Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics

Diploma Thesis

Revealed Comparative Advantage of Coffee Export:
The case study of Vietnam and its selected competitors

Do Phuong Dung

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Bc. Phuong Dung Do, BSc

Economics and Management
Economics and Management

Thesis title

Revealed comparative advantage of coffee export: the case study of Vietnam and its selected competitors

---

Objectives of thesis

The main aim of the present Master thesis is to define main determinants of coffee export in Vietnam and to map out possible ways of improving Vietnamese position in the global coffee market.
To achieve this research goal the state of affairs in Vietnamese coffee production and export will be compared with its selected competitors' state.
Since Vietnam is the second largest coffee producer in the world after Brazil, it becomes interesting to investigate the peculiarities in patterns of revealed comparative advantage for Vietnam and Brazil in the global coffee market over the last 20 years.
From gathered data, the thesis will also answer the question of whether Vietnam is currently strengthening or weakening its position in the global coffee market.

Methodology

The synthesis of relevant information from various reliable resources represented by printed literature, scientific articles, surveys, web sources will be done and used then in the practical part of the Master thesis.

Both theoretical and practical parts will rest on descriptive analysis and thematic synthesis. Own research work will be based on RCA index and regression analysis along with comparative techniques and statistical inference.

The proposed extent of the thesis

60-80

Keywords

Revealed comparative advantage index, Vietnam, Coffee export, Balassa

---

Recommended information sources

FISCHER, S. – SCHMALENSEE, R. – DORNBUSCH, R. *Introduction to macroeconomics.*.

GUJARATI, D N. *Econometrics by example.* London: Palgrave Macmillan Education, 2015. ISBN 978-1-137-37501-8.

GUPTA, R K. *Handbook of export oriented food processing projects.* Delhi: SBP Consultants and Engineers, 1993.

JENÍČEK, V. – KREPL, V. – ČESKÁ ZEMĚDĚLSKÁ UNIVERZITA V PRAZE. INSTITUT TROPŮ A SUBTROPŮ. *Foreign trade and development economics.* Prague: Czech University of Life Sciences, 2007. ISBN 978-80-213-1651-5.

MONTIEL, P. *International macroeconomics.* Chichester: Wiley-Blackwell, 2009. ISBN 978-1-4051-8386-4.

REUVID, J. – SHERLOCK, J. *International trade : an essential guide to the principles and practice of export.* London: Kogan Page, 2011. ISBN 978-0-7494-6237-6.

Expected date of thesis defence

2020/21 SS – FEM

The Diploma Thesis Supervisor

Mgr. Elena Kuzmenko, Ph.D.

Supervising department

Department of Economics

Electronic approval: 5. 3. 2021

prof. Ing. Miroslav Svatoš, CSc.

Head of department

Electronic approval: 7. 3. 2021

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 30. 03. 2021

Declaration

I declare that I have worked on my diploma thesis titled "Revealed Comparative Advantage of Coffee Export: the case study of Vietnam and its selected competitors" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 31 March 2021 _____

Acknowledgement

Revealed Comparative Advantage of Coffee Export: the case study of Vietnam and its selected competitors

Abstract

Vietnam is considered as the second largest coffee exporter in the world. However, noticeable fluctuations in Vietnamese coffee export occurred along with a declining trend in coffee export compared to major competitor countries, especially Brazil, the world's biggest coffee producer and exporter. The purposes of this Master Thesis are to examine whether Vietnam enjoyed a comparative advantage in coffee export, does Vietnam strengthen or weaken its position in global coffee market and to analyze factors influencing coffee export volume of Vietnam. The comparative advantage of Vietnam and Brazil coffee export were calculated by using selected Revealed Comparative Advantage (RCA) indices. Dynamic Revealed Comparative Advantage (DRCA) index was used to define Vietnam's position relatively its main competitor. Determinants of Vietnam coffee export were calculated by using Linear Regression Analysis with secondary data of time series from 2000 to 2019. During the studied period, Vietnam had a comparative advantage of coffee export and was strengthening its position in the market. Based on the findings derived from the regression analysis, it can be concluded that domestic coffee production, world coffee price and Vietnam's GDP growth rate exerted statistically significant effect on the volume of coffee export in Vietnam. However, the impact of Vietnam Dong/US Dollar exchange rate turned out to be not statistically significant in the analyzed period.

Keywords: coffee export, Vietnam, revealed comparative advantage, Balassa, RCA index, Vollrath, regression analysis.

Odhalená komparativní výhoda exportu kávy: případová studie Vietnamu a jeho vybraných konkurentů

Abstrakt

Vietnam je považován za druhého největšího vývozce kávy na světě. Ve vietnamském vývozu kávy však dochází k výkyvům spolu s klesající tendencí vývozu kávy ve srovnání s hlavními konkurenčními zeměmi, zejména Brazílií, největším světovým výrobcem a vývozcem kávy. Účelem této diplomové práce se stává analýza odhalené komparativní výhody při vývozu kávy, zjištění, zda Vietnam posiluje nebo oslabuje svou pozici na globálním trhu s kávou a rovněž analýza faktorů ovlivňujících objem vývozu kávy z Vietnamu. Odhalená komparativní výhoda vývozu kávy z Vietnamu a Brazílie byla vypočítána pomocí vybraných indexů RCA (Revealed Comparative Advantage). Pro identifikaci dynamické pozice Vietnamu na světovém trhu byl použit DRCA index (Dynamic Revealed Comparative Advantage). Determinanty exportu kávy z Vietnamu byly odhaleny pomocí lineární regresní analýzy se sekundárními daty pro období od roku 2000 do roku 2019. Během sledovaného období měl Vietnam komparativní výhodu exportu kávy a posiloval svoji pozici na trhu. Na základě zjištění získaných z regresní analýzy lze vyvodit závěr, že proměnné domácí produkce kávy, světové ceny kávy a míra růstu HDP statisticky významně ovlivňují objem vývozu kávy z Vietnamu. Dopad směnného kurzu vietnamského dongu k americkému dolaru se však v analyzovaném období ukázal jako statisticky nevýznamný.

Klíčová slova: export kávy, Vietnam, odhalil komparativní výhodu, Balassa, RCA index, Vollrath, regresní analýza.

Table of content

List of pictures

List of tables

List of abbreviations

ICO	International Coffee Organization
DRCA	Dynamic Revealed Comparative Advantage
RCA	Revealed Comparative Advantage
UN	United Nation
EU	European Union
USA	United States of America
WWII	World War II
MNCs	Multinational Corporations
UNCTAD	United Nations Conference on Trade and Development
IMF	International Monetary Fund
FAO	Food and Agriculture Organization of the United Nations
USDA	United States Department of Agriculture
MOFA	Vietnam Ministry of Foreign Affairs
CIAT	International Center for Tropical Agriculture
ILO	International Labour Organization
VICOFA	Vietnam Coffee – Cocoa Association
EVFTA	European Union – Vietnam Free Trade Agreement
FTA	Free Trade Agreement
VNM	Vietnam
BRA	Brazil
OSL	Ordinary Least Square
DW	Durbin-Watson
FE	Fixed Effects
RE	Random Effects
WTO	World Trade Organization
ASEAN	Association of Southeast Asian Nations
PPML	Poisson pseudo-maximum probability
WASI	Western Highlands Agriculture & Forestry Science Institute of Vietnam

1 Introduction

Vietnam's coffee industry is relatively new. Coffee was introduced to Vietnam by French missionaries in 1857, and it has become prominent in Vietnamese culture. Coffee has grown to become one of Vietnam's most important agricultural exports after more than 150 years of existence and production, after rice, which is a typical food crop, it is ranked second. Following Brazil, Vietnam is the world's second-largest coffee exporter. Furthermore, Vietnam is the world leader in Robusta coffee production.

Despite being the second coffee producer after Brazil, and the world's leader in Robusta coffee production, Vietnam coffee is still far behind Brazil in terms of volume and value. In particular, noted in January 2021 according to ICO (2021), prices for all Arabica indicators rose in January, while Robusta prices decreased by 1.8% to 70.71 US cents/lb. Global exports in December 2020 reached 10.97 million bags, exports of Arabica rose by 14.1% to 20.95 million bags and Robusta shipments declined by 6.8% to 10.64 million bags in this period. This can be explained since Arabica beans are mostly considered superior because they have a smoother taste with more acidity and a richer flavor, while the tougher Robusta beans are often used as a filler in lower-grade coffee blends. However, Robusta, compared to Arabica, is believed to have better resistance to pests and diseases and therefore has more yields than Arabica. Meanwhile, with the advances made in processing, Robusta coffee is increasingly popular among processors around the world because it contributes to reducing the cost of instant coffee products. Therefore, many experts believe that the demand for Robusta coffee will continue to increase.

The objectives of the Master Thesis are to find the comparative advantage of Vietnamese coffee export among major coffee export producers in the world, whether Vietnam strengthened or weakened its position in the global coffee market and to find the main determinants or factors affecting the coffee export volume of Vietnam. The scope of the research focuses on the comparative advantage of Vietnam coffee export during the period 2000-2019.

The thesis first used several selected Revealed Comparative Advantage (RCA) indices to define whether Vietnam enjoyed comparative advantage of coffee export compared with

Brazil, the world's biggest coffee producer and exporter. Then Dynamic Revealed Comparative Advantage (DRCA) index to find whether Vietnam is strengthening or weakening its position in the global coffee market. Then Multiple Linear Regression with Ordinary Least Square (OSL) method is used in order to define the main determinants or factors affecting Vietnam coffee export volume.

2 Objectives and Methodology

2.1 Objectives

The main aim of the present Master thesis is to define main determinants of coffee export volume of Vietnam and to map out possible ways of improving Vietnamese position in the global coffee market during the period 2000 to 2019. In order to achieve this research goal, the following questions will be answered:

During the years 2000 to 2019, did coffee export of Vietnam enjoy a comparative advantage in the international market?

Was Vietnam strengthening or weakening its position in the global coffee market in this period?

What determinants were responsible for the coffee export of Vietnam from 2000 to 2019?

What are possible solutions to improve Vietnamese position in the global coffee market?

2.2 Methodology

This Master thesis will first present some of the highlights in the economy in Vietnam, touching slightly on how the country's economy has changed over the years by comparing the real annual GDP growth rate. In addition, Vietnam's economy is introduced by presenting GDP share by main sectors including agriculture, industry, services and others. Five selected years from the time period 2000 to 2019 will be presented and compared. The following years are chosen as 5-continuously-year marks: 2000, 2005, 2010, 2015 and 2019. Any years with changes will be mentioned during the thesis.

Vietnam's GDP is shared mainly by 3 sectors: industry, services and agriculture. Agriculture represents around 14% of the GDP (World Bank, 2021). Vietnam has made strides in recent years as a leading agricultural product exporter and a desirable foreign investment destination with the key products are rice, cashew, nuts, coffee, tea, black pepper, fish products and rubber (ICO, 2019). Since Vietnam is the second largest coffee producer in the world after Brazil, it becomes interesting to investigate the peculiarities in patterns of comparative advantage of Vietnam and the main major coffee exporting

countries in the global coffee market, especially Brazil over the last 20 years. The comparative advantage of coffee export of Vietnam and Brazil will be examined in this paper. This paper used selected Revealed Comparative Advantage (RCA) indices by Balassa, by Donges and Riedel and by Vollrath to assess a country's coffee export comparative advantage. Since change in comparative advantage can affect a country's export market position, it will be investigated using the Dynamic Revealed Comparative Advantage (DRCA) approach.

Data is collected from 2000 to 2019, and it included coffee export and import value of Vietnam, Brazil and the world, total export of Vietnam, Brazil and the world. The International Coffee Organization (ICO, 2019) and the United Nation Comtrade Database were used as data sources (UN Comtrade, 2021).

In order to find out what determinants or factors affecting the Vietnam coffee export volume, first Michael Porter's Diamond was used. Then, the Multiple Linear Regression with the ordinary least squares (OSL) method had been used using software Gretl to quantify selected variable. The dependent variable (Y_{1t}) was Vietnam coffee export volume, while the independent variables were domestic coffee production (X_{1t}), world coffee prices (X_{2t}), real GDP growth rate of Vietnam (X_{3t}), and Vietnam Dong/ US Dollar exchange rate (X_{4t}). The thesis performed multiple experiments to collect any factors that occurred between independent and dependent variables. The thesis performed several conventional inference tests: Autocorrelation, Multicollinearity Tests, Normality Test, Heteroscedasticity prior to these tests to assess if the data used in the study was feasible.

3 Literature Review

3.1 Theories of Foreign Trade

Foreign trade or international trade is described as a transaction involving the exchange of a product or service between at least two countries. Imports and exports are also possible. An import is a product or service that is imported into a domestic country. An export is a product or service that is exported to a foreign country (Corporate Finance Institute, 2020). In another word, foreign trade fundamentally alters goods, inputs and technologies in two forms that benefit people. It expands the demand for the country's produce beyond national boundaries and, in many cases, ensures better prices. Importing commodities, inputs and technologies that are not available in the country is another way. However, these outlets are often available but only at higher costs, resulting in a higher degree of customer satisfaction (KRUGMAN, 2012).

Foreign trade in which microeconomic models are used to try to explain the world economy. Demand and supply analyses of foreign markets, companies and consumer behavior are all part of microeconomics models (Suranovic, 2012). In most parts of the world, improvements in production, communication, and transportation infrastructure have made trade simpler and more inevitable. Foreign trade appears to be good at first glance, but it contains negative effects. The first is the marginalization of local brands. Giant multinational corporations cover a big part of the market share, leaving local business in shambles. Secondly, foreign trade can unintentionally increase income inequality by creating the gap between low and high-income earners (Hill, 2014).

Foreign trade is important not only for the economy of a country, but also for businesses and consumers. Conditional developable enterprises will extend their market to other countries, allowing for healthy competition with that country's domestic products. Imported products provide shoppers with wide ranges of options for shopping, comparing and making cost-effective purchases. It also encourages local companies to invest and expand in order to compete with goods from other countries (S Chirag, 2016).

Economists have developed theories to explain global trade mechanisms over time. The most common historical theories are referred to as classical and are based on a country's perspective. Over the time, the theories had shifted to explain trade from the perspective of a firm rather than a country. These theories are known as modern theories, and they are firm-based or company-based. The theories are listed as follow:

Figure 1 Categories of Trade Theories

Classical Country-Based Theories	Modern Firm-Based Theories
Mercantilism	Country Similarity
Absolute Advantage	Product Life Cycle
Comparative Advantage	Global strategic Rivalry
Heckscher-Ohlin	Porter's National Competitive Advantage

Source: Github.io. (2021).

3.1.1   Classical Country-Based Theories

Mercantilism was one of the first theories in an attempt to develop an economic theory and it appeared around the sixteenth century. The main idea of this theory, according to GERINGER (2012), is that every country in order to achieve prosperity in economic development, they must do it through the volume of the currency in foreign trade development. Mercantilists believed that a country should increase its holdings of gold and silver by promoting exports and discouraging imports. Only when the trade balance is positive can each country benefit from trade (value of export is greater than value of import). It is advantageous because the surplus between export and import will be paid in gold and silver, which is regarded as currency and a symbol of wealth. The only way for a country with no gold or silver mines to develop is to rely on the development of foreign trade.

Irwin (1991) says "export of raw material was harmful, on the other hand, export of manufactured goods was very beneficial". In other words, raw material imports were seen as a positive move because the material that needed to be transformed into a new form would result in the creation of new jobs in the country. Although, material that has already been assembled was thought to be a risky strategy. However, this concept will never work if every country tries to implement the same strategy at the same time. Not every country can rely solely on exporting manufactured goods and importing raw materials (ECONLIB, 2001).

Mercantilism is one of the oldest trade theories, but it is still relevant today. Countries like Japan, China, Singapore, Taiwan and even Germany continue to prefer exports and discourage imports through a form of neo-mercantilism that combines protectionist policies and restrictions with domestic-industry subsidies (Github.io, 2021). While export-oriented businesses typically support protectionist policies that benefit their industries or businesses, protectionism harms other businesses and consumers. Taxpayers pay for higher taxes of export products and consumers pay more for foreign products.

Absolute Advantage theory, in discussion with the concept of mercantilism, Adam Smith (2001) believed that a nation's wealth shouldn't be judged by how much gold and silver it had but rather by the living standards of its people. Smith offered a new trade theory called absolute advantage, which focused on the ability of a country to produce a good more efficiently than another nation. Author and philosopher Adam Smith (2001) stated: "If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantage" (SMITH, 2001).

If country A could produce a good cheaper or faster (or both) than country B, then country A would have the advantage and could focus on producing that good. Similarly, if country B excelled at producing a different good, it could concentrate on specialization. Countries would gain efficiencies through specialization because their labor force would become more skilled by performing the same tasks. Production would become more efficient as a result of the increased incentive to develop faster and better production methods in order to increase specialization (Github.io, 2021).

Comparative advantage theory, in discussion with the absolute advantage, the theory does not explain why a country has an absolute advantage over others, or why countries with no advantage can still participate in the process of cooperation and international division of labor in order to develop international trade activities (NGUYEN, 2016). In order to answer the question above and improve Adam Smith's absolute advantage theory, David Ricardo proposed the theory of comparative advantage in his book "Principles of Political Economy" in 1816 to explain a more accurate overview of the mechanism that appeared to benefit international trade.

When a country cannot produce a product more efficiently than another country, but it can produce that product better and more efficiently than other goods, it is said to have comparative advantage. There is a subtle difference between absolute advantage and comparative advantage theories. Absolute advantage is concerned with absolute productivity, whereas comparative advantage is concerned with relative productivity differences (Github.io, 2021). During the book "International Trade Theory and Policy", Gandolfo gave example of comparative advantage as below:

Table 1 Example of Comparative Advantage Theory according to Gandolfo

Commodities	Unit costs of production in terms of labour	
	In England	In Portugal
Cloth	4	6
Wine	8	3

Source: Gandolfo, G. International Trade and Policy, p.10

If England wants to make clothes, it will cost them four units versus six in Portugal. Furthermore, wine production in England costs 8 units compared to 10 units in Portugal. As a result, we can assert that England has absolute advantage in both commodities. Although Portugal lacks an absolute advantage, this does not mean it cannot have the possibility of international trade. Portugal may still be able to trade in order to gain a competitive advantage as the calculation follows: Wine production determines the price of clothing in England (4/8 in England and 6/10 in Portugal). As a result, we discovered that

clothing production is less expensive in England, but wine production is less expensive in Portugal. Therefore, Portugal should concentrate on wine production while England concentrates on clothing production.

