

ORIGINAL SCIENTIFIC PAPER

RECEIVED: DECEMBER 2021

REVISED: FEBRUARY 2022

ACCEPTED: MARCH 2022

DOI: 10.2478/ngoe-2022-0002

UDK: 339.56:339.13

JEL: P51, C82, F14

Citation: Adigwe, E. O. (2022). Comparative Analysis of Competitive Trade in a Cluster Market of the European Union: The Revealed Comparative Advantage (RCA) Index. *Naše Gospodarstvo/Our Economy*, 68(1), 14-24.
DOI: 10.2478/ngoe-2022-0002.



This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

**NG
OE**
**NAŠE GOSPODARSTVO
OUR ECONOMY**

Vol. 68 | No. 1 | 2022

pp. 14–24

A Comparative Analysis of Competitive Trade in a Cluster Market of the European Union: The Revealed Comparative Advantage (RCA) Index

Edward O. Adigwe

PhD Student at the University of Applied Sciences Burgenland, Campus 1
Eisenstadt, Austria
2019001104@fh-burgenland.at

Abstract

This research is concerned with the comparative analysis of competitive trade within the cluster market economies of the European Union. The aim of this paper is to carry out trade analysis within the competing countries in the European market from 2009 to 2018 which represents the period after the global crisis of 2008 and prior to the Covid-19 pandemic of 2019 for the purpose of determining the extent of competitive trade within the European economies. The chosen metric is Béla Balassa's Revealed Comparative Advantage (RCA) index used for determining various countries' comparative advantage or disadvantage in trade. The findings show that the countries with $RCA > 1$ thrive economically in comparison to other competing lower economies. And the fact that the European Union economy thrives on mechanized trade other than agricultural products irrespective of the competitive market. This study is a significant contribution towards improving the Ricardian model of comparative advantage on trade within a cluster market in the European economies.

Keywords: competitiveness, revealed comparative advantage, international trade

Introduction

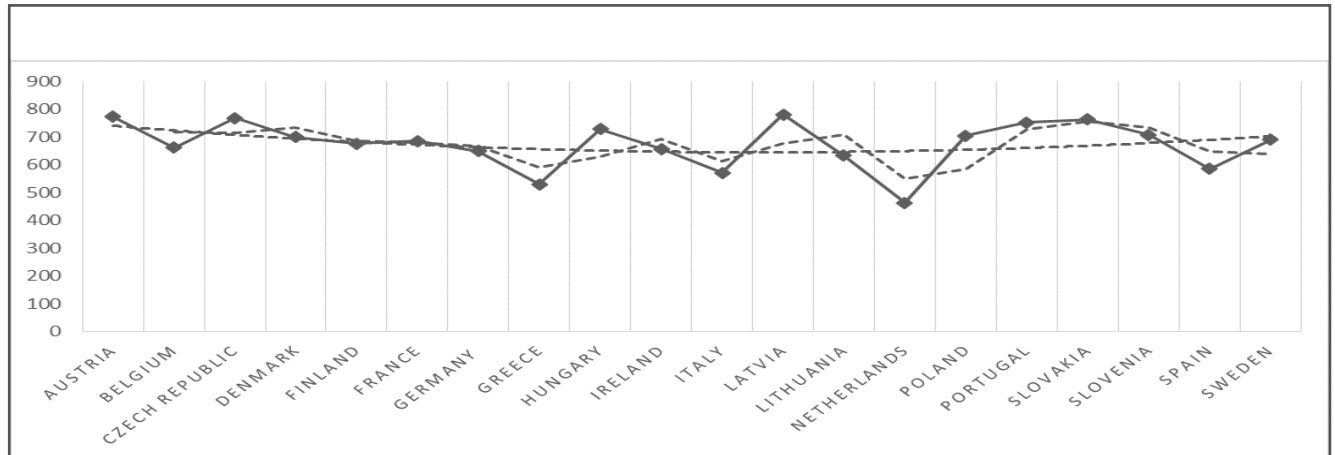
This paper aims to carry out a comparative analysis of trade within the competing economies in the European Union from 2009 to 2018 (after the recession and before the Covid-19 pandemic) in order to ascertain the level of trade competitiveness within the economies of the European Union.

The analysis is geared towards improving the Ricardian theory of comparative advantage using the Revealed Comparative Advantage model of Béla Balassa (1965) as the mathematical technique employed in order to give credence to the theory. The period from 2009 to 2018 was chosen because of the improvement in trade in the European economy after the 2008 global recession. The final year of data used for the study was 2018, as it allows clear analysis of the global trend after the recession prior to the Covid-19 pandemic. The desired metric for the analysis is the Revealed Comparative Advantage (RCA) Index which is derived for 20 products group and 27 countries that make up the European Union.

In 1993, the European Union single market was established according to In't Veld (2019, 804). It was estimated that it could raise overall GDP by 6.5% in the near future Cecchin-ic et al. (1988). The evidence of the existence of the internal

market was fortified by the sharing of competencies by the Union and the member states. Irrespective of this likely estimation, the overall GDP has since increased overtime.

Figure 1. Asymmetry testing for Sweden



In order to achieve this, and project higher values that would consequently stimulate growth and development in futuristic terms, there is a need for the advancement in trade between the European economies. According to the Eurostat report, the 27 European Union countries generated a gross domestic product (GDP) of 13.94 trillion euros from 2009 to 2018. However, the share of trade exchange between the European countries showed Latvia, Austria, Belgium, Czech Republic, Germany, Poland, Portugal, Slovakia, Slovenia, Sweden, Hungary, Finland, France, and Denmark gradually improved in trade between 2009 and 2018 immediately after the global recession. Although, there was a cyclical trend in trade movement (Figure 1) due to the erratic trade flow year on year between the countries. Spain, Greece, Italy and Netherlands occupied the least position of share of trade within the European Union using the available data of 21 countries in the Eurostat database.

