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# An Analysis of the Competitiveness of the Global Chocolate Industry: The Case of European Union Countries

## *Global Çikolata Endüstrisinin Rekabet Analizi: Avrupa Birliği Ülkeleri Üzerine Bir Çalışma*

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**Abstract**

European Union stand out as the region with the largest share of the global chocolate market. Therefore, identifying how and in which countries chocolate can be positioned with a competitive advantage requires a detailed competitive analysis. The purpose of this study is to determine and assess the chocolate industry's level of global competitiveness throughout the 27 European Union member states from 2010 to 2022. In the analysis process, the Revealed Comparative Advantage Index, the Revealed Symmetric Comparative Advantage Index, the Trade Balance Index, and the Product-Mapping method were applied. In the literature, a product-mapping of the chocolate industry in European Union countries was first conducted, providing a competitive analysis in this context. As a conclusion of the competitiveness analysis of the chocolate sector in EU countries, six countries were identified as net exporters with comparative advantage (Group A), 11 countries as net-importers with comparative advantage (Group B), and 10 countries as net-importers with comparative disadvantage (Group D).

**Öz**

Avrupa ülkeleri, dünya çikolata pazarında en büyük paya sahip bölge olarak öne çıkmaktadır. Bu nedenle, çikolatanın hangi ülkelerde nasıl bir rekabet avantajı ile konumlandırılabileceğinin belirlenmesi, detaylı bir rekabet analizi gerektirmektedir. Bu çalışmanın amacı, 2010-2022 yılları arasında Avrupa Birliği'ne üye 27 ülkenin çikolata endüstrisindeki uluslararası rekabet gücünü tespit etmek ve analiz etmektir. Analiz sürecinde Balassa'nın Açıklanmış Karşılaştırmalı Üstünlük Endeksi, Açıklanmış Simetrik Karşılaştırmalı Üstünlük Endeksi, Ticaret Dengesi Endeksi ve Ürün Haritalaması yöntemi uygulandı. Literatürde ilk kez Avrupa Birliği ülkelerinin çikolata endüstrisi için ürün haritalaması gerçekleştirildi ve bu bağlamda bir rekabet analizi sunuldu. Avrupa Birliği ülkelerinin çikolata sektöründeki rekabet gücü analizi sonucunda, 6 ülke mukayeseli üstünlüğe sahip net ihracatçı (Grup A), 11 ülke mukayeseli üstünlüğe sahip ancak net ithalatçı (Grup B), 10 ülke ise mukayeseli dezavantaja sahip net ithalatçı (Grup D) olarak belirlenmiştir.

## 1. INTRODUCTION

The relative capacity of a sector to create more jobs and revenue than similar sectors in other nations is known as competitiveness. Stated differently, it indicates that a nation's products are on par with those of other nations in terms of cost, value, style, dependability, and prompt delivery. It indicates how different industries or nations are currently doing in comparison to one another. The model of observable exchanges of products and services between industries used by economists forms the basis of the theory of comparative advantage. In the absence of these observations, comparative advantages are calculated indirectly. On the other hand, the revealed comparative advantage (RCA) index determines which countries have a comparative advantage based on a trade model. It does this by contrasting the industrial sectors of various nations with the global average (Çınar and Özçalık, 2013).

Notably, the European Union holds the greatest market share in the global chocolate industry. Thus, a thorough competitive analysis is necessary to determine which nations' chocolate can be positioned with a competitive advantage. Accordingly, this study aims to determine the chocolate industry's global competitiveness across 27 EU member states between 2010 and 2022. The analysis is based on Balassa's Revealed Comparative Advantage Index (RCA), Revealed Symmetric Comparative Advantage Index (RSCA), Trade Balance Index (TBI), and Product-Mapping method. When the studies in the literature are considered, competitiveness analysis and product-mapping for the chocolate industry in the European Union countries have been examined for the first time.

### 1.1. Foreign Trade of the Chocolate Industry

The cocoa and chocolate markets are experiencing steady growth. The global market for cocoa beans was estimated at $16 billion in 2023 and is projected to grow at a rate of around 7% per year, reaching $22 billion by 2028. Similarly, it is anticipated that the worldwide industrial chocolate market will expand at an average annual rate of 4.4% between 2022 and 2030. In Europe, the chocolate market was valued at €42 billion in 2022 and is forecasted to grow at an average annual rate of approximately 4.8% from 2022 to 2027 (CBİ, 2024). The global sales volume of chocolate confectionery products is projected to increase by 1%, from 7.544 million tonnes in 2022 to 7.610 million tonnes in 2023, with North America and the Asia-Pacific region contributing most significantly to the rising demand (ICCO, 2023).

The global trade for both cocoa and chocolate are increasing significantly. According to Table 1, total chocolate exports worldwide were $29 billion in 2019, $29.2 billion in 2020, $33.3 billion in 2021, $33 billion in 2022, and $37 billion in 2023. The top five countries in the global chocolate (HS code: 1806) export ranking are Germany, Belgium, Poland, Italy, and the Netherlands. In 2023, Germany exported $6.3 billion of chocolate, Belgium exported $4 billion, Poland exported $2.7 billion, Italy exported $2.6 billion, and the Netherlands exported $2.5 billion.

**Table 1:** Global Chocolate Industry Exporters

| Countries | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| World (Total) | 29.802.403 | 29.248.126 | 33.351.894 | 33.810.424 | 37.160.676 |
| Germany | 4.955.856 | 4.903.101 | 5.406.695 | 5.439.970 | 6.262.639 |
| Belgium | 3.169.385 | 3.141.542 | 3.589.601 | 3.324.238 | 4.007.488 |
| Poland | 1.834.831 | 2.079.762 | 2.344.542 | 2.356.913 | 2.701.852 |
| Italy | 2.109.415 | 2.097.070 | 2.483.096 | 2.439.823 | 2.661.795 |
| Netherlands | 1.989.243 | 1.837.246 | 2.124.148 | 2.246.477 | 2.553.168 |
| Canada | 1.595.321 | 1.612.509 | 1.770.952 | 1.971.723 | 2.061.576 |
| ABD | 1.660.633 | 1.394.403 | 1.684.101 | 1.735.085 | 1.798.861 |
| France | 1.226.570 | 1.309.147 | 1.564.961 | 1.488.146 | 1.728.165 |
| UK | 983.108 | 1.006.765 | 1.024.327 | 1.009.839 | 1.052.814 |
| Switzerland | 835.815 | 752.061 | 854.755 | 882.155 | 1.031.772 |
| Türkiye | 565.720 | 554.842 | 688.415 | 841.811 | 879.662 |
| Spain | 505.409 | 470.465 | 590.389 | 649.041 | 734.332 |
| Mexico | 671.921 | 625.949 | 582.004 | 663.731 | 698.503 |
| Austria | 417.900 | 457.448 | 550.488 | 537.731 | 667.180 |
| Sweden | 383.519 | 390.465 | 467.312 | 465.900 | 517.905 |

**Source:** ITC Trademap

Table 2 presents the top 15 importers in the global chocolate industry during the 2019-2023 period. According to the table data, total chocolate imports worldwide were $29 billion in 2019, $28 billion in 2020, $32 billion in 2021, $33 billion in 2022, and $37 billion in 2023. The top five countries in the world chocolate import ranking were the USA, the United Kingdom, Germany, France, and the Netherlands. Therefore, the chocolate imports of the USA, which ranked first in the ranking, amounted to $4 billion in 2023, the United Kingdom, which ranked second in the ranking, imported 3 billion dollars of chocolate, Germany, which ranked third in the ranking, imported $3 billion of chocolate, France, which ranked fourth in the ranking, imported $2 billion of chocolate and the Netherlands, which ranked fifth in the ranking, imported $1 billion of chocolate.

**Table 2:** Global Chocolate Industry Importers

| Countries | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| World (Total) | 29.358.364 | 28.677.778 | 32.342.226 | 33.706.741 | 37.047.402 |
| USA | 2.956.530 | 2.886.024 | 3.225.427 | 3.833.861 | 4.046.180 |
| UK | 2.081.372 | 2.242.546 | 2.309.247 | 2.671.795 | 3.105.403 |
| Germany | 2.432.725 | 2.426.233 | 2.587.834 | 2.497.933 | 3.003.163 |
| France | 2.171.639 | 2.209.860 | 2.545.810 | 2.414.881 | 2.721.708 |
| Netherlands | 1.313.047 | 1.339.932 | 1.572.455 | 1.583.265 | 1.779.289 |
| Belgium | 994.827 | 1.043.377 | 1.136.087 | 1.067.212 | 1.365.777 |
| Canada | 1.015.593 | 1.015.855 | 1.154.232 | 1.243.237 | 1.297.356 |
| Poland | 832.894 | 943.491 | 1.093.061 | 1.072.192 | 1.204.059 |
| Spain | 635.889 | 606.148 | 724.873 | 725.203 | 837.331 |
| Italy | 612.605 | 632.473 | 712.040 | 672.873 | 785.063 |
| Russia | 585.132 | 546.350 | 644.287 | 617.434 | 695.633 |
| Japan | 594.145 | 578.663 | 670.494 | 726.026 | 650.897 |
| Austria | 508.908 | 486.271 | 534.121 | 499.500 | 628.085 |
| China | 483.353 | 485.768 | 673.321 | 575.468 | 593.560 |
| Czech | 404.247 | 399.217 | 462.623 | 471.808 | 566.918 |