Smith and Ricardo's theories didn't help countries figure out which products would give them an advantage. Both theories assumed that free and open markets would encourage countries and producers to figure out which goods they could produce more efficiently (Github.io, 2021). Eli Heckscher and Bertil Ohlin (2006) introduced their theory that is based on a country's production factors - land, labor and capital, which provide the funds for plant and equipment investment. They discovered that the price of any factor or resource is determined by supply and demand. Factors in high supply compared to demand would be less expensive, factors in high demand compared to supply would be more expensive. For instance, China and India have cheap labors. As a result, these countries have become ideal locations for labor-intensive industries such as textiles and garments (Github.io, 2021).

3.1.2 Modern Firm-Based Theories

Country Similarity Theory: According to Heckscher-Ohlin theory, trade should take place between countries with greater differences in factor endowment. As a result, developing countries producing primary products and developed countries producing manufactured goods should be natural trading partners. Staffan B. Under, a Swedish economist, investigated international trade patterns in two categories: primary products (natural resource products) and manufactured goods. The relative costs of production and factor endowments were found to determine trade in natural resource-based industries. Costs for manufactured goods, on the other hand, were determined by product demand similarity across countries rather than relative production costs or factor endowments (Economics Discussion, 2016).

The product life cycle theory was developed in the 1960s by Raymond Vernon, a Harvard Business School professor. A product life cycle has three distinct stages, according to the theory, which originated in the field of marketing: (1) new product, (2) maturing product, and (3) standardized product. The theory assumed that the new product's production would take place entirely in the country where it was invented. This was a useful theory to

17

explain the United States' manufacturing success in the 1960s. Following WWII, US manufacturing became the world's dominant producer in many industries (Github.io, 2021).

If the innovating country has a large market, such as the United States, India, or China, mass production for domestic sales can be supported. This mass market also makes it easier for producers in these countries to achieve cost-effectiveness, allowing them to compete on a global scale. However, if a country's market is too small to achieve economies of scale from its domestic market, companies in that country can achieve economies of scale by establishing marketing and production facilities in other, more cost-effective countries (Economics Discussion, 2016).

Global Strategic Rivalry: The 1980s saw the emergence of global strategic rivalry theory, which was based on the work of economists Paul Krugman and Kelvin Lancaster. MNCs and their efforts to gain a competitive advantage over other global firms in their industry were the focus of their theory. In order to succeed, businesses will face global competition in their industries, and they will need to develop competitive advantages. The barriers to entry for that industry are the critical ways that firms can gain a sustainable competitive advantage. The barriers to entry are the challenges that a new company may face when attempting to enter a new industry or market (Github.io, 2021). The following are some of the entry barriers that businesses may try to reduce:

research and development,

the ownership of intellectual property rights,

economies of scale,

unique business processes or methods as well as extensive experience in the industry, and

the control of resources or favorable access to raw materials.

The theory of competitive advantage, as proposed by Michael Porter in The Competitive Advantage of Nations, focuses on a firm's home country environment as the primary source of competencies and innovations. The model is known as the diamond model because it has four determinants including (1) local market resources and capabilities, (2) local market demand conditions, (3) local suppliers and complementary industries, and (4) local firm characteristics.

Figure 2 Determinants of Competitive Advantage Theory according to Porter
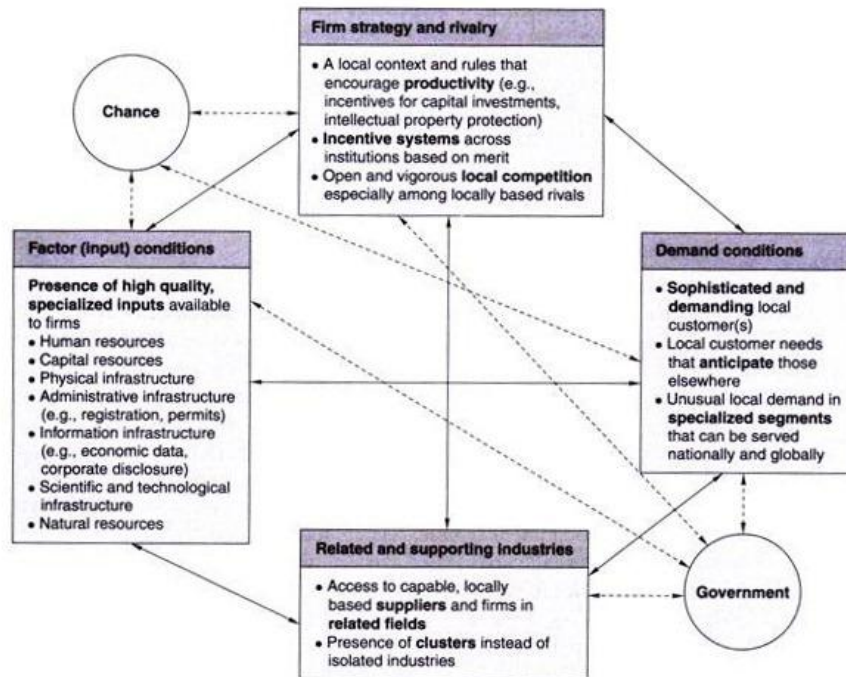
Source: Economics Discussion (2016).

3.2 Overview of The World Coffee Industry

3.2.1 Production

According to van de Vossen (1985), despite its enormous genetic potential, coffee is a difficult crop to grow. Breeding is still largely limited to the two species that dominate world coffee production, Coffea arabica and Coffea canephora (namely Robusta). In addition, the coffee's quality can vary greatly. This is caused not only by the type of coffee, but also by natural conditions and handling and processing methods. The different climatic conditions decide the production areas of two main types (Pieterse, 1988).

Arabica coffee is favoured over all other species due to its superior quality, and it would have remained the sole producer of all coffee in the world for more than 150 years until the end of the 19th century if it hadn't been so susceptible to diseases, especially coffee leaf rust, when grown at lower altitudes in the tropical zones (van de Vossen, 1985). In more details, irrigation is expected in low-rainfall areas, or provisions must be made to preserve soil moisture. Rainfall that is excessive is more easily accepted. The tree is vulnerable to diseases (leaf rust), necessitating herbicide application (Pieterse, 1988). Ideally, Arabica

19

coffee would require the average annual temperature is between 18 and 25 degrees Celsius, with minimum temperatures about 13 degrees Celsius and maximum temperatures not reaching 30 degrees Celsius (Pieterse, 1988). Arabica needs 1500-2500 mm of rain each year, evenly distributed throughout the year, with a two to three-month dry period (De Graaff, 1986; p. 29).

In Central America, countries along the Andes, some parts of Brazil, and parts of East Africa and Madagascar, Arabica conditions are especially well met. Only a few Asian countries (such as India and Indonesia) have the required requirements. What is remarkable is the low suitability of large areas of Brazil (especially in the south), which results in crop failures on a regular basis (Pieterse, 1988).

Basically, there are a multiple of Arabica coffee flavours, all derived from the same type of bean and varying according to where the bean is grown. The Arabica bean's flavour can be affected by the soil, temperature, weather, and even surrounding foliage. Ethiopian Arabica beans, for example, are known for their smooth, easy flavour with a floral finish, while Kenyan Arabica beans are bitter. Arabica beans grown in Latin America have a slightly bitter taste and a nutty finish. Colombia's favoured Arabica beans have a good flavour, a dark texture, and a walnut aftertaste. Costa Rica produces some of the finest Arabica beans in the world. They taste similarly to Brazilian beans, but are sharper and lighter in flavour (Coffee.org,2020).

Coffea canephora, also known as "robusta," accounts for around 25% to 40% of all coffee produced for consumption (Coffeehabitat.com, 2021). The tree is more adaptable than Arabica, but it thrives best in warm equatorial climates with average temperatures of 24 to 26 degrees Celsius. It thrives at lower elevations (300-800 m) and needs a high level of humidity all year. Rainfall of 1700 mm, ranging between 1000 and 2500 mm/year, should be evenly distributed over 9-10 months to achieve the best results (Pieterse, 1988). Robusta-friendly areas can be found throughout most of West Africa, the lower regions of Central and South America, the Caribbean, and large parts of Southeast Asia (Pieterse, 1988).

The caffeine content of the Robusta bean is higher than that of the Arabica bean. Since Robusta beans contain less oil than Arabic beans, they have a more acidic and bitter flavor. The Robusta bean is a less inexpensive bean than the Arabic bean, and it is used in both blended coffees on supermarket shelves and expensive espresso roasts around the world. This is due to the bean's higher caffeine content, which is at least 50% higher than the Arabica bean. While they are bitter and acidic, they do not have a bad taste; in reality, Robusta beans are used to make some of the best espressos (Coffee.org, 2020).

Table 2 Total production by all exporting countries

In thousand 60kg bags	
Crop year	Total production
2000/01	113,746
2005/06	111,169
2010/11	140,078
2015/16	156,126
2019/20	165,053

Source: ICO, 2021.

During the period from 2000 to 2019, world coffee production has greatly increased as is indicated in Table 2. However, what is remarkable is the instability of total world production. Close analysis shows that production fluctuations in Brazil were almost entirely to blame, as world production of coffee, excluding Brazil, has remained relatively constant. This can be explained as mentioned above that the low suitability of large areas of Brazil (especially in the south), which results in crop failures on a regular basis (Pieterse, 1988).

Figure 3 World and Brazil coffee's production
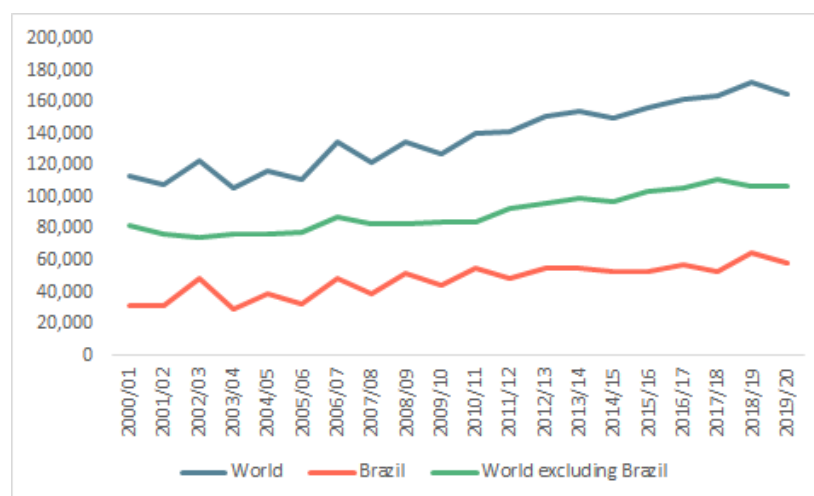
Source: data from ICO, 2021, chart created by author

However, Latin America is still the dominant coffee production area with Brazil ranks first with 35.27 percent of world coffee production in crop year 2019/20 and is followed by Colombia with 8.54 percent of world coffee production. Other major coffee producers are Vietnam, Indonesia, Ethiopia, India, Honduras, Uganda, Guatemala, Mexico and Nicaragua. Together, these twelve countries accounted for 92.28 percent of total world coffee production. Table below displays coffee production during the period 2000 to 2019 for these countries.

Table 3 Coffee production of selected exporting countries in 2000-2019

In thousand 60kg bags

Crop year	2000/01	2005/06	2010/11	2015/16	2019/20
Brazil	31,310	32,933	55,428	52,871	58,211
Indonesia	6,987	9,159	9,129	12,585	11,433
Peru	2,676	2,489	4,069	3,304	3,836
Colombia	10,519	11,952	8,523	14,009	14,100
Ethiopia	3,115	4,779	5,560	6,515	7,343
Guatemala	4,940	3,676	3,950	3,410	3,606
Honduras	2,667	3,204	4,331	5,786	5,931
India	5,020	4,566	5,600	5,830	4,988
Mexico	4,815	4,225	4,001	2,772	3,985
Nicaragua	1,572	1,432	1,638	2,130	2,882
Uganda	3,401	2,175	3,267	3,650	5,509
Viet Nam	14,841	13,842	20,000	31,090	30,487
Total	**113,746**	**111,169**	**140,078**	**156,126**	**165,053**

Source: ICO, 2021.

According to ICO (2021), the two main types of coffee traded internationally are *Arabica* and *Robusta. Excelsa* and *Liberica* coffees are also produced commercially but in much smaller quantities. Producing Members which produce Arabica or Robusta, exclusively or mainly are grouped into one of the four groups established under the Agreement: Colombian Mild Arabicas, Other Mild Arabicas, Brazilian Natural Arabicas, and Robusta. List of countries that mainly produce Robusta are Vietnam, Indonesia, the Philippines, Sri Lanka, Thailand, Uganda, Nigeria, etc. Countries producing Arabica coffee are grouped in one of the three groups of Arabica-producing countries namely Colombian Mild Arabicas, Brazilian Natural Arabicas, and Other Mild Arabicas, according to the type of Arabica coffee they produce. Over almost 20 years, coffee production has increased significantly especially during the year 2010, from 111,169 thousand 60kg bags in 2005 to 140,078 thousand 60kg bags in total (ICO, 2021).

Brazil is the biggest coffee producer in the world with the production of 58,211 thousand of 60kg bags in 2019, thus, there was a deduction of 6,920 thousand bags or 10.62% less compared to the year 2018 with the production of 65,131 thousand bags. According to USDA, this was not because of the weather condition but was because Arabica coffee trees are mostly in the off year of the biennial production cycle, thus producing less. Vietnam, the second biggest coffee producer in the world after Brazil, however, the coffee production was far less. In 2019, the production of coffee was 30,487 thousand of 60kg bags, slightly increased compared to the year 2018 with the production of 30,284 thousand bags. This is due to the good weather condition according to the USDA. Other major coffee producers in the world are Colombia, Indonesia, India and Mexico with the production of coffee were 14,100, 11,433, 4,988, 3,985 thousand of 60 kg bags in 2019; respectively (ICO, 2021).

3.2.2 Consumption

Coffee is mainly grown in developing countries, in contrast, coffee consumption is mainly in industrialized countries where coffee processing takes place into either roasted or instant coffee (Pieterse, 1988).

Table 4 Domestic coffee consumption of selected coffee exporting countries

					In thousand 60kg bags
Crop year	**2000/01**	**2005/06**	**2010/11**	**2015/16**	**2019/20**
Brazil	13,200	15,538	19,132	20,508	22,000
Indonesia	1,676	2,500	3,333	4,550	4,806
Philippines	820	1,040	2,125	3,000	3,250
Colombia	1,282	1,209	1,311	1,720	2,025
Ethiopia	2,014	2,609	3,171	3,501	3,781
India	975	1,238	1,325	1,450	1,450
Mexico	1,305	1,725	2,354	2,329	2,425
Thailand	500	500	775	1,300	1,400
Venezuela	1,184	1,457	1,650	1,650	1,275
Viet Nam	402	800	1,583	2,300	2,650
Total	**23,358**	**28,616**	**36,759**	**42,308**	**45,062**

Source: ICO, 2021.

Major coffee consumption in producing countries are limited to countries that are in Central and South America such as Brazil, Colombia, Mexico or Venezuela with the value of 22,000, 2,025, 2,425, and 1,275 thousand 60kg bags; and some other countries in Africa such as Ethiopia. Coffee consumption of Asian coffee producers has thrived despite Asian people traditionally drinking tea (ICO, 2019). Major coffee consumption in Asian producers are, for instance, Indonesia, Philippines, India or Vietnam. The remaining part is consumed in so-called consuming countries (Pieterse, 1988). Total consumption of all exporting countries in 2019 reached 45,062 thousand 60kg bags, almost the highest consumption out of 20 years (the highest year was 2018 with the consumption of 45,251 thousand bags) from 2000 to 2019.

Table 5 Coffee consumption in selected importing countries

<div align="right">In thousand 60kg bags</div>

Year	2000	2005	2010	2015	2019
EU	**36,008**	**37,196**	**38,061**	**38,207**	**41,262**
France	5,402	4,787	5,713	5591	6192
Germany	8,770	8,665	9,292	8421	8670
Italy	5,149	5,552	5,781	5660	5469
Spain	2,991	3,007	3,232	3524	3253
Japan	6,626	7,128	7,192	7695	7551
Norway	657	743	746	788	771
Russia	1,863	3,185	3,700	3846	4820
Switzerland	827	1,099	1,012	1096	1073
Tunisia	192	190	301	458	508
UK	2,342	2,680	3,134	3591	3770
USA	18,746	20,998	21,783	24438	27310
Total	**67,261**	**73,219**	**75,931**	**80,119**	**87,064**

Source: ICO, 2021.

These countries that consume the most coffee are clearly industrialized nations (Pieterse, 1988). In 2019, European Union (47.39 percent), USA (31.37 percent) and Japan (8.67 percent), together they accounted for almost 87.43 percent of total coffee consumption of importing countries. Within Europe, Germany (8,670 thousand bags), France (6,192 thousand bags), Italy (5,469 thousand bags) and Spain (3,253 thousand bags) account for the largest share of consumption in 2019.

Coffee for consuming countries comes from a variety of countries, depending on local customer preferences for specific flavors and the availability of specific coffees. However, some generalizations can be made (Pieterse, 1988). Pieterse has concluded that countries with a high per capita consumption of coffee have a high combined Arabica import share (e.g. Finland, Germany, Sweden), while countries with a newer coffee drinking tradition have a high Robusta share (e.g. the United Kingdom) and consume more instant coffee (UK , Japan). On the other hand, France and Italy have high Robusta shares, which may be due to proximity and former colonization of West African countries where Robusta is grown. When demand started to increase after World War I, French consumers shifted to Robusta. Instant coffee is common in the United States, as are light brews of unwashed

Arabicas and Robusta. In addition, Pelupessy (2005) had concluded that coffee intake is habit-forming, according to a logical addiction model (Olekalns 1996) that was studied in the United States. It was discovered that current usage improves potential desirability, which may explain the demand's low negative price elasticities of 0.2 to 0.4. Long-run elasticities are higher in absolute terms than short-run elasticities.

3.2.3 Trade

On the global market, a war rages between exporting and importing parties, with or without the support of traders. The prices of different grades of coffee are thus determined by the meeting of supply and demand, with the outcome affected by the atmosphere, market conditions, and marketing participants' strategies (Pieterse,1988). A bilateral differentiated oligopoly can be defined as the international coffee market. Supply and demand are equally concentrated in both exporting and importing countries (Pieterse,1988).

Green coffee is the most popular type of coffee traded on the global market. The cash market and the futures market are the two styles of markets for this coffee. Direct supply contracts between exporting organizations and processing companies are also an integral part of the global coffee marketing system (Pieterse,1988).