Irrespective of Germany’s position as the largest economy in the European Union, the available data showed that Germany occupied the 15th position while France occupied the 11th position with a cumulative value of 649.9 and 685.6 respectively. Latvia and Austria top the list of highest shares of trading economies from 2009 to 2018 with a cumulative value of 781 and 773.4 respectively. The trade exchange on the goods produced also showed that from 2009 to 2018 the European Union market improved after the economic crisis and financial meltdown. The 2009-2018 analysis (Table 1) further showed the product per share for all traded goods in the European Union and its level of significance on the European Union economy in general.

The traded goods and services in the European Union are majorly within the industrialized market compared to the Agricultural products. The World Integrated Trade Solutions database further revealed that within the period 2009-2018, consumer goods were the largest of all the traded goods in the European Union with 419.01 per product share, while minerals and hides and skins occupy the lowest position of 5.87 and 6.03 per product share respectively (Table 1).

It was indicative that the consumer goods, capital goods, intermediate goods, machinery and electronics, fuels, chemicals, transportation, raw materials, polymer products, and metals are the highest valued products for trade in the European Union market within the period 2009–2018.

Textiles and clothing, wood, vegetable, animal, hides and skins, on the other hand, all of which are attributable to agricultural produce, were ranked lower in the product per share. However, the product per share of industrialized market comprising both Consumer goods, Capital goods, Manufacturing, and Transportation, are worth 1,822.38 on an average of 195.91 per share. The Industrialized products make up 84.6 per cent of the total product share compared to the agricultural products worth 262.05 on an average of 36.60 per share which was 12.17 per cent of the total product per share (Figure 2).

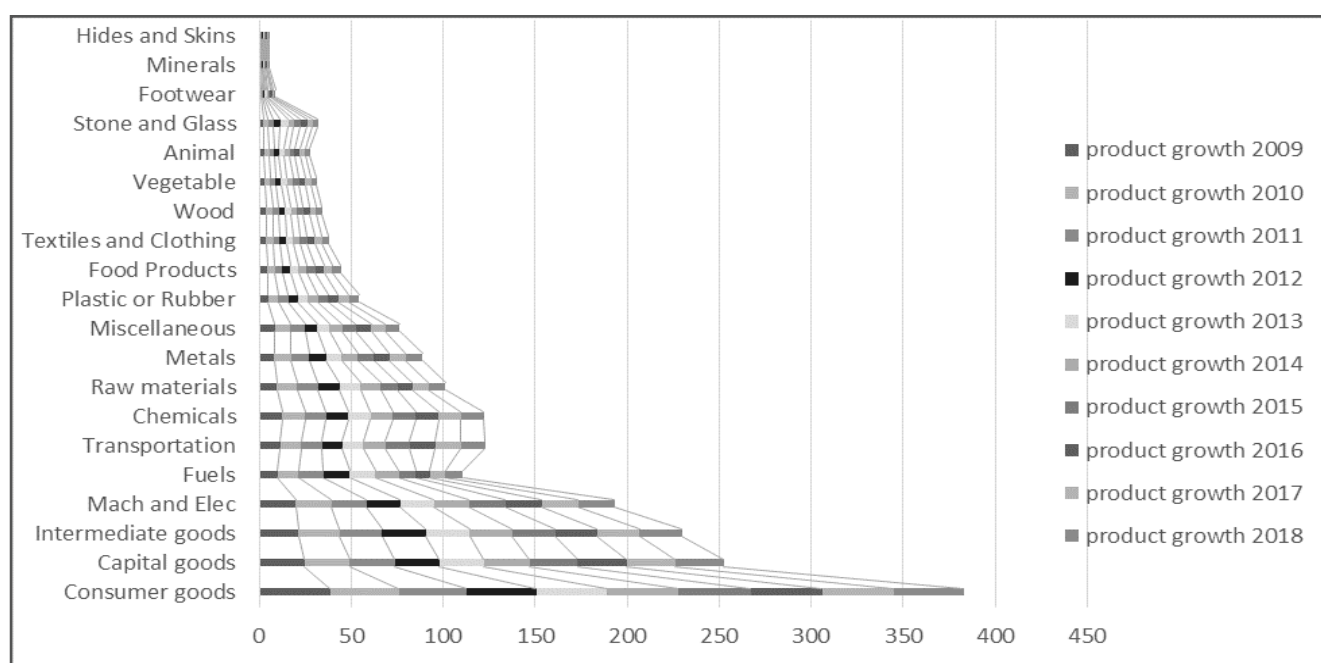
Moreover, there is an indication that from 2009 to 2018, there was a cyclical fluctuation between one product per share in comparison to the other. The cumulative product per share gave an insight into the analytical share performance of each product compared to the agricultural sector that had minimal