**Source:** ITC Trademap

## 2. LITERATURE REVIEW

In the context of competitive analysis of chocolate products, existing literature offers a rather limited scope. This study is significant as it represents the first to employ product-mapping methods in the competitive analysis of chocolate products, specifically focusing on European Union countries. There are several studies related to the chocolate industry in the literature. Kuşat and Kösekahyaoğlu (2011) conducted an innovation assessment in the confectionery, cocoa, and chocolate subsectors in the Western Mediterranean Region through surveying firms. Data obtained from the survey were analyzed using the Mann-Whitney U test to identify differences in firms' perceptions of their strengths or weaknesses in both domestic and international markets, depending on whether they engaged in innovation. The study revealed that firms implementing innovations perceived themselves as strong in areas such as product differentiation, raw material advantage, R&D, innovation, promotion, qualified labor, production standards, labor costs, branding, and product pricing. Önder (2016) analyzed the concentration levels of Türkiye's biscuit, chocolate, and confectionery sectors between 1997 and 2014. The study used N-firm Concentration Ratios, Entropy, Rosenbluth, and Herfindahl-Hirschman indices to measure concentration levels. The findings indicated a high concentration level in the N-firm Concentration Ratios index, while the results of the Entropy and Rosenbluth, Herfindahl-Hirschman indices suggested that the sector operates between monopolistic competition and oligopoly. Ramli (2017) explored the main marketing strategies employed by the European chocolate industry. The study focused on the role of country of origin, product diversification, and scenarios, offering a historical overview of the industry. The analysis compared the marketing strategies of selected case studies. Zengin (2019) conducted a market research study for the chocolate sector using secondary data, examining both global and national export and import trends. The study mapped key competitors and opportunity markets, with Vietnam, Saudi Arabia, and Israel identified as target markets. Uzun (2019) measured the competitive strength of Türkiye's chocolate and confectionery sector using the Revealed Comparative Advantage (RCA) index, incorporating Vollrath's Relative Import Advantage Index

for the years 2008-2017. The results indicated that out of 42 sub-sectors, 3 had low competitiveness, 5 were at the threshold, and 34 had high competitiveness. In-depth interviews with executives from 8 different firms provided further insights into the sector's position in international markets and its competitive advantage. Misevic, Volarevic and Peric (2020) analyzed the comparative advantage of the chocolate industries in 15 countries based on industry trends and business agendas. Using the RCA index to assess competitive strength over the period 2012-2017, the study identified promising markets through a SWOT analysis. The findings revealed the comparative advantages of 15 major chocolate exporters. İzgi (2022) assessed the global and Turkish markets for sugar and chocolate products, analyzing developments in foreign trade. The study evaluated Türkiye's international competitiveness in the sugar and chocolate confectionery sectors and compared it with selected countries (Germany, Belgium, the Netherlands, France, Switzerland, the United States, and Russia). The Balassa Index (RCA) was utilized to measure international competitiveness. The analysis demonstrated that Türkiye has a comparative advantage in HS1704 (sugar confectionery without cocoa) and HS1806 (chocolate and other food preparations containing cocoa). Compared with the U.S., Russia, Germany, and France, Türkiye showed a higher comparative advantage in both product groups.

Cocoa beans, the seeds of the cocoa tree fruit, serve as the primary raw material for chocolate production. In contrast to the relatively limited research on chocolate products, a significant number of studies have focused on analyzing the competitive strength of cocoa and cocoa beans. Jambor, Toth and Koroshegyi (2017) evaluated the export competitiveness of global cocoa producers for the period 1992-2015. Harya et al. (2018) investigated the potential development of cocoa beans in East Java and analyzed the competitiveness of the processed cocoa industry. Wulandari and Widjojoko (2021) compared the competitiveness of Indonesia's cocoa exports from 2009 to 2018 with major cocoa-exporting countries such as the Ivory Coast, Ghana, Nigeria, and Cameroon. Augustin, Prasetyo and Santoso (2021) analyzed the competitiveness of Indonesia's cocoa exports to five target countries: China, Germany, Malaysia, Singapore, and the United States, while also projecting trends for the country's cocoa exports over the next five years. Conceição et al. (2020) assessed the competitiveness of Brazilian cocoa farming based on the export of cocoa beans and products (such as powder and press cake, cocoa butter, and cocoa liquor) for the period 1996-2016. Suwanan, Kamaludin and Saputra (2021) examined the impact of the COVID-19 pandemic on the competitive dynamics of cocoa production in Indonesia and the Ivory Coast, comparing the pre-pandemic and pandemic periods. Izaati and Annas (2022) analyzed the export competitiveness of Indonesia's cocoa butter and powder within the European Union market. Tupamahu and Apituley (2022) explored the competitiveness of Indonesian cocoa products and derivatives before (2000-2009) and after (2010-2020) the implementation of export taxes in Indonesia. Serenčéš et al. (2023) assessed the global trade developments in cocoa and cocoa-based products, identifying the comparative advantage of the evaluated countries' competitiveness during the period 2013-2022. Nisa, Darsono and Antriyandarti (2023) analyzed the performance and competitiveness of Indonesia's cocoa bean trade from 2010 to 2019, comparing it with other major cocoa-producing countries, including the Ivory Coast, Ghana, Nigeria, Ecuador, and Cameroon.

The use of product-mapping methods to analyze competition in the literature is relatively scarce. Studies that have employed this approach include Topçu and Sarıgül (2015), who assessed the competitive strength of the five leading sectors in Türkiye's exports during the period from 2000 to 2014 and constructed a product-mapping for these sectors. Girik Allo, Sukartini and Widodo (2017) analyzed product-mapping for agricultural products in Indonesia, within the primary classification of food and live animals, covering the period from 1984 to 2014. Bakkalci (2018) assessed the Turkish textile industry's competitiveness between 2001 and 2016, incorporating a product map into the analysis. Ortikov and Vacek (2018) examined the international competitiveness of Uzbekistan's agricultural and food products from 1995 to 2015 and highlighted the results of product-mapping. Setyastuti, Adiningsih and Widodo (2018) identified the comparative advantage of 239 product groups within the ASEAN region between 1990 and 2015, using the 3-digit Standard International Trade Classification (SITC), and improved a corresponding

product map. Siddiqi (2020) explored the comparative advantage of Pakistan's SITC products at the 3-digit level across three time periods (2000, 2014, and 2015), emphasizing the results of the product-mapping approach. Maqbool, Rehman and Ditta (2020) investigated the comparative competitive advantage of Pakistan's mineral sector over the period from 2003 to 2018. Grzegorzewska (2021) analyzed the competitiveness of the furniture sector in the EU-13 countries between 2009 and 2017, constructing a product map as part of the analysis. Nuraini and Helbawanti (2024) highlighted the competitive strength of cocoa butter exports from Indonesia, Malaysia, the Netherlands, and Thailand in international markets from 2013 to 2022, employing product-mapping methods based on competitive advantage.

## 3. DATASET AND METHOD

### 3.1. Dataset

As part of this study's main goal, we collected export and import data for chocolate products from European Union countries between 2001 and 2020. The data, which specifically relates to chocolate products, was obtained from ITC Trademap. The study entails a comprehensive analysis of the competitiveness of HS 1806 (Chocolate and other food preparations containing cocoa) within the Customs Tariff Statistics Position.

### 3.2. Method

This study utilized various internationally recognized competitiveness indices commonly referenced in the literature as the main methodological approach. More specifically, the following indices were used to assess international competitiveness:

The Revealed Comparative Advantage (RCA) index, introduced by Bela Balassa in 1965, is widely utilized to assess relative export performance advantages across countries and industries (Balassa Indexes, 2003). To calculate this index, researchers first determine the share of a country's exports in a specific industry compared to its total exports. They then divide this figure by the global share of exports in the same industry. The formula for calculating the RCA index is expressed as:

$$\mathrm{RCA} = \frac{X_{kt}^{j} \,/\, X_{t}^{j}}{X_{kt}^{w} \,/\, X_{t}^{w}} \tag{1}$$

Based on the equation, j denotes any country or region, t refers period, k corresponds to the product/industry, and w stands for the global country group. RCA for specified product/industry below 1 indicates a comparative disadvantage, whereas a value above 1 reflects a comparative advantage (Balassa, 1965).

According to Laursen (2015), the Revealed Symmetric Comparative Advantage Index (RSCA) suffers from an asymmetry problem in cases where the export value of a product or industry is zero. This issue can bias the analytical outcomes and affect the interpretation of empirical findings. To address this issue, the RCA index can be modified symmetrically around its equilibrium point. Dalum, Laursen and Villumsen (1998) proposed the RSCA Index to address this problem (Widodo, 2009). Laursen further refined this adjustment by suggesting the following formula for the symmetrical RCA index (Balassa, 1965):

$$\mathrm{RSCA} = \frac{\mathrm{RCA} - 1}{\mathrm{RCA} + 1} \tag{2}$$

RSCA values range from -1 to +1." If the RSCA for the respective product/industry is greater than 0, then the country/region has a comparative advantage. Conversely, a negative RSCA value for this specific product/industry signifies the country's/region's comparative disadvantage (Widodo, 2009).

The Trade Balance Index (TBI) proposed by Lafay (1992) indicates whether a country is a net exporter or importer of a product or industry. The following is the formula for calculating this index:

$$TBI_{ABchocolate} = \frac{E_{ABchocolate} - M_{ABchocolate}}{E_{ABchocolate} + M_{ABchocolate}} \quad (3)$$

In this equation, "$E_{ABchocolate}$" refers to the European Union's exports of chocolate, while "$M_{ABchocolate}$" means its imports of chocolate. A negative TBI means the country is a "net importer" of the product or industry measured, while a positive TBI means the country is a "net exporter." (Widodo, 2009).