Table 6 Total coffee import and export in the world
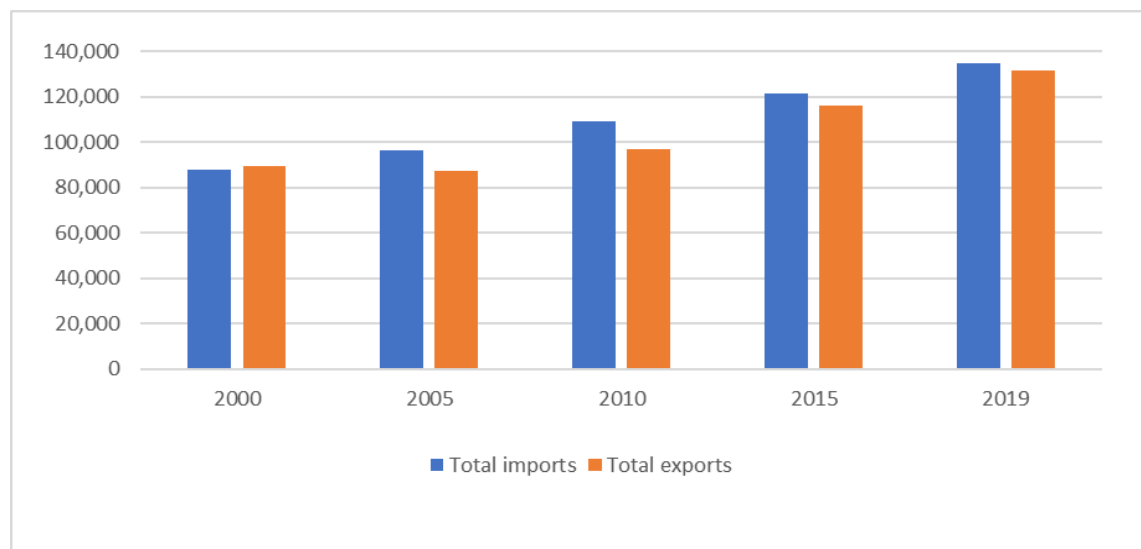
Source: ICO, 2021.

According to ICO trade statistics in December 2019, in December 2019, global coffee exports totaled 10.3 million bags, up from 10.27 million in December 2018. Exports fell 5.8% to 29.01 million bags in the first three months of the coffee year 2019/20 (October to September), compared to 30.78 million bags in the same timeframe last year. Arabica exports totaled 82.75 million bags in the year ending December 2019, up from 77.67 million bags the previous year, while Robusta exports totaled 47.08 million bags, up from 45.07 million bags.

3.3   The Concept of Competitiveness

Although the term "competitiveness" is widely used in many fields, experts and scholars still do not have a clear understanding of what it means. However, competitiveness can be understood as the ability to survive in business and achieve some desired results, such as profits, prices, income, or product quality, as well as the ability to exploit current market opportunities and raise new market opportunities, gain advantages for themselves, and make a profit (Porter, 1998). The levels of competitiveness including national competitiveness, sectoral competitiveness, enterprise competitiveness and product competitiveness (Porter, 1998).

The term "national competitiveness" refers to a country's ability to grow its economy. The level of productivity of a country is determined by a set of factors, policies, and institutions. National competitiveness is critical to a country's ability to improve its living standards. Increased productivity leads to higher national investment yields, which leads to growth. Economic growth is an important factor in enhancing one's quality of life. National competitiveness is a concept that can be defined in a variety of ways. It is a rough estimate of a country's ability to grow and compete for human capital, investments, and other resources with other countries (Reut-institute.org, 2021).

According to Martin, an industry is competitive if it has the "sustained ability to profitably gain and maintain market share in domestic and/or foreign markets". According to Porter, five forces influence the intensity of competition in any industry: power suppliers, the risk of substitution, entry barriers, customer strength, and the level of industry competition.

In a growing market sector, the ability to maintain market share and high profit margins will make it easier to recruit new firms, raising the level of competition in the industry, both domestically and internationally. As a result, sectoral competitiveness refers to the ability of businesses in the industry to maintain or grow their profitability both domestically and internationally (Nguyen, 2016).

In terms of industry competitiveness in Neo-classical Economics, a company is competitive in some homogeneous product "A" relative to another homogeneous product "B" if it has a relative cost advantage in producing and marketing it, according to neoclassical economics (Kancs, 2001).

An organization's competitiveness is defined as a multifaceted characteristic that identifies its ability to compete successfully in the market and gain economic advantages over competitors (Shevchenko, 2019). Businesses' competitiveness is defined as their ability to maintain and improve their competitive advantage in product marketing, sales network expansion, and attracting and utilizing the factors of production efficiently in order to achieve high economic growth benefits and ensure long-term economic viability. Business competitiveness is linked to the advantages of enterprise products to market, product market share, and business production efficiency. Many factors influence a company's competitiveness, including external factors like market businesses, institutional policies, and infrastructure as well as internal elements such as the level of technology, the ability to organize management, finance, human resources, or a company's image (Vietnamese industry magazine, 2004).

According to Tyunyukova, a product's competitive advantage can be expressed in a variety of ways, but it typically consists of characteristics or attributes of the product that are not noticed by competitors. Competitiveness is a metric that indicates the presence of such peculiarities and can be used to forecast the future success of a company's product marketing efforts.

Mr. Le Van Duoc, the Director of the Plan, the Ministry of Industry of Vietnam stated that "The competitiveness of a product is expressed through the comparative advantage for products of the same type. Comparative advantages of the products due to inside and

outside factors created, such as production capacity, production costs, product quality and market size of the product. The competitiveness of a product can be measured by the market share of such products on the market." (Vietnamese industry magazine, 2004).

Whan-Kan had defined the definition of export competitive as the ability of a country to produce and sell goods and services in international markets at prices and in a quality that ensures long-term viability and sustainability. In addition, defining the goals of an export strategy and understanding relative results are the first steps in assessing export competitiveness. The level (volume, share) and growth of exports, as well as diversification and quality or complexity of exports, are the most common outcome steps (Farole, 2010).

The national competitiveness advantage is not the same as the export competitiveness of a country. If a country's national competitiveness advantage is based on macroeconomic factors, the export competitiveness advantage is primarily based on macro business and is constrained by a single product. There is, however, a connection between these two meanings. The enterprise output item has an effect on a country's competitiveness in a commodity. The competitiveness of these businesses is influenced by the competitiveness of the nation. Businesses would have more resources to grow their competence, generating added demand for their goods that compete with those from other countries, if the country has strong institutions, a competitive climate of openness and equality (HBS Working Knowledge, 2010).

3.4 Main Factors Affecting Vietnam Coffee Export

There has been relatively little research into the main factors influencing coffee export. Natural factors and "explicit beyond-the-border" constraints, according to the literature review, have a major impact on Vietnam's exports, especially in agricultural commodities and rice. Natural factors are affected by the economic size of exporting and importing countries, as well as the geographical distance between them, meanwhile, tariffs and exchange rates are two important components of "explicit beyond-the-border" restrictions (Kalirajan, 2015). Another factor is coffee-growing method, which is heavily dependent on fertilizer and pesticides. This results in the depletion of soil and water habitats, which has a

negative effect on product production and quality (Nguyen, 2017). Furthermore, recent droughts and saline intrusion in the Central Highlands and Mekong Delta have decreased development areas and crop yields due to climate change (UNDP, 2016). Prajanti (2020) added that domestic coffee production has a huge effect on the amount of coffee exported, coffee exports will increase as domestic coffee production increases. While domestic coffee production has an effect on coffee exports, coffee quality must also be taken into account. More specifically, according to Batista (2016), good coffee quality affects the flavor of the coffee and makes it more marketable. Another variable influencing coffee exports volume is the exchange rate (Prajanti, 2020). According to Tuyen (2020), Vietnamese coffee, as an agricultural commodity, is affected not only by market price fluctuations caused by internal industry factors, but also by the volatility of non-agricultural products such as world oil prices, exchange rates, and so on. The price level of the local currency in relation to a foreign currency is known as the exchange rate. The more the local currency appreciates, the more expensive domestic coffee becomes, and as a result, the amount of coffee exports decreases (Prajanti, 2020).

In contrast, previous studies on Vietnam have overlooked the effects of "behind-the-border" constraints, such as dysfunctional institutions, in exporting countries and their trading partners. Some current behind-the-border factors in developing countries, according to Kalirajan (2015), can stymie export activities. Exports of rice and coffee in Vietnam may be hindered by "behind-the-border" restrictions. The first is related to Vietnam's trade policies, especially in the rice sector. Despite joining the World Trade Organization (WTO), according to Nguyen (2017), Vietnam's rice has not been fully reformed to comply with market rules due to a conflict between socialist policy legacy and trade liberalization goals. Furthermore, Vietnamese political institutions have established favourable conditions for political and economic elites, allowing them to implement policies and trade restrictions that are intended to benefit them (Fulton, 2015). These behaviors will have a negative effect on the export potential of Vietnamese products.

As a result, it is essential to assess the impact of "behind-the-border" factors on export, especially in Vietnam (Kalirajan, 2015). However, since researchers have insufficient expertise or data on these limitations, the calculation is difficult to enforce (Kalirajan, 2015). Many previous studies in Vietnam have used the gravity model to calculate the

30

determinants of total export and agricultural commodity export, especially rice export. Doanh (2009) used the fixed (FE) and random effects (RE) with this model to describe the AFTA's impacts on total trade volume between Vietnam and Singapore in the Association of Southeast Asian Nations (ASEAN) Free Trade Area (AFTA). Moreover, using both static and dynamic gravity models, Nguyen (2010) concluded that while Vietnam's and trading partners' incomes are positive, ASEAN membership has a negative effect on Vietnam's total export. Thuong (2018) used the ordinary least squares (OLS) and Poisson pseudo-maximum probability (PPML) estimator methods to find that tariff reductions substantially increased exports of manufactured goods but had no discernible effect on agricultural commodity exports to regional comprehensive economic partnership markets. Kalirajan (2008) suggested using a stochastic frontier gravity approach to solve this problem (SFGA). As a result, the overall impact of these restrictions on export can be modeled using the SFGA system (Kalirajan, 2015).

Another variable influencing coffee exports volume is the world coffee prices (Prajanti, 2020). As international coffee prices increase, export volume rises as well, so exporters will sell more coffee in international markets based on the principle of offering (Prajanti, 2020). In discussion, however, the reality is that low coffee prices are primarily due to supply outstripping demand. The gradual fall in world coffee prices has been due to a range of factors (Amrouk, 2018). The rapid expansion of production capacity in the major producing countries, the slow growth of global consumption, especially in developing countries, technological advances in coffee processing, and the excess market power of the major coffee roasters are some of these factors (Amrouk, 2018). Therefore, it can be said with the expansion of coffee exporting, the world coffee prices can decline. Moreover, the regular supply surpluses have placed downward pressure on world prices, which has been compounded by the coffee market's inherent economic and physical characteristics. Coffee demand is inelastic, which means that major changes in consumption can only be predicted when prices adjust drastically (Amrouk, 2018). In addition, Nguyen (2020) believed that there is a significantly positive relationship between Vietnam's GDP and its exports in coffee commodity.

3.5 Revealed Comparative Advantage and Its Indices

According to the United Nations Conference on Trade and Development (UNCTADstat, 2018), Revealed Comparative Advantage (RCA) is "based on Ricardian trade theory, which posits that patterns of trade among countries are governed by their relative differences in productivity. Although such productivity differences are difficult to observe, an RCA metric can be readily calculated using trade data to "reveal" such differences." As the main idea of RCA is to help "reveal" the differences, the usual approach of RCA is to "compare national sectoral shares with their international analogs and to infer the existence of comparative advantage through examination of actual output and/or trade flows" (De Benedictis, 2001). There have been numbers of literature for major RCA indices such as Balassa (1965), Donges and Riedel (1977), Vollrath (1991), etc.

Balassa Index was introduced by Bela Balassa for the first time in 1965 and was based on the traditional trade theory and the first empirical utilization of Liesner (1958) (Hoang, 2017). Balassa Index is the first and most widely used RCA measure in the literature (Yu, 2009). A country is said to have a revealed comparative advantage in a given product i when its ratio of exports of product i to its total exports of all goods (products) exceeds the same ratio for the world as a whole (UNCTADstat) as equation (1) bellow:

$$\textbf{RCA1} \quad = \quad \frac{\dfrac{X_{ij}}{\sum_i X_{ij}}}{\dfrac{\sum_j X_{ij}}{\sum_i \sum_j X_{ij}}} \tag{1}$$

Where:

Xij = exports of commodity i by country j

Xj = total exports of country j

Xiw = exports of commodity i in the world

Xw = total world exports

The formula indicates that if the result RCA1 >1, the country i has a comparative advantage in production of j; the greater the index, the stronger the advantage. In contrast,

if the result RCA1 <1, it indicates that country *i* has a comparative disadvantage in production of *j*; the smaller the index, the greater the disadvantage.

Despite the fact that Balassa's RCA is a useful measurement of whether or not a country has comparative advantage in commodities, the index contains limitations (Yu, 2009). According to UNCTADstat, "While the metric can be used to provide a general indication and first approximation of a country's competitive export strengths, it should be noted that applied national measures which affect competitiveness such as tariffs, non-tariff measures, subsidies and others are not taken into account in the RCA metric." Balassa's RCA index contained empirical inconsistencies such as asymmetry and the variable mean, therefore, it led to prompted subsequent researchers in altering the Balassa Index. Gnidchenko and Salnikov (2015) had shown that the results could be various based on the number of commodities. For example, the RCA result of one country with less exporting commodities would be higher with the country with more categories of exporting products. Another limitation that Balassa's RCA faced due to the fact that the data was post-trade data, therefore, any changes caused by various trade policies may affect the results (Vicente, 2020).

One of the RCA indices suggested by Donges and Riedel (1977) where there is existence of not only export but also import of the country (Granabetter, 2016) is shown as equation (2) below:

$$\text{RCA2} = \frac{\dfrac{X_{ij} - M_{ij}}{\sum_i X_{ij} + M_{ij}}}{\dfrac{\sum_j X_{ij} - \sum_j M_{ij}}{\sum_i X_{ij} + \sum_j M_{ij}}} \tag{2}$$

Where:

Xij = export value of product i of country j

Mij = import value of product i of country j

The formula indicates that if the result RCA2 >1, the country *i* has a comparative advantage in production of *j*; the greater the index, the stronger the advantage. In contrast,

if the result RCA2 <1, it indicates that country *i* has a comparative disadvantage in production of *j*; the smaller the index, the greater the disadvantage (RCA Indices, n.d.) However, in another discussion, the values of this index range from -∞ to +∞ (depending on the net exports index for the country's total trade). If a country is a strong net exporter or importer (say, its net exports index is above 0,5 or below -0,5), then its extreme values are strongly limited (in this example, from -2 to 2). But if a country's exports and imports are close, the index can potentially take very large values, and this is a drawback of Donges-Riedel index (Gnidchenko, 2015).

RCA index suggested by Vollrath with intention of improving the asymmetrical limitation of the Balassa index (Yu, 2009). This index calculates exports and imports in relation to the rest of the world (Granabetter, 2016) with the formula as in equations (3), (4), (5) bellow:

$$\textbf{RCA4} \quad = \frac{X_{ij}/X_{ik}}{X_{nj}/X_{nk}} - \frac{M_{ij}/M_{ik}}{M_{nj}/M_{nk}} \tag{3}$$

$$\textbf{RCA5} \quad = \ln\left(\frac{X_{ij}/X_{ik}}{X_{nj}/X_{nk}}\right) \tag{4}$$

$$\textbf{RCA6} \quad = \ln\left(\frac{M_{ij}/M_{ik}}{M_{nj}/M_{nk}}\right) \tag{5}$$

Where:

X_{ij} = export value of product j of country i

X_{ik} = total export value of other products of country i

X_{nj} = export value of product j of the rest of the world

X_{nk} = total export value of other products of the rest of the world

M_{ij} = import value of product j of country i

M_{ik} = total import value of other products of country i

M_{nj} = import value of product j of the rest of the world

M_{nk} = total import value of other products of the rest of world

According to Vollrath (1991), "a positive RCA4, RCA5, or RCA6 reveals a comparative advantage, while a negative value reveals a comparative disadvantage". Relative net export and Donges-Riedel indices, according to Vollrath, do not calculate comparative advantages since they "both focus on a single product and, therefore, do not fulfill the contrasting dimensions inherent in the concept of comparative advantage" (p. 272). According to Vollrath (1991), (3) and (4) have a major flaw: they are susceptible to policy-induced distortions arising from import security. As a result, he agrees that a simple update of the Balassa index would be preferable in certain situations (5).

The Dynamic Revealed Comparative Advantage (DRCA) index by Edwards and Schoer (2002) is useful because it looks at comparative advantage from a dynamic perspective. Balassa and Vollrath's indexes are constrained in that they cannot be used to describe improvements in competitive advantages over time (Güneş, 2017). The Dynamic RCA index, on the other hand, was created by Edwards and Schoer (2002) to examine evolving comparative advantages over time. It's made up of several components that are decomposed from RCA development. Edwards and Schoer (2002) decomposed the growth in the RCA index by taking the logs of the conventional RCA index and then complete differentiation as equation (6) below:

$$\text{DRCA} = \frac{\Delta RCA_{ij}}{RCA_{ij}} = \frac{\Delta(X_{ij}/X_i)}{X_{ij}/X_i} - \frac{\Delta(X_{wj}/X_w)}{X_{wj}/X_w} \tag{6}$$

The first term on the right-hand side of this formula in equation (7) represents the growth in the share of commodity j in the total trade of country I while the second term represents the growth in the share of commodity j in global trade. Edwards and Schoer (2002) examine the dynamics of marketplace outlined in Figure 4 below by looking at relative patterns in the share of commodity j in country I and global exports.

Figure 4 Market position of Exports

	Share j in country exports		Share j in world exports	Market position of exports
Increasing RCA	↑	>	↑	Rising stars
	↑	>	↓	Failing stars
	↓	>	↓	Lagging retreat
Decreasing RCA	↓	<	↑	Lost opportunity
	↓	<	↓	Leading retreat
	↑	<	↑	Lagging opportunity

Source: Edward and Schoer (2002).

Export products in competitive market positioning are classified into the following six categories using the dynamic RCA index. It should be noted that Edwards and Schoer (2002) evaluated the changes in RCA by comparing the values between an initial and a final year.

> Rising stars: If a country's share of global exports increases faster than the share of a product in overall exports. This is the most favored location for a country because its market share for commodities is growing as a result of rising global demand;
>
> Falling stars: If a country's share increases while its share of global exports falls;
>
> Lagging retreat: If a country's share of the global market falls faster than the share of a product;
>
> Leading retreat: If a country's share of the global market falls less than the share of a product;
>
> Lagging opportunity: If a country's share increases, but not as much as a product's share in global exports;
>
> Lost opportunity: If a country's share of global exports falls while its share of global imports rises. This is a country's most unfavorable situation.

