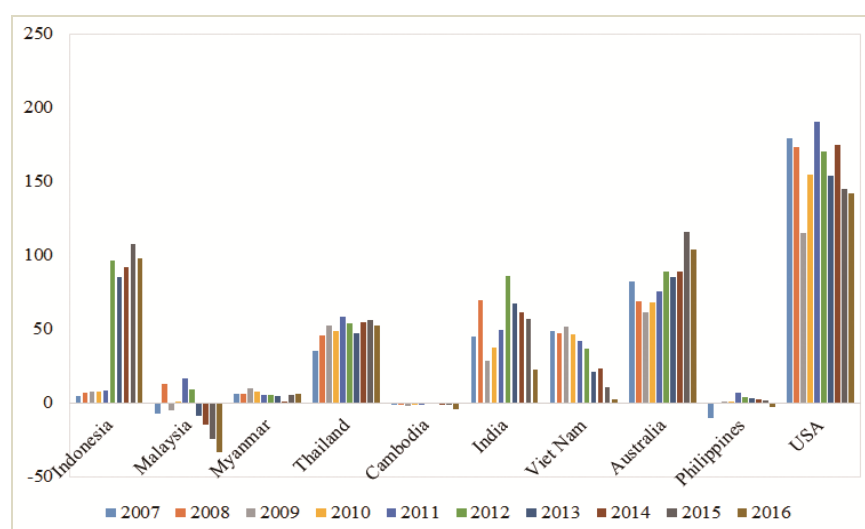
Source: UN Comtrade. 2017.

Note: China, Hong Kong SAR = Special Administrative Region; UK = United Kingdom, USA = United States, nes = abbr. not elsewhere specified in UN Comtrade database

5. COMPARISON OF NORMALIZED REVEALED COMPARATIVE ADVANTAGE BETWEEN MYANMAR AND ITS MAIN COMPETITORS

The NRCA scores for the agricultural sector and the selected commodities of Myanmar and its competitors are calculated and shown below in Figures 5.1 to 5.14. The NRCA scores of Myanmar were higher than zero from 2007 to 2016, indicating Myanmar enjoyed a comparative advantage in agricultural exports in the global market (Figure 5.1). The NRCA scores are comparatively stable across the ten years for Myanmar, except for the low NRCA score in 2014. This outlier, which is generated because of Myanmar's extremely high total export value, mainly came from exporting pearls, stones, mineral fuel, and apparel in 2014. Myanmar's agricultural export sector is not very competitive when compared with a number of identified competitors. The USA shows the highest NRCA score among the countries, followed by Australia, Thailand, India, Viet Nam, Indonesia, and Myanmar. Myanmar's agricultural export sector is more competitive than that of Malaysia, Cambodia, the Philippines, Japan, and China. In addition, each country shows different fluctuating trends in export competitiveness. For example, Viet Nam reveals decreasing agricultural competitiveness in the global market, while Australia shows upward competitiveness during the past ten years. Only Myanmar and Thailand show comparatively stable competitiveness.

Figure 5. 1: NRCA Scores of Aggregate Agricultural Exports of Myanmar and Its Competitors

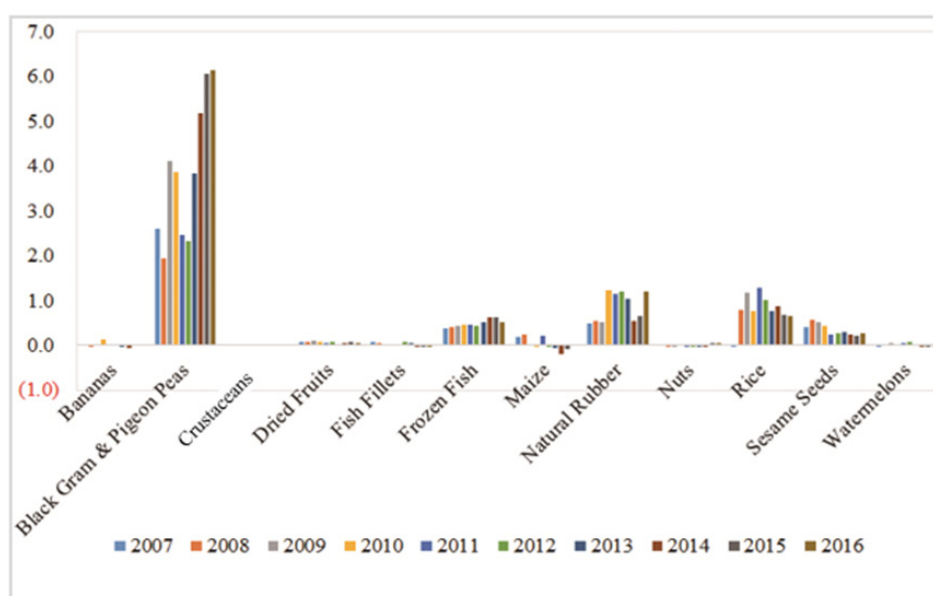


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage; USA = United States.

Figure 5.2 presents NRCA scores across 12 major commodity groups for ten years to identify Myanmar's export comparative advantage. Black gram & pigeon peas enjoy the highest comparative advantage, followed by rice, natural rubber, frozen fish, and sesame seeds. Moreover, the NRCA scores of bananas, fish fillets, maize, nuts, and watermelon in certain years are less than zero, indicating these particular product groups reveal no comparative advantage. The NRCAs of the 12 agricultural commodities fluctuate across 2007 to 2016.