This is the Product-Mapping Method, which suggests that applications, including the use of RSCA and TBI by Widodo (2009), give insights into the international trade balance and the national competitiveness of an industry. The four categories of product classification by this method are A, B, C, and D, as seen in Table 3. Products that demonstrate both export specialization and a comparative advantage are included in Group A. Products without export specialization but with a comparative advantage are included in Group B. Items that exhibit export specialization but no comparative advantage are in Group C, whereas items that have neither a comparative advantage nor export specialization are in Group D (Widodo, 2009)

**Table 3:** Product-Mapping

| RSCA | | |
|---|---|---|
| RSCA>0 | **Group B:**<br>**Comparative Advantage**<br>**Net-importer**<br>**(RSCA>0 and TBI<0)** | **Group A:**<br>**Comparative Advantage**<br>**Net-exporter**<br>**(RSCA>0 and TBI>0)** |
| RSCA<0 | **Group D:**<br>Comparative Disadvantage<br>Net-importer<br>(RSCA<0 and TBI<0) | **Group C:**<br>Comparative Disadvantage<br>Net-exporter<br>(RSCA<0 and TBI>0) |
| | **TBI<0** | **TBI>0** |

**Source:** Widodo (2009)

## 4. RESULTS

Findings are presented in the appendix table 4 and display the conclusions of the international competitiveness analysis of the European Union for the chocolate industry. The mean measurement of the RCA for Austria is assessed as 1.90. The mean conclusion measurement of the RSCA is calculated as 0.31. Therefore, according to the results of these two indices, Austria reveals the comparative advantage of the industry. Austria's negative TBI calculation for the chocolate industry reflects its status as a net importer of these goods overall. Based on the product-mapping analysis, Austria is classified under Group B within the chocolate industry. Austria's situation reflects a comparative advantage in the chocolate sector, even though it is a net importer of these goods.

The mean value of the RCA for Belgium was assessed as 4.29. The mean conclusion measurement of the RSCA is 0.62. Consequently, the metrics from both indices demonstrate Belgium's pronounced competitive advantage within the chocolate industry. When analyzing the overall TBI, it consistently exceeds zero, indicating that Belgium maintains a net exporter position for the chocolate sector. Belgium is categorized in Group A for the chocolate industry during the study periods based on product mapping, confirming its status as a net exporter in the chocolate trade.

The mean value of RCA for Bulgaria is determined as 2.82. The mean conclusion measurement of the RSCA is calculated as 0.47. Thus, based on the results of these two indices, it is revealed that Bulgaria holds a competitive advantage in the chocolate sector. The average TBI values for 2010–2018 are negative, indicating that Bulgaria was a net importer in the chocolate industry during this

time. According to the product-mapping method, Bulgaria is involved in Group B in the chocolate industry in the period 2010-2018 and Group A in the period 2019-2022.

The mean value of the RCA for Croatia is assessed as 5.00, and the index results have been higher since 2018. The mean conclusion measurement of the RSCA is calculated as 0.66. Consequently, the findings from both indices demonstrate that Croatia holds a competitive advantage in the chocolate sector. However, the TBI values for 2012-2017, along with their average, are below zero, reflecting Croatia's status as a net importer in this sector. Additionally, based on the product-mapping method, Croatia is classified in Group B for the chocolate industry during 2010-2017 and shifts to Group A in the period 2018-2022.

The mean value of the RCA for Cyprus is evaluated as 0.12. The mean conclusion measurement of the RSCA is -0.793. Based on the findings from the two indices, it is evident that Cyprus faces a competitive disadvantage in the chocolate industry. The TBI results, which were below zero during the study period, indicate that Cyprus is a net importer of chocolate products. Furthermore, the product-mapping analysis categorizes Cyprus in Group D for the years 2010 to 2022, reinforcing the conclusion that the country holds a comparative disadvantage in the chocolate trade and remains a net importer. These outcomes collectively highlight Cyprus's lack of competitiveness in this sector.

The Czech Republic's RCA averaged 1.12, while the RSCA averaged 0.05, indicating that the country holds a competitive and comparative advantage in the chocolate industry. Nonetheless, TBI was continuously below zero from 2010 to 2022, indicating that the Czech Republic is a net importer of chocolate goods. The country is categorized in Group B for most of the examined time, except 2017–2020, when it was not in this group. The Czech Republic is still a net importer in the chocolate trade, even though it has a competitive advantage.

The average RCA in Denmark is calculated to be 1.08, while the average RSCA is 0.057, indicating that Denmark has a competitive advantage in the chocolate industry as a whole. However, TBI values for the period 2010-2022 have consistently been lower than zero, indicating that Denmark is a relatively net importer of chocolate products. Using product map analysis, Denmark was consequently included in Group B for most of the period under review, but shifted to Group D in 2019-2020. Overall, these findings support that Denmark still has a comparative advantage in trading in chocolate, even if it remains a net importer (Group B) for the time being, even if it occasionally shifts to Group D in 2019-2020.

The mean measurement of the RCA for Estonia is assessed as 0.52. The mean conclusion measurement of the RSCA was determined as -0.31. Therefore, based on two indices, Estonia holds a competitive disadvantage in the chocolate sector. TBI values for Estonia are below zero, so this indicates it is a net importer. According to the product-mapping, Estonia is involved in Group D in the period 2010-2022. In this context, it has been revealed that the country of Estonia belongs to Group D (net-importer) in the chocolate sector trade.

The mean measurement of the RCA for Finland is evaluated as 0.76, and the values calculated throughout the periods considered in the study are less than 1. The mean conclusion measurement of the RSCA was determined as -0.130. Therefore, based on two indices, Finland holds a competitive disadvantage in the chocolate sector. The results of the TBI calculated over the period considered in the study are less than zero. According to the results product-mapping, Finland is in Group D (net importer) for the period 2010-2022.

The mean measurement of the RCA for France was computed as 1.80. The mean conclusion measurement of the RSCA was determined as 0.288. Therefore, based on two indices, France holds a competitive advantage in the chocolate sector. TBI results for France in the period of 2010-2022 are below zero, demonstrating it is a net importer. France is involved in Group B for the period covering 2010-2022.

The mean measurement of the RCA for Germany was evaluated as 2.55. The mean conclusion measurement of the RSCA was computed as 0.43. Therefore, Germany holds a competitive advantage in the chocolate sector. TBI results for Germany calculated for the periods covering 2010-2022 are above zero, indicating it is a net exporter. Germany is located in Group A in the chocolate sector for the periods considered in the study.

The mean measurement of the RCA for Greece is assessed as 0.696, and the values calculated throughout the periods considered in the study are less than 1. The mean conclusion measurement of the RSCA was found to be -0.185. Therefore, Greece holds a competitive disadvantage in the chocolate sector. TBI results for Greece calculated during the period considered in the study are below zero, revealing it is a net importer. Greece is involved in Group D for the period 2010-2022. The mean measurement of the RCA for Hungary was evaluated as 1.010. The mean conclusion measurement of the RSCA was determined as 0.005. Based on these figures, Hungary holds a competitive advantage in the chocolate sector. TBI results computed within the scope of the 2010-2022 periods are below zero, indicating it is a net importer. Hungary is in Group B in all periods except the 2010-2012 and 2015 periods. In the periods 2010-2012 and 2015, it is in Group D. The mean measurement of the RCA for Ireland is determined as 1.407, and the values assessed during the period considered in the study are greater than 1. The mean conclusion measurement of the RSCA was detected as 0.161. Therefore, Ireland holds a competitive advantage in the chocolate sector. Except for 2010, the TBI index values calculated in other periods are below zero, demonstrating it is a net importer. Ireland is in Group B in the chocolate industry in all periods except 2010. The mean measurement of the RCA for Italy is evaluated as 2.376, and the index results calculated for the period 2010-2022 are greater than 1. The mean conclusion measurement of the RSCA is determined as 0.405. Based on these figures, Italy holds a competitive advantage in the chocolate sector. TBI results computed within the scope of the 2010-2022 periods are above zero, indicating it is a net exporter. Italy is in Group A in the chocolate industry for the periods considered in the study.

The mean measurement of the RCA for Latvia was assessed as 1.570, and the values calculated during the period considered in the study were found to be 1 and above. The mean conclusion measurement of the RSCA was evaluated as 0.220. Therefore, Latvia holds a competitive advantage in the chocolate sector. TBI values computed for the periods 2010-2022 are below zero, demonstrating it is a net importer. Latvia is included in Group B based on product-mapping. The mean measurement of the RCA for Lithuania is evaluated as 2.804, and the index results calculated for the period 2010-2022 are greater than 1. The mean conclusion measurement of the RSCA is computed as 0.474. Therefore, Lithuania holds a competitive advantage in the chocolate sector. TBI values calculated for the periods covering 2010-2022 are above zero, displaying it is a net exporter. According to the result of the product-mapping method, the country of Lithuania is involved in Group A in the chocolate industry for the periods considered in the study. The mean measurement of the RCA for Luxembourg is assessed as 0.543, and the RCA values calculated in other periods, except the 2011-2013 periods, are less than 1. The mean conclusion measurement of the RSCA was determined as -0.362. Hence, Luxembourg holds a competitive disadvantage in the chocolate sector. TBI results calculated during the period considered in the study are below zero, revealing it is a net importer. Based on the product-mapping, Luxembourg is in Group D in all periods except the 2010-2013 periods. The mean measurement of the RCA for Malta is determined as 0.370, and the RCA values calculated for the period 2010-2022 are less than 1. The mean conclusion measurement of the RSCA was found to be -0.505. Therefore, Malta holds a competitive disadvantage in the chocolate sector. TBI results calculated during the period conducted in the study are less than zero, indicating it is a net importer. Malta is involved in Group D for all periods based on product-mapping. The mean measurement of the RCA for the Netherlands is evaluated as 2.209, and the index results calculated for the period 2010-2022 are greater than 1. The mean conclusion measurement of the RSCA is detected as 0.374. Therefore, the Netherlands holds a competitive advantage in the chocolate sector. TBI results calculated for the periods covering 2010-2022 are above zero, revealing it is a net importer. The Netherlands is included in Group A in the chocolate industry for the periods considered in the study. The mean measurement of the RCA for Poland is computed as 4.542, and

the RCA results evaluated for the period 2010-2022 are greater than 1. The mean conclusion measurement of the RSCA is determined as 0.637. Therefore, Poland holds a competitive advantage in the chocolate sector. TBI results calculated for the periods covering 2010-2022 are above zero, indicating it is a net importer. Poland is included in Group A in the chocolate industry for the periods conducted in the study based on product-mapping.