4 Practical Part

4.1 Overview of Vietnam Economy

Vietnam is a developing country in Southeast Asia. The development of Vietnam over the past 30 years has been exceptional. Starting from one of the poorest countries, Vietnam has become a lower middle-income country with a real GDP growth rate in 2019 was 7 percent (IMF, 2021). From 2000 to 2019, the GDP growth rate in Vietnam averaged 6.68 percent, reaching an all-time high of 7.8 percent in 2004 and a low of 5.4 percent in 2009. According to the World Bank (2021), the economy of Vietnam continued to demonstrate fundamental strength and resilience in 2019, supported by strong domestic demand and export-oriented manufacturing. Real GDP rose by an estimated 7% in 2019, one of the fastest growth rates in the region. The reason behind this growth was because of diversifying trade structure, rising wages and domestic consumption (Santander, 2020). Vietnam's economy is based on large state-owned industries such as textiles, food, furniture, plastics, and paper as well as tourism and telecommunications.

Figure 5 Vietnam's real GDP annual growth rate (annual percent change)

Source: data from IMF, 2021. Chart created by author.

Industry contributes 34 percent of Vietnam's GDP. According to Santander (2020), the energy sector has boomed in recent years including coal, hydrocarbons, electricity, cement and steel industry. Despite being a 'newcomer' in the oil industry, Vietnam has become the third largest Southeast Asian producer (ICO, 2019). The country has also invested in high value-added industries such as cars, electronic and computer technologies (software).

Services represent 45.5% of GDP and employ 34.7% of the total workforce. Main services include tourism and telecommunications. Double-digit growth is expected from the Vietnamese retail sector from 2019 to 2024 (AP, 2019).

Agriculture represents 14% of GDP. Main crops include rice, coffee, cashew nuts, corn, pepper, sweet potatoes, peanuts, cotton, rubber and tea as well as aquaculture (ICO, 2019) Despite the high GDP share of agriculture in Vietnam's GDP, the non-agricultural sectors have grown even faster, pushing the agricultural sector's share in GDP low for over the last 20 years . However, agriculture (including fisheries and forestry) continues to be an important share of Vietnam's GDP (the 3rd biggest share of GDP). The share of agriculture in GDP decreased from 25 percent in 2000 to 19 percent in 2005 and remained at this high level until 2015. By 2019, agriculture's share in GDP was reduced to only 14 percent.

Figure 6 Vietnam's economic by sectors (value added in % of GDP)
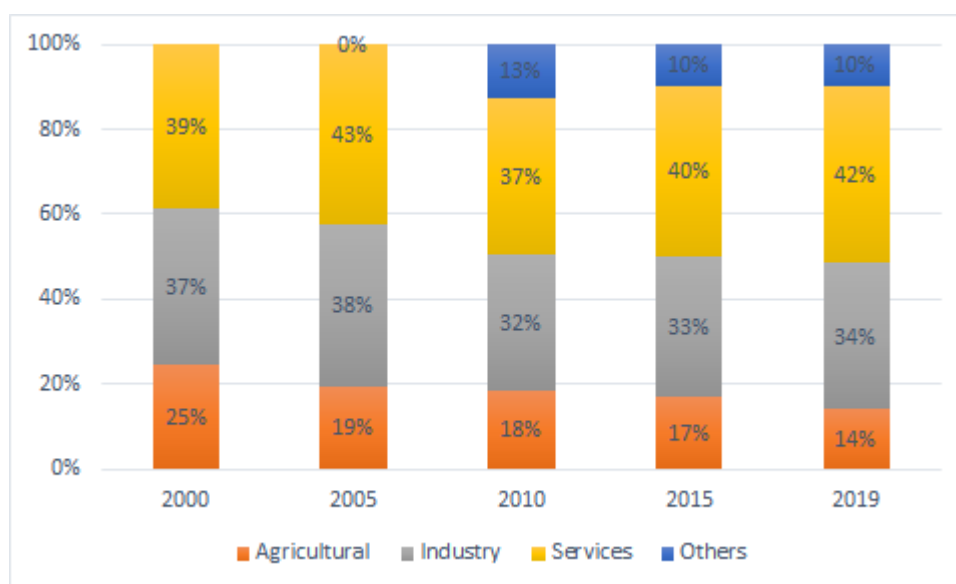
Source: data from World Bank, 2021. Chart created by author.

4.2 Introduction of Vietnam Coffee Industry

4.2.1 Production, Volume and Cultivation Area

Table 7 Production, volume and cultivation area of Vietnam

Year	2000	2005	2010	2015	2019
Area harvested (ha)	476,900	483,600	511,900	593,800	622,637
Production (tonnes)	802,500	831,000	1,105,700	1,452,999	1,683,971
Yield (kg/ha)*	16,827	17,184	21,600	24,470	27,046

Source: data from FAO.org, 2021. *Author calculation.

It is clearly shown from the data collected from FAOstat the expansion of cultivation of coffee from 476,900 hectares to 622,637 hectares over the past 20 years. As a result, from 2000 to 2019, coffee production has increased double in production, from 802,500 tonnes in 2000 to 1.1 million tonnes in 2010, and reached 1.6 million tonnes in 2019, generating an average yield of about 27,046 kilograms per hectare in 2019. According to Ipsos's report on Vietnam's coffee industry, in 2012, the Government of Vietnam set a master guideline for the coffee industry until 2030. The aim was to maintain the total coffee growing area of the country at 500,000 hectares in four primary provinces including Dak Lak, Lam Dong, Dak Nong and Gia Lai. For over 2 decades, coffee cultivation has expanded more than the expectation of Vietnamese Government. The key to the success of becoming the world's second producer and exporter was its reliance on varieties of Robusta.

According to ICO (2019), Robusta coffee type accounts for 97% of the total output volume and it is grown in four main provinces in the Central Highlands: Dak Lak, Lam Dong, Dak Nong and Gia Lai with a total area of 530,000 hectares.

Arabica is better in quality compared to Robusta, however, Arabica coffee isn't the main production. The production of Arabica accounts for only 4-5 percent of the total production of coffee in Vietnam and its planted area accounts for approximately 6 percent of total area

(USDA, 2019). The reason why Arabica coffee isn't the main production is due to its characteristic. Only if they grow at least 1,000 meters above sea level will they produce good quality cherries. These areas are in remote regions with ethnic minority populations, therefore, Arabica's production faces difficulties in terms of transport, storage and processing (USDA, 2019). Arabica coffee is mainly planted in Son La (Northwest Vietnam), Nghe An, Quang Tri (Central provinces) and Lam Dong (Central Highlands).

4.2.2 Consumption

Domestic consumption increased to 3.4 million bags, reflecting 3 million bags of roasted and ground coffee, or approximately 10 percent of total coffee supply (USDA, 2019). The expansion is due to the continuing proliferation of foreign franchises and local Vietnamese brands from coffee shops. The domestic coffee market is in fierce competition with renowned international coffee brands. International coffee brands such as Starbucks, Dunkin Donuts, McCafe, and local chains such as Trung Nguyen, Phuc Long, Highlands. Vietnamese coffee drinkers prefer to maintain the full-bodied flavour, that is why they choose roasted and ground coffee (USDA, 2019). Several chains are creating niche and value-added coffee products to stand out in the competitive market.

4.2.3 Trade

Figure 7 Total world coffee export of all forms
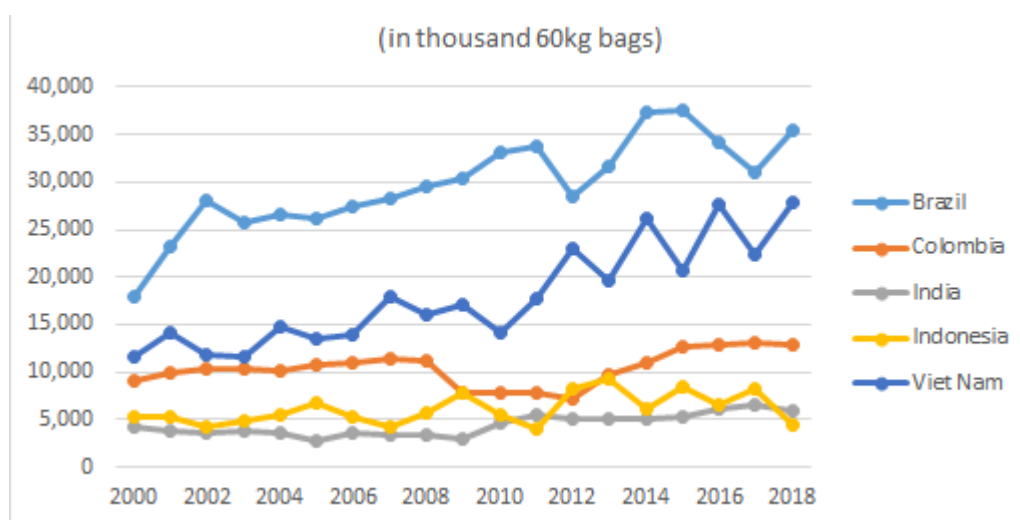
Source: data from ICO, 2021. Chart created by author.

Significant improvement in the volume of Vietnam's exports occurred in 2014 with the value of 26,097 thousand bags compared to 2013 of 19,718 thousand bags. Another major change was in 2016 compared to 2015. The volume of export rose to 27,568 thousand bags while the value was 20,655 thousand bags in 2015. The reasons for this continuous growth were due to Vietnam is Robusta-mainly-producer and its tree yield more beans per hectare than Arabica (ICO, 2021).

Figure 8 Vietnam coffee export's selected destinations

Year	2000		2005		2010		2015		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
	(mil.kg)	(mil.US$)	(mil.kg)	(mil.US$)	(mil.kg)	(mil.US$)	(mil.kg)	(mil.US$)	(mil.kg)	(mil.US$)
Algeria	1.14	0.96	4.85	7.10	24.04	36.95	36.79	68.64	69.40	110.62
Germany	82.23	52.61	52.01	76.13	151.33	232.92	190.52	353.95	228.90	345.47
Belgium	36.51	22.99	13.24	19.38	58.65	87.74	59.54	117.80	72.88	115.27
China	4.41	3.04	5.17	7.56	26.50	39.35	17.92	31.92	21.74	31.27
France	16.70	10.99	15.76	23.07	17.69	26.04	32.55	61.14	34.37	52.37
India	0.11	0.06	9.54	13.97	17.54	23.99	26.66	45.10	36.00	49.55
Indonesia	2.45	1.69	0.26	0.39	10.95	15.80	10.54	18.59	19.72	31.21
Italy	34.94	24.26	37.16	54.40	76.07	115.18	104.61	194.35	139.27	218.62
Japan	27.22	21.32	17.72	25.94	52.93	85.06	80.58	151.76	92.84	144.51
Malaysia	4.56	3.23	3.89	5.69	22.29	32.02	17.54	31.93	37.29	55.72
Mexico	0.16	0.11	5.47	8.01	18.22	28.05	16.91	30.44	6.92	10.22
Netherlands	49.32	34.87	11.49	16.81	24.20	39.14	13.17	24.94	9.58	15.38
Philippines	1.91	1.19	12.20	17.86	29.46	42.57	21.91	39.21	23.90	36.54
Poland	10.54	6.49	7.62	11.16	10.63	15.65	13.15	23.47	11.18	16.60
Rep. of Korea	6.86	4.15	12.41	18.17	33.56	51.53	27.23	50.78	30.43	46.72
Russia	0.55	0.38	0.86	1.26	27.95	40.10	42.45	78.31	78.38	119.35
Spain	28.33	17.71	36.99	54.14	79.99	116.94	109.47	201.73	124.37	188.38
Thailand	14.42	10.79	0.04	0.06	9.94	14.93	19.98	37.09	36.26	53.89
UK	54.78	39.24	25.15	36.81	28.56	41.99	30.31	58.94	46.97	72.44
USA	113.50	70.92	66.59	97.47	149.55	243.20	145.55	277.79	133.62	208.51
World	733.93	501.44	498.91	730.26	1,211.44	1,838.31	1,259.45	2,341.58	1,388.47	2,135.11

Source: Un.org, 2021.

Figure 9 shows coffee exports during 20 years from 2000 till 2019, however, statistics data from the year 2020 has not yet been published from the UN Comtrade Database. Vietnam's coffee has been exported to more than 19 countries around the world, Germany, the United States, and Italy remain the top three buyers of Vietnamese coffee. It has shown that Europe and the United States of America are the main consumption markets of Vietnamese coffee. According to ICO, Asian market of coffee consumption has thrived despite Asian people traditionally drinking tea. As a result, the consumption of coffee

export in Asian market has increased from less than 10% of the country's total global exports 10 years ago to 24% in 2016.

4.3 Revealed comparative advantage of Vietnam coffee export volume

4.3.1 The Level of Competition of Vietnamese Coffee

The quantity of coffee exported from different coffee producers increased significantly during the period 2000-2010 as shown in figure 10, with the increase from 5,06 billion kilograms in 2000 to 6,45 billion kilograms in 2010, the growth rate was 27.46 percent. During the period 2010-2015, the quantity increased to 6.83 billion kilograms in 2015 with the increase of 5.92 percent. However, the quantity of world coffee export in 2019 amounted only to 6,92 billion kilograms, it means that the increase of coffee export during the period 2015-2019 was only 1.31 percent.

Figure 9 Total coffee export by all exporting countries in the period 2000-2019
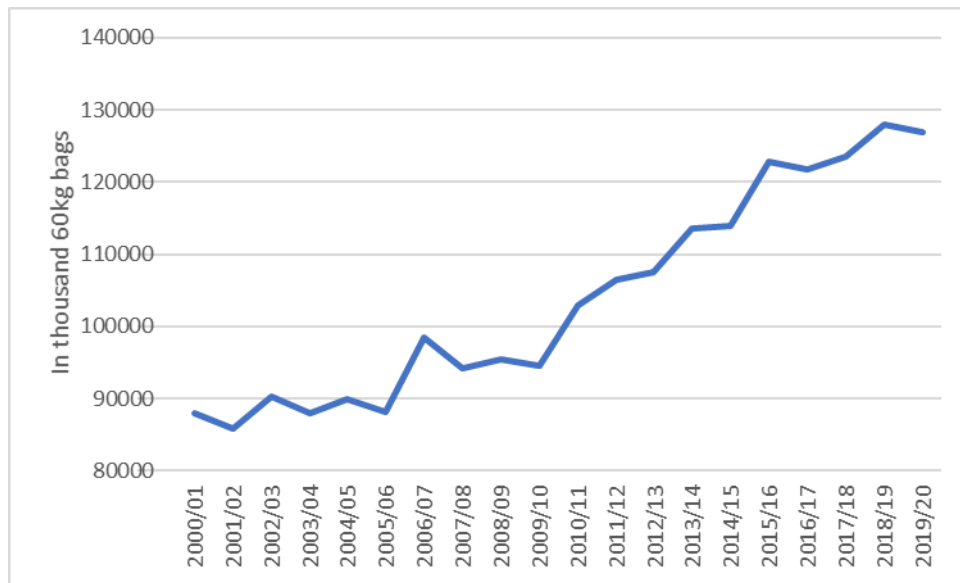
Source: data from Ico.org. (2021). Chart created by author.

For almost 2 decades, world coffee export has been dominated by Brazil as the largest producer of Arabica coffee with a market share in 2000, 2010, 2015 and 2019 were 19 percent; 28 percent; 29 percent; 32.26 percent, respectively. Brazil produces two types of coffee, Arabica and Robusta, but the production of Arabica is far greater than that of

42

Robusta. Brazil is the world's largest producer of Arabica coffee because of its successful productivity improvement programs, resulting in increased production (Rosiana, 2017). In addition, Colombia, Ethiopia, Honduras, Guatemala, Peru and others are also Arabica coffee producers (ICO, 2021).

Even though Vietnam became Southeast Asia's leading coffee producer, and after Brazil, the second largest producer and exporter of green coffee beans worldwide (ICO, 2019), Vietnam coffee share was only almost half of Brazil's with the market share over the years being 15 percent in 2000, 19% percent in 2010 and 2015, 20.08 percent in 2019. Moreover, Vietnam coffee production was mainly Robusta coffee. Other Robusta coffee producers are Indonesia, India, and Uganda (ICO, 2021). The second Robusta coffee producer belongs to Indonesia, however, Indonesia's share was only 7 percent in 2015 and decreased to 5.14 percent in 2019 and was way less than Vietnam's. Vietnam and Indonesia are countries producing both forms of coffee, but coffee produced and exported by Robusta is more prevalent.

Figure 10 Market share of world coffee export in selected years
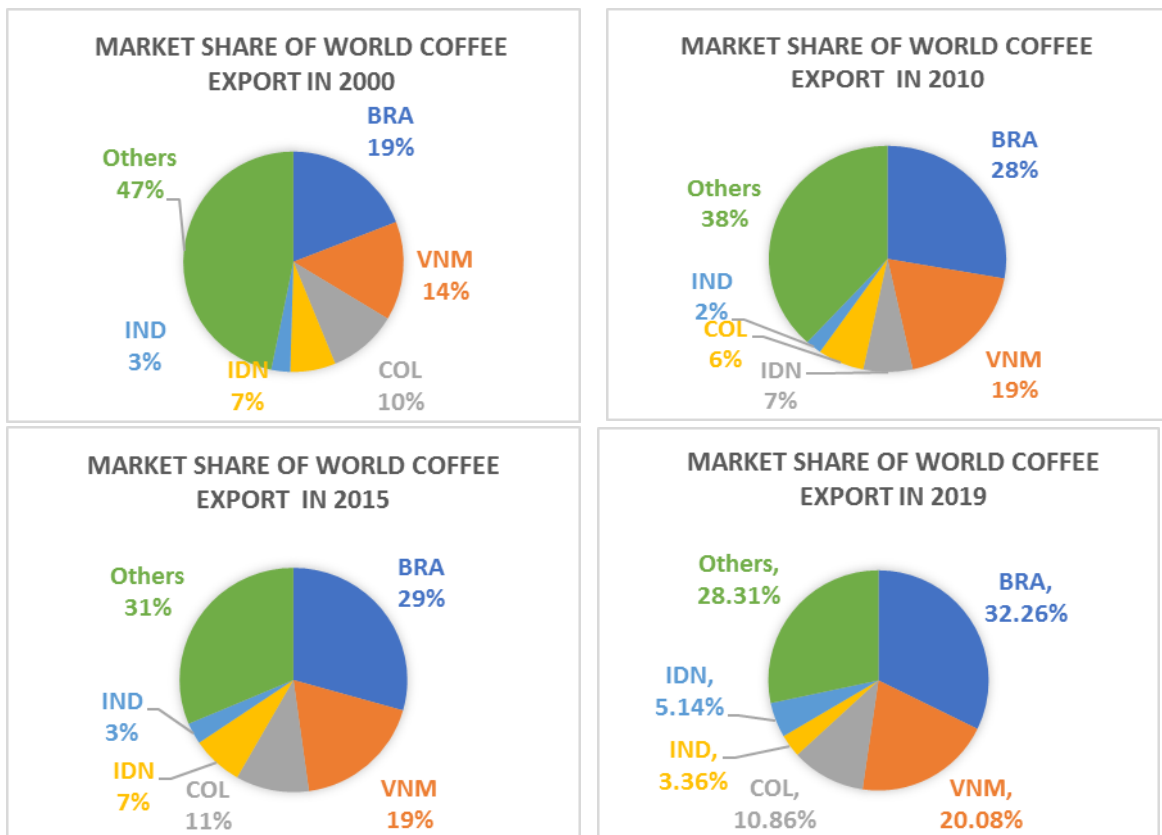
Source: Author's calculation. Data from Un.org, 2021.