Figure 5. 2: NRCA Scores of Myanmar's Agricultural Exports by 4-Digit or 6-Digit Levels



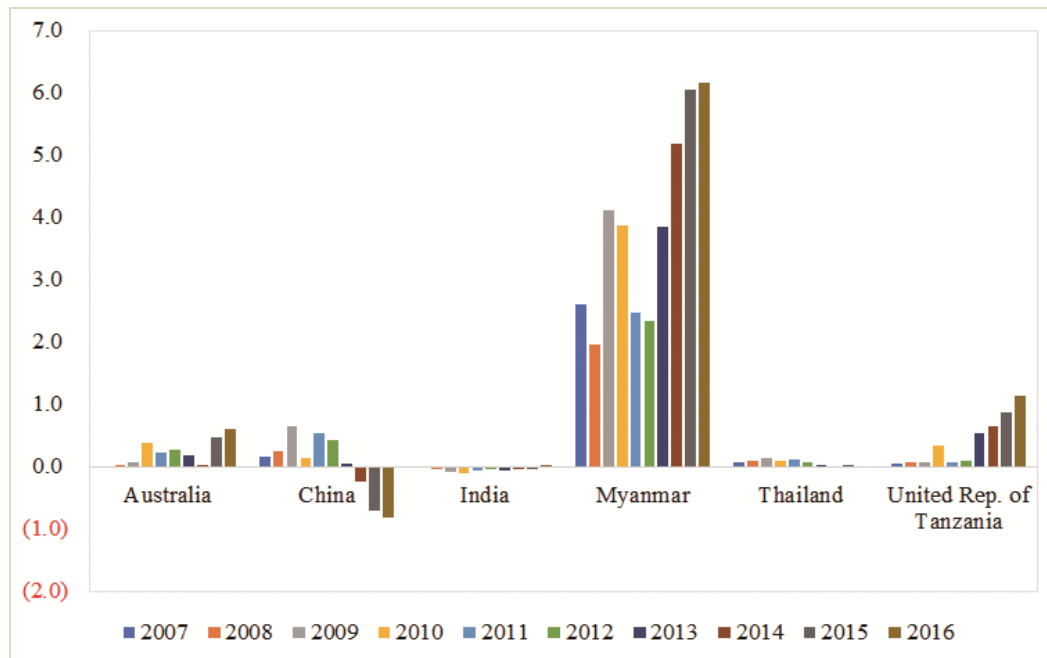
Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage.

The NRCA score is also compared between Myanmar and its competitors by agricultural commodity. Black gram & pigeon pea enjoy the strongest comparative advantages during the whole period, and although the NRCA scores fluctuated up and down from 2007 to 2012, after 2012, the NRCA trended upward reaching its highest value in 2016 (Figure 5.3). Myanmar's competitors, including Australia, China, India, Thailand, and the United Rep. of Tanzania, have considerably lower NRCA scores than Myanmar, indicating a lower level of competitiveness. Black gram & pigeon peas are land-intensive commodities. Experts in the field suggest the development of value-added beans and pulse

products through the development of more processing centers (Myanmar Inside 2015).

Figure 5. 3: NRCA Scores of Myanmar and Its Competitors in Black Gram and Pigeon Peas



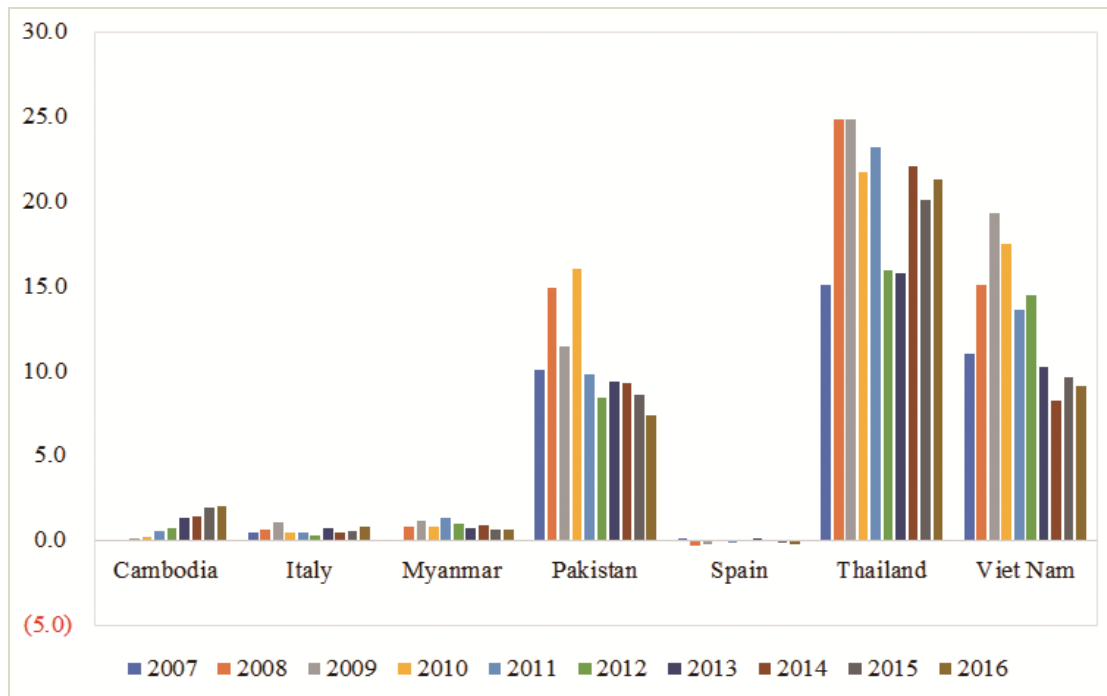
Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage.

Rice plays a crucial role in the agricultural exporting market in Myanmar. The NRCA value was less than zero in 2007, indicating a comparative disadvantage in rice exporting. After 2007, Myanmar enjoyed positive and stable NRCA scores (Figure 5.4). Among Myanmar' competitors, Thailand shows the highest NRCA score, followed by Viet Nam and Pakistan. Cambodia, Italy, and Myanmar have comparatively low competitiveness in rice exporting, while Spain shows no competitiveness. The potential limitations of rice exporting in Myanmar include low productivity and poor rice quality at the farm level. For example, the average paddy yields of 2.5 tons per hectare are only half of those realized by its competitors in the region. In addition, the milling sector operates with obsolete processing units that cause about 15-20 percent losses in quality and quantity during milling (World Bank 2017). Some policy tactics maybe useful for promoting rice production and rice exporting: 1) updating the existing seed management system; 2) allowing and encouraging direct foreign investment in rice milling, warehousing,

and trading; 3) reducing transport costs by encouraging the investment in farm-to-market roads (World Bank 2017).