Table 1. Product per share for all traded goods produced in EU 2009 – 2018

| Product Group | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----------------------|-------|-------|------|-------|-------|------|------|------|-------|------|
| Consumer goods | 38.49 | 37.32 | 37.2 | 37.58 | 38.39 | 39.1 | 39.2 | 38.8 | 38.49 | 38.4 |
| Capital goods | 24.55 | 24.69 | 24.6 | 23.98 | 24.2 | 24.9 | 26.2 | 26.7 | 26.42 | 26.3 |
| Intermediate goods | 21.17 | 22.43 | 23.2 | 23.68 | 23.8 | 23.1 | 23.4 | 22.8 | 23.07 | 23.2 |
| Mach and Elec | 19.72 | 19.59 | 19 | 18.35 | 18.31 | 19 | 19.8 | 19.9 | 19.71 | 19.8 |
| Fuels | 9.98 | 11.54 | 13.2 | 14.46 | 14.03 | 12.8 | 9.14 | 7.58 | 8.58 | 9.3 |
| Transportation | 11.39 | 11.38 | 11.5 | 11.07 | 11.23 | 11.9 | 13.3 | 14.1 | 13.7 | 13.2 |
| Chemicals | 12.65 | 12.2 | 11.7 | 11.89 | 12.04 | 12.2 | 12.5 | 12.3 | 12.14 | 12.3 |
| Raw materials | 9.71 | 10.77 | 11.5 | 11.83 | 11.4 | 10.8 | 9.02 | 8.36 | 8.8 | 9.15 |
| Metals | 8.19 | 9.27 | 9.72 | 9.1 | 8.68 | 8.75 | 8.7 | 8.28 | 8.95 | 9.17 |
| Miscellaneous | 8.49 | 8.49 | 7.92 | 6.69 | 6.75 | 6.87 | 7.33 | 8.22 | 7.87 | 7.76 |
| Plastic or Rubber | 5.05 | 5.28 | 5.43 | 5.27 | 5.4 | 5.48 | 5.61 | 5.58 | 5.67 | 5.58 |
| Food Products | 4.49 | 4.11 | 4.02 | 4.19 | 4.39 | 4.49 | 4.68 | 4.72 | 4.64 | 4.56 |
| Textiles and Clothing | 3.93 | 3.69 | 3.62 | 3.48 | 3.6 | 3.81 | 3.94 | 4.02 | 3.98 | 3.92 |
| Wood | 3.72 | 3.61 | 3.39 | 3.26 | 3.29 | 3.36 | 3.43 | 3.41 | 3.29 | 3.33 |
| Vegetable | 3.01 | 2.85 | 2.98 | 3.14 | 3.21 | 3.13 | 3.3 | 3.34 | 3.28 | 3.11 |
| Animal | 2.81 | 2.69 | 2.66 | 2.68 | 2.85 | 2.85 | 2.78 | 2.82 | 2.83 | 2.71 |
| Stone and Glass | 2.36 | 2.54 | 2.81 | 3.79 | 4.2 | 3.25 | 3.43 | 3.62 | 3.13 | 3.01 |
| Footwear | 0.81 | 0.78 | 0.8 | 0.77 | 0.84 | 0.91 | 0.97 | 1.02 | 1.03 | 1.04 |
| Minerals | 0.44 | 0.51 | 0.57 | 0.56 | 0.55 | 0.55 | 0.51 | 0.49 | 0.58 | 0.59 |
| Hides and Skins | 0.46 | 0.48 | 0.51 | 0.53 | 0.57 | 0.59 | 0.62 | 0.61 | 0.61 | 0.6 |

Source: Author's Calculation/ World Integrated Trade Solutions database

Figure 2. Top 20 Product growth in the European Union 2009 – 2018



Source: World Integrated Trade Solutions database 2009-2018

product share in the analysis. However, irrespective of the share of trade exchange by country (Figure. 1), the European Union export trade analysis from the World Integrated Trade Solutions database revealed that Germany has the largest export trade of 8,137.61 (US \$ billion), amongst the 27 countries that make up the European Union, while France stood at 4,878.40 (US \$ billion). The Netherlands had a total of 3,538.72 (US \$ billion), and Italy and Belgium stood at 3,342.80 (US \$ billion) and 2,595.84 (US \$ billion), respectively. The export trade analysis placed these countries as the major players in the European Union market irrespective of the share of trade exchange by the European Union economies.

The objective of this paper is to comparatively analyze trade competitiveness in a defined cluster market of the European Union, and to determine the extent of competitive trade within the economies of the European Union from 2009 to 2018. In the next section, the theoretical framework of the research is discussed with an emphasis on the Revealed Comparative Advantage (RCA) index. The methodology and hypothesis tested are discussed in section three. The results section reveals the computed figures for countries and products with RCA greater than 1, and the top 20 product groups with economic growth in the European Union cluster market as a whole.

Literature Review

The presumption that the world is a global economy is technically different in diverse perspectives where trade competition exists between global economies in a competitive market. The principle of comparative cost advantage propounded by David Ricardo (1817) may have logically been fairly viewed from the perspective of the weaker economies, and not necessarily with the objective of countries producing what they have a comparative advantage over. This perception, if objectively controlled, would have eradicated some socio-economic issues emanating from global trade and market competition between world economies. The major aim of institutionalizing global trade is to create opportunities for availability of different goods and services at cheaper prices competitive for the economies of the world. However, Nansen (2017) asserts that global trade is not a free market system.

In Nansen's perspective, a free market cannot exist in a stable equilibrium unless it is also a fair market. Diverse unprecedented assumptions had equally trailed the field of trade in international economics with different conceptual and empirical formulations that do not show the realistic development of trade performance due to the different views emanating from scientific research studies. The general

perception that the world is presumed a global economy is the likely perception that established the European Union founding principle making free trade one of the European Union policies where trading in a competitive market is fundamental.

In Faccarello's study, the principle of comparative advantage acts as a simple result of the decisions of agents in a free market (Faccarello, 2017). It is expected that the more productive economy should exchange its higher comparative advantage products and services with another economy where it has a lower advantage. And since it is expected that trade with other nations tends to increase the number of goods consumers can choose from, multinational competition will lower cost of those goods (Katz, 2018); various arguments of economic scholars and economic theorists have emerged against the Ricardian comparative advantage model and the likely insinuation that the model is subjected to the absolute control of the more technologically advanced economies in international trade. This has motivated the likely indication that the Ricardian comparative advantage model is not totally in the hands of free trade where the global market system takes cognizance.

New trade theory explained in empirical terms that comparative-advantage-based models have some inherent difficulties (Shiozawa, 2017) which exist in international trade between countries. The assumption is that the technologically advanced economies should export their capital-intensive products and import labour-intensive products. However, that has since ceased to exist. The more technologically advanced economies are mostly economic-giants who eventually thrive on both capital-intensive and labour-intensive products. This correlation simply creates a crack in the walls of the purpose of David Ricardo's comparative advantage principle, which continues to promote the economic growth of participating world economies in global trade, thereby fostering global growth and development.

