



## Specialization of countries in the global market of financial services

**Abstract.** The author provides a critical analysis of the applied techniques of specialization indices calculation. According to the author's calculations of the CSC index, the Balassa index (by export and employment) and the Krugman index of specialization of countries in the global financial services market for 2005-2015, the countries of the world were divided into the following groups: zero exporters of financial services, countries with absolute specialization, countries with factor-export specialization, countries with factor specialization, countries with export specialization, countries with partial export specialization and countries without explicit specialization. The findings of the research indicate that such countries as Luxembourg, Switzerland, the United States, Ireland, Canada and the United Kingdom have absolute specialization in financial services. Among the countries with factor-export specialization are South Africa and Australia; with factor specialization - Israel, South Korea, New Zealand and Austria; with export specialization - Kiribati, Hong Kong, Singapore, Afghanistan, Bermuda, Burkina Faso, Cyprus, Lebanon, Germany, and Latvia, with partial export specialization - Malta, Algeria, Liberia, Sweden, Benin, Guyana, Japan, Norway and France. Countries without explicit specialization are represented by the rest 123 countries of the world.

**Keywords:** Financial Services; Index of Specialization; Global Market of Financial Services; CSC Index; Balassa Index; Krugman Index

**JEL Classification:** F01; G15; G20

**DOI:** <https://doi.org/10.21003/ea.V168-02>

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#### Спеціалізація країн на світовому ринку фінансових послуг

**Анотація.** У статті надано аналіз індексів спеціалізації країн на світовому ринку. Наведено розраховані індекси CSC, Баласса та Кругмана по спеціалізації країн на світовому ринку фінансових послуг у 2015 році. Відповідно до індексів спеціалізації країни були розподілені на такі групи: нульові експортери фінансових послуг, країни з абсолютною спеціалізацією, країни з факторно-експортною спеціалізацією, країни факторної спеціалізації, країни експортної спеціалізації, країни часткової експортної спеціалізації, країни без явної спеціалізації. Дослідження довело, що абсолютну спеціалізацію в галузі фінансових послуг мають Люксембург, Швейцарія, США, Ірландія, Канада й Великобританія.

**Ключові слова:** індекс спеціалізації країн; світовий ринок фінансових послуг; індекс CSC; індекс Баласса; індекс Кругмана.

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#### Специализация стран на мировом рынке финансовых услуг

**Аннотация.** В статье проведен анализ индексов специализации стран на мировом рынке. Рассчитаны и предоставлены индексы CSC, Баласса и Кругмана по специализации стран на мировом рынке финансовых услуг в 2015 году. Согласно индексам специализации страны были разделены на следующие группы: нулевые экспортеры финансовых услуг, страны с абсолютной специализацией, страны с факторно-экспортной специализацией, страны факторной специализации, страны экспортной специализации, страны частичной экспортной специализации, страны без явной специализации. Исследование показало, что абсолютную специализацию по финансовым услугам имеют Люксембург, Швейцария, США, Ирландия, Канада и Великобритания.

**Ключевые слова:** индекс специализации стран; мировой рынок финансовых услуг; индекс CSC; индекс Баласса; индекс Кругмана.

### 1. Introduction

The evolution of international economic relations makes scientists find answers to many questions like the reason of certain processes, its regularity, how to use this knowledge for improving economic development. Such questions are of interest to those who research global market relationships. This is how a theoretical concept of world trade appeared. Specialization of countries is part of the world trade theory. It determines the influence of the productive forces on the country's development and the role of the country in the global market of goods and services.

Concepts and theoretical principles of world trade have been developing over the past six centuries. Yet, even now there emerge new horizons for research. Currently, the interpolation theory which explains international trade in goods is a new scientific problem. It is only now that a wide range of issues concerning the problem of specialization of countries in the global market of services have appeared (Herzog and Unal, 2011; Krenz, 2014; Marel, 2011; Stefaniak-Kopoboru and Kuczewska, 2016).

In the following paragraph, we will analyse already existing researches on specialization of countries in the global market of financial services.

### 2. Brief Literature Review

In the scientific literature, the category of specialization is perceived in terms of a country's comparative advantages in the production of a product. Accordingly, this involves categories such as the existence of some preferential factor of production in the country, which thereby determines the area of the country's specialization; economies of scale which manifest in the specialization and effects the efficiency of economic activities of the country; consumer benefits which become evident when reducing the cost of production the country specializes on; manufacturing benefits which emerge through expanding the market of products the country specializes on, and further benefits from trade for trading countries; threats emanating from a decline in competitive advantages of specialized industries in the global market, etc. There are scientists (Aiginger, 2000; Hirschman, 1980; Krenz, 2014a, b; Traistaru, Nijkamp

and Longhi, 2002) who combine the problem of specialization and the problem of concentration of countries. Most publications on the issues relevant to specialization of countries are dedicated to the specialization of the EU member states (Aiginger, 2000; Amity, 1997; Brühlhart, 2000; Frias, Iglesias and Neira 2000; Herzog and Unal, 2011; Palan and Schmiedeberg, 2008; Stefaniak-Kopoboru and Kuczevska, 2016; Traistaru, Nijkamp and Longhi, 2002). Analyses of specialization have been conducted primarily with regard to the regional level. Thus, we are unaware of any world analytical calculations.