Figure 5. 4: NRCA Score of Myanmar and Competitors in Rice

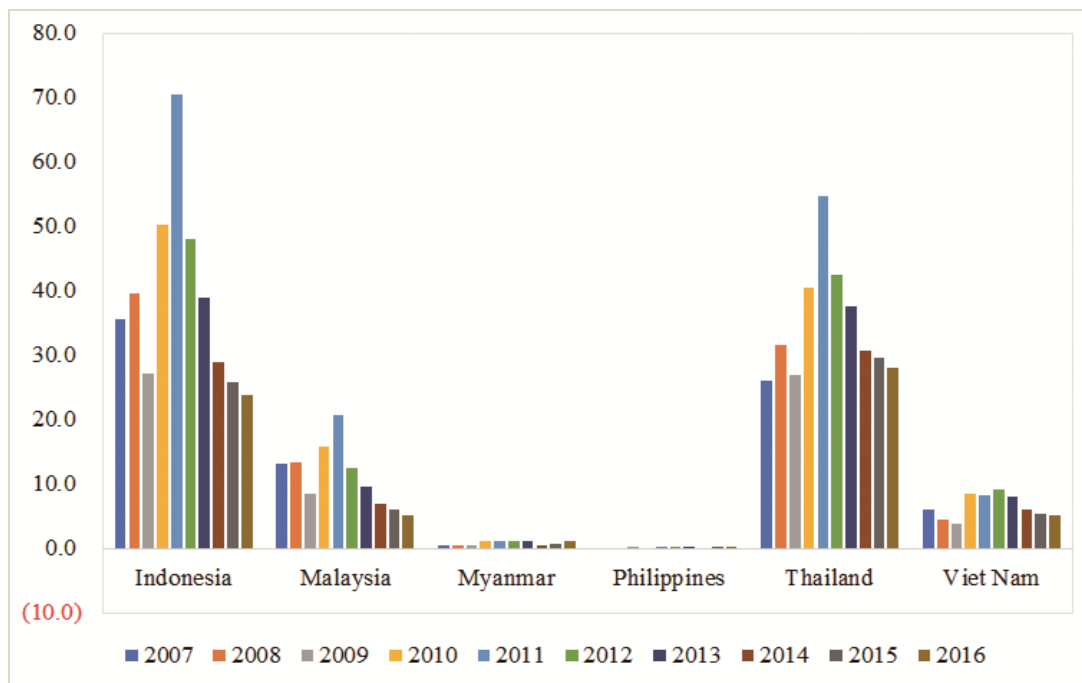


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage.

The NRCA score of natural rubber ranges from 0.49 (Year 2007) to 1.22 (Year 2010) (Figure 5.5). However, Myanmar faces strong competition from Asian countries such as Indonesia, Malaysia, Thailand, and Viet Nam. The average NRCA score of the past ten years in Thailand, Indonesia, Malaysia, and Viet Nam was around 55.6, 51.1, 18.1, and 8.2 times that of Myanmar, respectively. The shortcomings of Myanmar's rubber exporting include low productivity, high labor cost, and sub-par quality. Myanmar's rubber plantation produces at less than half the international production rate, and a rise in volume must be matched by improvements in product quality (Win 2016).

Figure 5. 5: NRCA Score of Myanmar and Competitors in Natural Rubber

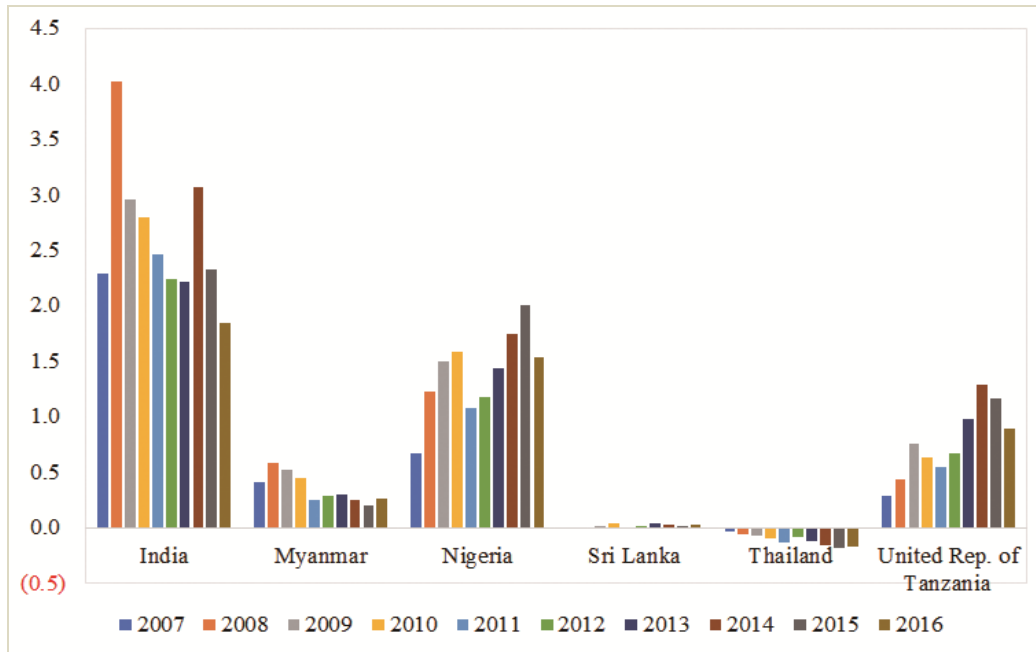


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage.

