STUDY ON THE DETERMINATION OF COMPARATIVE ADVANTAGE THROUGH THE ANALYSIS OF TRADE FLOWS IN A GLOBAL AND EUROPEAN INTEGRATIONIST CONTEXT THE CASE OF ROMANIA

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Abstract: The objective of this paper is to determine the comparative advantage of Romania in relation to the countries of the European Union in an integrationist context. The European single market offers free trade conditions, which allows the reference to Ricardo's theory of comparative advantage and the use of the Balassa index for the analysis of trade flows. This index measures the relative performance of exports, per countries and branches, and it is calculated as ratio between the share of a branch in the total export of the country and the share of the branch in the world exports. As the current export flows 'reveal' the country's strong sectors it is also known as Revealed Comparative Advantage. The conclusions of the analysis will identify the situations of relative comparative advantage and the situations in which the Romanian economy presents favourable opportunity costs.

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1. INTRODUCTION

In the context of globalization and European integration, nations display a growing inclination towards assessing their comparative advantages and utilizing them to bolster their competitiveness in the global market. These advantages are shaped by various factors, including natural resources, infrastructure, educational level, culture, and historical background.

This paper aims to explore the concept of comparative advantage, a crucial pillar in international trade theory. Notably, the research approach emphasizes that once the comparative advantage is identified, it becomes essential to establish the prerequisites for gaining a competitive edge in Romania's external commercial relations.

2. SPECIALTY LITERATURE

The research paper is grounded in three core ideas, which serve as the bedrock of its originality:

By analyzing the structure and dynamics of commercial flows (exports) over a minimum period of five years, one can identify comparative advantage scenarios within an economy. In the case of the Romanian economy, particular emphasis is placed on European economic relationships that are moving towards free trade, an essential condition for validating the Ricardian theory.

Once the scenarios of comparative advantage are pinpointed, the groundwork is laid for attaining a competitive edge in the external economic relations of Romania or any other nation.

The examination of comparative advantage scenarios necessitates an interpretive framework that considers both European and global integration, while also factoring in the contextual elements within the global economy that influence worldwide trade, such as crises, conflicts, geostrategic trends, and more. This approach represents an indispensable prerequisite in the pursuit of gaining a competitive advantage in the external economic relations of any given state

This approach model is designed to aid governmental entities responsible for formulating and implementing competitiveness strategies for the Romanian economy within the context of global and European integration.

3. METHODOLOGY

The Revealed Comparative Advantage (RCA) index is a tool employed in international economics to assess the relative advantage or disadvantage of a specific country in a particular category of goods or services, as reflected in trade patterns. The concept draws inspiration from Ricardo's theory of comparative advantage.

In this thesis research, I followed a series of steps to gather the most pertinent data, ensuring the accurate interpretation of the Balassa index.

Balassa index measures relative export performance by country and sector, calculated as the ratio between the share of the sector in world export and the share of the country's export in world export. The index for a country i and a product j is $RCA_{ij} = (X_{ij}/X_{wj})/(X_{it}/X_{wt})$, where X_{ij} = exports of country i (w = world) for product j (t = total products). If the index has a value greater than 1, the country for which these indices are calculated is specialized in the production of that product or group of products.

Tabel 1. Hypothetical case for exemplifying the Balassa model

Year A	Country B	World
Product C (million$)	20	2200
Product D	10	2000
All the products exported ($ million)	30	4200

Source: hypothetical situation personally constructed

Applying the formula to this hypothetical case will result in the following:

RCA prod.Z = $\frac{20/2200}{30/4200}$ =1.27, by applying Balassa's formula in this case, it will result that country B has a comparative advantage for product C and a recommendation is the possibility to invest in this sector.

87

RCA prod G = $\dfrac{10/2000}{30/4200}$ = 0.7 by applying Balassa's formula in this case, it will result that country B does not have a comparative advantage for product D, but it is close to reach the comparative advantage and that a recommendation is to invest in this sector or to try to give up on it.

4. RESULTS AND DISCUSSION

Upon joining the EU, a country gains entry into an extensive single market that fosters the free movement of goods, services, capital, and labor. The elimination of trade barriers and the establishment of a unified regulatory framework create an atmosphere conducive to expanding trade and promoting specialization. Consequently, the calculation of comparative advantage becomes a crucial instrument for countries as they navigate their path post-accession within the EU.