However, in Ricardo's earlier prediction, the Heckscher-Ohlin (H-O) model clearly stated that international trade is determined by differences in factor endowment. A clear indication that the opportunity cost of labour alone may not necessarily promote the required development where economic values are of importance. The same reason reflects the author's choice for using the European Union as a formidable region for the purpose of this research in comparison to other economies of the world. The European Union is one of the world's most cooperative and powerful economies and is mostly perceived as the largest single market area in international trade.

It is, however, significant to ascertain that the economies of the global market are not totally driven by David Ricardo's

principle of comparative advantage, but absolutely driven by the opportunity cost of factor endowment, such as labour and capital, enjoyed by the competitive economies of the world. The reason may not be unconnected with the viewpoints of some researchers who argue in the direction of its economic supremacy over the rest of the competing markets, especially where fundamental factors resulting from trade-competition in economic terms need to be critically examined. This is where the author is inclined towards a further research into the intrinsic value of interest where trade in a global market is of importance.

Another reason aggregated to these economic theorists is their economic speculations and theoretical assumptions towards the concept of globalization, and its inter-relationship with trade liberalization in the competing world economies. The first is the perception of trade liberalization from the basis of eliminating tariff barriers from international trade. The second is the non-consideration of agricultural products even where some economies may not be technologically advanced in the market competition evidently leading to unproductive economic growth. Consequently, it was argued that trade liberalization tends to benefit the stronger economies while the weaker economies are at a more disadvantaged position in the competitive market. According to Wyplosz (2013), "it is probably fair to assert that the prevailing view of the Euro area crisis is the consequence of serious competitiveness losses in the affected countries, which is entirely and uniquely based on one version or another of a displayed unit labor cost."

From the author's viewpoint, the cluster market existing in the European Union is assumed a global market within a conjugal and inter-related effort of a single economy, where each participating economy takes cognizance. According to Albrow et al. (1990), his definition of globalization is attributed to the various processes by which the people of the globe are integrated into a single world. Martins et al. (1997) also view it as an economic globalization from the insinuation of a progressive networking of national market economies politically connected as a global economy in which the distribution of resources is continually governed by neoliberal principles while minimizing government participation with an emphasis on the market in economic matters. In Jones's (1995) perception, "globalization may simply be an intensification of the process of international interdependence, a function of the growth of competition in an international free trade system intensified by the diffusion of technology." It is, however, clearly indicated that the emphasis of Martins et al. places a functional dependence on growth of competition in a free trade system within the context of globalization, a typical reference to the European Union single market system.

The European Union market might have considered the inter-relationship between free trade and market forces, disenchanted by prevailing policies of advanced economies. According to Katz (2018), global trade is not a free market system. A free market cannot exist in a stable equilibrium unless it is a fair market. In her book, *Factors Influencing International Trade*, reviewed by Hashaw Elkins, Frances Katz clearly confirmed one of such criteria as being due to the low cost of foreign labour and lack of overseas regulation regarding safety and quality (Katz, 2018). Since it is often assumed that international trade is supposed to stimulate mutual benefit and a positive relationship between countries, the expected objective in this regard has remained in the realm of the unknown. "The expected objective has partly been misinterpreted to deliver the opposite rather than its genuine purpose" Milanovic (2012).

A larger perspective is the implication that access to free trade between countries is greatly hindered by the choices of the various economies that take decisions in a free market system. Since free trade is an economic transaction between countries, the cost or benefit derived from such activity need to be emphasized as a direct consequence on foreign trade, which could directly affect the objectives of Ricardo's principle of comparative advantage or disadvantage. The sole reason international trade has remained a point of focus for globalization stems from the Ricardian principle of comparative advantage where the global economy exchanges goods and services they have a comparative cost advantage to produce considering the opportunity cost of production with consequent price reduction in the variety of goods in different countries. As a result, Marrewijk's (2017) perception of the Ricardian model not directly considering factor endowment, such as the relative amount of labour and capital in international trade is peculiar in its entirety.

The European Union's economic recovery between 2013 and 2019 has been resiliently significant since the 2008 financial crisis. However, 2020 was another year of economic recession in the European Union and the Eurozone due to the pandemic, which affected world economies equally. As noted from Zafu and Saracu (2012), an economic crisis can be defined as a period in the dynamics of a system, where a multitude of difficulties arise as a conflict or tension, which makes it difficult for normal functioning of economic activities. The economic crisis also represents a situation in which the economy of a country passes through a sudden reduction in its force, usually brought about by a financial crisis. The economic crisis may take the form of stagflation, a recession or an economic depression (Doinita et al., 2012). According to Silvia et al. (2011), the technical innovations may not bring real progress as long as 'stability-with-fractions' remains the dominant pattern.

According to Charles Wyplosz (2013, p. 63) on the European Sovereign debt crisis, labour costs are directly comparable and offer a clear picture of the evolution of national competitiveness viewed from two assumptions. First, the European Union has a single goods market and separate labour markets. Second, the European Union does not need to be concerned with exchange rates because all wages and GDPs are in euros in the economic market of the European countries.

However, Wyplosz was also of the view that it is probably fair to assert that the prevailing perception of the euro area crisis is the result of serious competitiveness losses in the affected countries, which may be entirely and uniquely based on one version or another of a displayed unit labour cost. This invariably means that policies aiming at restoring competitiveness look at the symptoms and not the cause (Wyplosz, 2013, p. 65). He further argues that the assumptions given by Lebrun and Perez (2011) and Mallariopoulos (2010) on the euro area countries only compete with each other, while intra-euro area trade often represents the largest part of the overall trade, and the fact that the individual countries have different specializations, which makes trading with different parts of the world unacceptable.