The Heckscher-Ohlin theory is the most widespread and universal theory among researchers, according to which countries specialize in those industries that use the factors which they have in excess. If the theory is adapted to financial services, highly skilled workforce is the most important factor in the creation of financial services (Lindeman, 2011; Marel, 2011), although some researchers mention the capital (Hoekman and Mattoo, 2007). Therefore, only those countries that have a comparable advantage in highly skilled workforce can specialize in financial services.

At the same time, M. Lindeman (2011) emphasises that a decrease in total company tax shield (Total tax rate (% of profit), sophistication of the financial market and its performance according to the international standards (Financial market sophistication), explicit limitations on capital flows by the financial services exporter country (Restriction on capital flows), existence of free competition and minimal intervention by the government in the financial sector (through direct regulation, property rights, etc.) (Financial freedom), cancelling of any restrictions on foreign investment into exporting countries (through currency exchange, capital transfers, real estate, industries, etc.) (Investment freedom), transparent and protected property rights from the part of the government side (Property rights), low corruption within government institutions (Freedom from corruption) are among the factors which have the greatest influence on countries' export specialization in the global financial services market.

The reason for specialization could be in excess of factors, presence of economies of scale, inter-firm relationships and proximity of production (Krenz, 2014a). As noted by A. Rey (2009), specialization in financial services is determined by obtaining advantages resulting from the monopoly over other countries.

A. Krenz (2014a) finds some negative points in terms of specialization of countries. She mentions that excessive specialization of a country or its excessive growth may lead to asymmetric shocks, which could adversely affect the country's economic development. This point of view is also shared by A. Hirschman (1980) who analysed the impact of specialization on gains from trade. According to his research, after the trading has begun with a given volume, the trade gains increase along with decreasing specialization.

A research on the manufacturing specialization of Bulgaria, Estonia, Hungary, Romania and Slovenia, conducted by I. Traistaru, P. Nijkamp and S. Longhi (2002), made it possible to conclude the following: specialization has a positive impact on GDP per unit of capital; it has no effect on wages; it has a negative impact on employment by increasing unemployment.

E. van der Marel (2011) points out that international trade in services differs from trade in goods. Firstly, services are more sensitive to excess of the labour factor, its high and medium level qualification of specialists; secondly, credibility to the importer plays the key role in international trade; thirdly, the liberalization of trade between the countries is a significant factor in the quality of regulation.

J. Stefaniak-Kopoboru and J. Kuczevska (2016) exploring the specialization in services made significant assumptions that distinguish services from goods, namely a trade model reflects relative costs and differences in elements other than prices; trade emerges between countries as a result of differences in endowments of economic resources, not as result of differences in technologies.

In scientific literature, there exist controversial provisions regarding the mechanism of determining the index of specialization of the country.

M. Amity (1997), A. Krenz (2014a, b), J. Stefaniak-Kopoboru and J. Kuczevska (2016) use share of employment in

industry and the Balassa index when calculating specialization of countries. If the Balassa index is higher than one, the country's specialization is high.

Analysing technological specialization of countries, D. Archibugi and M. Pianta (1992) used chi square values to verify the specialization index, calculated based on the share of exports in the global industry volume. If the country's share is equal to the global share, the value of the index is zero and the country has no specialization, whereas the more the deviation from the global share, the more specialization we observe. Their methodology is unclear, which is why it is not possible to repeat their analysis of specialization.

To analyse the international trade of the EU, I. Frias, A. Iglesias and I. Neira (2000) chose the Grubel-Lloyd index. The researchers concluded that trade between countries depends on the existing similarities and differences between countries, intra-industry trade will dominate between similar economies, and intersectoral trade will dominate between different economies. When analysing specialization, they were guided by the theory of comparative advantage and used the calculation of the ratio of net exports sector amounts to half of total exports plus total imports (net exports to  $\frac{1}{2}$  (total exports + total imports)). The problem of their methodology is that the Grubel-Lloyd index was calculated by trade between adjacent countries without explaining the results of research, and the calculations were made by using the factors of production without specifying the methodology, which also makes it impossible to repeat their calculations.

I. Traistaru, P. Nijkamp and S. Longhi (2002) calculated specialization by the part of industry in total manufacturing and by employment in this industry with the help of the Krugman<sup>1</sup> index. N. Palan and C. Schmiedeberg (2008) used a modified Krugman<sup>2</sup> index based on the employment rate.