Examining Romania's exports in relation to global exports between 2016 and 2020 holds significant importance in comprehending the country's role and standing in the international market during this period. This analysis offers valuable insights into the trajectory of Romania's exports in comparison to global trends, shedding light on its performance across various sectors and markets. Additionally, it serves as a vital tool for understanding economic performance, pinpointing comparative advantages, identifying development prospects, and assessing the country's competitiveness and economic integration.

The information gleaned from this analysis can play a pivotal role in guiding economic policies, formulating strategies, and fostering sustainable economic growth.

Table 2. Romania exports by major activities in the world after the accession of Romania to the EU(US$ Thousand)

Period	After the accession of Romania to the EU				
Product	2016	2017	2018	2019	2020
Animal	849,273.18	1,047,478.81	1,056,087.76	1,051,591.54	961,477.33
Chemicals	1,924,065.59	2,231,165.62	2,540,204.99	2,590,645.63	2,615,374.10
Food Products	1,835,846.88	1,972,974.05	2,121,577.38	2,414,471.21	2,966,926.28
Footwear	1,427,569.27	1,555,692.19	1,586,241.19	1,355,905.87	1,065,580.80
Fuels	2,288,995.75	2,682,057.03	3,279,849.67	2,924,933.95	1,717,183.71
Hides and Skins	402,209.95	466,672.84	480,453.58	417,180.50	337,335.94
Mach and Elec	18,373,760.13	19,714,498.24	22,972,751.74	22,508,394.71	21,281,521.45
Metals	4,827,812.32	6,000,044.78	7,089,738.93	6,658,127.43	6,005,843.78
Minerals	83,701.34	105,257.11	145,737.02	152,999.98	123,847.48
Miscellaneous	6,194,956.06	6,453,325.21	6,794,586.26	6,860,733.00	5,908,108.01
Plastic or Rubber	3,527,822.60	4,041,394.21	4,583,466.60	4,421,686.51	4,159,984.41
Stone and Glass	361,141.54	423,225.16	483,715.41	476,555.58	466,866.66
Textiles, Clothing	4,316,379.61	4,558,311.19	4,792,648.60	4,263,809.09	3,563,071.54
Transportation	11,034,339.14	12,728,266.79	15,100,961.93	14,188,526.83	13,410,254.04
Vegetable	3,906,556.77	4,197,456.55	4,469,589.53	4,591,479.53	4,040,703.40
Wood	2,226,574.21	2,449,067.73	2,579,995.70	2,421,707.07	2,422,319.84
Total	63,581,004.34	70,626,887.51	80,077,606.29	77,298,748.43	71,046,398.77

Source: Individual processing of data provided by https://wits.worldbank.org/Default.aspx?lang=en

During the period from 2016 to 2020, an analysis of the export values for different product categories reveals distinct trends.

Romania's export trends during this period were diverse, characterized by fluctuations in different product categories. It is essential to note that the year 2020 was particularly impacted by the COVID-19 pandemic, contributing to negative effects on exports in numerous sectors.

The analysis of fluctuations in world exports in the period 2016-2022 is of significant importance because it helps us to have an overview by being able to take into account several factors with a high degree of influence.

Table 3. World exports by major activities after the accession of Romania to the EU (US$ Thousand)

Period	After the accession of Romania to the EU				
Product	2016	2017	2018	2019	2020
Animal	350,790,481	383,892,858	399,157,313	407,199,471	403,567,584
Chemicals	1,690,059,274	1,847,011,838	2,080,656,969	2,086,896,105	2,142,759,380
Food Products	614,159,741	665,148,634	709,207,577	703,784,010	714,929,511
Footwear	152,822,735	163,594,461	172,785,051	178,480,166	157,716,888
Fuels	1,542,766,971	1,954,519,959	2,433,923,722	2,222,541,227	1,495,752,021
Hides and Skins	122,342,908	130,218,021	135,587,906	137,539,253	109,941,246
Mach and Elec	4,586,518,522	5,067,900,321	5,529,819,624	5,410,593,458	5,327,919,103
Metals	1,103,934,368	1,283,173,568	1,429,238,342	1,320,523,010	1,218,583,247
Minerals	196,451,319	247,202,808	263,537,641	283,536,509	300,354,700
Miscellaneous	1,673,454,856	1,743,513,097	1,918,190,220	1,833,339,993	1,731,822,803
Plastic, Rubber	767,251,670	856,178,276	921,908,851	878,743,204	862,770,628
Stone and Glass	893,871,828	902,162,623	923,412,289	920,761,324	921,557,973
Textiles, Clothing	756,001,936	795,518,456	835,764,424	828,107,416	792,074,447
Transportation	2,153,163,032	2,280,171,835	2,381,444,853	2,308,355,827	1,931,491,343
Vegetable	585,673,575	632,629,786	641,221,079	634,753,518	687,369,189
Wood	420,230,031	448,034,100	487,990,932	455,023,457	439,200,118
Total	17,609,493,246	19,400,870,641	21,263,846,795	20,610,177,947	19,237,810,179

