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COMPETITIVENESS IN MANGO TRADE: A COMPARATIVE ANALYSIS BETWEEN PAKISTAN ANDOTHER MANGO EXPORTING NATIONS

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Abstract

This paper analyses the Pakistan's mango export competitiveness against other leading mango producers and exporters. Using the trade data between the years 2010 and 2016, this paper estimates several revealed comparative advantage (RCA) indices, particularly in-version revealed comparative advantage (InRCA), revealed symmetric comparative advantage (RSCA) and competitive export performance (CEP) for each country compared. The results suggest that the competitiveness of Pakistan mangoes export was stable during the study period except in 2014-2015, when Pakistan's competitiveness declined. At the same period, Mexico, Thailand and Philippines had increased comparative advantage in mango export, presenting a serious threat to Pakistan's mango export potentials. An index of comparative export performance (CEP) indicates that Pakistan had a comparative advantage against most of the top mango producing and exporting countries expect Thailand and Philippines. The results indicate that Pakistan mango export exhibits strong comparative advantage, however to gain consistency in export competitiveness, Pakistan needs more managerial efforts from public and private institutions to address issues like food safety, importing countries' quarantine requirements and sanitary & phytosanitary (SPS) restrictions.
Keywords: *Export Competitiveness, RCA, RSCA, InRCA, CEP Indices, Mango Export*.
JEL Codes: *F13, F14, F17, Q13, Q17*

1. Introduction

Pakistan is an emerging economy with a Gross Domestic Product (GDP) of 304.952 billion USD and a per capita income of around 1,629 US$ in the year 2016-17. Pakistan's total export of goods and services is 25.114 Billion USD and it contribute 8.24 percent to total GDP in year 2016-17 (World Bank 2017). The dominated sectors of the Pakistan economy are agriculture (19.5 percent), manufacturing (13.5 percent) and services (67 percent) (Government of Pakistan (GoP) 2016-17). Although the contribution of agricultural sector in GDP has dropped overtime to 19.5 percent (Zaidi 2005), the agriculture sector is still major contributor to Pakistan's economy and plays a major role in national development, food

security and in reduction of poverty therefore, considered as the main sector for economic growth, poverty reduction and taken as priority sector in the government policies and development programs (GoP 2016-17).

Pakistan is also a leading mango producing and exporting country. With annual production of 1.7 million tonnes, Pakistan stands 6th in the world after India, China, Thailand, Indonesia and Mexico in terms of mango production (FAO 2017). In terms of export, Pakistan is the 7thlargest mango exporter after Mexico, India, Thailand, Peru, Brazil and Netherlands. Pakistan exports mangoes to 60 different countries around the world. The main destinations are United Arab Emirates (UAE), Saudi Arabia, United Kingdom (UK), Netherlands, Iran, Malaysia and some other Middle Eastern and European countries (FAO 2017; Government of Pakistan 2015; Sun et al. 2011; Badar 2015).

Of the main export markets, the UAE and UK imported 36,123 thousand tonnes and 11,247 thousand tonnes of mangoes respectively from Pakistan in year 2010-11, with an increasing trend (20 percent) in UAE market but decreasing in the UK (by -24%) during2011-15. Pakistan's mango export decreased by 4 percent overall from 2011 to 2015 and this decreasing trend in the export was also evident among major European markets namely, Belgium (-82%), France (-90%), Germany (-27%), Italy (-22%) and Netherlands (-36%) (Government of Pakistan 2016). At the same time, in Middle Eastern countries, especially Saudi Arabia and, to a lesser extent, the United Arab Emirates, which imports mangoes mainly from Egypt, India, and Pakistan, mango consumption has increased. Pakistan exports around 90% of agricultural commodities to the United Arabs Emirates (UAE), Saudi Arabia and Oman, as well as supplying part of the UK market, and India is the main competitor in these markets. (Sauco 2013).

However, Pakistan's total value of exports is the lowest (579 $/tonne) among other major exporters in the world. Poor product quality, short shelflife, non-compliance with standards, exceeding pesticide residual limits, fruit fly infestation, poor packaging and traceability are identified as main factors in the lower mango export price for Pakistan (UNIDO 2006; Ghafoor et al. 2009; Mazhar et al. 2010; Jabbar et al. 2011; Badar 2015).