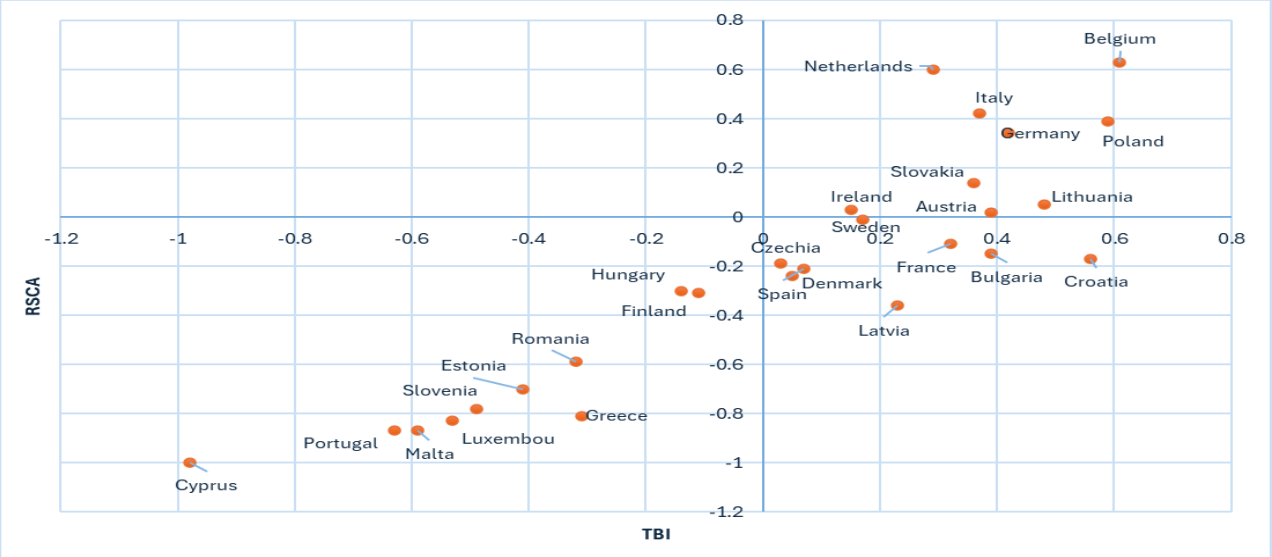
The mean measurement of the RCA for Portugal is evaluated as 0.297, and the RCA values calculated for the 2010-2022 periods are less than 1. The mean conclusion measurement of the RSCA was determined as -0.543. Therefore, Portugal holds a competitive disadvantage in the chocolate sector and has a comparative disadvantage. TBI results calculated during the period considered in the study are below zero, revealing it is a net importer. Portugal is involved in Group D for all periods based on product-mapping. The mean measurement of the RCA for Romania is assessed as 0.765, and the values calculated in other periods are less than 1, except for the periods 2019-2022. The mean conclusion measurement of the RSCA is calculated as -0.130. Hence, Romania holds a competitive disadvantage in the chocolate sector. TBI results calculated during the period discussed in the study are below zero, displaying it is a net importer. Romania is located in Group D in the period 2010-2018 and Group B in the period 2019-2022 based on product-mapping. The mean measurement of the RCA for Slovakia was evaluated as 1.866, and the values calculated during the period considered in the study were found to be 1 and above. The mean conclusion measurement of the RSCA was determined as 0.302. So, Slovakia holds a competitive advantage in the chocolate sector. TBI values calculated in all periods except the 2010-2011 period are below zero, indicating it is a net importer. Slovakia's chocolate industry is involved in Group B in all periods except the 2010-2011 period, based on product-mapping.

The mean measurement of the RCA for Slovenia is assessed as 0.521, and the RCA values calculated for the period 2010-2022 are less than 1. The mean conclusion measurement of the RSCA was revealed as -0.326. Thus, Slovenia holds a competitive disadvantage in the chocolate sector. TBI results calculated during the period conducted in the study are below zero, demonstrating it is a net importer. Slovenia is located in Group D for all periods based on product-mapping. The mean measurement of the RCA for Spain is calculated as 0.99, and the calculated index results vary from time to time. The mean conclusion measurement of the RSCA was concluded as -0.01. Therefore, Spain holds a competitive disadvantage in the chocolate sector and has a comparative disadvantage. TBI results calculated during the period conducted in the study are below zero, revaling it is a net importer. According to the results of the product-mapping method, the country of Spain is involved in Group D for all periods. The mean measurement RCA for Sweden was calculated as 1.448, and throughout the study period, the values were consistently 1 or above. The mean conclusion measurement of the RSCA was calculated as 0.181. Based on these two indices, it can be concluded that Sweden holds a competitive advantage and comparative advantage in the chocolate industry. Except for the year 2021, TBI values calculated for other periods were negative, displaying it is a net importer. Sweden is in Group B in the chocolate industry in all periods except 2021, based on product-mapping.

Using the results from the RSCA and TBI indices, along with the Cartesian coordinate system, the position of the European Union countries in the chocolate industry was mapped, revealing their role in foreign trade. The vertical axis reflects the competitive capacity of products: those positioned toward the northern end indicate high competitive advantage, while those located toward the southern end represent products with lower competitiveness. The horizontal axis illustrates the country's trade orientation. Products situated on the western side of the graph signify areas where the country is a net importer, whereas those on the eastern side indicate net export positions (Bakkalci, 2018:578). The product-mapping for the EU's chocolate industry was created using data from the years 2010, 2015, 2020, and the average. In Figure 1, the product-mapping results for 2010 are presented. Austria, Belgium, Germany, Ireland, Italy, Lithuania, the Netherlands, Poland, and Slovakia are classified in Group A, indicating that these 9 countries hold both comparative advantage and net-exporter status. Bulgaria, Croatia, Czechia, Denmark, France, Latvia, Spain, and

Sweden are placed in Group B, meaning they have a comparative advantage but are net-importers. Cyprus, Estonia, Finland, Greece, Hungary, Luxembourg, Malta, Romania, Portugal, and Slovenia are assigned to Group D, indicating that these 10 countries face a comparative disadvantage and are also net-importers.

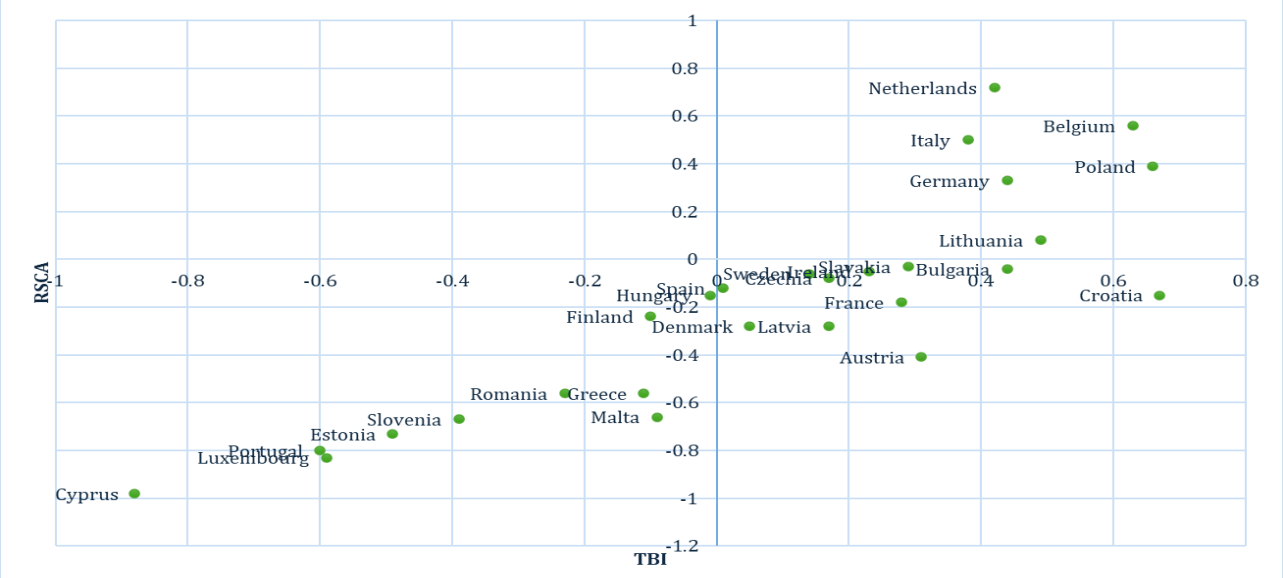
**Figure 1:** Product-Mapping for 2010




**Source:** Created by Authors

Figure 2 emphasizes the results of the product-mapping method for the chocolate industry of the European Union countries in 2015. Belgium, Germany, Italy, Lithuania, the Netherlands, and Poland are in Group A. Therefore, these 6 countries have both comparative advantages and are net exporters. Austria, Bulgaria, Croatia, Czechia, Denmark, France, Ireland, Latvia, Spain, Slovakia, and Sweden are in Group B. In this context, these 11 countries have a comparative advantage; however, are net-importers. Cyprus, Estonia, Finland, Greece, Hungary, Luxembourg, Malta, Slovenia, Romania, Portugal, and Slovenia are in Group D. Hence, it has been indicated that these 10 countries have a comparative disadvantage and at the same time are net-importers.

**Figure 2:** Product-Mapping for 2015




**Source:** Created by Authors

Figure 3: The results of the product-mapping method in the chocolate industry of the European Union countries for the year 2020 are highlighted. Belgium, Bulgaria, Croatia, Germany, Italy, Lithuania, the Netherlands, and Poland are in Group A. Therefore, these 8 countries have both a comparative advantage and are net exporters, and have maintained their competitive advantage

during the pandemic period. Austria, France, Hungary, Ireland, Latvia, Romania, Slovakia, and Sweden are in Group B. In this context, these 8 countries have a comparative advantage but are net-importers. Cyprus, Czechia, Denmark, Estonia, Finland, Greece, Luxembourg, Malta, Portugal, Slovenia and Spain are in Group D. Hence, these 11 countries have a comparative disadvantage and are net importers.