In the research by K. Aiginger (2000), specialization of a certain industry in the country is related to additional cost. The sign of high specialization is provision of a high level of production (export) by a small number of sectors. Depending on the selected index, specialization is differentiated by product, trade and the country's export. However, their findings are not supported by a clear calculation methodology, which does not allow using their research.

Herzog and Unal (2011a, b) used the index CSC (the CEPII's indicator of contribution to the trade balance)<sup>3</sup>, which determines the level of the comparative advantages of the country when calculating specialization of countries in international trade.

C. D. Guardia and J. Molero (2003) did not conduct any research on specialization indexes and took a ratio of the share of exports of relevant services in the total exports of services related to a certain country to the share of world exports of relevant services in the total exports of services (the Balassa index for exports).

A research on specialization indices in France, Germany, the UK and Greece in the EU market of financial services in 2005 has shown that only Germany and the United Kingdom had such a specialization with the Balassa index values at 1.1 and 1.14 respectively (Krenz, 2014b). Another study by Krenz (2014a) adds Ireland to those countries. According to the research, Finland, Portugal and Sweden were among the countries with minimum performance in terms of the Balassa index. No country of the Visegrad Group (Stefaniak-Kopoboru and Kuczevska, 2016) had any specialization in financial services in 2000-2013, with their Balassa index being less than 1.

According to the research conducted by Herzog and Unal (2011a, b), financial services is one of the five main branches in which countries specialize, with the first position for the EU 27 with their CSC index of 7 and the fourth position for the United States of America with its CSC index of 15. However, financial services were not leading in terms of specialization in Brazil, Japan, India and China in 2006-2008. Among EU countries, the UK, the Economic Union of Bel-

<sup>1</sup>  $K_{A,B} = \sum_{i=1}^n |b_i^A - b_i^B|$ , where  $b_i^A$  and  $b_i^B$  - are parts of employment in the industry  $i$  of the country  $A$  or  $B$ .

<sup>2</sup>  $K_{A,i} = \sum_{j=1}^n |b_j^A - b_j^i|$ , where  $b_j^A$  is part of employment in the industry  $i$  of the country  $A$ ,  $b_j^i$  - is an average employment in the group of industry.

<sup>3</sup>  $CSC^i = \left( \frac{X_i - M^i}{X_i + M^i} \right) \left( \frac{X_i - M^i}{X_i + M^i} - \sum_{k \neq i} \left( \frac{X_k - M^k}{X_k + M^k} \right) \right)$ , where  $X_i$ ,  $M^i$  are export and import of the country  $i$  and product  $k$ .

gium and Luxembourg, Cyprus and Malta specialized in financial services in 2006–2008 (Herzog and Unal, 2011a).

The research by C. D. Guardia and J. Molero (2003) on OECD countries shows that a growth of specialization in financial services was observed in several areas against a background of moderate growth in international trade in the relevant countries by 8–13%, with a fourfold increase in Korea in the period from 1992 to 1999, a 60–90% increase in countries such as Germany, Ireland, Portugal, Sweden and the US and an increase of 20% in New Zealand and the UK. All these countries were in the matrix of specialization in the segment of «rising stars» (growth of specialization in financial services with increasing demand for them in the international market) and improved their competitiveness in the international market during the period in question. At the same time, France, Canada, Greece, Italy and Spain reduced their specialization and competitiveness, being therefore located in the segment of «missed opportunities» losing potential revenue in the global development of this segment.

Investigating the specialization of European countries in services in 2005 and comparing it with the year 1970, N. Palan and C. Schmiedeberg (2008) concluded that there were similar specialization characteristics relevant to the three groups of countries (Central, South and North European countries), with only Central European countries specializing in financial services. They found that sectoral specialization persists through small countries, while large countries are more likely to be scattered by sector. Special attention was paid to the intensity in financial intermediation in Ireland, the explanation of which scientists find in a low level of financial regulation combined with favourable taxation for foreign investors and multinational companies, which attracts many foreign banks and raises employment from the lowest level to the highest level within this group of countries. Other countries also initially increased employment, which stopped and even decreased in some countries later. Generally, the growth of specialization in financial services leads to higher employment.

### 3. Purpose

A comprehensive study of theoretical provisions determining specialization of countries in the global market of services shows that there is very little information on the subject covering a small number of countries. Also, we have noted that no special studies of the relevant issues have been conducted.

This allows us to take the first step in conducting a comprehensive analysis of specialization of countries in the global market of financial services.

Despite the fact that most scientists emphasise that limitations in their studies are related to the lack of data, we hope that more data are available today. We will try to analyse all the indices of specialization in terms of financial services and choose the one that most accurately reflects the real situation in the global market.