Global agricultural trade has undergone increased competition under free-trade regimes and has improved the relative productivity of different economies. To understand the extent and potential of mango exports, the study of comparative advantage is important. This paper aims at analysing the changing comparative advantage of Pakistan's mango trade over time and its implications for export growth by comparing against major exporters of mangoes. A review of the literature on comparative advantage indicates that most of the analytical work on export competitiveness lacked a focus on a specific market. The literature on comparative advantage of Pakistan mango exports reflects a similar trend. No previous study was found that analyses export competitiveness of Pakistani mangoes in particular markets that are strategically important for Pakistan. This paper bridges the gap by analysing the comparative export performance (CEP) of mangoes between Pakistan and other mango producing and exporting countries. The rest of the paper includes an explanation of past trends and current mango export status, an analysis of the comparative advantage of mango exports from Pakistan and suggestions for policy measures to promote mango exports from Pakistan.

2. Materials and Methods

This paper compares Pakistan and other top mango producing and exporting countries on competitiveness. By using the trade date during 2010-2016, the export specialisation and competition level were calculated based on the factor intensity. The revealed comparative advantage (RCA) indices of major competitors of Pakistan in mango trade (India, China, Thailand, Philippines, Mexico, Indonesia, Pakistan, Brazil, Bangladesh and Malawi) were calculated. The data used in the analysis were drawn from the Food and Agriculture

Organisation (FAOSTAT Database – http://http://www.fao.org/faostat/en/#data). In this paper, following indices are calculated;

2.1 Export Index of Revealed Comparative Advantage (Balassa's RCA)

Liesner (1958) first introduced the index of revealed comparative advantage (RCA) and Balassa (1965) operationalized it to measure comparative advantage. The export index of revealed comparative advantage (RCA) is defined as the export ratio of a country to its share commodity category in total merchandise export *(Balassa and Noland, 1989)*. If a country's share of world export of a commodity category is greater than its share of world exports of all commodities, the RCA value will be greater than 1. A country, therefore, is seen as having a revealed comparative advantage in those products for which its market share of world is above its average share of world exports. RCA for a country (i) in commodity a, (RCAi)a, can be described as:

(RCAi)a = (Xi a / Xw a) / (Xi t / Xw t) …

where, Xia = commodity-a export by country-i,
Xit = Total exports by country-i,
Xwa = World exports of commodity-a; and
Xwt = Total world exports.

To reveal the power of comparative advantage, Hinloopen (2001) suggested a classification based on Balassa's RCA as follows:

No comparative advantage if RCA value is o< but *≤ 1;*
Weak comparative advantage if RCA value is *1 < but ≤ 2*
Moderate comparative advantage if RCA value *2 < but ≤ 4*
Strong comparative advantage if RCA value *4 or more;*

2.2 In Version of the Export index of Revealed Comparative Advantage (InRCA)

To suppress the skewness problem in RCA calculation, inversion of RCA will be applied. It also eliminates the weaknesses of RCA index by capturing a robust approximation of competitiveness of export commodities. The rule of thumb is when InRCA > 0; then comparative advantage exists, but in contrast, there is a comparative disadvantage if InRCA < 0 (Faustino, 2008; Vollrath, 1991).

2.3 Export Index of Revealed Symmetric Comparative Advantage *(RSCA)*

The RCA measure, according Nwachuku *et al.* (2010), could be made symmetric by acquiring an index called "Revealed Symmetric Comparative Advantage (RSCA)", it also be employed to suppress the skewness problem *(Dalum, Laursen and Villumsen, 1996)*. RSCA is computed (RCA - 1)/ (RCA + 1).

The RSCA ranges between + 1.0 and 1.0 and avoids the problem of zero values in the log arithmic transformation (when the RCA is not applied to an arbitrary constant). The economic advantage of the method is that if attributes changes below the unity (in this case, it is zero) the same weight as changes above the unity. With respect to normality, the measure is the best alternative. In addition to RSCA, ln version of RCA (InRCA) can be calculated to suppress the skewness problem (Dalum *et al. 1996,* Nwachuku *et al. 2010 and Vollrath, 1991)*.