The research question is: how can the level of trade between competing economies in a cluster market be determined using the European Union as a case study? Since international trade mostly involved the relative concept of the principle of comparative advantage, which was introduced and instituted by David Ricardo (1817), the most recognized application for determining the comparability between economies is the Revealed Comparative Advantage (RCA) Index. Béla Balassa's (1965) Revealed Comparative Advantage (RCA) index was proposed for the computation of a country's trade performance and the relative comparison of products and services. This metric is useful for obtaining theoretical results for a specific country's economies in international economics. The Revealed Comparative Advantage (RCA) is often referred to as an index by Béla Balassa (1965). The index is also used to compute the relative advantage or disadvantage of different goods and services in various sectors of different countries.

However, there are diverse assumptions by different scholars and researchers in the field of international economics on the alleged inconsistency of the Revealed Comparative Advantage (RCA) index put forward by Béla Balassa in relation to the computation of trade performance. According to Leromain and Orefice (2013), "the Balassa index suffers some empirical distribution weakness, mainly time instability and poor empirical distribution characteristics" (Yeats, 1985, Hinlopen and Van Marrewijk, 2001, 65). They concluded that the Balassa index is computed on observed trade flows, which mixes up all the factors influencing trade flows.

In a recent paper, Costinot et al. (2012) provide an instituted micro-founded version of David Ricardo's comparative advantage model, with a suggestion for a new measure of computing a comparative-advantage-based model in an attempt to overcome the shortcomings of Balassa. According to Sanidas and Shin (2007, 447), "those newly suggested indices can be classified in three classes: trade-cum-production indices containing both trade and production variables, e.g. Lafay index (Lafay, 1992); exports-only indices containing only exports variables, e.g. the symmetric RCA index, Dalum et al. (1998, 438), weighted RCA index, Proudman and Redding (2000), and additive RCA index, Hoen and Oosterhaven (2006); and an indices using hypothetical situation such as comparative - advantage - neutral point, e.g. normalized RCA, Yu et al. (2009, 278)." However, irrespective of a dataset that could provide new econometrics for Béla Balassa's (1965) Revealed Comparative Advantage (RCA) index, "the fact remains that Béla Balassa's index remains the most widely used and acceptable trade performance indices for measuring country - product - sector relative performance.

Adigwe (2021) further explains that "there is a possibility of developing a cross-sector assessment of countries' competitiveness in comparison to their products and services should the Revealed Comparative Advantage (RCA) Index be employed." It is, however, indicative that Balassa previously adopted Liesner's (1958, 310) concept of measuring relative export performance using export trade shares as an index for measuring comparative advantage. Some authors finally studied the Balassa index, and recommended that the empirical analysis discovered by the Balassa index is theoretically complete, validating it as a very useful tool for making critical analysis and economic decisions. With this explicit improvement on the RCA, there is a clear focus on a country's comparative advantage or disadvantage considering a specific product or service.

Methodology

The desired metric for the empirical analysis is the RCA index derived for 20 products group and 27 countries that make up the European Union. The data for the period 2009–2018 was used because of the improvement in exports after the 2008 global recession. Trade exports within the period 2009–2018 showed improvement after the 2008 sovereign debt crisis in Europe and prior to the 2019 global pandemic.

The study used data collated by the World Integrated Trade Solutions database and the Eurostat database report. The focus of the analysis is on 20 products group and 27 countries that make up the European Union with an RCA index

greater than 1. The data of the market products and services was compared relative to one another to arrive at their RCA. The Revealed Comparative Advantage (RCA), known as the Balassa index (1965), was used to determine the extent of competitive trade through a mathematical computation formulated for obtaining theoretical results for each of the specific country's economies.

The index was also used to compute the relative advantage or disadvantage of different goods and services in the various product groups classified in the form of consumer goods, industrialized or mechanized goods, capital goods, service delivery and agricultural products of the various economies in the European Union.

The Balassa index formula is given as follows:

$$RCA_{ij} = (Z_{ij} / Z_j) / (Z_{iw} / Z_w)$$

where RCA_{ij} is the revealed comparative advantage index for the commodity index i of the country index j ; Z_{ij} is country j 's exported commodity i ; Z_j is country j 's total exports; Z_{iw} is the commodity i of the global exports while Z_w is total global exports. A comparative advantage is "revealed" if $RCA > 1$. Where RCA is less than 1, the country is said to have a comparative disadvantage in the commodity.

For a secondary data analysis, data collected from the country's Economic Chamber of Commerce was used.

The following hypotheses were tested:

H1: Countries with $RCA > 1$ thrive economically in comparison to other competing lower economies.

H2: The European Union economy thrive on mechanized trade other than agricultural products irrespective of the competitive market.

Results

The computation of the RCA index was carried out on 20 products exported by the range of product category, and by each country in the European Union. The data analysis of each country's trade exchange performance was compared relative to one another to arrive at their RCA (Table 2). This confirms the hypothesis H1: Countries with $RCA > 1$ thrive economically in comparison to other competing lower economies.

However, it is indicative that almost all the European Union countries have an $RCA > 1$; Germany, Spain, Lithuania, the Netherlands, Italy, Ireland, Greece, Belgium and Finland

have an $RCA > 2$ except in 2014, where they had an RCA of 1.02 each.

However, irrespective of this unprecedented RCA in 2014, the author presumes that the economic improvement from 2009 to 2018 may not be unconnected with the European Union trade and cohesion policies that cushioned the effect of inequalities and ultimately strengthened the economic ties between these competing economies in the European Union market. The data for the remaining six competing economies in the European Union was not readily available in order to determine their comparative advantage or disadvantage in export trade. However, since the result showed about 78 per cent of the research analysis, the hypothesis H1 is validated.

The RCA index for product group showed fluctuations over the years under review. Consumer goods, however, maintained an $RCA > 1$ over the years. Capital goods and intermediate goods, as well as machineries and electronics, also maintained an $RCA > 1$.