### 4. Results

To achieve the goal of the research and to calculate the specialization index we will consider the following figures for the period from 2005 to 2015:

1. Countries' and world's exports (imports) of financial services (UNCTADSTAT, 2016b).
2. The share of countries' and world's exports (imports) of financial services in the total exports (imports) of services (UNCTADSTAT, 2016b) and the total exports (UNCTADSTAT, 2016a).
3. The employment rate in the sector of financial services (OECDSTAT, 2017) and all services (ILOSTAT, 2017).

Among all the countries (groups of countries) under research, we select those that have no export performance of financial services within the specified period. These are American Samoa, Anguilla, Andorra, Angola, Antigua and Barbuda, Bahamas, Bahrain, Bonaire, British Virgin Islands, Brunei, Gabon, Haiti, Gambia, Ghana, Guinea, Gibraltar, Grenada, Greenland, Guam, Djibouti, Dominica, Yemen, Equatorial Guinea, Eritrea, Zambia, Jordan, Cayman Islands, Qatar, Korea, Comoros, Congo, Cuba, Libya, Maldives, Marshall Islands, Mexico, Micronesia, Montserrat, Myanmar, Nauru, Nepal, Niue, UAE, Oman, St. Helena, Cook Islands, Palau, Palestine, Northern Mariana Islands, San Marino, Saint Lucia, Seychelles, St. Vincent and the Grenadines, Saint Kitts and Nevis, Saint Pierre and

Miquelon, Somalia, Tokelau, Trinidad and Tobago, Turkmenistan, Turks and Caicos, Uzbekistan, Falkland Islands, Holy See, Central Africa, Chad, Chile. The total number of such countries is 66. If there are no exports, the countries have no specialization in financial services. Conventionally, this group of countries can be called *zero exporters of financial services*.

The situation is much complicated with Finland. From the general database we have learned that the country exports services, yet it has no exports of financial services. However, according to other sources, the situation appears to be either the opposite or quantitatively different. Therefore, the calculation of the specialization index for Finland will be conducted based on the figures of exports and imports provided by Statistics Finland (2017).

Let us count the index of specialization in financial services focusing first on those calculations which are based only on the performance of exports and imports, and then using employment rates. We will build the ranking with regard to the latest evident yearly indicators. As the first index of specialization in the market of financial services, we will take the CSC index. When calculating the index, there appeared two countries (Malawi and East Timor), for which there are no data relevant to the same year either in exports or imports of financial services, and therefore it is not possible to calculate the index. The top ten leading countries with the highest index value were the United Kingdom, Kiribati, Switzerland, Hong Kong, Singapore, Afghanistan, the United States of America, Bermuda, Burkina Faso and Cyprus (Table 1-3).

We take the Balassa index for export as our second index of specialization. Among the countries leading in specialization in decreasing order, there are Luxembourg, Kiribati, Malta, Cyprus, UK, Switzerland, Hong Kong, Burkina Faso, Singapore and Lebanon (Table 1-3). As can be seen, the two indices mentioned above have a different range of countries with the maximum value, although most countries coincide. The same situation is evident with regard to all other countries. If we interpret the second index keeping in mind that the country should specialize in the index value greater than 1 when compared to the first index, we can exclude countries such as Algeria, Liberia, Sweden and South Africa, which were included in the top twenty countries by the value of the CSC index with more than 15 units. Conversely, we can include Malta with its CSC index equal to (-8).

The next step is to calculate indices that use the labour factor. We have data for a limited number of countries in terms of the employment in the segment of financial services. We will calculate the total labour resources with regard to financial services by summarising data by country. However, if data covering the corresponding year is unavailable, we will take the data for the previous year.

In 2015, among the countries that specialize in financial services with the corresponding Balassa index in employment being more than 1, which are sorted in ascending order, there were South Africa, Luxembourg, Switzerland, the USA, Ireland, Australia, Britain, Israel, Korea, New Zealand and Austria (Tables 1-3).

When calculating the Krugman index, we considered the average value of the share in the segment of financial services taking into account those countries, the index of which was greater than zero, which shows that their level of export is higher than the average world level. Among such countries, there are South Africa, Luxembourg, Switzerland, the USA, Ireland, Australia, Britain, Israel, Korea, New Zealand and Austria. As can be seen, the distribution of countries by the Balassa index regarding employment and the Krugman index is the same.

If we compare the results for all the four indices of specialization of countries in the global market of financial services, we can distinguish the following groups of countries:

1. *Countries with absolute specialization*, which have their specialization in all the four indices. These are Luxembourg, Switzerland, US, Ireland, Canada and the United Kingdom (Table 1).
2. *Countries with factor-export specialization*, the specialization in financial services of which is reflected in two of the indices calculated basing on the employment factor and the CSC index on exports. Such countries include South Africa and Australia (Table 1).