The NRCA score of sesame seeds in Myanmar ranged from 0.20 to 0.58 with the highest score in 2008. In addition, the NRCAs were quite stable after 2010 (Figure 5.6). India reveals the highest NRCA value among all the competitors, followed by Nigeria, Tanzania and Myanmar. Thailand and Sri Lanka reveal no comparative advantage. However, Myanmar' trade value of sesame oilseed is low, considering its strong competitiveness. Improving the quality and efficiency of sesame seed production as well as processing (e.g., proper extraction, roasting and producing snacks) provide potential ways to enhance the trade value and open opportunities to new markets (Wageningen University & Research 2015).

Figure 5. 6: NRCA Score of Myanmar and Competitors in Sesame Seeds

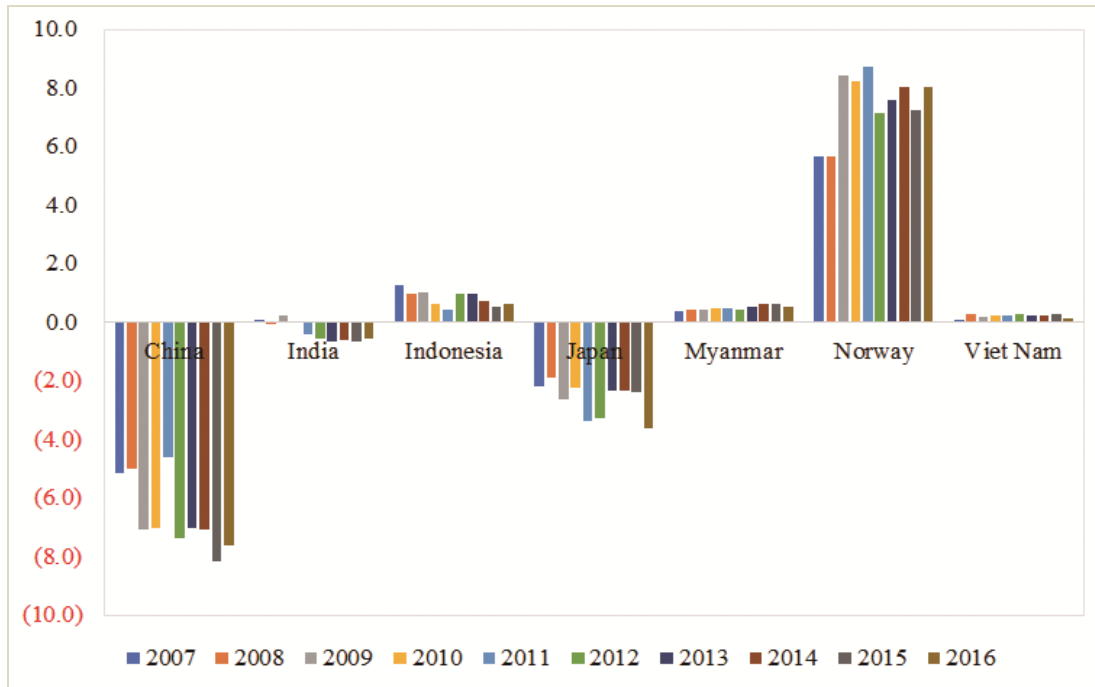


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage.

Frozen fish and crustaceans reveal strong competitive advantage, while fish fillets reveal comparative disadvantage (Figure 5.7-5.9). Myanmar's primary competitors in the export of frozen fish include Norway, China, Viet Nam, Indonesia, Japan, and India. Myanmar's NRCA score was 0.52 in 2016, higher than most of its competitors except for Norway and Indonesia (Figure 5.7). On average, Norway's NRCA is around 15 times that of Myanmar. Furthermore, among the other competitors, China, India, and Japan show no competitiveness in exporting frozen fish, while Viet Nam and Indonesia do.

Figure 5. 7: NRCA Score of Myanmar and Competitors in Frozen Fish

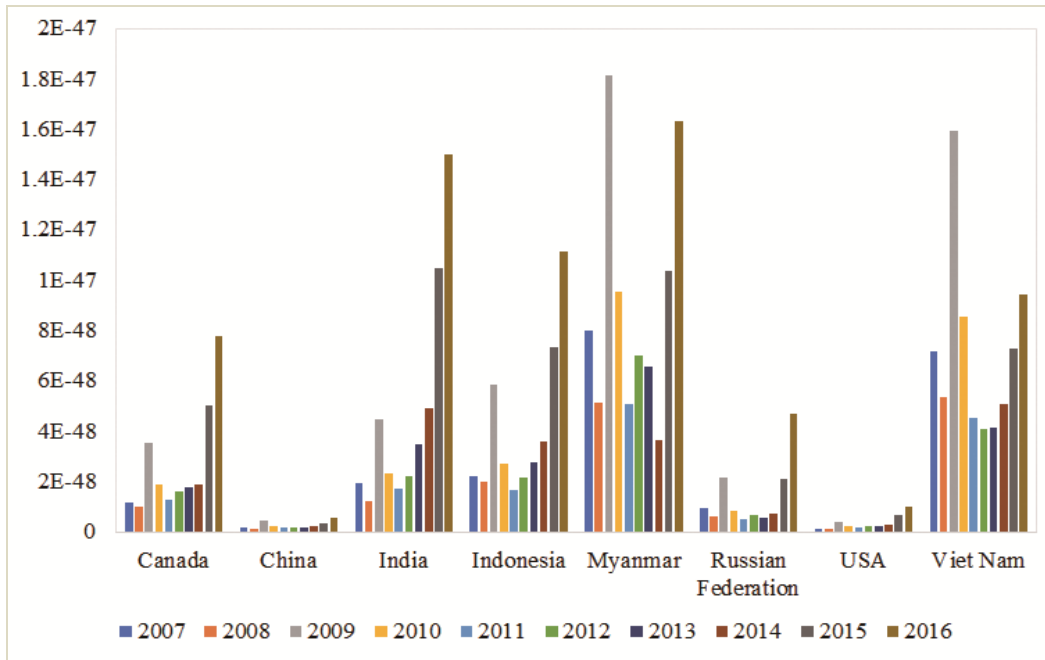


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage.