Evaluating the RCA index of the products group revealed that consumer goods, capital goods and the manufacturing sector tend to have the largest market share in the European Union compared to other products in the agricultural sector with an $RCA < 1$. This further means that the industrialized sector of the European Union market is productively engaged in consumer goods, capital goods and manufacturing far above other products in the economies of scale. It is also proof of the product share in the European Union market when compared to other products.

This analysis demonstrates that given the product group in the EU market, the statistics of product share clearly show that mechanized products enjoy a greater part of the market share in the European Union economy than any other product group. The RCA index proves H2 (H2: The European Union economy thrives on mechanized trade other than agricultural products irrespective of the competitive market) to be true.

This invariably means that the European Union economy has a higher rate of trade exports and market consumption of these group of products in comparison to stone and glass, footwear, animals, hides and skins, minerals and vegetables. According to the Journal of Policy Modeling (2019), the European Union accounts for 21 per cent of global economic output, which is second only to the United States.

From 2009 to 2018, the export share in manufacturing and technology was 92.7 per cent, while other products, which includes wood, vegetable, animal, minerals, and footwear made up 7.3 per cent. This reflects the fact that the European Union is a productive region with a growing export share in manufacturing and technology compared to agricultural products.

Table 2. RCA Index for Countries in the European Union Trade Exchange 2009 – 2018

| Product Group | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----------------------|-------|-------|------|-------|-------|------|------|------|-------|------|
| Consumer goods | 38,49 | 37,32 | 37,2 | 37,58 | 38,39 | 39,1 | 39,2 | 38,8 | 38,49 | 38,4 |
| Capital goods | 24,55 | 24,69 | 24,6 | 23,98 | 24,2 | 24,9 | 26,2 | 26,7 | 26,42 | 26,3 |
| Intermediate goods | 21,17 | 22,43 | 23,2 | 23,68 | 23,8 | 23,1 | 23,4 | 22,8 | 23,07 | 23,2 |
| Mach and Elec | 19,72 | 19,59 | 19 | 18,35 | 18,31 | 19 | 19,8 | 19,9 | 19,71 | 19,8 |
| Fuels | 9,98 | 11,54 | 13,2 | 14,46 | 14,03 | 12,8 | 9,14 | 7,58 | 8,58 | 9,3 |
| Transportation | 11,39 | 11,38 | 11,5 | 11,07 | 11,23 | 11,9 | 13,3 | 14,1 | 13,7 | 13,2 |
| Chemicals | 12,65 | 12,2 | 11,7 | 11,89 | 12,04 | 12,2 | 12,5 | 12,3 | 12,14 | 12,3 |
| Raw materials | 9,71 | 10,77 | 11,5 | 11,83 | 11,4 | 10,8 | 9,02 | 8,36 | 8,8 | 9,15 |
| Metals | 8,19 | 9,27 | 9,72 | 9,1 | 8,68 | 8,75 | 8,7 | 8,28 | 8,95 | 9,17 |
| Miscellaneous | 8,49 | 8,49 | 7,92 | 6,69 | 6,75 | 6,87 | 7,33 | 8,22 | 7,87 | 7,76 |
| Plastic or Rubber | 5,05 | 5,28 | 5,43 | 5,27 | 5,4 | 5,48 | 5,61 | 5,58 | 5,67 | 5,58 |
| Food Products | 4,49 | 4,11 | 4,02 | 4,19 | 4,39 | 4,49 | 4,68 | 4,72 | 4,64 | 4,56 |
| Textiles and Clothing | 3,93 | 3,69 | 3,62 | 3,48 | 3,6 | 3,81 | 3,94 | 4,02 | 3,98 | 3,92 |
| Wood | 3,72 | 3,61 | 3,39 | 3,26 | 3,29 | 3,36 | 3,43 | 3,41 | 3,29 | 3,33 |
| Vegetable | 3,01 | 2,85 | 2,98 | 3,14 | 3,21 | 3,13 | 3,3 | 3,34 | 3,28 | 3,11 |
| Animal | 2,81 | 2,69 | 2,66 | 2,68 | 2,85 | 2,85 | 2,78 | 2,82 | 2,83 | 2,71 |
| Stone and Glass | 2,36 | 2,54 | 2,81 | 3,79 | 4,2 | 3,25 | 3,43 | 3,62 | 3,13 | 3,01 |
| Footwear | 0,81 | 0,78 | 0,8 | 0,77 | 0,84 | 0,91 | 0,97 | 1,02 | 1,03 | 1,04 |
| Minerals | 0,44 | 0,51 | 0,57 | 0,56 | 0,55 | 0,55 | 0,51 | 0,49 | 0,58 | 0,59 |
| Hides and Skins | 0,46 | 0,48 | 0,51 | 0,53 | 0,57 | 0,59 | 0,62 | 0,61 | 0,61 | 0,6 |

Source: Author's Calculation/ Eurostat Database 2009-2018

Table 3. RCA Index for Top Product group in the European Union Trade 2009 – 2018

| Product Group | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|--------------------|------|------|------|------|------|------|------|------|------|------|
| Consumer goods | 2.19 | 2.16 | 2.13 | 2.13 | 2.12 | 2.12 | 2.12 | 2.13 | 2.13 | 2.13 |
| Capital goods | 1.45 | 1.43 | 1.42 | 1.42 | 1.41 | 1.41 | 1.41 | 1.41 | 1.41 | 1.41 |
| Intermediate goods | 1.31 | 1.30 | 1.28 | 1.28 | 1.27 | 1.27 | 1.27 | 1.28 | 1.28 | 1.28 |
| Mach and Elec | 1.11 | 1.10 | 1.09 | 1.09 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 |
| Fuels | 0.64 | 0.63 | 0.63 | 0.63 | 0.62 | 0.62 | 0.62 | 0.63 | 0.63 | 0.62 |
| Transportation | 0.70 | 0.69 | 0.69 | 0.69 | 0.68 | 0.68 | 0.68 | 0.69 | 0.69 | 0.68 |
| Chemicals | 0.69 | 0.68 | 0.68 | 0.68 | 0.67 | 0.67 | 0.67 | 0.67 | 0.67 | 0.67 |
| Raw materials | 0.58 | 0.58 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 |