- Countries with factor specialization, where specialization is shown only in the calculation of indices based on employment. Israel, Korea, New Zealand and Austria are among them (Table 1).
- Countries with export specialization with obvious signs of specialization in both export indices. Kiribati, Hong Kong, Singapore, Afghanistan, Bermuda, Burkina Faso, Cyprus, Lebanon, Germany, Latvia belong to this group (Table 2).
- Countries with partial export specialization, in which only one export specialization index is shown. These include Malta, Algeria, Liberia, Sweden, Benin, Guyana, Japan, Norway and France (Table 2).
- Countries without explicit specialization with specialization index figures which are lower the required value - 123 countries altogether (Table 3).

The availability of data allowed us to analyse the specialization at the global market of financial services. A comparison of calculations of the four indices of specialization in financial services does not allow us to single out the most credible one. At the same time, it is possible not to calculate both the Krugman index and the Balassa index on employment because they show relatively similar results.

**5. Conclusions**

- The analysis of scientific sources relating to the assessment of the level of specialization of countries

**Tab. 2: Indices of specialization of countries in 2015 with the countries' rating positions (countries with export and partial export specialization)**

| Country                                      | CSC   |     | Balassa (export) |    | Balassa (employment) |    | Krugman |    |
|--|-------|-----|------------------|----|----------------------|----|---------|----|
|  | I     | P   | I                | P  | I                    | P  | I       | P  |
| Countries with export specialization         |       |     |                  |    |                      |    |         |    |
| Kiribati                                     | 74.49 | 2   | 3.53             | 2  |                      |    |         |    |
| Hong Kong                                    | 57.60 | 4   | 2.12             | 7  |                      |    |         |    |
| Singapore                                    | 56.98 | 5   | 1.68             | 9  |                      |    |         |    |
| Afghanistan                                  | 42.21 | 6   | 1.14             | 15 |                      |    |         |    |
| Bermuda                                      | 34.45 | 8   | 1.55             | 11 |                      |    |         |    |
| Burkina Faso                                 | 33.18 | 9   | 2.00             | 8  |                      |    |         |    |
| Cyprus                                       | 30.34 | 10  | 2.86             | 4  |                      |    |         |    |
| Lebanon                                      | 23.47 | 14  | 1.57             | 10 |                      |    |         |    |
| Germany                                      | 21.89 | 15  | 1.00             | 17 | 0.93                 | 15 | -0.0022 | 15 |
| Latvia                                       | 15.21 | 20  | 1.32             | 13 | 0.58                 | 32 | -0.0126 | 32 |
| Countries with partial export specialization |       |     |                  |    |                      |    |         |    |
| Malta  | -8.92 | 126 | 3.36             | 3  |                      |    |         |    |
| Algeria                                      | 24.79 | 12  | 0.87             | 20 |                      |    |         |    |
| Liberia                                      | 15.92 | 17  | 0.92             | 19 |                      |    |         |    |
| Sweden                                       | 15.39 | 18  | 0.74             | 23 | 0.66                 | 25 | -0.0101 | 25 |
| Benin  | 15.27 | 19  | 0.44             | 36 |                      |    |         |    |
| Guyana                                       | 14.83 | 21  | 0.78             | 22 |                      |    |         |    |
| Japan  | 14.25 | 22  | 0.73             | 24 | 0.88                 | 19 | -0.0037 | 19 |
| Norway                                       | 12.03 | 25  | 0.58             | 29 | 0.60                 | 30 | -0.0120 | 30 |
| France                                       | 11.94 | 26  | 0.59             | 28 | 0.96                 | 13 | -0.0013 | 13 |

Notes: I - index, P - rating position  
 Source: Calculated by the author based on data of UNCTADSTAT (2016a, b), ILOSTAT (2017), OECDSTAT (2017)

**Tab. 1: Indices of specialization of countries in 2015 with the countries' rating positions (countries with absolute, factor-export, and factor specialization)**

| Country                                     | CSC   |     | Balassa (export) |    | Balassa (employment) |    | Krugman |    |
|---|-------|-----|------------------|----|----------------------|----|---------|----|
|   | I     | P   | I                | P  | I                    | P  | I       | P  |
| Countries with absolute specialization      |       |     |                  |    |                      |    |         |    |
| Luxembourg                                  | 24.68 | 13  | 6.80             | 1  | 3.67                 | 2  | 0.0797  | 2  |
| Switzerland                                 | 73.49 | 3   | 2.19             | 6  | 1.59                 | 3  | 0.0177  | 3  |
| USA   | 38.89 | 7   | 1.41             | 12 | 1.57                 | 4  | 0.0171  | 4  |
| Ireland                                     | 19.55 | 16  | 1.03             | 16 | 1.36                 | 5  | 0.0108  | 5  |
| Canada                                      | 13.85 | 24  | 1.15             | 14 | 1.29                 | 6  | 0.0086  | 6  |
| UK  | 80.04 | 1   | 2.81             | 5  | 1.18                 | 8  | 0.0054  | 8  |
| Countries with factor-export specialization |       |     |                  |    |                      |    |         |    |
| South Africa                                | 25.17 | 11  | 0.66             | 27 | 4.50                 | 1  | 0.1042  | 1  |
| Australia                                   | 14.23 | 23  | 0.70             | 25 | 1.21                 | 7  | 0.0064  | 7  |
| Countries with factor specialization        |       |     |                  |    |                      |    |         |    |
| Israel                                      | -4.52 | 108 | 0.22             | 61 | 1.09                 | 9  | 0.0025  | 9  |
| Korea                                       | -0.24 | 72  | 0.19             | 71 | 1.02                 | 10 | 0.0006  | 10 |
| New Zealand                                 | 1.76  | 54  | 0.38             | 42 | 1.02                 | 11 | 0.0005  | 11 |
| Australia                                   | 3.09  | 44  | 0.51             | 31 | 1.01                 | 12 | 0.0004  | 12 |

