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## Revealed comparative advantage and constant market share analysis of Indonesian cinnamon in the world market

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**Abstract:** The study analysed the RCA and CMS of Indonesian cinnamon in the world market. Data on all types of cinnamon products traded by Indonesia to USA and the world market from 1987 to 2017 were retrieved from the UN Comtrade. Results showed that Indonesian cinnamon has comparative advantage in either the world or US market because the RCA value is greater than one. The CMS analysis indicated that Indonesian cinnamon garnered positive signs for the world effect, commodity growth effect, and competitiveness. The negative sign of market distribution implied the difficulty of Indonesian cinnamon to increase its volume of exports to the US market. The Indonesian government should identify other markets, and not solely depend on the requirements of the US market. There is an opportunity for Indonesians to grow and produce cinnamon to increase its supply to existing and potential markets.

**Keywords:** cinnamon; spices; revealed comparative advantage; RCA; constant market share; CMS.

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## 1 Introduction

In the global era, many factors influence and complicate the international business and management. No one is alike in consuming products (Adeloka and Sergi, 2017). In other words, trading of any kind of commodity can be easily changed. Based on World Bank WITS database in 2016, Indonesia has experienced a decrease in total spice export from 1996 to 2015 compared to periods 1991 to 1995. Indonesia has been ranked number 1 among top spice exporters but became third and fourth place for the years 1996 to 2015. The top spice importers in the world from 1991 to 2015 have put the USA as the main importer, followed by Japan and Germany (Jambor et al., 2018).

Cinnamon as the oldest spice was mentioned in the Bible; and has been used and consumed for many purposes since the ancient Egypt era (Maheswari et al., 2013). The consumption of cinnamon is still increasing. Annual demand of Indonesian cinnamon increases approximately at 9% because of its healthy natural ingredients (Ferry, 2013). Since a decade ago, the domestic consumption has been increasing as well. Although considered as the oldest spice, cinnamon has not been the top spice export product in the world since 1991. However, it is still imported by countries in the world.

Fifteen countries around the world are considered as top cinnamon exporters. Sri Lanka is the top cinnamon exporter in 2017 with 32% of total cinnamon exports, while Indonesia is second with 23.4% of total cinnamon exports for the same year. This situation resulted from Sri Lanka's development and implementation of new policies in agriculture after its independence (Ranathilaka and Arachchi, 2019). On the other hand, Indonesia is called *Mother of Spices* because of its geographic position and is aggressive to bring back its success in producing spices (Saefudin, 2017). Indonesia has supplied 14% of the world's demand for spices for the period 2012–2016 wherein 80% of this amount was pepper products and about 10% for cinnamon. In 2018, Indonesian spice is the 4th export commodity after shrimp followed by fish and coffee (Indonesian Ministry of Trade, 2018). The islands of Sumatra, Java and Sulawesi are suitable for growing cinnamon. Other potential cinnamon-growing areas exist as long as rainfall is adequate and a cool daily temperature of 19–23°C.

The fast-growing cinnamon exporting countries are Czech Republic, Spain, UK and Madagascar (Workman, 2018). Global spice trade in 1991 to 2015 was mainly in

Guatemala, Sri Lanka and India (Jambor, et al., 2018). This spice in Sri Lanka is mostly available in quills which usually used for cooking and baking (Samarawickrema, 2015).

Despite the dynamic changes in the global business map, it is important for a country to focus or specialise its best products if it wants to increase efficiency and productivity. It is not enough to know the dynamic changes of customers only, but also from the endowment factors that create the comparative and competitive advantages of the country's commodity (Widodo, 2010). Since 2017, the Ministry of Agriculture of Indonesia has aggressively put more efforts to enhance the export of spices, specifically cinnamon, to have a better competitive position in world market. The study analysed the revealed comparative advantage (RCA) and constant market share (CMS) of Indonesian cinnamon in the world market.

## 2 Literature review

Cinnamon (*Cinnamomum burmanii* L) is a material to produce spices. The type of cinnamon, which is lighter and sweeter, called as Ceylon cinnamon, is produced in Sri Lanka and popular as a curry ingredient. The other type of cinnamon, found in Indonesia and other Southeast Asia countries, is from cassia tree, which is cheaper, spicier and pungent. This type then is more preferred in any kind of foods and beverages (Maheswari et al., 2013). Cinnamon can be formed into many other derived products. Its leaves and branches are the materials for oil-making which also can be used as pesticide. It is also used as conservation plants to support the environment. Other products made from cinnamon's chemistry content are pharmaceutical products, cosmetics, food, and beverages. This spice, also known as an antioxidant, regulates blood sugar and LDL cholesterol level.