4.3.2   Revealed Comparative Advantage of Vietnamese Coffee Export

Comparative Advantage of Vietnamese and Brazilian coffee exports were analyzed by Balassa's RCA, Donges and Riedel's RCA and Vollrath's RCA indices in the form of beans (not roasted, not decaffeinated) with HS code: 090111. The three indices were chosen due to the following reasons: Balassa's RCA index is the first and most widely used RCA measure in the literature (Yu, 2009). The other two indices were used to compare the differences in result with the standard Balassa's RCA index since it contains limitations. The data source was obtained from the United Nation Comtrade Database (UN Comtrade) including the following indicators: coffee import and export value of Vietnam, Brazil and the world, total import and export of Vietnam, Brazil and the world and during the period 2000-2019. The RCA results below were calculated by the author using the RCA indices above.

Table 8 RCA values of Vietnam and Brazil coffee export using selected RCA indices

Year	Balassa's RCA index		RCA index by Donges & Riedel		RCA index by Vollrath	
	BRA	VNM	BRA	VNM	BRA	VNM
2000	23.39	28.62	-178.14	-210.69	24.04	29.57
2001	24.60	30.66	-147.01	-168.99	25.10	30.99
2002	26.74	26.04	-187.69	-147.58	27.26	26.32
2003	24.50	34.51	-201.25	-207.09	24.93	35.17
2004	24.33	32.52	-360.60	-358.44	24.76	33.17
2005	24.10	25.55	-304.34	-244.84	24.60	26.08
2006	24.16	34.71	-336.70	-377.71	24.66	35.73
2007	22.81	42.73	-424.79	-605.34	23.28	44.32
2008	22.08	35.57	-300.83	-395.20	22.53	36.65
2009	22.45	27.42	-338.87	-338.50	22.99	28.06
2010	23.07	22.88	-631.22	-544.29	23.65	23.36
2011	22.08	19.95	-420.82	-337.26	22.76	20.32
2012	18.89	24.53	-331.82	-411.00	19.32	25.05
2013	21.23	21.34	-143.83	-141.21	21.62	21.39
2014	24.89	20.17	-1453.36	-1175.41	25.55	20.22
2015	24.87	12.37	-379.93	-174.43	25.59	12.36
2016	22.29	14.33	-610.96	-338.38	22.86	14.34
2017	18.40	12.17	-504.39	-275.46	18.77	11.98
2018	20.95	13.30	-138.15	-75.76	21.32	13.09
2019	19.51	7.75	-150.97	-53.12	19.89	7.55

Source: Author's calculation. Data from Un.org. (2021).

The table 8 above shows the results of comparative advantage of coffee export of Vietnam and Brazil using 3 RCA indices: the Balassa's RCA index, the RCA index suggested by Donges and Riedel, the RCA index suggested by Vollrath. Based on the outcome, during the period 2000- 2019 there was a comparative advantage of coffee export for both countries by using Balassa's RCA index and RCA index by Vollrath. This result is shown by the RCA value over 20 years that was greater than one. There was, however, a comparative disadvantage for both countries during this period when using the RCA index by Donges and Riedel. The result when using this index was less than one.

Figure 11 Development of Balassa's RCA Index Value
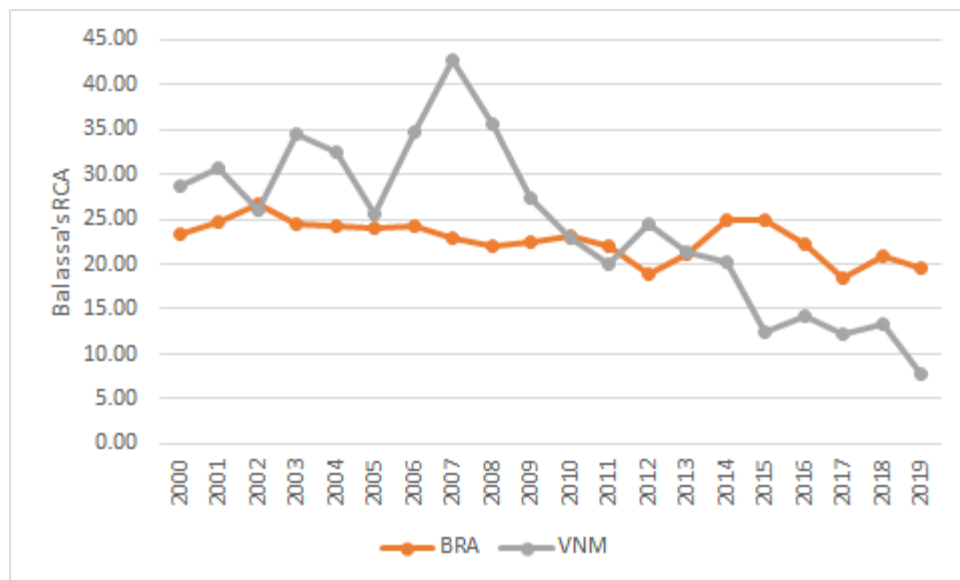
Source: Author's calculation based on data from Un.org (2021).

In terms of Balassa's RCA index, the result showed that the country enjoyed the highest RCA of 26.74 in 2002 and the lowest value of 18.4 in 2017. The result of Vietnam when calculated using Balassa's RCA index had shown that Vietnam enjoyed the highest RCA in 2007 with the value of 42.73 and the lowest value of 7.75 in 2019. It can be seen from the Figure 12 above that the comparative advantage of Vietnamese coffee during 2000–2019 was higher compared to Brazil, especially in the period 2000-2009, however, the RCA during the period 2000-2019 was fluctuated with a tendency to decrease. Brazil, on the other hand, had shown more stable development over the year, but also with the tendency to decrease. Overall, when it comes to the Balassa's index, Vietnam surprisingly

45

had 11 out of 20 years with RCA greater than Brazil including 2000, 2001, 2003 till 2009, 2012 and 2013.

Figure 12 Development of RCA value suggested by Donges & Riedel
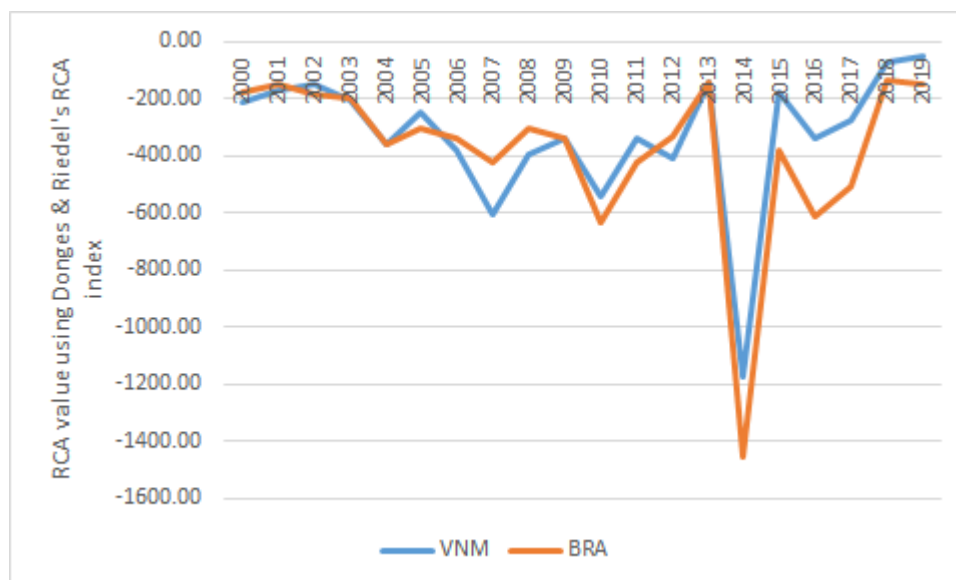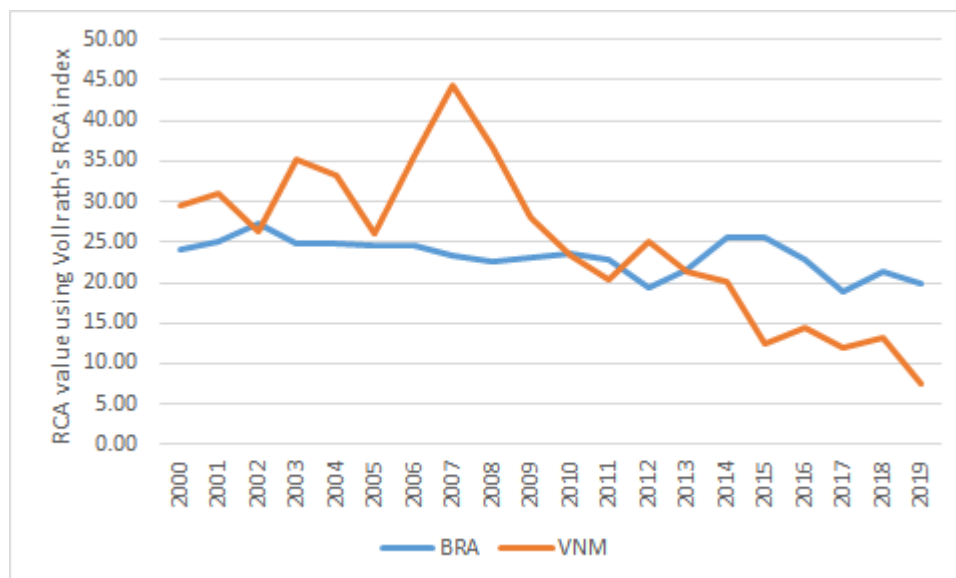

Source: Author's calculation based on data from Un.org (2021).

Concerning the RCA index suggested by Donges and Riedel, it can be seen from the Figure 13 above that both of the countries had a comparative disadvantage in coffee export during the period 2000-2019. By using this formula, the highest RCA of Brazil was noted in the year 2018 with the value of -138.15 and the lowest RCA value was -1453.36 in 2014. The result of Vietnamese coffee export was -53.12 as the highest in 2019 and -1175.41 as the lowest in 2014. Both of the countries witnessed the lowest value of RCA in 2014, the reason was that both countries and the world decreased coffee export values. Concerning RCA index by Donges and Riedel, Vietnam had 13 out of 20 years with RCA greater than Brazil. These years, however, are different from Balassa's RCA index which are 2002, 2004, 2005, 2009, 2010, 2011 and 2013 till 2019.

The highest and lowest years by using the Vollrath index are the same with Balassa's RCA index but with the value of 27.26 as the highest and 18.77 as the lowest value for Brazil and highest and lowest years of 44.32 in 2007 and 7.55 in 2019 for Vietnam (see Figure 14). With the result by using the RCA index by Vollrath, Vietnam had only 10 years with greater RCA than Brazil. Similar to Balassa's index, the development of the RCA value of Vietnam was fluctuated and with the tendency to decrease.

Figure 13 Development of RCA value suggested by Vollrath

Source: Author's calculation based on data from Un.org (2021).

In 2019, the value of exports of Brazilian coffee reached 4.58 billion US dollars (comtrade, 2021) or 2,23 billion kilograms (ICO, 2021). As the world's largest coffee producer and exporter, it can be seen that Brazil has several strengths and opportunities to have the place such as natural advantage, advanced methods and technology, and also tax advantage. According to Mahab, there are no taxes on Brazil's coffee exports, duty-free shipments of unprocessed coffee can be made to the three main markets: The United States, the European Union and Japan. Processed coffee, such as ground beans, instant coffee and decaffeinated coffee is taxed in the EU at 7.5 percent and in Japan at 10 percent. Exports are tariff-free to the United States.

While the value of Vietnam coffee export decreased, the total export value of Vietnam increased in 2019, from 243 billion US dollars (UN comtrade, 2021) in 2018 to 264 billion US dollars in 2019 (UN comtrade, 2021), with the increase of 8.58 percent. If it is seen, however, Vietnam was still the country exporting the highest quantity of coffee to the world market in the same year among Robusta producers, with the quantity was 1,38 billion kilograms (ICO, 2021), or about 20.08 percent (see Figure 10) of the total world coffee exports.

Based on this analysis result, the comparison of comparative advantage between two countries can be seen in Figure 12, 13, 14 above. Competitiveness of Vietnamese coffee tended to decrease compared to Brazil, even though Vietnam showed higher RCA values, this is because Vietnam had greater share of coffee among other commodities in Vietnam. However, the competitiveness level of Vietnam coffee was still far behind in volume (see Figure 10) compared to Brazilian coffee. A decline in Vietnamese coffee competitiveness is a disadvantage for Vietnam with the consequence of having to increase coffee productivity and quality to meet the demand of world consumers.

4.3.3 Dynamic Revealed Comparative Advantage index (DRCA)

Change in the comparative advantage of coffee export of Vietnam and Brazil during a certain period can determine the position of the coffee commodity in the market. The Dynamic Revealed Comparative Advantage (DRCA) approach by Edward and Schoer will be used to examine this situation.

The Table 10 shows the dynamic market positioning of coffee exports of Brazil and Vietnam for 4 periods of time: 2000-2005, 2005-2010, 2010-2015, 2015-2019. The DRCA index was calculated by differences between the share of coffee commodity in the country's exports and the share of coffee commodity in world's exports. If the result is less than 0, it is considered "Decreasing RCA". If the result is greater than 0, it is considered "Increasing RCA".

According to Table 10 of market position of exports by Edward and Schoer (2002), 4 periods of Brazil are calculated as lagging opportunity in 2000-2005, lagging retreat in 2005-2010, leading retreat in 2010-2015 and rising stars in 2015-2019. A comparison of 4 periods shows that only period 2015-2019 that Brazil's coffee export enjoyed rising stars position. This position shows that the share of coffee in Brazil exports rises more than the rise of coffee in the world's total exports. In the period 2000-2005, Brazil's market position was a lagging opportunity. This means that even though the share of coffee in Brazil's market rises, this rise is not comparable with the rise of share of coffee in the world's market. In the period 2005-2010, this position of Brazil was lagging retreat. This shows that Brazil's share falls more than the fall in the share of coffee in the world market. The period 2010-2015, in contrast with the period 2005-2010, Brazil's market position was

leading retreat. This means that Brazil's share falls less than the fall in the share of coffee in the world market.

Table 9 Dynamic RCA of coffee export of Brazil and Vietnam in 4 periods of time

					BRA
Period	**Share of coffee in Brazil exports**	**Share of coffee in world exports**	**Dynamic RCA**		**Market position of Brazil's coffee exports**
2000-2005	0.33	0.37	-0.04	Decreasing RCA	Lagging opportunity
2005-2010	-0.17	-0.21	0.04	Increasing RCA	Lagging retreat
2010-2015	-0.12	-0.05	-0.07	Decreasing RCA	Leading retreat
2015-2019	0.43	0.12	0.31	Increasing RCA	Rising stars
					VNM
Period	**Share of coffee in Vietnam exports**	**Share of coffee in world exports**	**Dynamic RCA**		**Market position of Vietnam's coffee exports**
2000-2005	0.54	0.37	0.17	Increasing RCA	Rising stars
2005-2010	-0.12	-0.21	0.09	Increasing RCA	Lagging retreat
2010-2015	0.76	-0.05	0.81	Increasing RCA	Falling stars
2015-2019	0.79	0.12	0.67	Increasing RCA	Rising stars

Source: Author's calculation. Data from Un.org (2021).

In this sense, it is possible to say that the market position of Brazil's coffee within the specified periods do not change consistently. For over 20 years, Brazil only enjoyed one period that fell into the rising stars position, which is the most desirable position, in the period 2015-2019.

According to this table, the dynamic RCA results calculated that Vietnam had 2 periods in rising stars which are period 2000-2005 and period 2015-2019. Vietnam stayed in the same market position as lagging retreat with Brazil in the period 2005-2010. In the period 2010-2015, Vietnam's market position was falling stars, which means that coffee share in Vietnam's exports rises while the share of coffee in worldwide exports is falling.

It is seen that Vietnam had 2 periods falling under the rising star category, whereas Brazil had only one. This indicates the potential of Vietnam to get ahead in the coffee sector in due course of time. What can be seen in brief after calculating the comparative advantage of coffee export using three different RCA indices and dynamic comparative advantage index (DRCA) of Brazil and Vietnam that Vietnam seems to enjoy better comparative advantage compared to Brazil, yet Brazil still has greater market share of world coffee exports.

4.4 Main Factors Affecting Vietnam Coffee Export

4.4.1 Main Factors According to Porter's Diamond

4.4.1.1 Production factor conditions

Perhaps the most important factor to decide that Vietnam has comparative advantage in coffee export is that Vietnam has ideally natural conditions for cultivation and growth of the coffee tree. Basalt red soil is ideal for growing coffee, but it can also be grown on red limestone soil, granite, or slate soil. The coffee grounds should be relatively flat, with a slope of less than 8 degrees. In terms of chemistry, coffee can tolerate a wide range of acidity, with a pH ranging from 4, 5 to 6, 5. The presence of organic matter in the soil helps to keep it porous and nutrient rich. More than 3 million hectares of fertile basalt land suitable for growing coffee exist in Vietnam, with more than 2 million hectares in the Central Highlands accounting for more than 60% of the country's basalt land area. Vietnam currently has 536,959 hectares of coffee-growing land, with the Central Highlands accounting for nearly 90% of the total (123doc.net, 2017).

In addition, with two main coffee varieties, Arabica and Robusta, Vietnam's climate is split into two distinct zones, each suited to a different type of coffee. Arabica grows well in areas with a temperate climate, cold winters, and rainfall, as well as elevations of over 1,000 meters above sea level. Vietnam's total coffee acreage was around 653,000 hectares in 2014, placing it fourth in the world (Nguyen, 2016).

According to ICO (2019), climate change has resulted in a number of disasters in the country's coffee production. A tropical storm hit the Central Highlands in November 2007,

and record heat and drought hit the region in 2013, disrupting most coffee-growing areas. El Nino conditions ushered in the worst drought in 20 years in early 2016. Rainfall was 40 percent below average from December 2015 to February 2016, and reservoir levels were 15 percent to 35 percent below average by mid-March. Rising temperatures and changing rainfall patterns, according to the International Center for Tropical Agriculture (CIAT, 2019), could cost Vietnam 50 percent of its current Robusta coffee production areas by 2050.