2.4 Comparative Export Performance Index (CEP)

To compare export competitiveness between two countries directly, the index of comparative export performance (CEP) can be used (Bobirca and Miclaus, 2011 and Donges, 1982)). The index is based on export shares and thus allows two indices to compare findings. The formula which was used to measure the CEP index was given by *Bobirca and Miclaus, 2011:*

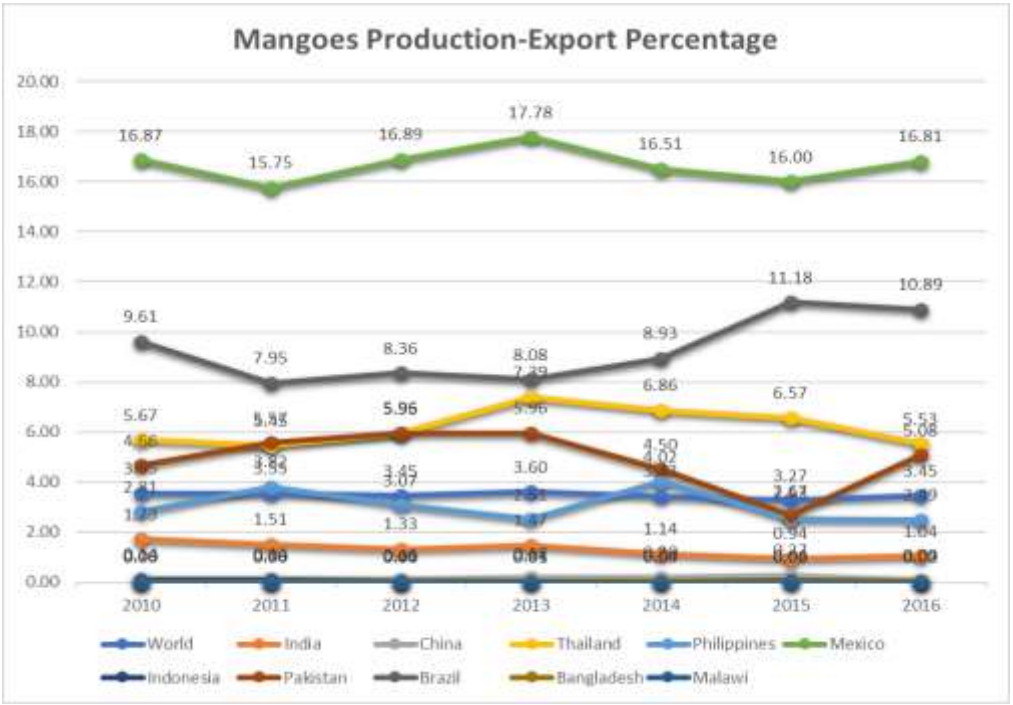
Comparative Export Performance Index = (Xia/Xa)/(Xib/Xb)

CEP reflects competitive export advantage country-A over country-B. If the index value exceeds 1, then country-A have competitive advantage in export over country-B.

These measures of RCA, RSCA, InRCA and CEP were estimated for the export competitiveness of mango producing countries.

RCA and other indices are based on trade patterns that have been observed. An increase in RCA's price means an increase in the productivity of a country in a product market. This competitiveness measure is widely adopted because the computation of measures is quite simple.

However, observed trade trends are skewed by policies and other factors, such as gover nment interventions, and can thus misinterpret comparative advantages. This applies in particular to the agricultural sector (Liesner 1958). It is necessary to consider the extent to which import restrictions, export subsidies and other protection policies could distort the index of the revealed comparative advantage (Jing, 2004) while drawing conclusion and recommendations.