Indonesian cinnamon, in farmer's level as well as exporters, is usually formed as dry roll in one-meter length. Further process is done by cleaning, drying, cutting, sorting and packaging. The length after further process is 5–7.5 centimetres for easier packing. This commodity has been exported since 2015 mainly to USA (Ikhwan, 2015) and has a unique aroma that is rarely found in other countries' cinnamon (Ikhwan, 2015).

Comparative advantage is an important measure for analysing international trade flow (Jambor et al., 2018). Measuring RCA using Balassa Index is considerably relevant to current trade situation because RCA measures observed data. This index is used to decide which export destination is the most important for a country. It also measures the relative advantage or maybe the disadvantage experienced by a country in its specific trade commodity (Granabetter, 2016).

Constant market share (CMS) is usually used for export performance evaluation of each country (Othman and Rashid, 1993). Constant market share determines the country's export performance, and decomposes the market share variations of any country in international trade (Bonanno, 2015). CMS can show either weakness or strength of the factors influencing a country's export (Octaviana et al., 2016).

There are four indicators of CMS, namely:

- 1 world export growth effect (export growth)
- 2 commodity composition effect
- 3 market distribution effect

## 4 competitiveness effect.

The world export growth effect shows the changes of a country's export that is related to the world's exports. The country's export can be different from another country's export commodities because of specialisation. The commodity composition effect measures the specific commodity export growth compared to the world's export growth. Market distribution effect identifies if the country's export growth is higher than the average export to the destined market. The competitiveness effect measures the difference between actual and predicted export growth while the country is maintaining the commodity share.

### 3 Methodology

The export data of cinnamon from 1989 to 2017 were gathered from the UN Comtrade with the HS code 0906 for cinnamon products (cinnamon and cinnamon-tree flowers). Balassa index was used to measure the export of Indonesian cinnamon relative to its total exports and to the corresponding exports of the world. The original RCA index formula used in this study, based on Balassa index (Jambor et al., 2018) is written as:

$$RCA = (X_{ij}/X_{it}) / (X_{nj}/X_{nt})$$

where

$X_{ij}$  Indonesia's cinnamon export to the world

$X_{it}$  Indonesia's all goods export to the world

$X_{nj}$  world's cinnamon export to world

$X_{nt}$  world's all goods export to world.

The value of the RCA is either less or more than 1. A RCA value greater than 1 ( $RCA > 1$ ) indicates that Indonesia has a revealed comparative advantage. On the other hand, a RCA value less than 1 ( $RCA < 1$ ) indicates that Indonesia does not have a revealed comparative advantage.

The value of CMS for each indicator results to either a positive or negative sign. A positive world export growth effect implies that Indonesia has maintained its export share in the world market, otherwise a negative effect. A positive commodity composition effect concludes that Indonesia has concentrated in cinnamon as its favourable export commodity and has a positive demand growth. A positive market distribution effect means that Indonesia's cinnamon export to the US market is growing faster than the world's. A positive competitiveness effect indicates that Indonesia has maintained its share in cinnamon.

CMS values were calculated using the formula,

$$V_{(t)} - V_{(t-1)} = r_{\text{world}} \cdot V_{(t-1)} + (r_i \cdot r_{\text{world}}) V_{(t-1)i} + (r_{ij} - r_i) V_{(t-1)ij} + (V_{(t)ij} - V_{(t-1)ij})$$

where

$V$  value of Indonesia's all-goods exports in the world market

$V_i$  value of Indonesian cinnamon exports

$V_j$	value of Indonesia's all-goods exports to USA
$V_{ij}$	value of Indonesian cinnamon exports to USA
$t$	current year
$(t - 1)$	base year
$r_{\text{world}}$	percentage change in total world's all-goods exports from previous year to current year.
$r_i$	percentage change in world's cinnamon exports from previous year to current year
$r_{ij}$	percentage change in world's cinnamon exports to USA.

#### 4 Results and discussion

Table 1 shows the measurement items required for the calculation of RCA and CMS. Furthermore, the table indicates the total value in US dollars of Indonesia's and the world's cinnamon export to the world and the US market from 1989 to 2017. Indonesia's total value of cinnamon export to the USA from 1989 to 2017 is USD 644,632,172 or more than 60% of the world's exports (USD 1,008,859,228). For the same period, the total value of Indonesia's cinnamon export to the world amounted to USD 1,276,141,173 or about 50% of world's cinnamon export to world (USD 5,889,701,615). Therefore, the performance of Indonesian cinnamon is stronger in the US market compared to its position in the world market because other cinnamon producers in the world have improved production levels and increased exports to other countries instead of the USA.