Notes: I - index, P - rating position  
 Source: Calculated by the author based on data of UNCTADSTAT (2016a, b), ILOSTAT (2017), OECDSTAT (2017)

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Tab. 3: Indices of specialization of countries in 2015 with the countries' rating positions (countries without explicit specialization)

| Country                                   | CSC    |     | Balassa (export) |     | Balassa (employment) |    | Krugman |    | Country                                   | CSC    |     | Balassa (export) |     | Balassa (employment) |    | Krugman |    |
|---|--------|-----|------------------|-----|----------------------|----|---------|----|---|--------|-----|------------------|-----|----------------------|----|---------|----|
|   | I      | P   | I                | P   | I                    | P  | I       | P  |   | I      | P   | I                | P   | I                    | P  | I       | P  |
| Countries without explicit specialization |        |     |                  |     |                      |    |         |    | Countries without explicit specialization |        |     |                  |     |                      |    |         |    |
| Azerbaijan                                | -0.57  | 76  | 0.01             | 147 |                      |    |         |    | Malaysia                                  | -0.58  | 78  | 0.12             | 97  |                      |    |         |    |
| Albania                                   | -6.96  | 117 | 0.01             | 145 |                      |    |         |    | Mali                                      | 1.62   | 55  | 0.17             | 77  |                      |    |         |    |
| Argentina                                 | -3.78  | 105 | 0.01             | 146 |                      |    |         |    | Morocco                                   | -1.93  | 92  | 0.04             | 127 |                      |    |         |    |
| Aruba                                     | -11.63 | 129 | 0.08             | 114 |                      |    |         |    | Mozambique                                | -1.52  | 85  | 0.00             | 152 |                      |    |         |    |
| Bangladesh                                | -34.36 | 150 | 0.27             | 55  |                      |    |         |    | Moldova                                   | -1.03  | 81  | 0.07             | 116 |                      |    |         |    |
| Barbados                                  | 1.08   | 58  | 0.24             | 60  |                      |    |         |    | Mongolia                                  | -8.62  | 125 | 0.12             | 95  |                      |    |         |    |
| Belize                                    | -19.93 | 138 | 0.09             | 107 |                      |    |         |    | Namibia                                   | -1.47  | 84  | 0.01             | 143 |                      |    |         |    |
| Belgium                                   | 3.45   | 41  | 0.69             | 26  | 0.91                 | 17 | -0.0026 | 17 | Niger                                     | 2.66   | 49  | 0.13             | 93  |                      |    |         |    |
| Cote d'Ivoire                             | 9.18   | 27  | 0.35             | 46  |                      |    |         |    | Nigeria                                   | 5.43   | 36  | 0.92             | 18  |                      |    |         |    |
| Belarus                                   | -27.32 | 147 | 0.06             | 117 |                      |    |         |    | Netherlands Antilles                      | -2.71  | 96  | 0.01             | 140 |                      |    |         |    |
| Bulgaria                                  | -2.45  | 95  | 0.13             | 92  |                      |    |         |    | Netherlands                               | -3.62  | 104 | 0.30             | 52  | 0.90                 | 18 | -0.0030 | 18 |
| Bolivia                                   | -3.39  | 101 | 0.05             | 121 |                      |    |         |    | Nicaragua                                 | -2.45  | 94  | 0.03             | 133 |                      |    |         |    |
| Bosnia and Herzegovina                    | -17.33 | 137 | 0.02             | 137 |                      |    |         |    | New Caledonia                             | -0.35  | 73  | 0.01             | 142 |                      |    |         |    |
| Botswana                                  | -0.67  | 80  | 0.01             | 149 |                      |    |         |    | Pakistan                                  | -7.50  | 120 | 0.17             | 76  |                      |    |         |    |
| Brazil                                    | 3.28   | 43  | 0.25             | 56  | 0.38                 | 35 | -0.0186 | 35 | Panama                                    | -26.29 | 145 | 0.56             | 30  |                      |    |         |    |
| Burundi                                   | 6.93   | 34  | 0.42             | 37  |                      |    |         |    | Papua New Guinea                          | -2.90  | 97  | 0.10             | 100 |                      |    |         |    |
| Bhutan                                    | -0.58  | 77  | 0.02             | 139 |                      |    |         |    | Paraguay                                  | -16.93 | 136 | 0.10             | 99  |                      |    |         |    |
| Vanuatu                                   | -1.29  | 83  | 0.16             | 83  |                      |    |         |    | Peru                                      | 1.51   | 56  | 0.16             | 85  |                      |    |         |    |