Source: Author's Calculation/ World Integrated Trade Solutions Database 2009-2018

Discussion

The RCA index is very useful in the evaluation of a country's comparative advantage as well as the country's products and services. The comparative analysis gave credence to

the assessment of trade in each of the country's product groups and year on year basis of comparison between the economies in the cluster market. This further proved that the extent of a country's economic growth and development is determined to a large extent by the rate of the RCA in its

comparative advantage to the other economies. This invariably means that where there is a higher level of trade in an economy within a competitive market, there is the possibility of producing an $RCA > 1$, while a lower level of trade could translate to an $RCA < 1$. However, the analysis had proved that the share of trade exchange between competing economies does not necessarily affect the economic strength of a country. This reason for this conception is, however, beyond the scope of this paper. Meanwhile the possibility of harnessing the growth potential of economy is also fundamental where export trade is concerned.

In the analysis, there was a clear indication that manufacturing- and technological-based mechanized trading in the European Union cluster market had developed over the years from 2009 to 2018 with the potential of further development in the nearest future. Meanwhile, the RCA indices had shown relative trading fluctuations between the European economies implying the likely unstable trend if the market forces within the European economy were not critically monitored. For example, the export trade of Belgium and Spain have increased indices from 2009 to 2018, while Poland, Austria, Sweden, the Czech Republic, Denmark and Hungary have fluctuating indices in export trade growth potential over the period under review. However, the economic relations between the competing economies had strengthened over time due to the European Union's cohesion policy.

David Ricardo's principle of Comparative Advantage actually induced global economic growth and development in the competitive economies of the global market. However, the author is of the opinion that Ricardo's principle did not really consider the absolute advantage derived in a technologically driven market. This is because Ricardo's only factor of production is labour, and this factor had evidently been outweighed by the evidence of the inclusion of technology in labour-intensive products rather than capital-intensive products in an absolute advantage position relative to other lower economies in a competitive market.

The author's submission is that trade between countries in the global market is absolutely driven by the opportunity cost of the benefit derived from the factor endowment, and not necessarily for the purpose of promoting the comparative-advantage-based model. Hence, the dynamics of trade in the competitive economies tend to be absolutely driven by an intrinsic value of interest of the competing economies. The author's perception is that the more advanced countries of the world are prone to using prerogative controls of an opportunity cost in trade between economies in a free-market system where competition is not risk-averse. The technologically advanced economies gain the absolute control in international trade, which evidently does not end in the hands of a free market system.

Conclusion

The aim of this research was to conduct a comparative analysis of competitive trade in the cluster market economies of the European Union using the Revealed Comparative Advantage (RCA) index in order to improve on the Ricardian model of comparative advantage in a contemporary trend of economic realities. The RCA index was used as the metric suitable for determining the extent of trade performance between the countries in the European Union considering mechanized trade in comparison to agricultural products. The underlying analysis and results proved that the aim of the research was achieved.

However, the advent of global investment transcends the internal or domestic market, which gives rise to trading activities amongst countries particularly with the aim of creating room for exchange of goods and services. This concept further enhances global market competition that could lower production costs, thereby making it competitive at a reduced cost, which could be adduced to the single market economy of the European Union. There could be the perception that the barriers to trading activities in the global market are numerous: cultural beliefs, language interpretations, embargos, tariffs on goods and services, exchange controls and vast a number of incidental factors, which are likely to discourage the primary objective of achieving a global market trade between countries in the European cluster market.

Also, the likely regulations of economic policies in any particular country, which may threaten the existence of the investment of another, had also been considered within the European Union single market system. For example, the Eurostat database reported that the European Stability and Growth Pact led to pegging of the new annual net debt of the European Union member states to a maximum of 3 per cent of their respective gross domestic product. This is in addition to the national debt of up to 60 per cent of the economic power of the member state.

Meanwhile, one of the reasons international trade has remained a point of focus for globalization stems from the Ricardian principle of comparative advantage where the global economy exchange goods and services they have comparative cost advantage to produce if considering the opportunity cost of production vis-a-vis the variety of goods produced in different countries.

Since this research specifically focused on the available data of European countries, further research could be carried out on the global economy in general. The results shown from this analysis only provided the comparative position of competitive trade and the product groups and services in the

economies of the European Union. It is, however, critical to further analyze other areas of research interest raised by the author as well as other economic factors that have created the need for other studies relating to per capita income, and the level of activities in the European market. This research

is a significant contribution towards improving the Ricardian model with the contemporary study of economic realities within the European Union economy while considering a cluster market as a reference in the global community.