**Table 1** Measurement items

<i>Measurement items</i>	<i>Total value (in USD)</i>
Indonesia's cinnamon exports to world ( $X_{ij}$ )	1,276,141,173
Indonesia's all goods exports to world ( $X_{it}$ )	2,669,769,885,904
World's cinnamon export to Indonesia	12,233,898
World's all goods export to Indonesia	2,224,189,619,956
World's cinnamon export to world ( $X_{nj}$ )	5,889,701,615
World's all goods export to world ( $X_{nt}$ )	273,201,216,147,030
Indonesia's cinnamon exports to USA	644,632,172
Indonesia's all goods exports to USA	285,064,941,152
World's cinnamon exports to USA	1,008,859,228
World's all goods exports to USA	34,746,234,238,529

A country has a comparative advantage if the RCA value is greater than 1. Table 2 summarises the RCA of Indonesian cinnamon in the world market from 1989 to 2017. All RCA values during those years are more than 1. This implies that Indonesia has a comparative advantage in the world market and has a relative advantage from cinnamon as its specific trade commodity.

The trend of RCA of Indonesian cinnamon at the world market is further shown in Figure 1. This figure shows the decreasing trend of RCA of Indonesian cinnamon at the world market. The highest RCA value was recorded in 1998, and continuously fluctuating to a further decrease. Since 2014, the RCA value of Indonesian cinnamon became stronger although a fluctuation still occurred.

**Table 2** RCA values of Indonesian cinnamon at world market, 1989-2017

<i>Year</i>	<i>RCA at world market</i>	<i>Year</i>	<i>RCA at world market</i>
1989	35	2004	22
1990	21	2005	17
1991	24	2006	17
1992	21	2007	21
1993	22	2008	20
1994	26	2009	15
1995	32	2010	19
1996	31	2011	16
1997	39	2012	14
1998	44	2013	19
1999	20	2014	24
2000	16	2015	23
2001	14	2016	20
2002	16	2017	25
2003	18		

**Figure 1** Trend of RCA values of Indonesian cinnamon at world market, 1989–2017

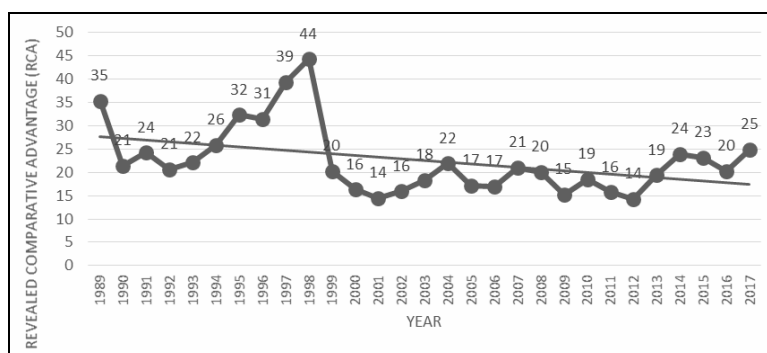


Table 3 shows the RCA values of Indonesian cinnamon at the US market from 1989 to 2017. As the main exporter of cinnamon in this market, Indonesian cinnamon is preferred compared to other cinnamon exporters in the world.

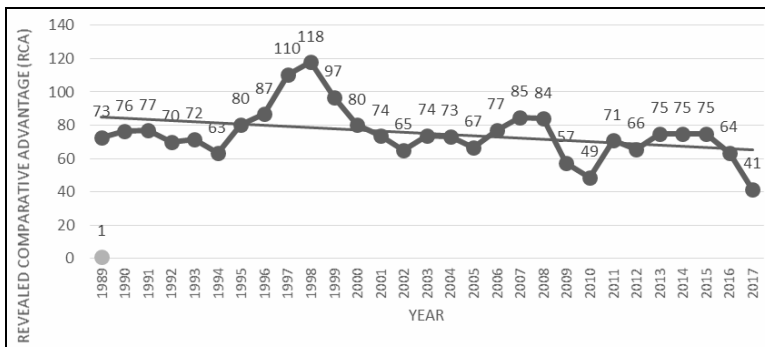
Figure 2 shows the trend of RCA value of Indonesian cinnamon in the US market. The lowest RCA value was seen in 2017. The drastic decrease of the RCA value in 2016–2017 can be attributed to the increasing competition within the market as producers of cinnamon in the world are also developing their commodities.