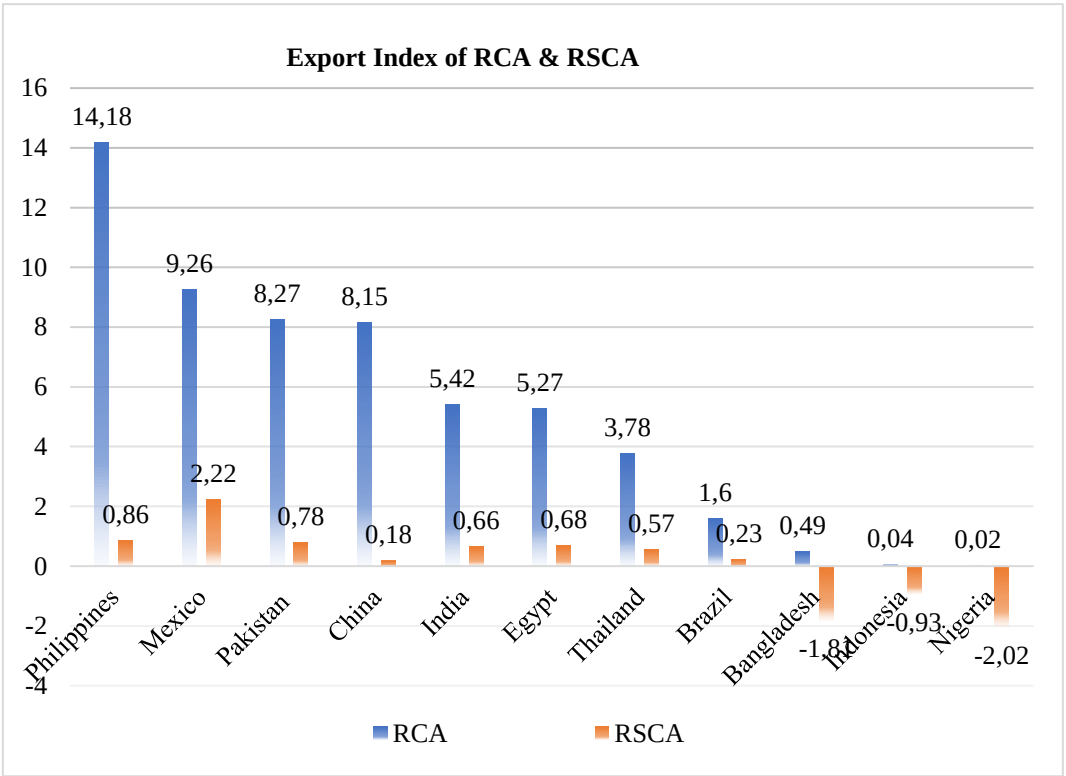


Source: Researchers/Authors Calculation based on FAO Statistics 2017

Figure 1. Mangoes Export – Production Percentage Shares

3. Results and Discussion

As compared to major global mango producers, Pakistan's share of mango export to domestic production (quantity wise) is indicated in *Figure-1*. Mexico, India, Brazil, Thailand and Pakistan have consistent share of mango export while Indonesia, Bangladesh and Egypt have improved their export share to mango production. In addition, the export index of revealed comparative advantage (Balassa's RCA), Inversion of the export index of revealed comparative advantage (InRCA) and the export index of revealed symmetric comparative advantage (RSCA) were calculated for the leading mango producing nations in the world (See Table 1 in Appendixes). The average of the estimated values of the period (2010-2016) is presented as "means".



Source: Researchers/Authors' calculations

Figure 2. The Export Index of Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA)

Based on revealed comparative advantage (RCA) values, over the study period, there was no comparative advantage in mango for Indonesia, Bangladesh and Nigeria. Weak and moderate comparative advantage was found for Brazil and Thailand respectively. However, RCA values demonstrated strong comparative advantage for Pakistan, India, China, Mexico, Egypt and Philippines.

When applied logarithms to the RCA values, it was identified that Pakistan, India, Philippines, Thailand, Mexico and Egypt have > 0 InRCA values which indicates that they have comparative advantage. On the other hand, Brazil, Nigeria, Indonesia, Bangladesh and

China have shown < 0 InRCA values and have comparative disadvantages in export of mangoes.

According to the means revealed symmetric comparative advantage (RSCA) values, Pakistan and all other top ranked mangoes producing countries are competitive in the mango export except Nigeria, Bangladesh and Indonesia. Initially, India and China had the competitiveness but, on from 2012 onwards, they had been losing the competitiveness. However, Pakistan including Thailand, Mexico, Brazil, Philippines and Egypt had consistent international competitiveness with minor variations during the same period.

In the following section, Pakistan and other top ranked mango producing countries' export competitiveness in global markets are evaluated. Similarly, the index of comparative export performance (CEP) is examined for Pakistan's competitive position against other top ranked mangoes producing countries.