**Figure 3:** Product-Mapping for 2020


**Source:** Created by Authors

Figure 4 demonstrates the results of the average product-mapping method for the chocolate industry of the European Union countries for the period 2010-2022. Belgium, Germany, Italy, Lithuania, the Netherlands, and Poland are in Group A. Therefore, these 6 countries have both comparative advantages and are net exporters. Austria, Bulgaria, Croatia, Czechia, Denmark, France, Hungary, Ireland, Latvia, Slovakia, and Sweden are in Group B. In this context, these 11 countries have a comparative advantage but are net importers. Cyprus, Estonia, Finland, Greece, Luxembourg, Malta, Portugal, Romania, Slovenia, and Spain are in Group D. Consequently, it has been indicated that these 10 countries have a comparative disadvantage and at the same time are net-importers.

**Figure 4:** Average Product-Mapping results


**Source:** Created by Authors

## 5. CONCLUSION AND RECOMMENDATIONS

The chocolate industry is a crucial part of the food industry, both in terms of its global economic contribution and its wider impact on agriculture, trade, and employment. This study aims to identify and analyze the international competitiveness of the chocolate industry in 27 member states of the European Union for the period 2010-2022. In the analysis process, we used Balassa's Revealed Comparative Advantage Index (RCA), Revealed Symmetric Comparative Advantage Index (RSCA), and Balance of Trade Index (TBI), and applied the Product-Mapping method. For the first time, product-mapping for the chocolate industry in the European Union countries has been constructed with this study.

The general results of the study can be summarized;

**Group A:** The 6 countries in this group (Belgium, Germany, Italy, Lithuania, the Netherlands and Poland) have both comparative advantages and are net exporters. These countries are highly competitive in the international market in chocolate products and export to global markets by utilizing their production capacities and advantages effectively.

**Group B:** Despite having a comparative advantage, 11 countries (Austria, Bulgaria, Croatia, Czechia, Denmark, France, Hungary, Ireland, Latvia, Slovakia, and Sweden) are net-importers. Although these countries are competitive in chocolate production, they remain dependent on external sources to meet their domestic demand. This demonstrates that local production capacities are insufficient to offset imports.

**Group D:** The 10 countries with a comparative disadvantage and net importers (Cyprus, Estonia, Finland, Greece, Luxembourg, Malta, Portugal, Romania, Slovenia, Spain) perform poorly in terms of competitiveness. These countries cannot achieve self-sufficiency in chocolate products and remain largely dependent on foreign markets.

These outcomes are parallel with İzgi (2022) and Misevic et al. (2020), and align with European Commission (2024) data indicating that Germany, Belgium, and the Netherlands lead EU chocolate exports.

In conclusion, this study provides a detailed analysis of the competitiveness of the chocolate sector among European Union countries and emphasizes how countries' trade policies shape their sectoral performance. This analysis can help EU countries identify strategic areas where they can improve on a sectoral basis and strengthen their position in the global market. Conducting a competitive analysis of the EU chocolate market provides firms with a strategic roadmap. With such analyses, brands have a strong basis for understanding which competitive strategies are most appropriate in different markets.

From a policy perspective, these findings support the goals of the Common Agricultural Policy (CAP, 2023), particularly the 2023–27 reform, which aims to enhance market orientation, competitiveness, and environmental sustainability in agri-food systems Moreover, sustainability objectives in CAP and the European Green Deal underscore the importance of fair, traceable and environmentally respectful cocoa supply chains—themes emphasized in both EU regulation and FAO–BASIC reports (FAO & BASIC, 2020).

European Union countries can adopt several strategies to maintain and improve their competitive advantage in the chocolate industry. Firstly, they should highlight sustainable and ethical production processes with increasing environmental awareness. In addition, investing in high-value-added and innovative products can provide a competitive advantage, especially in the premium chocolate segment. A critical step would also be to prioritize technological investments and R&D activities to increase production efficiency. Finally, to reduce the dependence of some countries on imports, it is necessary to encourage local production and review trade agreements. Providing more favorable terms for cocoa imports and supporting local brands can help the market get on a firmer footing.

Recommendations for future studies include a more in-depth examination of consumer behavior and consideration of qualitative factors affecting competitiveness. Sustainability and environmental impacts should also be considered, and the effects of environmentally friendly countries' policies in the chocolate sector should be investigated. Furthermore, Europe's position in the global sector can be considered in a broader context by comparing it with markets outside the EU.

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***Ethics Statement:*** The authors declare that ethical rules are followed in all preparation processes of this study. In case of detection of a contrary situation, BİİBFAD Journal does not have any responsibility and all responsibility belongs to the authors of the study

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## Appendix

**Table 4:** Analysis Results

| Years | Country | RCA | RSCA | TBI | Product-Mapping |
|---|---|---|---|---|---|
| 2010 | Austria | 2,28 | 0,39 | 0,02 | Group A (RSCA>0 and TBI>0) |
| | Belgium | 4,15 | 0,61 | 0,63 | Group A (RSCA>0 and TBI>0) |
| | Bulgaria | 2,27 | 0,39 | -0,15 | Group B (RSCA>0 and TBI<0) |
| | Croatia | 3,58 | 0,56 | -0,17 | Group B (RSCA>0 and TBI<0) |
| | Cyprus | 0,01 | -0,98 | -1,00 | Group D RSCA<0,TBI<0 |
| | Czechia | 1,06 | 0,03 | -0,19 | Group B (RSCA>0 and TBI<0) |
| | Denmark | 1,11 | 0,05 | -0,24 | Group B(RSCA>0 and TBI<0) |
| | Estonia | 0,42 | -0,41 | -0,70 | Group D RSCA<0,TBI<0 |
| | Finland | 0,80 | -0,11 | -0,31 | Group D RSCA<0,TBI<0 |
| | France | 1,95 | 0,32 | -0,11 | Group B (RSCA>0 and TBI<0) |
| 2011 | Austria | 2,09 | 0,35 | -0,00 | Group B (RSCA>0 and TBI<0) |

| | | | | | |
|---|---|---|---|---|---|
| | Belgium | 4,15 | 0,61 | 0,61 | Group A (RSCA>0 and TBI>0) |
| | Bulgaria | 1,67 | 0,25 | -0,22 | Group B (RSCA>0 and TBI<0) |
| | Croatia | 3,22 | 0,53 | -0,24 | Group B (RSCA>0 and TBI<0) |
| | Cyprus | 0,17 | -0,71 | -0,98 | Group D-RSCA<0,TBI<0 |
| | Czechia | 1,09 | 0,04 | -0,18 | Group B (RSCA>0 and TBI<0) |
| | Denmark | 1,13 | 0,06 | -0,26 | Group B (RSCA>0 and TBI<0) |
| | Estonia | 0,32 | -0,51 | -0,75 | Group D RSCA<0,TBI<0 |
| | Finland | 0,80 | -0,11 | -0,26 | Group D RSCA<0,TBI<0 |
| | France | 2,07 | 0,35 | -0,10 | Group B (RSCA>0 and TBI<0) |
| | Austria | 2,00 | 0,33 | -0,06 | Group B (RSCA>0 and TBI<0) |
| | Belgium | 4,25 | 0,62 | 0,59 | Group A RSCA>0 and TBI>0 |
| | Bulgaria | 1,92 | 0,32 | -0,13 | Group B RSCA>0 and TBI<0 |
| | Croatia | 2,96 | 0,49 | -0,30 | Group B RSCA>0 and TBI<0 |
| | Cyprus | 0,03 | -0,94 | -1,00 | Group D RSCA<0,TBI<0 |
| 2012 | Czechia | 1,25 | 0,11 | -0,15 | Group B RSCA>0 and TBI<0 |
| | Denmark | 1,23 | 0,10 | -0,27 | Group B RSCA>0 and TBI<0 |
| | Estonia | 0,90 | -0,05 | -0,42 | Group D RSCA<0,TBI<0 |
| | Finland | 0,89 | -0,06 | -0,27 | Group D RSCA<0,TBI<0 |
| | France | 2,07 | 0,35 | -0,08 | Group B (RSCA>0 and TBI<0 |
| | Austria | 2,21 | 0,37 | -0,01 | Group B(RSCA>0 and TBI<0 |
| | Belgium | 4,18 | 0,61 | 0,57 | Group A (RSCA>0 and TBI>0) |
| | Bulgaria | 2,15 | 0,36 | -0,06 | Group B:RSCA>0 and TBI<0 |
| | Croatia | 3,27 | 0,53 | -0,31 | Group B:RSCA>0 and TBI<0 |
| | Cyprus | 0,02 | -0,95 | -1,00 | Group D-RSCA<0,TBI<0 |
| 2013 | Czechia | 1,29 | 0,13 | -0,14 | Group B:RSCA>0 and TBI<0 |
| | Denmark | 1,22 | 0,10 | -0,28 | Group B:RSCA>0 and TBI<0 |
| | Estonia | 0,46 | -0,37 | -0,64 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,83 | -0,09 | -0,31 | Group D-RSCA<0,TBI<0 |
| | France | 1,96 | 0,32 | -0,10 | Group B:RSCA>0 and TBI<0 |