Crustacean exports show a considerably lower NRCA score than frozen fish in Myanmar. However, Myanmar has the highest NRCA score among its competitors, followed by Viet Nam, Indonesia, India, Canada, the Russian Federation, China, and the USA (Figure 5.8). Additionally, the NRCA scores went up and down for all the selected countries, with extremely high values in 2009, 2015, and 2016.

Figure 5. 8: NRCA Score of Myanmar and Competitors in Crustaceans

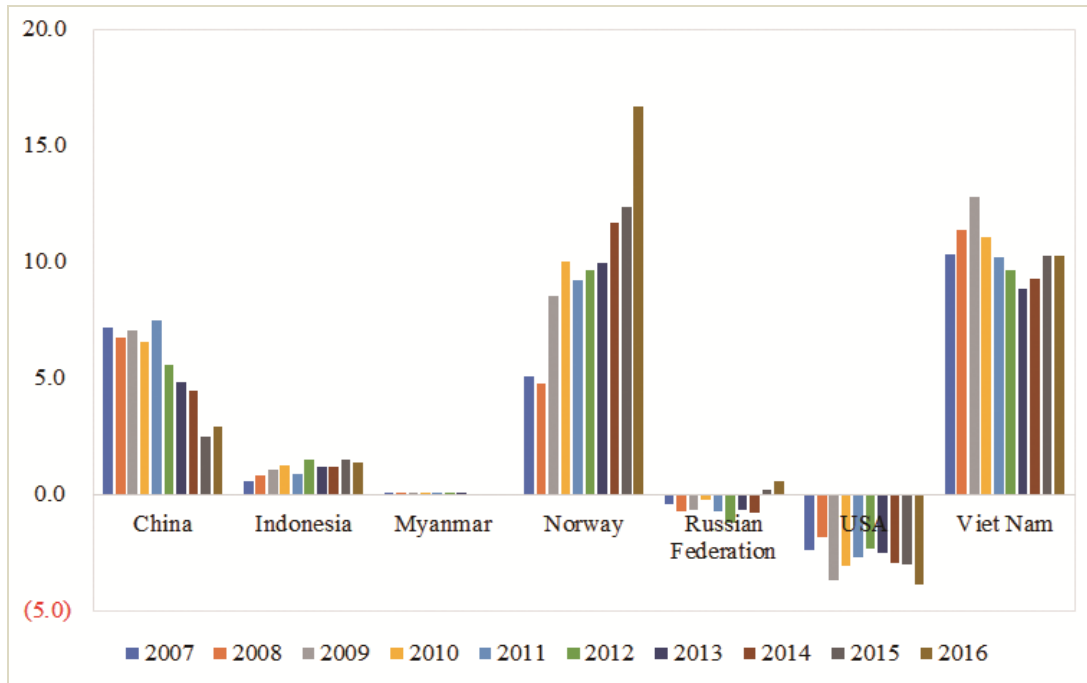


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage; USA = United States.

Fish fillets are mainly exported to Japan, Malaysia, Korea, and the UK. The primary competitors are China, Indonesia, Norway, the Russia Federation, the USA, and Viet Nam with Norway showing the highest NRCA score. Viet Nam, China, and Indonesia also enjoy comparatively higher NRCA scores than Myanmar (Figure 5.9). Myanmar's comparative advantage in fish fillets exports shows some variability with positive values from 2007 to 2013 but no competitiveness from 2014 to 2016.

Figure 5. 9: NRCA Score of Myanmar and Competitors in Fish Fillets



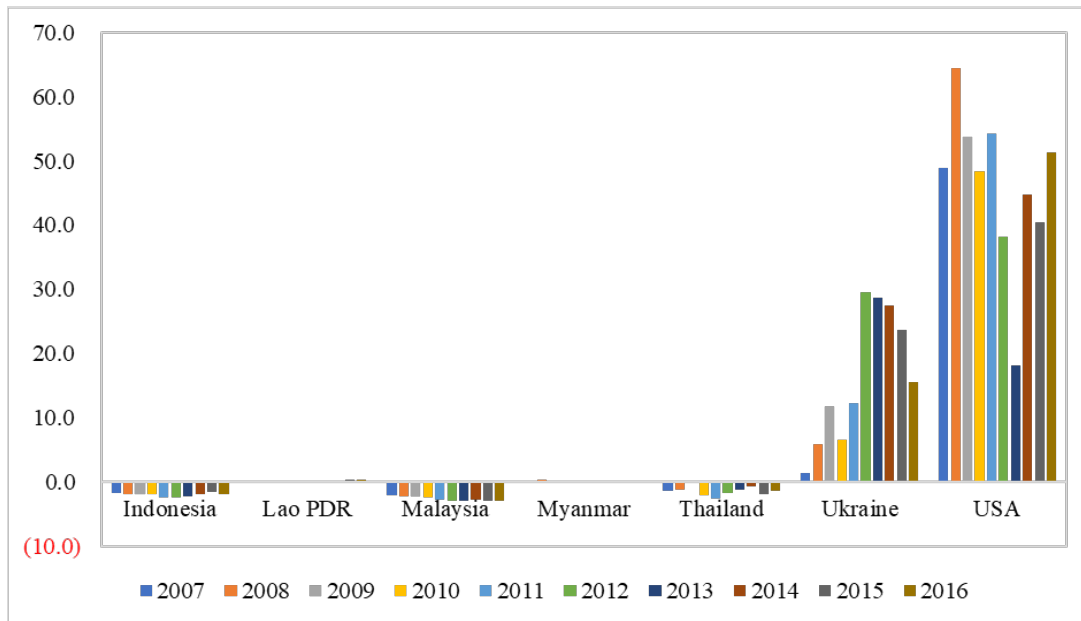
Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage; USA = United States.

The Myanmar fishery sub-sector's NRCAs and export values were unstable during the period examined. Fishery production and export needs various special equipment including fishing and transport vessels, ice plants, processing plants, cold storage, fishmeal plants, dehydration plants, etc. However, insufficient facilities in Myanmar maybe a restriction for the expansion of fishery sector production, exports, or value addition. It's necessary to construct facilities and introduce fishery policies for the development of this sector (N. W. Aung 2009).