Source: Individual processing of data provided by https://wits.worldbank.org/Default.aspx?lang=en

Throughout the analyzed period, most products witnessed an upswing in exports, although the growth rates varied from year to year. Notably, chemicals, food, and livestock experienced steady and consistent increases, albeit with certain products showing more rapid growth than others.

Conversely, certain products exhibited considerable fluctuations in export volumes on an annual basis. For instance, fuels demonstrated significant growth in 2018 but experienced a sharp decline in 2020.

Additionally, specific products encountered notable declines in exports during particular periods. For instance, fuels experienced a substantial drop in 2020 compared to preceding years, largely due to the impact of the COVID-19 pandemic and the subsequent decrease in global demand for fuel.

Table 4. RCA value after the accession of Romania to the EU Romania-World

Period	After the accession of Romania to the EU				
Product	2016	2017	2018	2019	2020

Animal	0.67	0.75	0.70	0.69	0.65
Chemicals	0.32	0.33	0.32	0.33	0.33
Food Products	0.83	0.81	0.79	0.91	1.12
Footwear	2.59	2.61	2.44	2.03	1.83
Fuels	0.41	0.38	0.36	0.35	0.31
Hides and Skins	0.91	0.98	0.94	0.81	0.83
Mach and Elec	1.11	1.07	1.10	1.11	1.08
Metals	1.21	1.28	1.32	1.34	1.33
Minerals	0.12	0.12	0.15	0.14	0.11
Miscellaneous	1.03	1.02	0.94	1.00	0.92
Plastic or Rubber	1.27	1.30	1.32	1.34	1.31
Stone and Glass	0.11	0.13	0.14	0.14	0.14
Textiles and Clothing	1.58	1.57	1.52	1.37	1.22
Transportation	1.42	1.53	1.68	1.64	1.88
Vegetables	1.85	1.82	1.85	1.93	1.59
Wood	1.47	1.50	1.40	1.42	1.49

Source: This analysis is done by calculations based on the previous tables (2 and 3)

The analysis of Romania's exports during the period under review reveals varying trends in different sectors. Food exports exhibited significant growth, indicating high specialization and competitiveness. The transport sector also experienced considerable growth, suggesting a strong presence in the global market. Machinery and electrical equipment exports showed moderate growth, indicating stable competitiveness. Similarly, the metals sector demonstrated a moderate increase in competitiveness. However, plastic or rubber products experienced only a modest growth rate, signaling a steady but less dynamic sector. On the other hand, footwear, textile products, and clothing exports faced significant declines, pointing towards a loss of competitiveness in these areas.

It's important to consider that the global pandemic had a substantial impact on the analyzed period, affecting various aspects of the economy, including trade. This external factor led to fluctuations and uncertainties, making a precise and definitive analysis challenging. The presented values are close to reality, but caution must be exercised when interpreting them due to the exceptional circumstances. Further analysis and monitoring are required to understand the long-term trends and competitiveness of each sector, considering the post-pandemic recovery and potential structural changes in global markets.

The analysis of Romanian and European Union exports from 2016 to 2022 is crucial for various reasons, evaluating economic performance, identifying economic specialization, assessing competitiveness within the EU, identifying market opportunities, and monitoring European integration. Understanding the structure of exports allows for the identification of competitive sectors and the formulation of economic policies.

Comparing exports with other countries helps assess competitiveness and identify advantages or disadvantages in specific sectors. Analyzing EU exports is particularly important for Romania as an EU member, allowing for the assessment of the country's economic performance within the single market and recognizing challenges and opportunities.