Table 1. The Index of Comparative Export Performance (CEP)

Comparative Export Performance (CEP)	2010	2011	2012	2013	2014	2015	2016	MEANS
PAK-INDIA	0.77	1.30	2.14	2.30	1.60	1.47	2.35	1.71
PAK-CHINA	0.66	0.52	0.63	0.64	24.24	184.89	58.44	38.57
PAK-THAILAND	2.83	3.29	2.32	1.90	1.33	1.53	2.99	2.31
PAK-MEXICO	0.92	0.88	0.80	0.86	0.76	0.74	1.33	0.90
PAK-INDONESIA	255.58	178.29	163.79	273.52	175.46	169.79	905.22	303.09
PAK-BRAZIL	4.74	4.97	5.45	6.29	4.28	3.71	6.95	5.20
PAK-BANGLADESH	89.82	120.30	243.06	8.99	5.29	632.61	10.95	158.72
PAK-PHILIPPINES	0.69	0.42	0.54	0.85	0.39	0.42	1.15	0.64
PAK-NIGERIA	235.78	280.95	346.17	314.36	11093.26	2126.15	7341.87	3105.51
PAK-EYGPT	1.72	1.62	1.51	2.29	1.02	1.10	2.03	1.61

Source: Researchers/Authors' calculations

The index of comparative export performance (CEP) shows that Pakistan has a comparative advantage over most of the top ranked mango producing and exporting countries with the exception of Mexico and Philippines because Pakistan has < 1 CEP values against both countries.

To conclude, compared with other top ranked mangoes producing and exporting countries, Pakistan has an essential comparative advantage in the export of mangoes. Nevertheless, the CEP indices indicate that the comparative export advantage of Pakistan has increased in comparison with other countries since 2016.

3. Conclusions

This research analyses the competitive position of Pakistan in the global mango export market over the 2010-16 period against the world's leading mango producing and exporting players. The study indicates that in Pakistan and other considered countries, the structure of competition in mango exports is generally similar. Pakistan has a comparative advantage in the production and export of mangoes over most mango exporting countries because of the suitability of climatic conditions and the low cost of production (Hassan 2013, Akhtar *et al.* 2009). The study also exhibited that the competitiveness of Pakistan mango exports was stable except in 2014-2015, wherein Pakistan's competitiveness declined. Pakistan's mango export has declined during 2014-2015because of a major decrease in Pakistan's mango exports to the EU and UK markets. This decline of Pakistan's mango exports to EU & UK was caused by strict sanitary, phytosanitary and quarantine regulations by the importing countries. Moreover,

new competitors like Mexico, Thailand, and Philippines gained strength in their competitive advantage. The analysis of world mango markets also indicates a huge potential for Pakistan to increase mango exports particularly to the Middle East, USA, EU and UK.

Despite trade liberalisation regime, most of the countries including Pakistan analyzed in this study have not fully benefited from opportunities emanating from the growth in international trade during the past decade. However, the indices of RCA, RSCA, InRCA CEP state that the trade openness and export competitiveness of major mango producing countries have been increasing. In the emerging environment of trade liberalisation and strict trade and regulations, Pakistan needs to develop efficient system of reviewing and redesigning its trade policies to further strengthen its mango export competitiveness. Concrete measures such as compliance with the quality, safety standards and quarantine regulations of importing countries and WTO can maintain and enhance Pakistani mango export competitiveness.

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Appendices

Table 1. Mango Production – Export Percentage (2010-2016)

COUNTRIES	*MANGO: PRODUCTION-EXPORT PERCENTAGE (2010-2016)*						
	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
WORLD	3.55	3.55	3.45	3.60	3.43	3.27	3.45
INDIA	1.73	1.51	1.33	1.47	1.14	0.94	1.04
CHINA	0.14	0.14	0.11	0.17	0.20	0.27	0.09
THAILAND	5.67	5.45	5.96	7.39	6.86	6.57	5.53
MEXICO	16.87	15.75	16.89	17.78	16.51	16.00	16.81
INDONESIA	0.06	0.06	0.05	0.04	0.04	0.06	0.02
PAKISTAN	4.66	5.57	5.95	5.96	4.50	2.67	5.08
BRAZIL	9.61	7.95	8.36	8.08	8.93	11.18	10.89
BANGLADESH	0.00	0.00	0.00	0.03	0.04	0.02	0.02
EGYPT	2.64	0.00	2.49	0.00	3.23	2.54	2.01
MALAWI	0.00	0.00	0.00	0.01	0.00	0.00	0.00
PHILIPPINES	2.81	3.82	3.07	2.51	4.02	2.53	2.49