Moreover, around half of all coffee trees grown in Vietnam are between the ages of 10 and 15. This is where the most productive and highest yielding coffee trees can be found. Vietnam's coffee production will be primarily focused on this region in the coming years. Nearly 30% of coffee trees in the rest of the country are 15 to 20 years old, and about 20% are more than 20 years old, well past their most profitable period, resulting in lower yields and outputs for farmers season after season. Ageing trees would have a direct impact on the production and quality of coffee in Vietnam if they are not renovated in the next few years (ICO, 2019).

According to United Nations World Population Prospects, the population of Vietnam in March 2021 was 98,168,833 people, that makes Vietnam the 15th most populous country in the world and the 3rd in Southeast Asia. Particularly, the number of people of working age is 54,6 million, which is rapidly increasing and accounts for a large percentage of the national population (approximately 55.6 percent) (Thanh, 2020). According to ILO (2021), in 2018, the number of workers that worked in the coffee sector in Vietnam was 1,439,712 people, accounting 2.67 percent of all workers in Vietnam. The coffee industry can employ a large percentage of a country's workforce. This is particularly true in countries like Vietnam, Costa Rica, and Ethiopia. However, it may seem counterintuitive to see Indonesia's total jobs figure marginally higher than Vietnam's. This is particularly true given that Vietnam's coffee production increased to 1,461,000 tonnes in 2016, more than double the Indonesian output of 639,000 tonnes. The efficiency of each country's output in this case may be able to reconcile these apparently conflicting facts. The yield per hectare in Vietnam is around 2,400 kilos, while that of successful Indonesian farmers is only around 800 kilos (ILO, 2021).

Even though Vietnam has an advantage when it comes to providing abundant and cheap human resources (GSO, 2015), the workforce in the coffee sector often does not continue their education beyond the early secondary years, and university graduates are rarely seen in their workforce. This, however, will affect the value of entrepreneur's profit and eventually the value of coffee export. This conclusion was introduced by ILO's regression result where it said primary education, secondary education, and tertiary education increase an entrepreneur's profit by, respectively, 30.9 per cent, 44.9 percent and 63.9 percent.

Coffee production is mostly concentrated in small households, with very little investment. The majority of them had to borrow money from a bank, which is primarily an Agriculture and Rural Development Bank. The loan period for coffee is usually one year with three times the borrowing. As a result, farmers are forced to sell coffee at low rates in order to repay their loans and be able to borrow for the following season, resulting in little benefit or even losses. Farmers, on the other hand, do not have the funds to purchase materials and fertilizer on loan from dealers, and they often have an early harvest to sell to raise money to repay the debt. As a result, production and business performance aren't especially high (Nguyen, 2016).

The low quality and unstable output is due to the type of production, limited scale, dispersion, and relative independence of the farming households. The quality of the entire coffee sector has been impacted by differences in investment in various stages of coffee harvesting and processing between coffee producers. Furthermore, for every 100 hectares of coffee, one large dry mill is suggested. Even in potential coffee resource areas like Dak Lak and Lam Dong, this level is still 'far away.' After processing, standard storage spaces for coffee beans are still in short supply. As a consequence, obtaining quality certification is challenging (ICO, 2019). Despite the fact that coffee is a water-hungry plant, conventional but ineffective irrigation is still the primary method used in most coffee-growing areas, resulting in significant ground-water loss. Drilling wells for irrigation has resulted in the depletion of groundwater supplies and soil contamination in many areas, which is both unsustainable and ineffective (ICO, 2019).

Furthermore, aside from some companies that have a systematic planting, manufacturing, and drying system in place, most households dry their clothes in the field around their

home. They can't build cement yards because of the weather, so they have to rely on land yards. Due to a lack of space to dry the coffee, it is dried with a high density, resulting in a lack of sunshine, which affects the consistency of the coffee. Roads, dams, and power reserves are all underdeveloped. Seaports are located in major cities, far from the coffee industry, making exporting difficult. The processing plant hasn't progressed much, and the technology level isn't very high (Nguyen, 2016).

4.4.1.2 Demand conditions

Coffee consumption in Vietnam is considered poor, but it is growing (Nguyen, 2016). Ninety percent of Vietnam's coffee is exported. Domestic intake is just 0.6 kg/person/year, compared to 5-6 kg/person/year in Brazil and 10 kg/person/year in the Nordic countries, which is a big difference (Ngoc Hoi, n.d.). The amount of coffee consumed in the Vietnamese market is still very limited, owing to the fact that coffee is not really common in the daily lives of all Vietnamese people; for a large portion of the population, green tea is the main daily drink (123doc.net, 2017).

Domestic consumption is expected to rise to 3.4 million bags in marketing year 19/20, owing to the strong performance of roasted and ground coffee, which is expected to reach 3 million bags, or around 10% of total coffee production. Due to the continued proliferation of coffee shops and cafes from both foreign franchises and local Vietnamese brands, the expansion is unavoidable. Well-known international coffee brands such as Dunkin Donuts, Coffee Beans and Tea Leaves, Gloria Jeans, My Life Coffee, McCafe, PJ's, and Coffee Bene compete against each other as well as local chains like Trung Nguyen, Phuc Long, Highlands, Coffee House, Coffee Factory, and King Coffee in the domestic coffee market.

Vietnamese coffee drinkers prefer roasted and ground coffee for its full-bodied flavors, and many chains are developing specialty and value-added coffee products to stand out in the competitive market (USDA, 2019). In addition, the Vietnam coffee market is divided into three categories: whole bean, ground coffee, and instant coffee; and on-trade and off-trade distribution networks (supermarket/hypermarket, specialty shops, online retailing, and others). Consumers have moved from fresh ground coffee to instant coffee mixes around

the country as a result of their busy lifestyles and longer working hours. As compared to other Asian countries, Vietnam's per capita soluble coffee intake has remained constant over the last decade, according to ICO (2019). As a result, the rapid growth in sales of Vietnamese instant coffee paints a promising picture for the coffee industry's future. Roast and ground coffee products account for 74.8 percent of domestic coffee consumption, while instant coffee products account for 10.2 percent (Mordorintelligence.com,2021).

In order to satisfy customer needs, coffee brands in the Vietnamese market are becoming increasingly diverse, with a range of product categories. In addition to well-known domestic brands such as Trung Nguyen, Vinacafe, and Nestlé, Vietnamese consumers have begun to become familiar with international coffee shop brands such as Gloria Jeans and Illy's (123doc.net, 2017). This is encouraging news for the Vietnamese coffee industry.

4.4.1.3 Related and supporting industries

The transportation and shipping of crops from one location to another for production and processing is almost entirely by road. Coffee is produced in small households in 85 percent of cases. Almost all of these households have rudimentary transportation, such as tricycles or motor cultivators. Businesses purchase coffee in bulk, which is then delivered by the transport company. And while sea freight is still the primary mode of transport for goods shipped to other countries, air freight has recently grown. There have been several new innovations in the shipping and warehousing industries recently to meet demand. The main seaports, on the other hand, are concentrated in major cities such as Saigon, Haiphong, and Quang Ninh (Nguyen, 2016). As a result, transportation from rural areas of agriculture causes numerous development difficulties and costs.

The logistics management system relies heavily on warehousing. It includes finished goods storage, as well as packaging and delivery of the order. Efficient warehousing benefits both the company and its customers financially. Receiving, storing, and distributing items becomes simpler because all of the goods are held in one place. As a result, a company's transportation expenses are reduced. As soon as the shipment arrives, warehouse workers must label, sort, and dispatch the goods (Santosintl.com, 2015). Expanding and improving the warehouse, according to RFgen (2013), makes it easier to store the beans grown in the

area. Furthermore, the warehouse will allow suppliers, companies, and businesses to target Vietnam's growing coffee-drinking population. Historically, the places that grew the majority of the world's coffee were not always the biggest coffee consumers. Although coffee is grown in places like Brazil, Colombia, and Indonesia, Europe and the United States are the primary consumers, according to the US Department of Agriculture. The coffee culture in Vietnam is rapidly expanding, and a better warehouse would allow supplying coffee beans easier, faster and cheaper (RFgen, 2013).

Biotechnology is also a related industry, as high-yield coffee varieties are constantly being researched and developed thanks to advancements in biological research; additionally, factors such as fertilizers, coffee cultivation techniques, harvesting techniques, and so on are constantly being researched and developed (123doc.net, 2017). Various agricultural seedling research institutes, especially the Western Highlands Agriculture & Forestry Science Institute (WASI), have been researching hybridizing and grafting various Robusta varieties since the early 1990s, when coffee was widely grown in the Central Highlands provinces. This was done in order to develop and select hundreds of new Robusta varieties with healthy growth, soil and climate adaptability, high pest and disease tolerance (hemileia vastatrix), and high yields of 3.5 tonnes per hectare or more. Vietnamese researchers have given the names clone TR4, TR5, TR6, TR7, TR8, TR9, TR11, TR12, TR13, TR14, and TR15 or TRS1 to traditional multi-variety late ripening hybrids and varieties. In recent years, three of these clones have become the most common and widely cultivated by Vietnamese coffee growers. TR14 and TR15, which adapt well to changes in environment, and TRS1, which copes well with the need to react quickly to replanting programs, are the clones in question (ICO, 2019).

Related sectors have a strong effect on the course and business objectives of coffee exporting companies. Coffee exporters take advantage of opportunities to select dominant goods to manufacture and return to relevant industries by relevant industries.

Vietnam consumes a large amount of fertilizer each year as an agricultural country, but the fertilizer market in Vietnam is still underdeveloped, relying heavily on imports. Domestic fertilizer production technology in Vietnam can only satisfy 50% to 60% of urea demand, so fertilizers like SA and potassium must be imported entirely. Imports continue to be a

significant source of supply for plant safety goods. Since the production of synthetic chemicals for plant protection in Vietnam has not advanced, businesses that process plant protection goods must continue to import a significant amount of raw materials, pushing up costs. Another issue is that many farmers are forced to purchase inferior fertilizers and plant safety materials. These illicit goods have a significant negative impact on the environment, damaging farmland and lowering coffee quality, which has a negative impact on competitiveness (Nguyen, 2016).

The input supply industries for the chain of production and business operations, such as the mechanical industry, fabricate and assemble machines to serve the processing and packaging, are the supporting industries for each coffee exporting enterprise. Although the supporting industry in Vietnam has not yet grown to the point that it can compete in the international market, it is clear that the industry's growth trend is becoming more integrated and comprehensive. For example, the country's mechanical industry was able to manufacture a variety of machines in the coffee production line, such as roasting and drying machines, while previously, all coffee processing and production machines had to be imported. Nylon, which is used to make labels, bags, and boxes, has become a valuable raw material that Vietnam can provide (123doc.net, 2017).

Businesses that buy fresh or semi-processed coffee have primarily contributed to coffee export activities; however, since Vietnam's unification and opening up, many international businesses have joined the operation. Coffee buying practices have aided in boosting market productivity by motivating domestic companies to capitalize on their own advantages and be more proactive. It is illustrated by the fact that today's purchasing firms are rushing to the garden to collect and transport goods. This provides favorable conditions for exporters because they can meet the required quantity and be more proactive in product translation delivery (123doc.net, 2017).

4.4.1.4 Firm strategy, structure and rivalry

Vietnam has nearly 200 coffee processing businesses and over 140 exporters, but the majority are small and medium-sized businesses with a lack of capital and expertise, as well as a fiercely competitive domestic market (Nguyen, 2016). Many businesses assessing

the prospects of the coffee market said that, while Vietnam will continue to compete with other exporting countries in 2021, coffee is an important commodity, so demand will continue to grow. Ms. Le Hoang Diep Thao, General Director of TNI King Coffee, predicts that in the next five years, the global coffee industry will continue to develop, and Vietnam will have a once-in-a-lifetime opportunity to break through (CA, 2021). On the same discussion, Mr. Do Ha Nam, Vice Chairman of the Vietnam Coffee Association (Vicofa), believes that since coffee is a global demand and it is difficult to convert from one taste to another, Vietnamese products will continue to be successful. "It may be difficult, but with existing potentials we will overcome" (CA, 2021).

However, Ms. Le Hoang Diep Thao claims that in order for the coffee industry to conquer competition, Vietnam's value must be improved by product diversification, such as coffee energy drinks, instant coffee, and real coffee. Coffee supplements and supplements are mixed with food, thus retaining - developing conventional coffee items such as instant coffee, roast coffee, and roasting. Furthermore, Vietnam needs industry integration. Building and cultivating a coffee community, including tourism to promote Vietnamese coffee around the world, education - coffee training and certification, and brewing. In addition, coffee consumption in the domestic market has increased from 1.68 kg per person in 2019 to 3 kg per person in 2023. Because only by having strong internal market strength can Vietnamese coffee be treated fairly, valued, and at the right price, commensurate with the value for which farmers and other Vietnamese producers have invested their money. TNI King Coffee, in reality, is successfully implementing these measures while growing exports and gaining a foothold in the domestic market (CA,2021). Ms. Tran Thi My Dung, Director of the My Le Agricultural Service Cooperative, explained that in order to gain a foothold for coffee, the cooperative developed a unique flavor by mixing Ganoderma and coffee. This allows users to have fun while also improving their fitness (CA, 2021). This is also one of the tactics that a Vietnamese company is pursuing in order to boost coffee's place in the domestic market.

In Vietnam, the majority of companies are based on coffee bean commodities. Since it needs a significant capital expenditure and high technology costs, roasted, ground coffee, and soluble coffee products are less concentrated. Outside of Vinacafé and G7, roasted,

ground, and soluble coffee products such as Colombia Expresso, Ethiopia Expresso, Lavazza, and others (Nguyen, 2016).

Inside the business structure, there is no cohesion. The relation between purchase and export has yet to be identified. Exports also have a small administrative power. Many companies sign export contracts even though there are no reserves available for the coffee source; they only do so when there are buying orders to collect products. As a result, the price cannot be anticipatory. Furthermore, the private sector has been slow to take advantage of institutional and association funding, as well as external connections to farmers. Farmers are planting, but they are concerned about yield, demand, and market knowledge. This is because the coffee product chain's organized activity is inefficient. The relation between growers and businesses and the government is still shaky (Nguyen, 2016).

4.4.1.5 The role of the government

The government, according to the diamond model, is the element that can influence national competitive advantage through the four groups of factors mentioned above. Over the last few years, the Vietnamese government has used its executive position to boost the competitiveness of our country's coffee, with the following results:

The government set out the Sustainable Coffee Development Plan up to 2020 and the Vision to 2030 in 2014, an overall agenda aimed at managing the coffee sector's economic and environmental capital sustainably, increasing export earnings, and ensuring stable production. The strategy sets out clear economic targets for the sector, such as increasing intensive processing for added value in order to achieve US$6 billion in export revenue over the next decade. It also lays out clear environmental targets, such as restricting coffee production to 600,000 hectares nationally, replacing old low-yielding coffee trees with new varieties that yield higher yields and are more pest and disease resistant, rezoning coffee regions, and researching water-saving irrigation methods, as well as developing new environmental and safety requirements for fertilizer and pesticides (ICO, 2019).

In order to protect domestic coffee producers from possible threats, the Ministry of Industry and Trade barred foreign entities from directly purchasing coffee from farmers and developing coffee buying networks in Vietnam on June 7, 2012, in which enterprises with some amount of foreign investment now account for 60-65 percent of total coffee exported each year (Ipsos, 2019).

The Western Highlands Agriculture & Forestry Science Institute had provided farmers with nearly 300,000 seedlings free of charge in an effort to address the usefulness of coffee seedlings from unknown sources, which were used to replant 270 hectares. The Vietnam Coffee Association (VICOFA) and Nestle Vietnam provided funding for the project (Ipsos, 2019).

To support harvest credit and improve product quality, the Prime Minister issued Decision 63/2010/QD-TTg on October 25th, 2010, under which organizations and individuals can borrow preferentially through the Agriculture and Rural Development Bank system to purchase domestic production machinery and equipment to reduce post-harvest losses (Nguyen, 2016).

4.4.1.6 The role of opportunities

The Arabica seed supply will be in short supply within a year, according to Marubeni wholesalers, by September 2022. Slow production in Brazil, which produces the majority of the world's Arabica beans, is the reason. Furthermore, by 2050, climate change and a number of other factors could have wiped out roughly half of the arable land suitable for growing Arabica. As a consequence, Robusta beans will provide a steady supply (TG&VN, 2020). Furthermore, when several consumers stayed at home and drank instant coffee, Covid-19 made the public pay much more attention to Robusta (TG&VN, 2020).

The EVFTA Agreement was formally ratified by the National Assembly of Vietnam on June 8, 2020 and went into effect on August 1, 2020. The EVFTA (Vietnam-EU Free Trade Agreement) was negotiated between 2012 and 2015 and was formally signed on June 30, 2019 in Hanoi, Vietnam. According to the European Commission, the FTA is the most comprehensive free trade agreement ever achieved with a developing country, since it

removes almost all tariff barriers, including over 99 percent of customs duties on exports in both directions. This agreement would provide Vietnam with a great opportunity to export coffee to the EU market, which is an increasing potential market.

4.4.2 Main Factors Using Regression Analysis

Econometric model using one-equation model analyses the relationship between Vietnam coffee export volume and Domestic coffee production, World coffee price, real GDP growth rate of Vietnam and Vietnam Dong/US Dollar exchange rate during the period 2000-2019. The assumptions based on the hypotheses in Literature Review that:

When there is an increase in domestic coffee production, coffee export volume grows;

GDP is positively related to coffee export volume;

World coffee prices negatively affect coffee export volume.

When Vietnam Dong has more value, the coffee export volume decreases.

The econometric model will be formulated as logarithm model in equation (7) below:

$$\mathbf{lnY1t = \gamma0 + \gamma1lnX1t + \gamma2lnX2t + \gamma3lnX3t + \gamma4lnX4t + ut} \tag{7}$$

Where:

Y1t: Vietnamese coffee export volume (pound/year)

γ0: Intercept/constant

X1t: domestic coffee production (pound/year)

X2t: world coffee prices (dollar/pound)

X3t: real GDP growth rate (annual %)

X4t: Vietnam Dong/US Dollar exchange rate

γ1, γ2, γ3, γ4: slope or direction of the regression line that states the value of Y due to change in one unit of variable X

ut: residual error representing other factors influencing on Y1t but not included in the model

The expected assumptions from previous literature review regarding the model as follow:

When there is an increase in domestic coffee production, Vietnamese coffee export volume increase;

World coffee price is positively (or negatively) affect Vietnamese coffee export volume;

Real GDP growth rate possesses positive relation with Vietnamese coffee export volume;

Vietnam Dong/US Dollar exchange rate has negative affect with Vietnamese coffee export volume.