References

- Adigwe, E. O. (2021). Revealed Comparative Advantage (RCA) Index: Analysis of Export Trade in the Competitive Economies of the European Union (pp. 8-17). Proceedings of an International Scientific Conference at the University of Economics in Bratislava, June 4, 2021. Vydavateľstvo EKONÓM. ISBN: 978 – 80 – 225 – 4832 – 8
- Albrow, M., & King, E. (1990). *Globalization, Knowledge and Society. International Sociology*. Thousand Oaks: Sage.
- Balassa, B. (1965). Trade Liberalization Revealed Comparative Advantage. *The Manchester School of Economic and Social Studies*, 33, 99-123. <https://doi.org/10.1111/j.1467-9957.1965.tb00050.x>
- Bogliacino, F. (2020). Inequality and Europe 2020. *Intereconomics*, 49(5), 288-294. <https://doi.org/10.1007/s10272-014-0511-1>
- Dalum, B., Laursen, K., Villumsen, G. (1998). Structural change in OECD export specialization patterns. *International Review of Applied Economics*, 12, 423-443. <https://doi.org/10.1080/02692179800000017>
- Eurostat Database. Retrieved from <https://ec.europa.eu/eurostat/data/database>.
- Faccarello, G. (2017). A calm investigation into Ricardo's principle of international trade. *The European Journal of the History of Economic Thought*, 22(5), 754-790. <https://doi.org/10.1080/09672567.2015.1086011>
- Francesco, B., Virginia, M. (2016). Wealth Inequality and the Great Recession, *Intereconomics* 51(2), 61-66. <https://doi.org/10.1007/s10272-016-0578-y>
- Hinloopen, J., Marrewijk, V.C. (2001). On the empirical distribution of the Balassa index. *Weltwirtschaftliches Archive*, 137(1), 1-35. <https://doi.org/10.1007/BF02707598>
- Hinloopen, J., Marrewijk, V.C. (2008). Empirical relevance of the Hillman condition for revealed comparative advantage: 10 Stylized Facts. *Applied Economics*, 40(18), 2313-2328. <https://doi.org/10.1080/00036840600949488>
- Hoen, A., Oosterhaven, J. (2006). On the measurement of comparative advantage. *Annals of Regional Science*, 40, 677 - 691. <https://doi.org/10.1007/s00168-006-0076-4>
- Jones, R. B. (1995). *Globalization and Interdependence in the International Political Economy*. London, New York: St. Martin's Press.
- Katz, F. (2018). *Factors influencing international trade*. Retrieved from: <https://bizfluent.com/info-8210281-factors-influencing-international-trade.html>
- Laboutkova, S., Bednarova, P., Valentova, V. H. (2016). Economic Inequalities and the Level of Decentralization in European Countries: Cluster Analysis. *Comparative Economic Research*, 19(4), 27-46.
- Lafay, G. (1992). The measurement of revealed comparative advantages, In: Dagenais, M. G. & Muet, P.-A. (eds.) *International Trade Modelling*. London: Chapman & Hall.
- Leromain, E. & Orefice, G. (2013). New revealed comparative advantage index: Dataset and empirical distribution. *CEPII Working paper* No. 2013-20.
- Liesner, H. H. (1958). The European Common Market and British Industry. *The Economic Journal*, 68(270), 302-316. <https://doi.org/10.2307/2227597>
- Marrewijk, C. V. (2017). *International trade*. Oxford, UK: Oxford University Press. Retrieved from: <https://moam.info/marrewijk-c-van-2017-international-trade-oxford-university-press->
- Martins, H.-P., Schumann, H., Camiller P. (1997). *The Global Trap: Globalization and the Assault on Prosperity and Democracy*. London: Zed Books.
- Milanovic, B. (2012). Global Income Inequality by the Numbers: In History and Now - An Overview. *Policy Research Working Paper* No. 6259. World Bank, Washington DC. <https://doi.org/10.1596/1813-9450-6259>
- Nansen, T. (2017). *What are some of the forces that affect trading in global market?* Retrieved from: <http://bizfluent.com/info-7814010-forces-affect-trading-global-markets.html>
- OECD. *Income Inequality in the EU* (2012). Retrieved from <https://oecd-ilibrary.org/economics/income-inequality-in-the-eu>.
- Proudman, J., Redding, S. (2000). Evolving patterns of international trade. *Review of International Economics*, 8, 373-396. <https://doi.org/10.1111/1467-9396.00229>
- Sanidas, E. (2007). Revealed comparative advantage and economic development with emphasis on East Asia. *Proceedings of the Korea in the World Economy, VI Conference*, 2, 445-463.
- Wyplosz, C. (2013). The Eurozone Crisis and the Competitiveness Legend. *Asian Economic Papers*, 12(3), 63-81. https://doi.org/10.1162/ASEP_a_00238

- Yeats, A. J. (1985). On the Appropriate Interpretation of the Revealed Comparative Advantage Index: Implications of a Methodology Based on Industry Sector Analysis. *Weltwirtschaftliches Archiv*, 121(1), 61-73. <https://doi.org/10.1007/BF02705840>
- Yu, R., Cai, J., & Leung, P. (2009). The normalized revealed comparative advantage index. *Annals of Regional Science*, 43, 267- 282. <https://doi.org/10.1007/s00168-008-0213-3>
- Zafiu C. D., Cucos Saracu, A.F. (2012). The Economic Crisis – Meanings and Significations. *Risk in Contemporary Economy*, 111-114. Retrieved from: https://econpapers.repec.org/article/ddjfserec/y_3a2012_3ap_3a111-114.htm

Primerjalna analiza konkurenčnega trgovanja na trgu Evropske unije: indeks razkritih primerjalnih prednosti (RCA)

Izvleček

Ta raziskava obravnava primerjalno analizo konkurenčne trgovine znotraj grozdov tržnih gospodarstev Evropske unije. Cilj tega članka je izvedba trgovinske analize znotraj konkurenčnih držav na evropskem trgu od leta 2009 do 2018. To je obdobje po svetovni krizi leta 2008 in pred pandemijo covid-19 leta 2019, namen analize pa je določiti obseg konkurenčne trgovine znotraj evropskih gospodarstev. Izbrana metrika je indeks razkritih primerjalnih prednosti (RCA) Béle Balasse, ki se uporablja za določanje primerjalne prednosti ali slabosti trgovanja različnih držav. Ugotovitve kažejo, da države z $RCA > 1$ v primerjavi z drugimi konkurenčnimi gospodarstvi na nižji ravni gospodarsko uspevajo. In dejstvo je, da gospodarstvo Evropske unije uspeva z mehaniziranim trgovanjem, ki ne zajema kmetijskih proizvodov, ne glede na konkurenčni trg. Študija je pomemben prispevek k izboljšanju Ricardovega modela primerjalnih prednosti na skupnem trgu evropskih gospodarstev.

Ključne besede: konkurenčnost, razkrite primerjalne prednosti, mednarodna trgovina