| Years | Country | RCA | RSCA | TBI | Product-Mapping |
|---|---|---|---|---|---|
| 2014 | Austria | 2,12 | 0,35 | -0,02 | Group B-RSCA>0 and TBI<0 |
| | Belgium | 4,18 | 0,61 | 0,57 | Group A-RSCA>0 and TBI>0 |
| | Bulgaria | 2,24 | 0,38 | -0,06 | Group B-RSCA>0 and TBI<0 |
| | Croatia | 4,13 | 0,61 | -0,25 | Group B-RSCA>0 and TBI<0 |
| | Cyprus | 0,01 | -0,97 | -1,00 | Group D-RSCA<0,TBI<0 |
| | Czechia | 1,23 | 0,10 | -0,11 | Group B-RSCA>0 and TBI<0 |
| | Denmark | 1,15 | 0,07 | -0,30 | Group B-RSCA>0 and TBI<0 |
| | Estonia | 0,42 | -0,40 | -0,67 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,84 | -0,09 | -0,25 | Group D-RSCA<0,TBI<0 |
| | France | 1,92 | 0,31 | -0,12 | Group B-RSCA>0 and TBI<0 |
| 2015 | Austria | 1,93 | 0,31 | -0,04 | Group B-RSCA>0 and TBI<0 |
| | Belgium | 4,46 | 0,63 | 0,56 | Group A-RSCA>0 and TBI>0 |
| | Bulgaria | 2,57 | 0,44 | -0,04 | Group B-RSCA>0 and TBI<0 |
| | Croatia | 4,99 | 0,67 | -0,15 | Group B-RSCA>0 and TBI<0 |
| | Cyprus | 0,06 | -0,88 | -0,98 | Group D-RSCA<0,TBI<0 |
| | Czechia | 1,40 | 0,17 | -0,08 | Group B-RSCA>0 and TBI<0 |
| | Denmark | 1,11 | 0,05 | -0,28 | Group B-RSCA>0 and TBI<0 |
| | Estonia | 0,34 | -0,49 | -0,73 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,81 | -0,10 | -0,24 | Group D-RSCA<0,TBI<0 |
| | France | 1,78 | 0,28 | -0,18 | Group B-RSCA>0 and TBI<0 |
| 2016 | Austria | 1,71 | 0,26 | -0,09 | Group B-RSCA>0 and TBI<0 |
| | Belgium | 4,46 | 0,63 | 0,56 | Group A-RSCA>0 and TBI>0 |
| | Bulgaria | 2,62 | 0,45 | -0,02 | Group B-RSCA>0 and TBI<0 |
| | Croatia | 4,87 | 0,66 | -0,10 | Group B-RSCA>0 and TBI<0 |
| | Cyprus | 0,08 | -0,85 | -0,97 | Group D-RSCA<0,TBI<0 |
| | Czechia | 1,36 | 0,15 | -0,09 | Group B-RSCA>0 and TBI<0 |
| | Denmark | 1,13 | 0,06 | -0,25 | Group B-RSCA>0 and TBI<0 |
| | Estonia | 0,42 | -0,40 | -0,67 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,78 | -0,13 | -0,26 | Group D-RSCA<0,TBI<0 |
| | France | 1,75 | 0,27 | -0,19 | Group B-RSCA>0 and TBI<0 |
| 2017 | Austria | 1,78 | 0,28 | -0,06 | Group B-RSCA>0 and TBI<0 |
| | Belgium | 4,48 | 0,64 | 0,56 | Group A-RSCA>0 and TBI>0 |

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|---|---|---|---|---|---|
| | Bulgaria | 2,81 | 0,47 | -0,01 | Group B-RSCA>0 and TBI<0 |
| | Croatia | 5,22 | 0,68 | -0,05 | Group B-RSCA>0 and TBI<0 |
| | Cyprus | 0,10 | -0,82 | -0,97 | Group D-RSCA<0,TBI<0 |
| | Czechia | 0,99 | -0,01 | -0,14 | Group D-RSCA<0,TBI<0 |
| | Denmark | 1,16 | 0,07 | -0,27 | Group B-RSCA>0 and TBI<0 |
| | Estonia | 0,48 | -0,35 | -0,64 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,73 | -0,16 | -0,34 | Group D-RSCA<0,TBI<0 |
| | France | 1,74 | 0,27 | -0,20 | Group B-RSCA>0 and TBI<0 |

| Years | Country | RCA | RSCA | TBI | Product-Mapping |
|---|---|---|---|---|---|
| 2018 | Austria | 1,56 | 0,22 | -0,12 | Group B-RSCA>0 and TBI<0 |
| | Belgium | 4,36 | 0,63 | 0,53 | Group A-RSCA>0 and TBI>0 |
| | Bulgaria | 3,18 | 0,52 | -0,01 | Group B-RSCA>0 and TBI<0 |
| | Croatia | 6,05 | 0,72 | 0,01 | Group A-RSCA>0 and TBI>0 |
| | Cyprus | 0,12 | -0,79 | -0,95 | Group D-RSCA<0,TBI<0 |
| | Czechia | 0,94 | -0,03 | -0,15 | Group D-RSCA<0,TBI<0 |
| | Denmark | 1,02 | 0,01 | -0,28 | Group B-RSCA>0 and TBI<0 |
| | Estonia | 0,57 | -0,27 | -0,57 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,62 | -0,23 | -0,35 | Group D-RSCA<0,TBI<0 |
| | France | 1,65 | 0,24 | -0,22 | Group B-RSCA>0 and TBI<0 |
| 2019 | Austria | 1,53 | 0,21 | -0,09 | Group B-RSCA>0 and TBI<0 |
| | Belgium | 4,46 | 0,63 | 0,52 | Group A-RSCA>0 and TBI>0 |
| | Bulgaria | 3,54 | 0,56 | 0,02 | Group A-RSCA>0 and TBI>0 |
| | Croatia | 7,08 | 0,75 | 0,06 | Group A-RSCA>0 and TBI>0 |
| | Cyprus | 0,14 | -0,76 | -0,96 | Group D-RSCA<0,TBI<0 |
| | Czechia | 0,94 | -0,03 | -0,15 | Group D-RSCA<0,TBI<0 |
| | Denmark | 0,90 | -0,06 | -0,32 | Group D-RSCA<0,TBI<0 |
| | Estonia | 0,65 | -0,21 | -0,52 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,72 | -0,16 | -0,30 | Group D-RSCA<0,TBI<0 |
| | France | 1,39 | 0,16 | -0,28 | Group B-RSCA>0 and TBI<0 |
| 2020 | Austria | 1,68 | 0,25 | -0,03 | Group B-RSCA>0 and TBI<0 |
| | Belgium | 4,48 | 0,64 | 0,50 | Group A-RSCA>0 and TBI>0 |
| | Bulgaria | 4,23 | 0,62 | 0,08 | Group A-RSCA>0 and TBI>0 |

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|---|---|---|---|---|---|
| | Croatia | 6,27 | 0,72 | 0,00 | Group A-RSCA>0 and TBI>0 |
| | Cyprus | 0,29 | -0,55 | -0,91 | Group D-RSCA<0,TBI<0 |
| | Czechia | 0,97 | -0,01 | -0,12 | Group D-RSCA<0,TBI<0 |
| | Denmark | 0,89 | -0,06 | -0,35 | Group D-RSCA<0,TBI<0 |
| | Estonia | 0,57 | -0,28 | -0,52 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,68 | -0,19 | -0,34 | Group D-RSCA<0,TBI<0 |
| | France | 1,65 | 0,24 | -0,26 | Group B-RSCA>0 and TBI<0 |
| | Austria | 1,87 | 0,30 | 0,01 | Group A-RSCA>0 and TBI>0 |
| | Belgium | 4,34 | 0,63 | 0,52 | Group A-RSCA>0 and TBI>0 |
| | Bulgaria | 3,89 | 0,59 | 0,09 | Group A-RSCA>0 and TBI>0 |
| | Croatia | 6,66 | 0,74 | 0,03 | Group A-RSCA>0 and TBI>0 |
| | Cyprus | 0,27 | -0,57 | -0,92 | Group D-RSCA<0,TBI<0 |
| 2021 | Czechia | 1,01 | 0,01 | -0,14 | Group B-RSCA>0 and TBI<0 |
| | Denmark | 1,03 | 0,01 | -0,33 | Group B-RSCA>0 and TBI<0 |
| | Estonia | 0,59 | -0,26 | -0,51 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,76 | -0,14 | -0,29 | Group D-RSCA<0,TBI<0 |
| | France | 1,81 | 0,29 | -0,24 | Group B-RSCA>0 and TBI<0 |
| | Austria | 1,92 | 0,31 | 0,03 | Group A -RSCA>0 and TBI>0 |
| | Belgium | 3,81 | 0,58 | 0,51 | Group A-RSCA>0 and TBI>0 |
| | Bulgaria | 3,70 | 0,57 | 0,03 | Group A-RSCA>0 and TBI>0 |
| | Croatia | 6,64 | 0,74 | 0,06 | Group A-RSCA>0 and TBI>0 |
| | Cyprus | 0,30 | -0,54 | -0,91 | Group D-RSCA<0,TBI<0 |
| 2022 | | | | | Group B-RSCA>0 and TBI<0 |
| | Czechia | 1,04 | 0,02 | -0,15 | Group B-RSCA>0 and TBI<0 |
| | Denmark | 1,08 | 0,04 | -0,33 | Group B-RSCA>0 and TBI<0 |
| | Estonia | 0,64 | -0,22 | -0,52 | Group D-RSCA<0,TBI<0 |
| | Finland | 0,76 | -0,14 | -0,34 | Group D-RSCA<0,TBI<0 |
| | France | 1,80 | 0,29 | -0,23 | Group B-RSCA>0 and TBI<0 |