Maize's comparative advantage in Myanmar was unstable across the ten years examined. Maize lost its comparative advantage from 2012 to 2015 and gained competitiveness in 2016 (Figure 5.10). The USA reveals the highest comparative advantage, followed by Ukraine. Indonesia, Malaysia, and Thailand show no comparative advantage.

Figure 5. 10: NRCA Score of Myanmar and Competitors in Maize

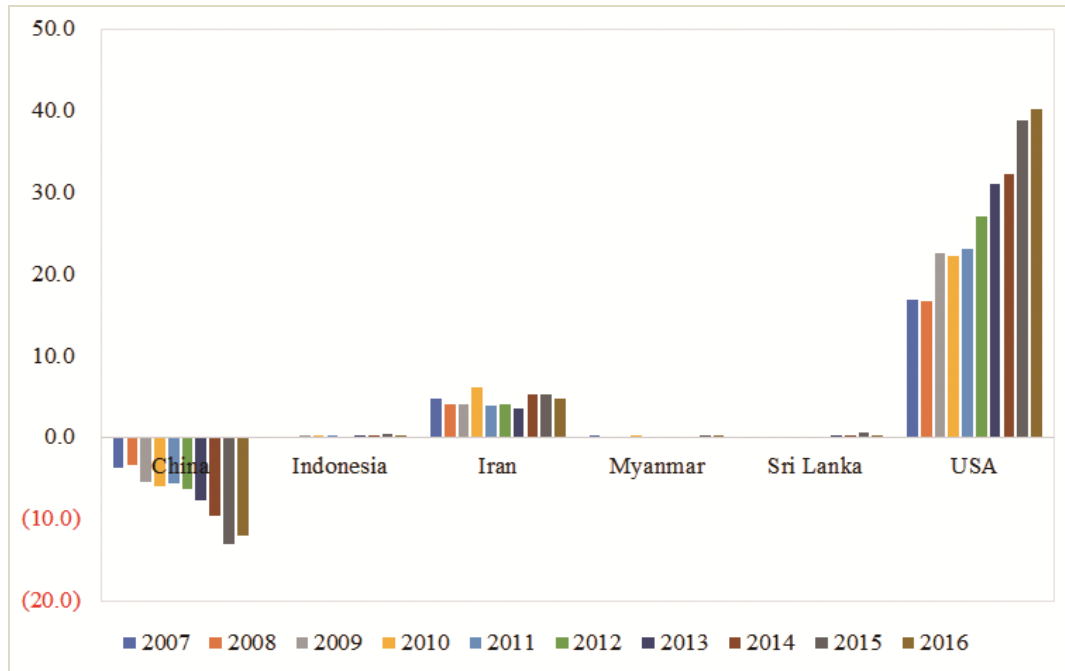


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage; USA = United States.

Nuts (e.g., almonds, walnuts, hazelnuts, and macadamia), bananas, watermelons, and dried fruits show unstable NRCAs across the period (Figure 5.11-5.14). The USA has the highest NRCA score in nuts exports, followed by Iran and Indonesia. Myanmar only gained comparative advantage in nuts exports in 2007, 2010, 2015 and 2016 (Figure 5.11).

Figure 5. 11: NRCA Score of Myanmar and Competitors in Nuts

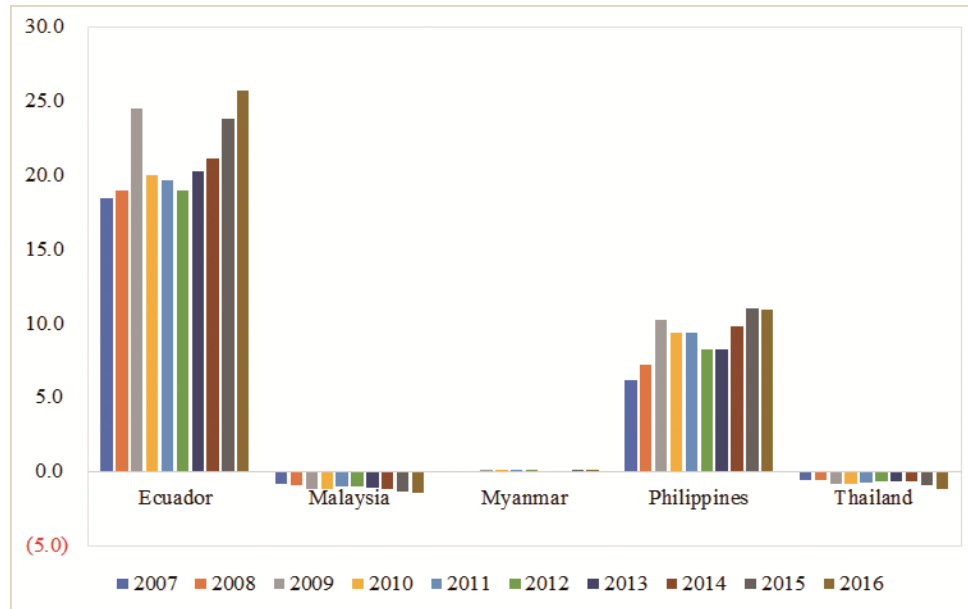


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage; USA = United States.

China is the biggest buyer of bananas, importing 99.91 percent of Myanmar's bananas. Myanmar's competitors include Ecuador, Malaysia, the Philippines, and Thailand. In the past ten years, Ecuador has the highest NRCA score, followed by the Philippines and Myanmar. Malaysia and Thailand show no competitiveness in exporting bananas (Figure 5.12). Myanmar lost its competitiveness in 2013 and 2014, and regained competitiveness in 2015 and 2016.