| Venezuela                                 | -1.81  | 89  | 0.08             | 113 |                      |    |         |    | Poland                                    | -7.26  | 118 | 0.19             | 74  | 0.81                 | 21 | -0.0057 | 21 |
| Vietnam                                   | -8.41  | 124 | 0.19             | 68  |                      |    |         |    | Portugal                                  | -11.71 | 130 | 0.19             | 72  | 0.61                 | 28 | -0.0116 | 28 |
| Armenia                                   | -2.18  | 93  | 0.05             | 123 |                      |    |         |    | Russia                                    | 0.33   | 64  | 0.27             | 54  |                      |    |         |    |
| Guatemala                                 | -24.83 | 143 | 0.06             | 119 |                      |    |         |    | Rwanda                                    | -1.56  | 86  | 0.01             | 141 |                      |    |         |    |
| Guinea-Bissau                             | 8.53   | 30  | 0.29             | 53  |                      |    |         |    | Romania                                   | -7.33  | 119 | 0.16             | 81  |                      |    |         |    |
| Honduras                                  | -3.49  | 103 | 0.02             | 138 |                      |    |         |    | Salvador                                  | -39.66 | 151 | 0.19             | 73  |                      |    |         |    |
| Greece                                    | -10.92 | 128 | 0.04             | 129 | 0.66                 | 26 | -0.0102 | 26 | Samoa                                     | 9.02   | 28  | 0.39             | 40  |                      |    |         |    |
| Georgia                                   | -1.26  | 82  | 0.04             | 128 |                      |    |         |    | Sao Tome and Principe                     | 5.02   | 38  | 0.34             | 47  |                      |    |         |    |
| Denmark                                   | 0.06   | 67  | 0.13             | 91  | 0.93                 | 14 | -0.0022 | 14 | Saudi Arabia                              | 2.01   | 52  | 0.20             | 64  |                      |    |         |    |
| Democrat Rep. Congo                       | 2.16   | 51  | 0.36             | 45  |                      |    |         |    | Swaziland                                 | -3.97  | 106 | 0.16             | 84  |                      |    |         |    |
| Dominican Republic                        | -45.16 | 152 | 0.13             | 90  |                      |    |         |    | Senegal                                   | 0.18   | 66  | 0.12             | 98  |                      |    |         |    |
| Ecuador                                   | -10.81 | 127 | 0.48             | 34  |                      |    |         |    | Serbia                                    | -5.64  | 113 | 0.05             | 120 |                      |    |         |    |
| Estonia                                   | -5.06  | 110 | 0.20             | 65  | 0.51                 | 33 | -0.0147 | 33 | Syria                                     | 7.07   | 33  | 0.37             | 43  |                      |    |         |    |
| Ethiopia                                  | 0.00   | 70  | 0.00             | 153 |                      |    |         |    | Sint Maarten                              | -3.48  | 102 | 0.00             | 151 |                      |    |         |    |
| Egypt                                     | 2.83   | 47  | 0.08             | 115 |                      |    |         |    | Slovakia                                  | 0.91   | 60  | 0.31             | 51  | 0.68                 | 24 | -0.0096 | 24 |
| Zimbabwe                                  | 0.00   | 69  | 0.00             | 154 |                      |    |         |    | Slovenia                                  | -11.87 | 131 | 0.09             | 105 | 0.81                 | 20 | -0.0057 | 20 |
| India                                     | 4.45   | 40  | 0.40             | 39  |                      |    |         |    | Solomon Islands                           | -0.21  | 71  | 0.13             | 94  |                      |    |         |    |
| Indonesia                                 | -5.96  | 114 | 0.14             | 88  |                      |    |         |    | Sudan                                     | 3.33   | 42  | 0.10             | 103 |                      |    |         |    |
| Iraq                                      | -24.60 | 142 | 0.02             | 134 |                      |    |         |    | Suriname                                  | 3.07   | 45  | 0.20             | 66  |                      |    |         |    |
| Iran                                      | -8.04  | 122 | 0.13             | 89  |                      |    |         |    | Timor-Leste                               |        |     | 0.01             | 148 |                      |    |         |    |
| Iceland                                   | 0.93   | 59  | 0.34             | 49  |                      |    |         |    | Sierra Leone                              | -1.71  | 88  | 0.04             | 125 |                      |    |         |    |
| Spain                                     | -13.31 | 133 | 0.34             | 48  | 0.65                 | 27 | -0.0104 | 27 | Tajikistan                                | 5.08   | 37  | 0.17             | 79  |                      |    |         |    |