| Years | Country | RCA | RSCA | TBI | Product-Mapping |
|---|---|---|---|---|---|
| 2010 | Germany | 2,47 | 0,42 | 0,34 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,53 | -0,31 | -0,81 | Group D-RSCA<0,TBI<0 |
| | Hungary | 0,75 | -0,14 | -0,30 | Group D-RSCA<0,TBI<0 |
| | Ireland | 1,35 | 0,15 | 0,03 | Group A-RSCA>0 and TBI>0 |
| | Italy | 2,17 | 0,37 | 0,42 | Group A-RSCA>0 and TBI>0 |
| | Latvia | 1,59 | 0,23 | -0,**36** | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,88 | 0,48 | 0,05 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,30 | -0,53 | -0,83 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,26 | -0,59 | -0,87 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 1,80 | 0,29 | 0,60 | Group A-RSCA>0 and TBI>0 |
| 2011 | Germany | 2,46 | 0,42 | 0,32 | Group B-RSCA>0 and TBI<0 |
| | Greece | 0,54 | -0,30 | -0,75 | Group D-RSCA<0,TBI<0 |
| | Hungary | 0,67 | -0,20 | -0,32 | Group D-RSCA<0,TBI<0 |
| | Ireland | 1,30 | 0,13 | -0,09 | Group D-RSCA<0,TBI<0 |
| | Italy | 2,18 | 0,37 | 0,43 | Group A-RSCA>0 and TBI>0 |
| | Latvia | 1,50 | 0,20 | -0,32 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,73 | 0,46 | 0,07 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 1,24 | 0,11 | -0,50 | Group B-RSCA>0 and TBI<0 |
| | Malta | 0,32 | -0,51 | -0,82 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,22 | 0,38 | 0,68 | Group A-(RSCA>0 and TBI>0 |
| 2012 | Germany | 2,62 | 0,45 | 0,33 | Group A -RSCA>0 and TBI>0 |
| | Greece | 0,61 | -0,24 | -0,66 | Group D-RSCA<0,TBI<0 |
| | Hungary | 0,81 | -0,10 | -0,22 | Group D-RSCA<0,TBI<0 |
| | Ireland | 1,72 | 0,27 | -0,02 | Group B-RSCA>0 and TBI<0 |
| | Italy | 2,43 | 0,42 | 0,47 | Group A-RSCA>0 and TBI>0 |
| | Latvia | 1,69 | 0,26 | -0,24 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,65 | 0,45 | 0,04 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 1,26 | 0,12 | -0,54 | Group B-RSCA>0 and TBI<0 |
| | Malta | 0,46 | -0,37 | -0,76 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,34 | 0,40 | 0,70 | Group A-RSCA>0 and TBI>0 |
| 2013 | Germany | 2,70 | 0,46 | 0,33 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,62 | -0,23 | -0,64 | Group D-RSCA<0,TBI<0 |

| | | | | | |
|---|---|---|---|---|---|
| | Hungary | 1,11 | 0,05 | -0,10 | Group B-RSCA>0 and TBI<0 |
| | Ireland | 1,69 | 0,26 | -0,09 | Group B-RSCA>0 and TBI<0 |
| | Italy | 2,23 | 0,38 | 0,46 | Group A-RSCA>0 and TBI>0 |
| | Latvia | 1,52 | 0,21 | -0,25 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,82 | 0,48 | 0,06 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 1,25 | 0,11 | -0,53 | Group B-RSCA>0 and TBI<0 |
| | Malta | 0,79 | -0,12 | -0,66 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,31 | 0,40 | 0,69 | Group A -RSCA>0 and TBI>0 |

| **Years** | **Country** | **RCA** | **rsca** | **TBI** | **Product-Mapping** |
|---|---|---|---|---|---|
| 2014 | Germany | 2,75 | 0,47 | 0,31 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,60 | -0,25 | -0,66 | Group D-RSCA<0,TBI<0 |
| | Hungary | 1,03 | 0,02 | -0,16 | Group B-RSCA>0 and TBI<0 |
| | Ireland | 1,76 | 0,27 | -0,04 | Group B: (RSCA>0 and TBI<0) |
| | Italy | 2,18 | 0,37 | 0,46 | Group A (RSCA>0 and TBI>0 |
| | Latvia | 1,34 | 0,15 | -0,29 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,89 | 0,49 | 0,07 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,41 | -0,42 | -0,73 | Group B-RSCA>0 and TBI<0 |
| | Malta | 0,80 | -0,11 | -0,66 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,33 | 0,40 | 0,70 | Group A-RSCA>0 and TBI>0 |
| 2015 | Germany | 2,57 | 0,44 | 0,33 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,80 | -0,11 | -0,56 | Group D-RSCA<0,TBI<0 |
| | Hungary | 0,97 | -0,01 | -0,15 | Group D-RSCA<0,TBI<0 |
| | Ireland | 1,60 | 0,23 | -0,05 | Group B-RSCA>0 and TBI<0 |
| | Italy | 2,23 | 0,38 | 0,50 | Group A-RSCA>0 and TBI>0 |
| | Latvia | 1,40 | 0,17 | -0,28 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,92 | 0,49 | 0,08 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,26 | -0,59 | -0,83 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,84 | -0,09 | -0,66 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,43 | 0,42 | 0,72 | Group A-RSCA>0 and TBI>0 |
| 2016 | Germany | 2,49 | 0,43 | 0,33 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,80 | -0,11 | -0,56 | Group D-RSCA<0,TBI<0 |
| | Hungary | 1,04 | 0,02 | -0,14 | Group B-RSCA>0 and TBI<0 |

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|---|---|---|---|---|---|
| | Ireland | 1,39 | 0,16 | -0,08 | Group B-RSCA>0 and TBI<0 |
| | Italy | 2,15 | 0,36 | 0,50 | Group A -RSCA>0 and TBI>0 |
| | Latvia | 1,67 | 0,25 | -0,26 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 3,04 | 0,50 | 0,06 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,28 | -0,56 | -0,81 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,26 | -0,58 | -0,85 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,39 | 0,41 | 0,72 | Group A-RSCA>0 and TBI>0 |
| | Germany | 2,56 | 0,44 | 0,34 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,74 | -0,15 | -0,55 | Group D-RSCA<0,TBI<0 |
| | Hungary | 1,01 | 0,00 | -0,20 | Group B-RSCA>0 and TBI<0 |
| | Ireland | 1,37 | 0,16 | -0,10 | Group B-RSCA>0 and TBI<0 |
| | Italy | 2,47 | 0,42 | 0,53 | Group A-RSCA>0 and TBI>0 |
| 2017 | Latvia | 1,67 | 0,25 | -0,25 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,72 | 0,46 | 0,08 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,27 | -0,57 | -0,85 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,23 | -0,63 | -0,91 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,32 | 0,40 | 0,70 | Group A-RSCA>0 and TBI>0 |

| **Years** | **Country** | **RCA** | **RSCA** | **TBI** | **Product-Mapping** |
|---|---|---|---|---|---|
| | Germany | 2,55 | 0,44 | 0,34 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,67 | -0,20 | -0,56 | Group D-RSCA<0,TBI<0 |
| | Hungary | 1,02 | 0,01 | -0,23 | Group B-RSCA>0 and TBI<0 |
| | Ireland | 1,32 | 0,14 | -0,09 | Group B-RSCA>0 and TBI<0 |
| | Italy | 2,49 | 0,43 | 0,55 | Group A-RSCA>0 and TBI>0 |
| 2018 | Latvia | 1,71 | 0,26 | -0,23 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,67 | 0,45 | 0,06 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,42 | -0,41 | -0,76 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,20 | -0,67 | -0,92 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,27 | 0,39 | 0,69 | Group A-RSCA>0 and TBI>0 |
| | Germany | 2,52 | 0,43 | 0,34 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,72 | -0,17 | -0,53 | Group D-RSCA<0,TBI<0 |
| 2019 | Hungary | 1,06 | 0,03 | -0,19 | Group B-RSCA>0 and TBI<0 |
| | Ireland | 1,21 | 0,09 | -0,12 | Group B-RSCA>0 and TBI<0 |

| | | | | | |
|---|---|---|---|---|---|
| | Italy | 2,47 | 0,42 | 0,55 | Group A-RSCA>0 and TBI>0 |
| | Latvia | 1,64 | 0,24 | -0,26 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,72 | 0,46 | 0,05 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,32 | -0,51 | -0,81 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,31 | -0,52 | -0,87 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,17 | 0,37 | 0,68 | Group A-RSCA>0 and TBI>0 |
| | Germany | 2,50 | 0,43 | 0,34 | Group A -RSCA>0 and TBI>0 |
| | Greece | 0,82 | -0,10 | -0,45 | Group D-RSCA<0,TBI<0 |
| | Hungary | 1,11 | 0,05 | -0,16 | Group B-RSCA>0 and TBI<0 |
| | Ireland | 1,13 | 0,06 | -0,08 | Group B-RSCA>0 and TBI<0 |
| 2020 | Italy | 2,52 | 0,43 | 0,54 | Group A-RSCA>0 and TBI>0 |
| | Latvia | 1,51 | 0,20 | -0,30 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,82 | 0,48 | 0,07 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,32 | -0,51 | -0,81 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,14 | -0,76 | -0,94 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,00 | 0,33 | 0,65 | Group A -RSCA>0 and TBI>0 |
| | Germany | 2,53 | 0,43 | 0,35 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,80 | -0,11 | -0,45 | Group D-RSCA<0,TBI<0 |
| | Hungary | 1,21 | 0,10 | -0,13 | Group B:RSCA>0 and TBI<0 |
| | Ireland | 1,25 | 0,11 | -0,02 | Group B:RSCA>0 and TBI<0) |
| | Italy | 2,68 | 0,46 | 0,55 | Group A (RSCA>0 and TBI>0) |
| 2021 | Latvia | 1,54 | 0,21 | -0,28 | Group B-RSCA>0 and TBI<0 |
| | Lithuania | 2,72 | 0,46 | 0,09 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,34 | -0,49 | -0,79 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,10 | -0,82 | -0,96 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,03 | 0,34 | 0,64 | Group A-RSCA>0 and TBI>0 |
| | Germany | 2,52 | 0,43 | 0,37 | Group A-RSCA>0 and TBI>0 |
| | Greece | 0,69 | -0,19 | -0,47 | Group D-RSCA<0,TBI<0 |
| | Hungary | 1,35 | 0,15 | -0,11 | Group B-RSCA>0 and TBI<0 |
| 2022 | Ireland | 1,15 | 0,07 | -0,04 | Group B-RSCA>0 and TBI<0 |
| | Italy | 2,70 | 0,46 | 0,57 | Group A-RSCA>0 and TBI>0 |
| | Latvia | 1,63 | 0,24 | -0,27 | Group B-RSCA>0 and TBI<0 |