Figure 5. 12: NRCA Score of Myanmar and Competitors in Bananas

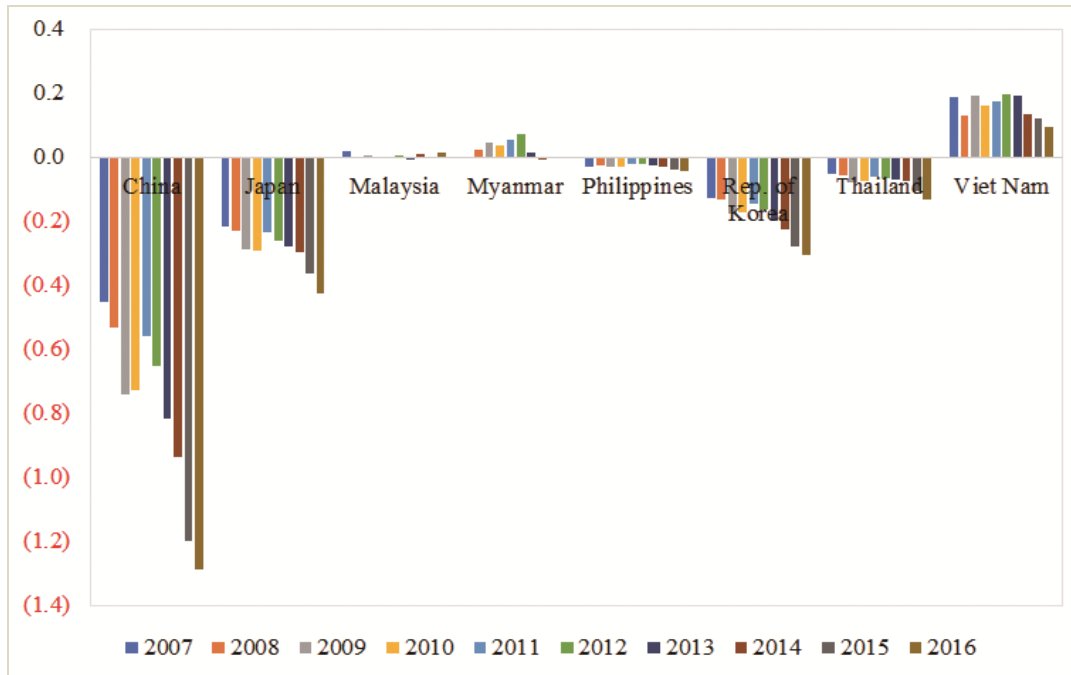


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage.

Approximately 92% of Myanmar's watermelons are exported to China though a small amount of exports go to Malaysia; China, Hong Kong Special Administrative Region (SAR); and the Russian Federation. Among Myanmar's competitors in watermelon exporting, only Viet Nam enjoys a consistent comparative advantage over the period (Figure 5.13). China, Japan, the Philippines, the Rep. of Korea, and Thailand show no comparative advantage across the years. Myanmar gained and lost comparative advantage over time. Myanmar revealed no comparative advantage in 2007, but gained competitiveness from 2008 to 2013, and again lost competitiveness after 2014. It may be caused by China, which is Myanmar's biggest buyer, banning imports from Myanmar.

Figure 5. 13: NRCA Score of Myanmar and Competitors in Watermelons

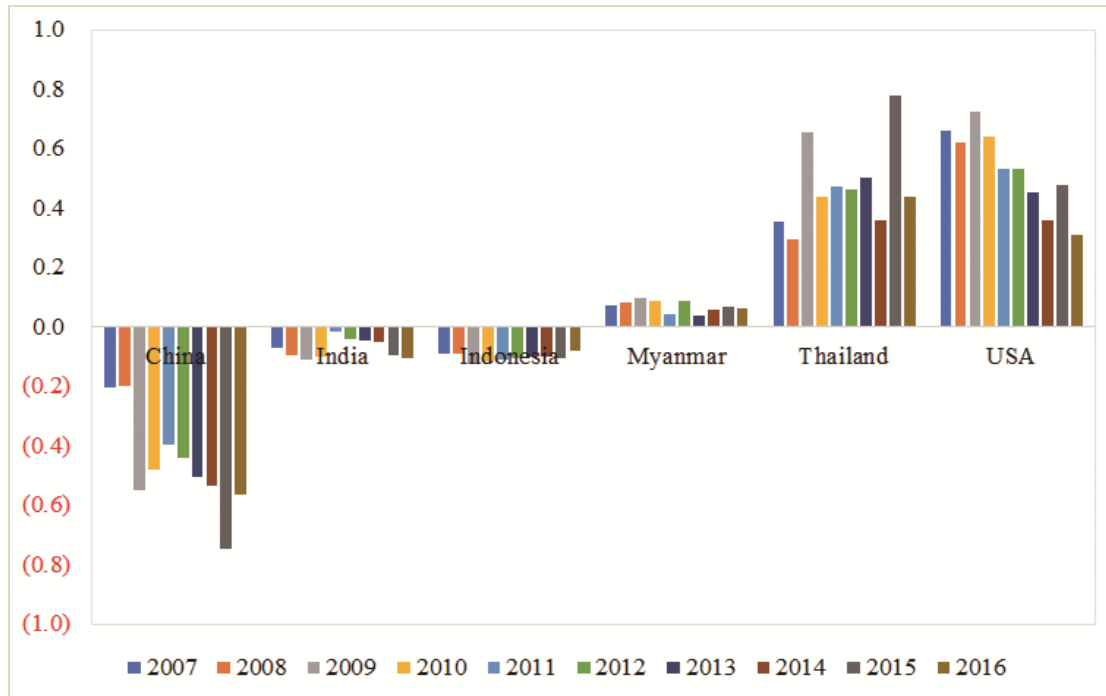


Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage.

Dried fruits have a high NRCA score in Myanmar, though lower than Thailand and the USA. Other competitors that include China, India, and Indonesia reveal no comparative advantage (Figure 5.14). However, the trade value of dried fruits has fluctuated in the last ten years. Given the sectors competitiveness globally, policy support and logistic improvement are needed to bolster production and exports.

Figure 5. 14: NRCA Score of Myanmar and Competitors in Dried Fruits



Source: Calculated by Authors.

Note: NRCA = normalized revealed comparative advantage; USA = United States.