Table 5. Romania exports by major activities in the European Union after the accession of Romania to the EU (Thousand EURO)

Period	After the accession of Romania to the EU						
Product	2016	2017	2018	2019	2020	2021	2022
Animal	144,651	165,283	173,891	169,086	130,529	154,901	159,740
Cereals	645,252	758,876	1,031,348	946,155	722,367	1,094,443	1,508,174
Sea Food	134,532	142,708	165,576	178,084	190,772	202,024	249,509
Tabaco	745,596	668,775	603,015	865,164	1,064,304	1,117,168	936,187
Fuels	920,550	1,158,555	1,206,544	1,106,652	677,448	1,371,710	3,662,286
Pharma	506,497	511,198	549,118	587,855	605,088	664,228	724,827
Plastic, rubber	998,820	1,131,736	1,216,192	1,256,160	1,215,716	1,742,997	2,043,012
Leather goods	257,757	294,067	286,033	270,824	219,768	243,413	298,222
Wood	783,314	779,923	818,489	831,600	792,974	1,038,795	1,280,867
Knitted clothes	676,672	640,462	594,145	569,933	459,719	487,952	600,801
Regular clothes	1,958,745	1,835,418	1,790,911	1,653,658	1,206,511	1,127,032	1,329,842
Footwear	1,275,405	1,293,735	1,258,673	1,131,670	863,113	929,920	1,154,231
Iron and steel	756,072	1,024,146	1,213,694	1,121,306	944,442	1,940,470	2,011,741
Cars and parts	9,374,819	9,611,127	10,320,468	10,547,439	10,124,462	11,410,492	13,060,291
Vehicles	6,848,146	8,098,180	9,669,107	9,703,360	9,032,912	9,204,121	11,319,403
Total	26,026,828	28,114,190	30,897,205	30,938,946	28,250,125	32,729,669	40,339,135

Source: Individual processing of data provided by https://trade.ec.europa.eu/access-to-markets/ro/home

The analysis of the European Union's market trends from 2016 to 2022 reveals varying patterns in different sectors. The analysis of the European Union's market trends from 2016 to 2022 indicates diverse patterns across various sectors. Sectors such as cereals, seafood, pharmaceuticals, plastic/rubber products, iron and steel, and vehicles experienced significant and steady growth, reflecting strong competitiveness and consistent demand. However, the tobacco sector faced fluctuations with an overall decline, while the Fuels sector exhibited substantial fluctuations, influenced by changes in the global energy market. Some sectors, like knitted clothes, regular clothes, and footwear, witnessed declines, signaling challenges in maintaining competitiveness. Despite these variations, the EU's total exports recorded a substantial increase, highlighting the overall strength and dynamism of the European Union's trade performance.

The analysis reveals several key conclusions regarding Romania's exports during the period under review. Significant increases were observed in grain and plastic/rubber products, indicating a robust performance and potential for enhancing competitiveness in these sectors on the European market. The seafood and pharmaceutical sectors exhibited steady growth, presenting opportunities for further

91

expansion. Fuels and iron/steel products experienced notable fluctuations but demonstrated overall strong growth, potentially influenced by changes in the energy market and metal prices. On the other hand, declines were observed in knitwear and casual wear sectors, highlighting the need to adapt to evolving consumer preferences and address competition from other producing countries. Conversely, exports of automobiles and auto parts displayed steady and substantial growth, reflecting a thriving automotive industry and consistent demand in the European market.

Overall, Romania's total exports to the EU's free market demonstrated a significant increase, underscoring the country's solid economic performance and export sector.

Table 6. European Union exports by major activities after the accession of Romania to the EU (Thousand EURO)

Period	After the accession of Romania to the EU						
Product	2016	2017	2018	2019	2020	2021	2022
Animal	2,632,758	2,841,600	2,823,427	2,878,810	2,512,020	2,608,101	2,909,041
Cereals	7,643,638	5,908,777	5,682,682	7,822,326	9,468,496	9,988,251	14,316,791
Sea Food	1,499,986	1,602,926	1,698,884	1,808,661	1,766,308	1,898,488	2,152,406
Tabaco	5,691,374	5,607,562	5,611,045	5,983,084	5,394,298	5,726,046	6,591,765
Fuels	74,874,296	99,453,508	114,944,067	104,668,423	59,499,383	94,097,614	163,101,618
Pharma	136,551,644	148,821,105	161,061,883	190,026,661	189,699,157	209,308,728	255,592,799
Plastic, rubber	51,647,793	55,870,092	57,322,144	56,918,981	52,619,895	63,136,264	69,872,517
Leather goods	10,639,442	11,887,315	13,095,061	16,194,334	13,436,405	17,220,546	19,877,890
Wood	11,796,343	12,993,370	13,142,772	13,684,441	13,975,615	18,157,057	19,851,983
Knitted clothes	8,278,956	9,334,143	9,971,770	11,135,054	9,368,742	11,752,485	13,722,716
Regular clothes	14,630,760	15,666,631	16,631,211	17,863,991	13,870,540	16,457,244	19,802,734
Footwear	8,781,808	9,838,401	10,370,829	11,284,613	9,385,828	11,426,587	14,025,667
Iron and steel	23,363,747	28,591,405	30,234,427	28,138,224	21,782,041	29,906,226	34,841,205
Cars and parts	151,700,520	163,046,788	165,762,698	172,677,417	154,359,096	169,540,467	195,190,211
Vehicles	196,811,860	210,596,507	208,120,999	203,277,241	160,680,096	181,861,282	213,342,592
Total	706,544,926	782,060,129	816,473,899	844,362,260	717,817,919	843,085,386	1,045,191,936