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|---|---|---|---|---|---|
| | Lithuania | 2,88 | 0,48 | 0,10 | Group A-RSCA>0 and TBI>0 |
| | Luxembourg | 0,36 | -0,47 | -0,78 | Group D-RSCA<0,TBI<0 |
| | Malta | 0,11 | -0,80 | -0,96 | Group D-RSCA<0,TBI<0 |
| | Netherlands | 2,14 | 0,36 | 0,66 | Group A-RSCA>0 and TBI>0 |

| Years | Country | RCA | RSCA | TBI | Product-Mapping |
|---|---|---|---|---|---|
| | Poland | 3,83 | 0,59 | 0,39 | Group A-RSCA>0 and TBI>0 |
| | Portugal | 0,22 | -0,63 | -0,87 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,52 | -0,32 | -0,59 | Group D-RSCA<0,TBI<0 |
| 2010 | Slovakia | 2,12 | 0,36 | 0,14 | Group A-RSCA>0 and TBI>0 |
| | Slovenia | 0,34 | -0,49 | -0,78 | Group D-RSCA<0,TBI<0 |
| | Spain | 1,14 | 0,07 | -0,21 | Group B-RSCA>0 and TBI<0 |
| | Sweden | 1,40 | 0,17 | -0,01 | Group B-RSCA>0 and TBI<0 |
| | Poland | 4,01 | 0,60 | 0,40 | Group A-RSCA>0 and TBI>0 |
| | Portugal | 0,32 | -0,52 | -0,79 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,51 | -0,32 | -0,57 | Group D-RSCA<0,TBI<0 |
| 2011 | Slovakia | 2,21 | 0,38 | 0,07 | Group A-RSCA>0 and TBI>0 |
| | Slovenia | 0,40 | -0,43 | -0,74 | Group D-RSCA<0,TBI<0 |
| | Spain | 1,06 | 0,03 | -0,18 | Group B-RSCA>0 and TBI<0 |
| | Sweden | 1,28 | 0,12 | -0,05 | Group B-RSCA>0 and TBI<0 |
| | Poland | 4,36 | 0,63 | 0,41 | Group A-RSCA>0 and TBI>0 |
| | Portugal | 0,29 | -0,55 | -0,79 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,59 | -0,26 | -0,55 | Group D-RSCA<0,TBI<0 |
| 2012 | Slovakia | 1,73 | 0,27 | -0,02 | Group B-RSCA>0 and TBI<0 |
| | Slovenia | 0,51 | -0,32 | -0,67 | Group D-RSCA<0,TBI<0 |
| | Spain | 0,97 | -0,01 | -0,18 | Group D-RSCA<0,TBI<0 |
| | Sweden | 1,31 | 0,14 | -0,09 | Group B-RSCA>0 and TBI<0 |
| | Poland | 4,94 | 0,66 | 0,42 | Group A-RSCA>0 and TBI>0 |
| | Portugal | 0,26 | -0,59 | -0,80 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,53 | -0,31 | -0,59 | Group D-RSCA<0,TBI<0 |
| 2013 | Slovakia | 1,72 | 0,26 | -0,06 | Group B-RSCA>0 and TBI<0 |
| | Slovenia | 0,50 | -0,33 | -0,67 | Group D-RSCA<0,TBI<0 |
| | Spain | 0,98 | -0,01 | -0,18 | Group D-RSCA<0,TBI<0 |

| | | | | | |
|---|---|---|---|---|---|
| | Sweden | 1,48 | 0,19 | -0,04 | Group B-RSCA>0 and TBI<0 |

| Years | Country | RCA | RSCA | TBI | Product-Mapping |
|---|---|---|---|---|---|
| | Poland | 4,37 | 0,63 | 0,41 | Group A -RSCA>0 and TBI>0 |
| | Portugal | 0,27 | -0,58 | -0,79 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,56 | -0,28 | -0,57 | Group D-RSCA<0,TBI<0 |
| 2014 | Slovakia | 1,75 | 0,27 | -0,04 | Group B-RSCA>0 and TBI<0 |
| | Slovenia | 0,44 | -0,39 | -0,68 | Group D-RSCA<0,TBI<0 |
| | Spain | 0,98 | -0,01 | -0,17 | Group D-RSCA<0,TBI<0 |
| | Sweden | 1,46 | 0,19 | -0,03 | Group B-RSCA>0 and TBI<0 |
| | Poland | 4,93 | 0,66 | 0,39 | Group A-RSCA>0 and TBI>0 |
| | Portugal | 0,25 | -0,60 | -0,80 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,62 | -0,23 | -0,56 | Group D-RSCA<0,TBI<0 |
| 2015 | Slovakia | 1,82 | 0,29 | -0,03 | Group BRSCA>0 and TBI<0 |
| | Slovenia | 0,44 | -0,39 | -0,67 | Group D-RSCA<0,TBI<0 |
| | Spain | 1,02 | 0,01 | -0,12 | Group B-RSCA>0 and TBI<0 |
| | Sweden | 1,33 | 0,14 | -0,06 | Group B-RSCA>0 and TBI<0 |
| | Poland | 4,95 | 0,66 | 0,41 | Group A-RSCA>0 and TBI>0 |
| | Portugal | 0,27 | -0,57 | -0,78 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,74 | -0,15 | -0,53 | Group D-RSCA<0,TBI<0 |
| 2016 | Slovakia | 2,01 | 0,34 | -0,05 | Group B-RSCA>0 and TBI<0 |
| | Slovenia | 0,42 | -0,41 | -0,67 | Group D-RSCA<0,TBI<0 |
| | Spain | 0,92 | -0,04 | -0,16 | Group D-RSCA<0,TBI<0 |
| | Sweden | 1,32 | 0,14 | -0,06 | Group B-RSCA>0 and TBI<0 |
| | Poland | 4,38 | 0,63 | 0,34 | Group A-RSCA>0 and TBI>0 |
| | Portugal | 0,30 | -0,54 | -0,76 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,82 | -0,10 | -0,51 | Group D-RSCA<0,TBI<0 |
| 2017 | Slovakia | 1,82 | 0,29 | -0,04 | Group B-RSCA>0 and TBI<0 |
| | Slovenia | 0,41 | -0,41 | -0,66 | Group D-RSCA<0,TBI<0 |
| | Spain | 0,90 | -0,05 | -0,18 | Group D-RSCA<0,TBI<0 |
| | Sweden | 1,43 | 0,18 | -0,07 | Group B-RSCA>0 and TBI<0 |

| Years | Country | RCA | RSCA | TBI | Product-Mapping |
|---|---|---|---|---|---|
| 2018 | Poland | 4,28 | 0,62 | 0,35 | Group A-RSCA>0 and TBI>0 |
| | Portugal | 0,26 | -0,59 | -0,79 | Group D-RSCA<0,TBI<0 |
| | Romania | 0,79 | -0,12 | -0,54 | Group D-RSCA<0,TBI<0 |
| | Slovakia | 1,78 | 0,28 | -0,06 | Group B-RSCA>0 and TBI<0 |
| | Slovenia | 0,43 | -0,40 | -0,66 | Group D-RSCA<0,TBI<0 |
| | Spain | 0,93 | -0,04 | -0,15 | Group D-RSCA<0,TBI<0 |
| | Sweden | 1,46 | 0,19 | -0,06 | Group B-RSCA>0 and TBI<0 |
| 2019 | Poland | 4,68 | 0,65 | 0,38 | Group A (RSCA>0 and TBI>0 |
| | Portugal | 0,29 | -0,55 | -0,77 | Group D-RSCA<0,TBI<0 |
| | Romania | 1,05 | 0,03 | -0,48 | Group B-RSCA>0 and TBI<0)- |
| | Slovakia | 1,68 | 0,25 | -0,08 | Group B-RSCA>0 and TBI<0 |
| | Slovenia | 0,59 | -0,26 | -0,54 | Group D-RSCA<0,TBI<0 |
| | Spain | 0,94 | -0,03 | -0,11 | Group D-RSCA<0,TBI<0 |
| | Sweden | 1,50 | 0,20 | -0,05 | Group B-RSCA>0 and TBI<0 |
| 2020 | Poland | 4,89 | 0,66 | 0,38 | Group A -RSCA>0 and TBI>0 |
| | Portugal | 0,33 | -0,50 | -0,76 | Group D-RSCA<0,TBI<0 |
| | Romania | 1,02 | 0,01 | -0,50 | Group B-RSCA>0 and TBI<0 |
| | Slovakia | 1,83 | 0,29 | -0,03 | Group B-(RSCA>0 and TBI<0) |
| | Slovenia | 0,72 | -0,17 | -0,47 | Group D-RSCA<0,TBI<0 |
| | Spain | 0,90 | -0,05 | -0,13 | Group D-RSCA<0,TBI<0 |
| | Sweden | 1,51 | 0,20 | -0,04 | Group B-RSCA>0 and TBI<0 |
| 2021 | Poland | 4,64 | 0,65 | 0,36 | Group A- RSCA>0 and TBI>0 |
| | Portugal | 0,37 | -0,46 | -0,72 | Group D-RSCA<0,TBI<0 |
| | Romania | 1,06 | 0,03 | -0,49 | Group B-RSCA>0 and TBI<0 |
| | Slovakia | 1,68 | 0,25 | -0,13 | Group B-RSCA>0 and TBI<0 |
| | Slovenia | 0,91 | -0,05 | -0,40 | Group D-RSCA<0,TBI<0 |
| | Spain | 1,00 | 0,00 | -0,10 | Group B-RSCA>0 and TBI<0 |
| | Sweden | 1,57 | 0,22 | 0,00 | Group A- RSCA>0 and TBI>0 |
| 2022 | Poland | 4,80 | 0,66 | 0,37 | Group A -RSCA>0 and TBI>0 |
| | Portugal | 0,42 | -0,41 | -0,71 | Group D-RSCA<0,TBI<0 |
| | Romania | 1,12 | 0,05 | -0,48 | Group B-RSCA>0 and TBI<0 |
| | Slovakia | 2,12 | 0,36 | -0,04 | Group B-RSCA>0 and TBI<0 |

| | | | | |
|---|---|---|---|---|
| | Slovenia | 0,67 | -0,20 | -0,48 | Group D-RSCA<0,TBI<0 |
| | Spain | 1,12 | 0,06 | -0,06 | Group B-RSCA>0 and TBI<0 |
| | Sweden | 1,80 | 0,28 | -0,02 | Group B-RSCA>0 and TBI<0 |