The data collected for the regression analysis is collected with variables Vietnamese coffee export volume (Y1t), domestic coffee production (X1t), world coffee prices (X2t), real GDP of Vietnam (X3t), Vietnam Dong/US Dollar exchange rate (X4t) during the period 2000-2019 as shown in Table 10 below:

Table 10 Data used for regression analysis

Year	Y1t	X1t	X2t	X3t	X4t
2000	1,932,089,491	1,963,169,114	0.6555	0.068	14167.75
2001	1,582,792,746	1,731,939,698	0.462	0.069	14725.167
2002	1,528,477,150	1,530,969,520	0.602	0.071	15279.5
2003	1,917,647,714	2,028,784,371	0.6495	0.073	15509.583
2004	1,851,102,151	1,900,885,527	1.0375	0.078	15746
2005	1,735,721,812	1,830,961,508	1.071	0.075	15858.917
2006	2,392,864,314	2,558,211,009	1.262	0.070	15994.25
2007	2,086,556,083	2,170,023,094	1.362	0.071	16105.125
2008	2,299,789,998	2,438,945,776	1.1205	0.057	16302.25
2009	1,930,104,577	2,357,889,546	1.3595	0.054	17065.083
2010	2,228,873,435	2,645,547,107	2.405	0.064	18612.917
2011	2,871,160,847	3,505,298,491	2.2685	0.064	20509.75
2012	2,733,474,021	3,095,568,667	1.438	0.055	20820000
2013	3,294,015,746	3,652,148,883	1.107	0.056	20933.417
2014	2,914,668,298	3,603,304,213	1.666	0.064	21148
2015	3,808,270,622	4,112,508,540	1.267	0.070	21697.568
2016	3,415,292,362	3,679,847,074	1.3705	0.067	21935.001
2017	3,932,936,355	4,422,362,572	1.262	0.069	22370.087
2018	3,741,210,354	4,005,765,066	1.0185	0.071	22602.05
2019	3,510,265,943	4,032,761,499	1.297	0.070	23050.242

Source: ICO, 2021, macrotrends, 2020, IMF, 2019, World Bank, 2021.

In order to testing out if the date is feasible, Autocorrelation, Multicollinearity Tests, Normality Test, Heteroscedasticity were performed and the results are shown as Figure 13, 15, 16 and 17. The result of Ordinary Least Square is presented in Figure 14.

Figure 14 Multicollinearity Testing Result

```
Correlation Coefficients, using the observations 2000 - 2019
5% critical value (two-tailed) = 0.4438 for n = 20

       l_Y1t          l_X1t          l_X2t          l_X3t          l_X4t
      1.0000         0.9847         0.5012        -0.1711         0.1738  l_Y1t
                     1.0000         0.5855        -0.2573         0.1903  l_X1t
                                    1.0000        -0.3373         0.1897  l_X2t
                                                   1.0000        -0.4388  l_X3t
                                                                  1.0000  l_X4t
```

Source: Author's calculation using Gretl.

Based on result in Figure 13, it is shown that there was no multicollinearity between variables. The test was conducted by using correlation matrix, and if there is existence of pair correlation coefficient that higher than 0.8, it means there is multicollinearity. The test shows that there is no high dependency between explanatory variables.

The following Figure 14 is the result of data analysis using the Gretl software and the multiple linear regression method:

Figure 15 The Results of Data Analysis Carried out Using Multiple Linear Regression

```
Model 1: OLS, using observations 2000-2019 (T = 20)
Dependent variable: l_Y1t

              coefficient   std. error    t-ratio    p-value
   ---------------------------------------------------------
   const        1.14852      0.860310      1.335     0.2018
   l_X1t        0.970149     0.0382754     25.35     9.95e-014 ***
   l_X2t       -0.0710291    0.0318828     -2.228    0.0416    **
   l_X3t        0.234814     0.114866      2.044     0.0589    *
   l_X4t        0.00504526   0.00731919    0.6893    0.5011

Mean dependent var    21.62788    S.D. dependent var    0.309019
Sum squared resid      0.030684   S.E. of regression    0.045228
R-squared              0.983088   Adjusted R-squared    0.978579
F(4, 15)             217.9916     P-value(F)            4.31e-13
Log-likelihood        36.41878    Akaike criterion    -62.83756
Schwarz criterion    -57.85890    Hannan-Quinn        -61.86567
rho                   -0.231887   Durbin-Watson         2.381676

Log-likelihood for Y1t = -396.139

Excluding the constant, p-value was highest for variable 10 (l_X4t)
```

Source: Author's calculation using Gretl.

From the parameter estimation in Gretl the variable with the highest effect in Vietnam coffee export volume is Vietnam coffee production and the other one is the real GDP growth rate. The result from this parameter estimation showed that world coffee prices has negative effect to Vietnam coffee export but not positive. In addition, variable Vietnam Dong/US Dollar exchange rate doesn't comply with our assumption that when Vietnam Dong/US Dollar exchange rate increase, Vietnam coffee export volume decrease. However, according to the results derived, the interpretation is done as follow:

If all the variables are kept 0, then the Vietnamese coffee export volume will be 1.14852 pound per year.

If the domestic coffee production increases by 1 percent, then the Vietnamese coffee export volume increases by 0.97 percent, ceteris paribus;

If the world coffee price increases by 1 percent, then the Vietnamese coffee export volume decreases by 0.07 percent, ceteris paribus;

If the real GDP growth rate increases by 1 percent, then the Vietnamese coffee export volume increases by 0.23 percent, ceteris paribus;

If the Vietnam Dong/US Dollar exchange rate increases by 1 percent, then the Vietnamese coffee export increase by 0.005 percent, ceteris paribus.

For each parameter we compare the p-value with the level of significance alpha which in our case we have taken level of alpha is 0.05. If p-value is less than level alpha, the parameter is considered statistical significance. According to the results from Gretl, the significant parameters with p-value less than level of alpha are $\gamma1$, $\gamma2$ and $\gamma3$. Parameter $\gamma4$ coefficient is not statistical significance. That means that the econometric model can explain the Vietnamese coffee export volume by the domestic coffee production, world coffee price and the real GDP growth rate. R-squared value is 0.98 which means that the econometric model explains 98% of the variance of the Vietnamese coffee export volume.

Figure 16 Autocorrelation Testing Result

```
Breusch-Godfrey test for first-order autocorrelation
OLS, using observations 2000-2019 (T = 20)
Dependent variable: uhat

              coefficient    std. error    t-ratio    p-value
   ------------------------------------------------------------
   const       -0.194429      0.881687      -0.2205     0.8286
   l_X1t        0.00402337     0.0384767      0.1046     0.9182
   l_X2t       -0.00409266     0.0321359     -0.1274     0.9005
   l_X3t       -0.0520916      0.126034      -0.4133     0.6856
   l_X4t       -0.00326095     0.00800704    -0.4073     0.6900
   uhat_1      -0.301133       0.300162      -1.003      0.3328

   Unadjusted R-squared = 0.067070

Test statistic: LMF = 1.006481,
with p-value = P(F(1,14) > 1.00648) = 0.333

Alternative statistic: TR^2 = 1.341395,
with p-value = P(Chi-square(1) > 1.34139) = 0.247

Ljung-Box Q' = 1.14878,
with p-value = P(Chi-square(1) > 1.14878) = 0.284
```
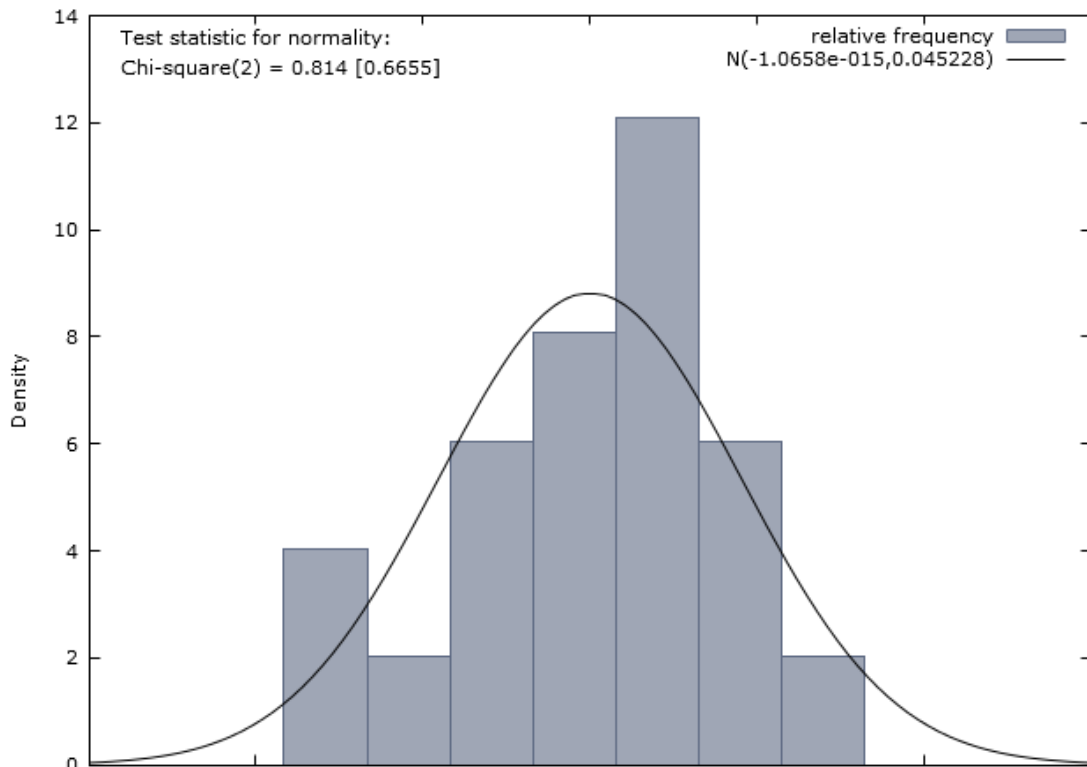
Source: Author's calculation using Gretl

Figure 15 result showed that there is no autocorrelation happens in the model. Autocorrelation happens when residual component of the model is correlated with their lagged and future values. By using Breusch-Godfrey test, the result showed with p-value equals 0.333 which is greater than level of alpha 0.05, it means there is no presence of autocorrelation.

Figure 17 Normality Testing Result

Source: Author's calculation using Gretl.

Figure 16 was the result of testing whether the data is contributed normally. The p-value obtained from the test was 0.66551 and it is greater than level of alpha 0.05, it means the variables are distributed normally. Lastly, the dispersion should be constant in time, it means there is no Heteroskedasticity in the model. In order to test this, White test was used, and the result is shown in Figure 17. The p-value obtained from the test was 0.493 and it is greater than level of alpha 0.05. It means that there is no Heteroskedasticity.

Figure 18 Heteroskedasticity Testing Result

```
White's test for heteroskedasticity
OLS, using observations 2000-2019 (T = 20)
Dependent variable: uhat^2

              coefficient   std. error    t-ratio    p-value
  ---------------------------------------------------------------
  const       -17.2339      13.1785       -1.308     0.2479
  l_X1t         0.938025     0.690482      1.359     0.2324
  l_X2t        -0.244729     0.249875     -0.9794    0.3724
  l_X3t        -0.266692     0.689592     -0.3867    0.7149
  l_X4t         1.36282      2.61231       0.5217    0.6242
  sq_l_X1t     -0.00937217   0.0351882    -0.2663    0.8006
  X2_X3         0.0130932    0.0253296     0.5169    0.6273
  X2_X4         0.00215410   0.110809      0.01944   0.9852
  X2_X5        -0.0543278    0.118084     -0.4601    0.6648
  sq_l_X2t      0.000766932  0.00525884    0.1458    0.8897
  X3_X4         0.0842265    0.0624292     1.349     0.2352
  X3_X5         0.0189133    0.0651987     0.2901    0.7834
  sq_l_X3t      0.0619714    0.0982175     0.6310    0.5558
  X4_X5         0.0558047    0.208260      0.2680    0.7994
  sq_l_X4t     -0.000778138  0.00753996   -0.1032    0.9218

Warning: data matrix close to singularity!

  Unadjusted R-squared = 0.671476

Test statistic: TR^2 = 13.429517,
with p-value = P(Chi-square(14) > 13.429517) = 0.493016
```

Source: Author's calculation using Gretl.

5 Results and Discussion

The result calculated using Balassa's RCA index and RCA index suggest by Vollrath showed that during the period 2000-2019, Vietnam enjoyed comparative advantage compared to Brazil. This result showed Vietnam had 11 out of 20 years with great RCA value compared to Brazil in terms of Balassa's RCA index, namely 2000, 2001, 2003 till 2009, 2012 and 2013. Similar result that Vietnam had comparative advantage in coffee export by using RCA index by Vollrath, however, it showed that Vietnam only enjoyed 10 out of 20 years with greater RCA value, namely 2000, 2001, from 2003 to 2009 and 2012.

On the other hand, concerning the RCA index suggested by Donges and Riedel, it said that both of countries had comparative disadvantage when it comes to coffee export. The result showed that Vietnam coffee export had less comparative disadvantage compared to that of Brazil. The years Vietnam had less comparative disadvantage were 2002, 2004, 2005, 2009, 2010, 2011 and 2013 till 2019. In discussion with this result, Gnidchenko (2015) stated that the value of this index can be in the range from $-\infty$ to $+\infty$ (depending on the net exports index for the country's total trade). It means that the value of this RCA index can be positive if the value of export of coffee is greater than the value of import of coffee in both country and international level. In this case, the reason that make both of countries had negative RCA result is because the level of coffee import globally is higher than the level of coffee export.

In terms of Vietnam position in international coffee market, the result calculated by using Dynamic Revealed Comparative Advantage (DRCA) index, it can be concluded that Vietnam is strengthening its position in global market by achieving rising stars position in the period 2015-2019 after 2 periods of undesirable positions as lagging retreat and falling stars. However, the trend position is fluctuated as Vietnam lost its position after period 2000-2005 also as rising stars.

There are several determinants affecting Vietnam coffee export, namely Vietnam domestic coffee production, world coffee prices and the GDP growth rate. With a coefficient value of 0.9701, the regression analysis revealed that the Vietnam domestic coffee production variable (X1t) had a positive and important impact on the amount of coffee exports in

67

Vietnam. It claimed that each increase in domestic coffee production would result in an increase in Vietnam's coffee export value. In more detail, assuming that all other variables remain constant, an increase in coffee output of one unit would result in an increase in coffee export volume of 0.9701. This result is consistent with Prajanti (2020), who believes that domestic coffee production has a positive and important effect on the amount of coffee exports.

Coffee production is a factor that has a direct and important effect on the amount of coffee exported from Vietnam; as coffee production grows, so do coffee exports. Because of the plentiful availability of coffee, it is not only sold domestically but also exported globally. Conversely, as coffee production declines, so does the export of coffee beans due to a lack of supply.

The result from regression showed that world coffee prices had negative effect to Vietnam coffee export, however, Prajanti (2020) stated that world coffee prices had positive impact to the export of coffee commodity. The regression analysis result is supported by Amrouk (2018) that the reality is that low coffee prices are primarily due to supply outstripping demand. Nguyen (2020) believed that Vietnam's GDP had significantly positive relationship with Vietnam coffee export, as this is shown as the regression analysis result. The last variable in the regression analysis is Vietnam Dong/US Dollar exchange rate, however, does not have major influence in Vietnam coffee export during the period 2000-2019.

6 Recommendations

In order to improve coffee quality, it is important to understand that high-quality coffee starts from the harvest and post-harvest preservation (Cà phê Trung Tín, 2018). According to Cà phê Trung Tín, the first prerequisite is to select the correct level of maturity for the coffee range. It is important to select red or medium ripe fruit to have the best quality coffee, not to harvest green fruit, deep fruit, flat fruit and dry ripe fruit on the tree. It is important to immediately process the harvested coffee. The consistency of the coffee pods started to decline after they left the tree.

Regarding the production and processing, the Ministry of Industry and Trade of Vietnam has stated that there is indeed building concentrated and specialized growing areas that are associated with the development of the processing industry and in needs of applying high technology. Furthermore, it is necessary to link raw material areas with deep processing establishments and factories to create a stable source of goods in terms of quality and quantity.

Connecting with other nations, arranging staff study trips and training courses of the Technical Institute of Agriculture and breeding centers are learning exchanges at a country's research center with a long history in the coffee industry such as Brazil, Colombia about the same advanced methods (Nguyen, 2016).

First of all, it must be noted that, in addition to the increase in product quality, more attention must be paid to branding, in which companies are responsible for creating their own brands. Enterprises must understand market's needs such as market share, taste, quality and price, in order to decide proportion of the processing of suitable goods, product development orientation, building promotion, marketing strategy, branding positioning. There is the importance of governments responsible for helping and supporting businesses in this matter.

Vietnam coffee exporters need to concentrate on hiring and educating workers with foreign language skills and experiences, to engage actively in trade promotion initiatives and in the

Ministry of Industry and Trade activities, as well as organized by ministries, branches and associations; attending international fairs and exhibitions both at home and abroad to introduce products and find partners; creating a separate research channel and export market data to update information and changes in trade developments through the support of Vietnamese trade representatives in other countries to have an adjust production and business activities that are consistent with market signals.

7 Conclusion

In summarization, after comparing the comparative advantage of Vietnam's coffee export through the useful analysis tools such as RCA index, DRCA index, the thesis are able to provide overall assessment of the comparative advantage of Vietnamese coffee export among other major coffee export producers, especially compared to the world's biggest coffee exporter Brazil and enter the competition with formidable coffee opponents.

It can be seen that during the period 2000-2019, Vietnam had comparative advantage in coffee export, however, the results through the years were fluctuated. Moreover, by using regression analysis, it can be concluded that Vietnam domestic coffee production, world coffee price and real GDP growth rate play a major role on Vietnam coffee export volume. Vietnam, however, is still struggling and facing common threats in which strengths and possibilities are not big enough to cover deficiencies. Therefore, in both internal and external sources, Vietnam companies still face some challenges, they control them to mitigate vulnerabilities, risks and convert them into benefits.

Nobody denies that the government of Vietnam plays an extremely vital role in the promotion of the national industry, especially in the coffee industry. In addition, the Vietnamese Ministry of Agriculture has an undeniable duty to recognize the reasons for difficulties in the production and export of coffee. They can also illustrate efficient solutions that are applicable to government budgets, local circumstances.

It is essential to recognize that collaboration within Vietnamese institutions will provide effective support to local enterprises in order to promote better control of unexpected external impacts. As a result, the quality and export volume of Vietnamese coffee is definitely increasing, so product performance is likely to improve at the optimum level, not only in the global market.

In conclusion, the Vietnamese government should fully encourage domestic businesses to build up the reputation of Vietnamese coffee, which not only brings enormous profit to the nation, but also the pride of domestic commodities and provides Vietnamese farmers with a better life.