Source: Researchers/Authors' calculations

Table 2. The Export Index of Revealed Comparative Advantage (RCA, InRCA) and Revealed Symmetric Comparative Advantage (RSCA)

COUNTRIES	*RCA/INRCA/ RSCA*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*AVERAGE*
PAKISTAN	RCA	8.31	8.31	8.57	9.16	6.33	6.12	11.07	*8.27*
	InRCA	2.12	2.12	2.15	2.15	1.85	1.81	2.40	*2.09*
	RSCA	0.79	0.79	0.79	0.80	0.73	0.72	0.83	*0.78*
INDIA	RCA	10.74	6.40	4.00	3.97	3.95	4.15	4.70	*5.42*
	InRCA	2.37	1.86	1.39	1.38	1.37	1.42	1.55	*1.62*
	RSCA	0.83	0.73	0.60	0.60	0.60	0.61	0.65	*0.66*
CHINA	RCA	12.63	16.02	13.62	14.27	0.26	0.03	0.19	*8.15*
	InRCA	2.54	2.77	2.61	2.66	-1.35	-3.51	-1.66	*0.58*
	RSCA	0.85	0.88	0.86	0.87	-0.59	-0.94	-0.68	*0.18*
THAILAND	RCA	2.93	2.52	3.70	4.83	4.76	3.99	3.70	*3.78*
	InRCA	1.08	0.92	1.31	1.58	1.56	1.38	1.31	*1.31*
	RSCA	0.49	0.43	0.57	0.66	0.65	0.60	0.57	*0.57*
MEXICO	RCA	8.99	9.43	10.72	10.70	8.37	8.28	8.31	*9.26*
	InRCA	2.20	2.24	2.37	2.37	2.13	2.11	2.12	*2.22*
	RSCA	0.80	0.81	0.83	0.83	0.79	0.78	0.79	*0.80*
INDONESIA	RCA	0.03	0.05	0.05	0.03	0.04	0.04	0.01	*0.04*
	InRCA	-3.51	-3.00	-3.00	-3.51	-3.22	-3.22	-3.61	*-3.30*
	RSCA	-0.94	-0.91	-0.90	-0.94	-0.93	-0.93	-0.98	*-0.93*
BRAZIL	RCA	1.75	1.67	1.57	1.46	1.48	1.65	1.59	*1.60*
	InRCA	0.56	0.51	0.45	0.38	0.39	0.50	0.46	*0.46*
	RSCA	0.27	0.25	0.22	0.19	0.19	0.25	0.23	*0.23*
BANGLADESH	RCA	0.09	0.07	0.04	1.02	1.20	0.01	1.01	*0.49*
	InRCA	-2.41	-2.66	-3.22	0.02	0.18	-4.61	0.01	*-1.81*
	RSCA	-0.83	-0.87	-0.93	0.01	0.09	-0.98	0.01	*-0.50*
PHILIPPINES	RCA	12.13	19.98	15.88	10.73	16.34	14.56	9.62	*14.18*
	InRCA	2.50	3.00	2.77	2.37	2.80	2.68	2.26	*2.63*
	RSCA	0.85	0.90	0.88	0.83	0.88	0.87	0.81	*0.86*
NIGERIA	RCA	0.04	0.03	0.02	0.03	0.00	0.00	0.00	*0.02*
	InRCA	-3.22	-3.51	-3.91	-3.51	0.00	0.00	0.00	*-2.02*
	RSCA	-0.93	-0.94	-0.95	-0.94	-1.00	-0.99	-1.00	*-0.97*
EGYPT	RCA	4.84	5.12	5.66	4.00	6.23	5.57	5.46	*5.27*
	InRCA	0.69	1.63	1.73	1.39	1.83	1.72	1.70	*1.53*
	RSCA	0.66	0.67	0.70	0.60	0.72	0.70	0.69	*0.68*

Source: Researchers/Authors' calculations