| Italy                                     | -15.47 | 135 | 0.50             | 33  | 0.92                 | 16 | -0.0024 | 16 | Thailand                                  | -0.52  | 75  | 0.04             | 130 |                      |    |         |    |
| Cape Verde                                | -6.48  | 116 | 0.05             | 122 |                      |    |         |    | Taiwan                                    | 7.34   | 32  | 0.25             | 58  |                      |    |         |    |
| Kazakhstan                                | -3.31  | 100 | 0.04             | 124 |                      |    |         |    | Tanzania                                  | 2.18   | 50  | 0.09             | 108 |                      |    |         |    |
| Cambodia                                  | 2.99   | 46  | 0.10             | 102 |                      |    |         |    | Togo                                      | 6.92   | 35  | 0.21             | 63  |                      |    |         |    |
| Cameroon                                  | 1.91   | 53  | 0.19             | 70  |                      |    |         |    | Tonga                                     | -21.61 | 141 | 0.09             | 110 |                      |    |         |    |
| Kenya                                     | 2.81   | 48  | 0.42             | 38  |                      |    |         |    | Tuvalu                                    | 8.92   | 29  | 0.39             | 41  |                      |    |         |    |
| Kyrgyzstan                                | -4.11  | 107 | 0.12             | 96  |                      |    |         |    | Tunisia                                   | -1.83  | 90  | 0.20             | 67  |                      |    |         |    |
| China                                     | 1.18   | 57  | 0.09             | 104 |                      |    |         |    | Turkey                                    | -28.27 | 148 | 0.16             | 82  |                      |    |         |    |
| Colombia                                  | -27.13 | 146 | 0.09             | 106 |                      |    |         |    | Uganda                                    | 4.81   | 39  | 0.15             | 87  |                      |    |         |    |
| Costa Rica                                | -20.92 | 139 | 0.08             | 111 | 0.74                 | 22 | -0.0077 | 22 | Hungary                                   | -4.71  | 109 | 0.09             | 109 | 0.70                 | 23 | -0.0090 | 23 |
| Kuwait                                    | -8.32  | 123 | 0.51             | 32  |                      |    |         |    | Ukraine                                   | -32.22 | 149 | 0.17             | 80  |                      |    |         |    |
| Curacao                                   | -1.86  | 91  | 0.06             | 118 |                      |    |         |    | Uruguay                                   | 7.84   | 31  | 0.32             | 50  |                      |    |         |    |
| Laos                                      | 0.57   | 61  | 0.02             | 136 |                      |    |         |    | Faroe Islands                             | 0.00   | 68  | 0.10             | 101 |                      |    |         |    |
| Lesotho                                   | -0.36  | 74  | 0.00             | 150 |                      |    |         |    | Fiji                                      | 0.39   | 63  | 0.04             | 126 |                      |    |         |    |
| Lithuania                                 | -6.16  | 115 | 0.15             | 86  | 0.47                 | 34 | -0.0159 | 34 | Philippines                               | -1.63  | 87  | 0.17             | 78  |                      |    |         |    |
| Mauritius                                 | -3.27  | 99  | 0.37             | 44  |                      |    |         |    | Finland                                   | -21.30 | 140 | 0.18             | 75  | 0.60                 | 29 | -0.0119 | 29 |
| Mauritania                                | 0.22   | 65  | 0.01             | 144 |                      |    |         |    | French Polynesia                          | -5.17  | 111 | 0.25             | 59  |                      |    |         |    |
| Madagascar                                | 0.55   | 62  | 0.19             | 69  |                      |    |         |    | Croatia                                   | -25.59 | 144 | 0.08             | 112 |                      |    |         |    |
| Macao                                     | -3.24  | 98  | 0.25             | 57  |                      |    |         |    | Czech Republic                            | -0.64  | 79  | 0.22             | 62  | 0.58                 | 31 | -0.0125 | 31 |
| Macedonia                                 | -14.01 | 134 | 0.02             | 135 |                      |    |         |    | Montenegro                                | -5.50  | 112 | 0.04             | 131 |                      |    |         |    |
| Malawi                                    |        |     | 0.83             | 21  |                      |    |         |    | Sri Lanka                                 | -11.95 | 132 | 0.46             | 35  |                      |    |         |    |
|   |        |     |                  |     |                      |    |         |    | Jamaica                                   | -7.58  | 121 | 0.03             | 132 |                      |    |         |    |

Notes: I - index, P - rating position

Source: Calculated by the author based on data of UNCTADSTAT (2016a, b), ILOSTAT (2017), OECDSTAT (2017)

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Received 23.01.2017