8 References

123doc.net. (2017). LỢI THẾ CỦA CÀ PHÊ VIỆT NAM. [online] Available at: https://123doc.net//document/2378494-loi-the-cua-ca-phe-viet-nam.htm [Accessed 19 Mar. 2021].

Amrouk, E. (n.d.). Feature articles 25 FOOD OUTLOOK JULY 2018 DEPRESSED INTERNATIONAL COFFEE PRICES: INSIGHTS INTO THE NATURE OF THE PRICE DECLINE. [online]. Available at: http://www.fao.org/fileadmin/templates/est/-COMM_MARKETS_MONITORING/Coffee_Cocoa/Documents/coffee_prices_2018.pf.

AP NEWS. (2019). The Vietnam Retail Sector: Analysis on Growth, Trends and Forecasts (2019-2024) - ResearchAndMarkets.com. [online] Available at: https://apnews.com-/pre-ss-release/pr-businesswire/2ba800fedb854268aa704e85548bbd20 [Accessed 25 Feb. 2021].

Balassa, B., 1965. Trade liberalization and "revealed" comparative advantage 1. The manchester school, 33(2), pp.99-123.

Batista, L.R., de Souza, S.C., e Batista, C.S. and Schwan, R.F., 2016. Coffee: types and production.

Bebek, U.G., 2011. Monotonicity of additive indices of revealed comparative advantage. Economics Bulletin, 31(2), pp.1894-1901.

Bowen, H.P., 1983. On the theoretical interpretation of indices of trade intensity and revealed comparative advantage. Weltwirtschaftliches Archiv, 119(3), pp.464-472.

Cà Phê Trung Tín (2018). *Cà phê chất lượng cao bắt đầu từ khâu thu hoạch - bảo quản sau thu hoạch*. [online] Dalatcoffee.com.vn. Available at: http://dalatco-ffee.com.vn/vn/ca-phe-chat-luong-cao-bat-dau-tu-khau-thu-hoach-bao-quan-sau-thu-hoach.html [Accessed 26 Feb. 2021].

Ca, M. (2021). *Bước đi chiến lược để xuất khẩu cà phê tìm vị thế "ngôi vương."* [online] Báo Công Thương điện tử, kinh tế, chính trị, xã hội. Available at: https://congthuong.vn/buoc-di-chien-luoc-de-xuat-khau-ca-phe-tim-vi-the-ngoi-vuong-151656.html [Accessed 22 Mar. 2021].

CIAT. (2019). *HOME*. [online] Available at: https://ciat.cgiar.org/ [Accessed 31 Mar. 2021].

Coffee.org. (2020). Coffee | Coffee Subscriptions | Coffee Beans. [online] Available at: https://coffee.org/ [Accessed 29 Mar. 2021].

Coffeehabitat.com. (2021). Coffee & Conservation — Are your beans for the birds? [online] Available at: http://www.coffeehabitat.com/ [Accessed 29 Mar. 2021].

Corporate Finance Institute (2020). International Trade. [online] Corporate Finance Institute. Available at: https://corporatefinanceinstitute.com/resources/knowle-dge/economics/inte-rnational-trade/ [Accessed 5 Mar. 2021].

De Benedictis, L. and Tamberi, M., 2001. A note on the Balassa index of revealed comparative advantage. Available at SSRN 289602.

Doanh, N.K. and Heo, Y., 2009. AFTA and trade diversion: An empirical study for Vietnam and Singapore. International area review, 12(1), pp.163-192.

Donges, J.B. and Riedel, J., 1977. The expansion of manufactured exports in developing countries: An empirical assessment of supply and demand issues. Review of World Economics, 113(1), pp.58-87.

Econlib. The library of Economics and Liberty. A Brief History of International Trade

Economics Discussion. (2016). Essay on Theories of International Trade. [online] Available at: https://www.economicsdiscussion.net/essays/international-trade-essays/essay-on-the-ories-of-international-trade/17910 [Accessed 7 Mar. 2021].

Edwards, L. and Schoer, V., 2002. Measures of competitiveness: a dynamic approach to South Africa's trade performance in the 1990s. South African Journal of Economics, 70(6), pp.1008-1046.

Fao.org. (2021). FAOSTAT. [online] Available at: http://www.fao.org/faostat/en/#home [Accessed 29 Mar. 2021].

Fao.org. n.d. Search Results | FAO | Food and Agriculture Organization of The United Nations. [online] Available at: <http://www.fao.org/search/en/?cx=01817-062014370110-4933%3Aqq82jsfba7w&q=RCA+indices+&cof=FORID%3A9> [Accessed 13 January 2021].

Farole, T., Reis, J. and Wagle, S. (2010). *Analyzing Trade Competitiveness A Diagnostics Approach*. [online]. Available at: http://documents1.worldbank.org/curated/en/2498-51468161954392/pdf/WPS5329.pdf [Accessed 8 Mar. 2021].

Fulton, M.E. and Reynolds, T., 2015. The political economy of food price volatility: The case of Vietnam and rice. American Journal of Agricultural Economics, 97(4), pp.1206-1226.

GANDOLFO, Giancarlo a Giancarlo GANDOLFO. International trade theory and policy. New York: Springer, c1998. ISBN 3540643168.

GERINGER, J. Michael, Michael S. MINOR a Jeanne M. MCNETT. International business. New York, NY: McGraw-Hill/Irwin, c2012. ISBN 0078029376.

Github.io. (2021). What Is International Trade Theory? [online] Available at: https://-saylordotorg.github.io/text_international-business/s06-01-what-is-international-tradeth.-
html#:~:text=There%20are%20two%20main%20categories,industry%20to%20innovate%20and%20upgrade. [Accessed 5 Mar. 2021].

Gnidchenko, A. and Salnikov, V., 2015. Net comparative advantage index: Overcoming the drawbacks of the existing indices. Higher School of Economics Research Paper

Granabetter, D., 2016. Revealed comparative advantage index: an analysis of export trade in the Austrian district of Burgerland. Review of Innovation and Competitiveness: A Journal of Economic and Social Research, 2(2), pp.97-114.

GSO, 2015. Daily Statistical Information. Available: https://www.gso.gov.vn/Default.asp-x?tabid=382&ItemID=15148. [Accessed 20 Mar. 2021].

Güneş, S. and Marina, T.A.N., 2017. Static and dynamic revealed comparative advantage: A comparative analysis of Turkey and Russia. İktisadi Yenilik Dergisi, 4(3), pp.22-38.

HBS Working Knowledge. (2010). *Export Competitiveness: Reversing the Logic*. [online] Available at: https://hbswk.hbs.edu/item/export-competitiveness-reversing-the-logic [Accessed 8 Mar. 2021].

Heckscher, E.F., 2006. Eli Heckscher, international trade, and economic history. MIT Press.

HILL, Charles W., 2014. International Business; Competing in the Global Marketplace. 10th edition Berkshire: McGraw-Hill Education.

Hoang, V.V., Tran, K.T., Tu, B.V., Nguyen, V.N. and Nguyen, A.Q., 2017. Agricultural Competitiveness of Vietnam by the RCA and the NRCA Indices, and Consistency of Competitiveness Indices. AGRIS on-line Papers in Economics and Informatics, 9(665-2018-3598), pp.53-67.

Ico.org. (2021). International Coffee Organization - Historical Data on the Global Coffee Trade. [online] Available at: http://www.ico.org/new_historical.asp?section=Statistics [Accessed 29 Mar. 2021].

Ilo.org. (2021). International Labour Organization. [online] Available at: https://www.il-o.org/global/lang--en/index.htm [Accessed 31 Mar. 2021].

IMF. (2019). Vietnam and the IMF. [online] Available at: https://www.imf.org/en/Countries-/VNM [Accessed 29 Mar. 2021].

International Coffee Organization, 2019. Country Coffee Profile: Vietnam. ICO.

Irwin, D.A., 1991. Mercantilism as strategic trade policy: the Anglo-Dutch rivalry for the East India trade. Journal of Political economy, 99(6), pp.1296-1314.

Kalirajan, K. and Paudel, R., 2015. India's trade deficit with China: will free trade agreement (FTA) work for India? Global Economy Journal, 15(4), pp.485-505.

Kalirajan, K., 2008. Gravity model specification and estimation: revisited. Applied Economics Letters, 15(13), pp.1037-1039.

Kancs, D.A. and Kielyte, J., 2001. Analysing sectoral competitiveness: a framework of strategic management. Journal for East European Management Studies, pp.169-188.

KRUGMAN, Paul R., Maurice OBSTFELD a Marc J. MELITZ. International economics: theory & policy. 9th ed. Boston: Pearson Addison-Wesley, c2012. Pearson series in economics. ISBN 978-0-13-214665-4.

Liesner, H.H., 1958. The European common market and British industry. The Economic Journal, 68(270), pp.302-316.

Macrotrends.net. (2020). Coffee Prices - 45 Year Historical Chart. [online] Available at: https://www.macrotrends.net/2535/coffee-prices-historical-chart-data [Accessed 29 Mar. 2021].

Mahab Rahman (2014). *World's Largest Coffee Producer and Exporter: Brazil*. [online] More Than Shipping. Available at: https://www.morethanshipping.com/worlds-largest-coffee-producer-and-exporter-brazil/ [Accessed 31 Mar. 2021].

Moit.gov.vn. (2021). *Nâng cao chất lượng sản phẩm và phát triển thương hiệu: Chìa khóa cho tăng trưởng xuất khẩu cà phê trong bối cảnh hội nhập*. [online] Available at: https://www.moit.gov.vn/tin-chi-tiet/-/chi-tiet/nang-cao-chat-luong-san-pham-va-phat-trien-thuong-hieu-chia-khoa-cho-tang-truong-xuat-khau-ca-phe-trong-boi-canh-hoi-nhap-16871-22.html [Accessed 26 Feb. 2021].

Mordorintelligence.com. (2021). Vietnam Coffee Market | Growth | Trends | Forecast. [online] Available at: https://www.mordorintelligence.com/industry-reports/vietnam-coffee-market [Accessed 21 Mar. 2021].

Muradian, R. and Pelupessy, W., 2005. Governing the coffee chain: The role of voluntary regulatory systems. World Development, 33(12), pp.2029-2044.

Ngoc Hoi, n.d. Kinh doanh cà phê: Hai điểm nổi bật! Available: http://www.tapchithuong-mai.vn/User/CE_per.aspx?iCat=45&iDt=331. [Accessed 20 Mar. 2021].

Nguyen, B.X., 2010. The determinants of Vietnamese export flows: Static and dynamic panel gravity approaches. International Journal of Economics and Finance, 2(4), pp.122-129.

Nguyen, D.D., 2020. Determinants of Vietnam's rice and coffee exports: using stochastic frontier gravity model. Journal of Asian Business and Economic Studies.

NGUYEN, T., 2016. Foreign Trade of Vietnam Case study of coffee export. Undergraduate. Czech University of Life Sciences Prague.

Nguyen, T.H., 2017. An Overview of Agricultural Pollution in Vietnam.

Nguyen, T.H.N., 2016. THE COMPETITIVENESS OF VIETNAMESE COFFE INTO THE EU MARKET.

OECD (2015). Chính sách Nông nghiệp Việt Nam BETTER POLICIES FOR BETTER LIVES. [online] Available at: https://www.oecd.org/countries/vietnam/OECD-Review-Agricultural-Policies-Vietnam-Vietnamese-Preliminaryversion.pdf [Accessed 25 Feb. 2021].

Olekalns, N. and Bardsley, P., 1996. Rational addiction to caffeine: An analysis of coffee consumption. Journal of Political Economy, 104(5), pp.1100-1104.

Olekalns, N. and Bardsley, P., 1996. Rational addiction to caffeine: An analysis of coffee consumption. Journal of Political Economy, 104(5), pp.1100-1104.

Pieterse, M.T.A. and Silvis, H.J., 1988. The world coffee market and the international coffee agreement (No. 9). Agricultural University.

Policy. 26 November 2001. [online]. Available at WWW: https://www.econlib.org/lib-rary/-Columns/Irwintrade.html

Porter, M.E., 1998. Clusters and the new economics of competition (Vol. 76, No. 6, pp. 77-90). Boston: Harvard Business Review.

Prajanti, S.D.W., Pramono, S.E. and Adzmin, F., 2020, January. Factors influencing Indonesia coffee exports volume. In International Conference on Research and Academic Community Services (ICRACOS 2019) (pp. 41-45). Atlantis Press.

RCA Indices. (n.d.). [online]. Available at: http://www.fao.org/3/i1214e/i1214e06.pdf [Accessed 29 Mar. 2021].

Reut-institute.org. (2021). *National Competitiveness - Reut Institute*. [online] Available at: http://reutinstitute.org/en/Publication.aspx?PublicationId=1301#:~:text=National%20 Competitiveness%20is%20a%20relative,accepted%20measure%20of%20National%2 0Competitiveness. [Accessed 7 Mar. 2021].

RFgen. (2013). *Nestle Warehouse Logistics to Improve Coffee Supply Chain*. [online] Available at: https://www.rfgen.com/blog/nestle-incorporates-warehouse-logistics-to-improve-coffee-supply-chain/ [Accessed 21 Mar. 2021].

S Chirag. Preservearticles.com. What are the basic functions of foreign trade? 2016. [online]. Available at: http://www.preservearticles.com/2012030525013/what-are-the-basic-func-tions-offoreign-trade.html

Santandertrade.com. (2020). Vietnamese economic outline - Santandertrade.com. [online] Available at: https://santandertrade.com/en/portal/analyse-markets/vietnam/economic-outline#:~:text=Main%20Sectors%20of%20Industry,39.4%25%20of%20the%20total %20workforce.&text=Main%20services%20include%20tourism%20and%20telecom munications. [Accessed 25 Feb. 2021].

Santosintl.com. (2015). *Blog | Customs Brokerage, Warehouse Distribution US, Mexico*. [online] Available at: http://www.santosintl.com/Blog/Post/275/Importance-of-Warehousing-In-A-Logistics-System#:~:text=The%20warehousing%20serv-ice%20is%20the,with%20the%20warehousing%20management%20system. [Accessed 21 Mar. 2021].

Shevchenko, M.N., Dorofeev, A.F., Dobrunova, A.I., Chugay, D.Y. and Lebed, A.V., 2019. The choice of competitive strategy of agricultural enterprise. Инновации в АПК: проблемы и перспективы, (3), pp.105-116.

SMITH, Adam. Pojednání o podstatě a původu bohatství národů. Nové přeprac. vyd. opatřené margináliemi. Přeložil Vladimír IRGL. Praha: Liberální institut, 2001. ISBN 80- 86389-15-4.

Suranovic, S., 2012. Policy and Theory of International Trade.

TG&VN (2020). Xuất khẩu ngày 22-25/12: Cơ hội cho cà phê Robusta Việt Nam, xuất khẩu thủy sản năm 2021 kỳ vọng tăng 10%; gỡ mối lo dệt may vào EU. [online] Báo Thế giới và Việt Nam. Available at: https://baoquocte.vn/xuat-khau-ngay-22-2512-co-hoi-cho-ca-phe-robusta-viet-nam-xuat-khau-thuy-san-nam-2021-ky-vong-tang-10-go-moi-lo-det-may-vao-eu-132378.html [Accessed 22 Mar. 2021].

Thanh, T. (2020). Infographic Dân số, lao động và việc làm năm 2020. [online] General Statistics Office of Vietnam. Available at: https://www.gso.gov.vn/du-lieu-va-so-lieu-thong-ke/2021/01/infographic-dan-so-lao-dong-va-viec-lam-nam-2020/ [Accessed 19 Mar. 2021].

theory & policy. 9th ed. Boston: Pearson Addison-Wesley, c2012. Pearson series in economics. ISBN 978-0-13-214665-4.

Thuong, N.T.T., 2018. The effect of Sanitary and Phytosanitary measures on Vietnam's rice exports. EconomiA, 19(2), pp.251-265.

Tuyen, D.T., Caihong, Z., Hong, N.T., Akhtar, R. and Elamin, K.M., 2020. ASSESSING THE EFFECT OF FACTORS ON AGRICULTURAL COMMODITY EXPORT PRICE VOLATILITY: EVIDENCE FROM VIETNAMESE COFFEE.

Tyunyukova, E., Ruban, V. and Burovtsev, V., 2018. Modern approaches to product competitiveness evaluation for companies of various industries. In MATEC Web of Conferences (Vol. 216, p. 02016). EDP Sciences.

Un.org. (2021). UN Comtrade | International Trade Statistics Database. [online] Available at: https://comtrade.un.org/ [Accessed 29 Mar. 2021].

UNCTAD (2018). *UNCTADstat*. [online] Unctad.org. Available at: https://unctadstat.unctad.org/EN/ [Accessed 29 Mar. 2021].

Unctadstat.unctad.org. n.d. Unctadstat - RCA Radar. [online] Available at: <https://unctadstat.unctad.org/en/RcaRadar.html> [Accessed 11 January 2021].

UNDP. (2016). *Viet Nam Drought and Saltwater Intrusion | UNDP in Viet Nam*. [online] Available at: https://www.vn.undp.org/content/vietnam/en/home/library/environment_-climate/vietnam-drought-and-saltwater-intrusion.html [Accessed 31 Mar. 2021].

USDA (2019). Vietnam Coffee Annual. [online]. Available at: https://apps.fas.usda.gov-/newgainapi/api/report/downloadreportbyfilename?filename=Coffee%20Annual_Hanoi_Vietnam_5-20-2019.pdf.

van der Vossen, H.A., 1985. Coffee selection and breeding. In Coffee (pp. 48-96). Springer, Boston, MA.

Vicente, R., 2020. The Analysis of Economic Performance and Foreign Trade Development in The Republic of The Philippines. Msc. Czech University of Life Sciences Prague.

Vietnam's Coffee Industry Ipsos Business Consulting Build Compete Grow. (n.d.). [online]. Available at: https://www.ipsos.com/sites/default/files/ct/publication/documents/2018-09/vietnams_coffee_industry-jul2013.pdf [Accessed 22 Mar. 2021].

Vietnamese industry magazine, 2004. Enhance the competitiveness of industrial products. Available: http://tapchicongnghiep.vn/News/channel/1/News/81/1847/-Chitiet.html. Accessed 8th March 2021.

Vollrath, T.L., 1991. A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. Weltwirtschaftliches Archiv, 127(2), pp.265-280.

World Bank. (2018). Overview. [online] Available at: https://www.worldbank.org/en/-country/vietnam/overview [Accessed 23 Feb. 2021].

Worldbank.org. (2021). World Bank Open Data | Data. [online] Available at: https://data.worldbank.org/ [Accessed 29 Mar. 2021].

Yu, R., Cai, J. and Leung, P., 2009. The normalized revealed comparative advantage index. The Annals of Regional Science, 43(1), pp.267-282.