Source: Individual processing of data provided by https://trade.ec.europa.eu/access-to-markets/ro/home

The importance and resilience of the EU's export sector in the global market. The strong growth in certain sectors presents opportunities for further development and increased competitiveness, while the fuel sector requires adaptation to evolving energy market dynamics. Overall, the European Union's exports demonstrate a solid performance and a robust ability to thrive in the competitive landscape of international trade.

Tabel 7. RCA value after the accession of Romania to the EU Romania-EU

Period	After the accession of Romania to the EU						
Product	2016	2017	2018	2019	2020	2021	2022
Animal	1,492	1,618	1,628	1,603	1,320	1,530	1,423
Cereals	2,292	3,573	4,796	3.301	1,939	2,822	2,729
Seafood	2,435	2,477	2,575	2,687	2,744	2,741	3,004
Tobacco	3,556	3,318	2,840	3,946	5,013	5,026	3,680

Fuels	0.334	0.324	0.277	0.289	0.289	0.376	0.582
Pharma	0.101	0.096	0.090	0.084	0.081	0.082	0.073
Plastic, rubber	0.525	0.563	0.561	0.602	0.587	0.711	0.758
Leather goods	0.658	0.688	0.577	0.456	0.416	0.364	0.389
Wood	1,803	1,670	1,646	1,658	1,442	1,474	1,672
Knitted clothes	2,219	1,909	1,575	1,397	1,247	1,069	1,134
Regular clothes	3,634	3,259	2,846	2,526	2,210	1,764	1,740
Footwear	3,943	3,658	3.207	2,737	2,337	2,096	2,132
Iron and steel	0.878	0.996	1,061	1,088	1.102	1,671	1,496
Cars and parts	1,678	1,640	1,645	1,667	1,667	1,734	1,734
Vehicles	0.945	1,070	1,228	1,303	1,428	1,304	1,375

Source: This analysis is done by calculations based on the previous tables (5 and 6)

The examination of the Balassa index exposes the changes in exported products from 2016 to 2022. Each product's Balassa index displayed distinct trends and fluctuations during this period. For instance, plastic and rubber products showed a consistent increase, while casual clothing and footwear experienced gradual declines. Moreover, certain products, such as cereals and pharmaceuticals, exhibited significant fluctuations but ultimately returned to a stable level. These conclusions highlight the significance of analyzing the Balassa index to assess the export performance and competitiveness of various products in the global market.

5. CONCLUSIONS

Based on the data identifying comparative advantages in specific sectors, the paper concludes that formulating competitiveness strategies in a global integrationist context is crucial for sustainable development. To remain competitive in the market, companies must focus on developing innovative products, improving processes, adopting new technologies, and investing in education to enhance employee skills. Adequate infrastructure and partnerships between companies, educational institutions, and the public and private sectors also play vital roles in gaining a competitive edge. Effective leadership and management are essential in aligning strategies and driving innovation and performance.

Collaboration between the government, private sector, and educational institutions is essential for successful strategy implementation. By adopting these integrated approaches, a country can enhance economic competitiveness, boost innovation, and ensure long-term success.

In conclusion, the paper successfully achieved a theoretical and practical approach to comparative advantage, facilitating the formulation of well-designed competitiveness strategies and achieving a competitive advantage in a state's external economic relations. Additionally, the work aimed to create economic tools that enable easier analysis of trade data, aiding governments in generating well-structured, competitive strategies to penetrate foreign markets, particularly the European Single Market with its free trade characteristics.

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