In summary, Myanmar's black gram and pigeon peas, crustaceans, dried fruits, frozen fish, natural rubber, and sesame seeds reveal comparative advantages in the global market. Myanmar has the strongest NRCA score at the global level in black gram & pigeon peas, followed by rice, natural rubber, frozen fish, and sesame seeds. However, for the other products, such as bananas, maize, fish fillets, nuts, watermelons, its export competitiveness is unstable; those commodities lost and gained their comparative advantage through the years.

6. CONCLUSIONS, IMPLICATIONS, AND LIMITATIONS

Myanmar is an agrarian country, with the agricultural sector contributing 37.8 percent to GDP. Agricultural exports make up 27.5% of total export earnings. However, agriculture development and agricultural trade are still far below their potential. This study utilizes UN Comtrade data to compute NRCA scores for a variety of important export commodities based on the methodology used by Yu, Cai, and Leung (2009). Cross-border trade plays a significant role in Myanmar's agricultural trade market, but because of lengthy official licensing requirements and incentives to avoid tariffs, unofficial trade often occurs (W. S. Aung 2009). By relying on the official UN Comtrade data, unofficial trade data is excluded and may be one possible limitation of the study.

The export values and trade patterns from UN Comtrade from 2007 to 2016 demonstrate that Myanmar is dependent on its natural resources rather than value-added products. The major export products include beans and pulses, fishery products, rice, and nuts. In addition, Myanmar's agricultural trade is mainly concentrated with neighboring countries such as China, Thailand, and India and those in the region such as Japan, Singapore and Malaysia. Agricultural trade with developed countries is still low, and the partners are limited to the United States, the EU and Japan. Furthermore, for black gram & pigeon peas and nuts, more than 80 percent of the exports go to India, while for watermelon, natural rubber, and dried fruits, the export market is concentrated in China. As such, the export market of Myanmar is vulnerable to the policies of these major trade partners. Myanmar has thus far shown low product and market diversification in the agricultural export sector.

Myanmar enjoys comparative advantages in the agricultural sector and these have been relatively stable for the last ten years. Myanmar needs to seize these opportunities. However, thus far, Myanmar's agricultural export sector has not been very competitive when compared with its direct competitors. The USA shows the highest NRCA score among the countries, followed by Australia, Thailand, India, Viet Nam, and Indonesia. Myanmar's agricultural export sector is only more competitive than Malaysia, Cambodia, the Philippines, Japan, and China. Myanmar enjoys high NRCA scores in black gram & pigeon

peas, natural rubber, sesame seeds, rice, and frozen fish, while the NRCAs in crustaceans, dried fruits are low. The competitiveness of bananas, fish fillet, maize, nuts, and watermelon are negative in certain years.

One of the challenges of Myanmar's agricultural export has been greater reliance on a smaller number of exportable commodities, which are mainly land-intensive. Policy action needs to be taken to diversify Myanmar's export portfolio horizontally by adding more commodities to the existing export pattern and vertically including the creation of new commodities lines by means of value-added measures (Oo, Soe, and Myat 2017).

In terms of horizontal diversification, marketing research can determine consumer demand both domestically and abroad for new products. Land development strategies that utilize agriculture research to determine climate and topographic suitability for new crops is need. Agricultural extension services are necessary to help farmers understand how to grow new crops to encourage their potential adoption and new input markets may be need to help farmers access seeds and harvesting machinery. Lastly, basic infrastructure including roads to reduce transaction costs needs to be developed but also storage and processing facilities. Once developed these same types of facilities can encourage downstream processing of primary commodities to support vertical diversification. Considering the poor storage conditions for perishable commodities (frozen fish, fish fillets, vegetables, etc.), the development of a cold supply chain (including precooling facilities, cold storage, refrigerated carriers, packaging, and traceability systems) is vital to the expansion of these high value commodities and necessary for international trade where food safety is a primary concern (UN 2011).

Private and foreign investment is needed to fuel the development of processing facilities as well as input and machinery markets. In India, foreign investment makes up 51% of the total cold value chain. In Australia, public-private partnerships play a significant role in strengthening the cold chain framework (OECD 2015). Foreign direct investment also provides a good way of fulfilling domestic technology and equipment gaps in Myanmar for high value products. To ensure the sustained flow of new investments, a

favorable investment and business environment needs to be created that removes the barriers to foreign investment.

Several things can be done to support improved market access and facilitate trade with neighboring countries and globally. China, India, Thailand and Japan are Myanmar's four most important trade partners and entering into more bilateral or multilateral trade agreements can draw the countries closer. The government can support trade promotion through improved branding and trade fairs. Improved trade facilitation can be accomplished through the elimination of complicated and lengthy legal procedures, through tax credits and by making trade policies and procedures stable, transparent, and affordable for small- and medium-sized traders.

Myanmar can learn much from its competitors' trade promotion strategies. For example, Viet Nam has operated a national trade promotion program since 2005 that utilized global marketing experts to advise on export development and commodity quality improvement. Additionally, the Viet Nam Development Bank (VNDB) was established in 2006 to provide financial support to promote trade. The VNDB provides export credits, investment credit guarantees, and export project performance security to support exporters needing funding to increase the scale of investment (OECD 2015). Malaysia is cooperating with Alibaba to launch the Digital Free Trade Zone (e.g., satellite services, eFulfillment Hub, and eServices platform) to encourage international market development and trade. Through the Digital Free Trade Zone, the purchase of commodities via the internet worth up to US\$275 will be exempted from taxes (ecommerceIQ 2017).

Myanmar has prioritized increasing agricultural exports in several recent policy documents and the 2015 National Export Strategy. The purpose of this paper has been to provide a better understanding of Myanmar's agricultural export performance compared to its competitors in different commodities. It has shown that Myanmar has enormous potential to utilize its comparative advantage in several commodities to further expand its exports to achieve more stable export earnings. However, it will take policy reform and investment by both the government and the private sector to achieve these goals but we are confident that with time Myanmar can achieve them.

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