In the world market, however, Indonesian cinnamon maintained its competitive position as shown by a stable RCA. The comparison of Indonesian cinnamon exports to the world and the US market in 1989 to 2017 is displayed in Figure 3.

**Table 3** RCA values of Indonesian cinnamon at US market, 1989–2017

Year	RCA at US market	Year	RCA at US market
1989	73	2004	73
1990	76	2005	67
1991	77	2006	77
1992	70	2007	85
1993	72	2008	84
1994	63	2009	57
1995	80	2010	49
1996	87	2011	71
1997	110	2012	66
1998	118	2013	75
1999	97	2014	75
2000	80	2015	75
2001	74	2016	64
2002	65	2017	41
2003	74		

**Figure 2** Trend of RCA values of Indonesian cinnamon at US market, 1989–2017



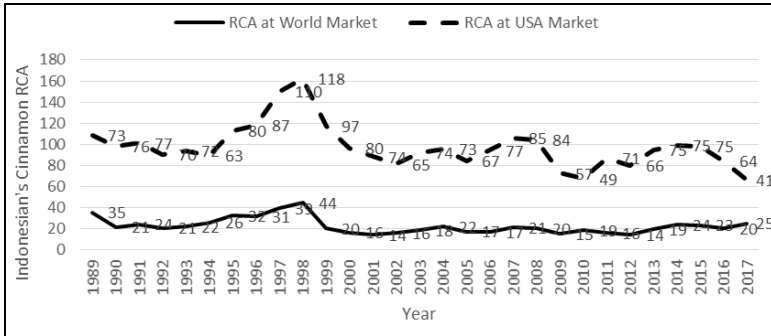
Revealed comparative advantage is to calculate the relative advantage or disadvantage of Indonesian cinnamon trade flows and assess the potential export by a country (Chaudhary, 2016) and in this study, the RCA value of Indonesian cinnamon indicate the potential export of this commodity.

Figure 3 shows that Indonesian cinnamon at the world market is not as strong as in the US market. Rather, there is a steady state in the world market. This can be attributed to Indonesia being the top cinnamon producer in the world.

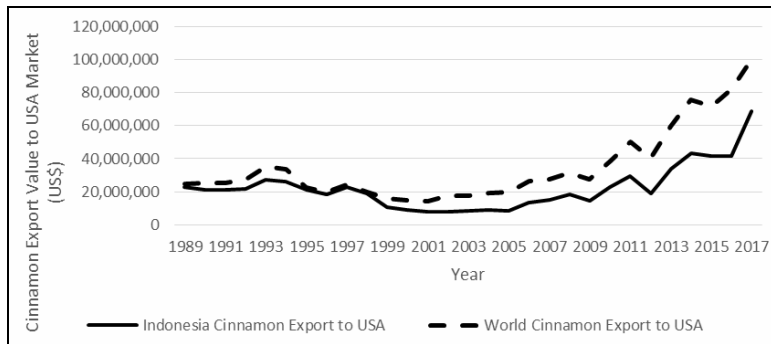
The cinnamon export value of Indonesia to the world and the US markets are both increasing. However, the export value to the world is higher than its export to the US market.

Table 4 shows the percentage change in Indonesia and the world export of cinnamon and total-all goods to the USA. The percentage increase of Indonesia’s cinnamon exports to the US market from 1989 to 2017 was 2.16, while the world’s export was 1.95. Total all-goods exports to the US market from Indonesia in the same period was 1.84 and the world’s export was 1.97.

**Figure 3** Trend of RCA values of Indonesian cinnamon export to world and USA, 1989–2017



**Figure 4** Cinnamon exports to US market, 1989–2017



CMS analysis identifies the difference between a country’s and world’s export growth. The CMS values measures the world trade effect, commodity composition effect, market distribution effect, and competitiveness effect.

The CMS effect for Indonesian cinnamon is shown as:

$$266,180,895,882.90 = 262,457,002,797.05 + 3,825,055,043.62 - 147,377,270.78 + 46,215,313.00$$

The values and signs of the four indicators of CMS are shown in Table 5. The positive world trade effect indicates that there is an increased impact of world exports on Indonesian cinnamon exports. If the world’s all goods export increase, the exports of Indonesian cinnamon also increases. Cinnamon export is increasing as the result of goods export growth. A positive commodity growth effect implies that Indonesia has focused in



exporting cinnamon resulting to a relatively fast market growth, and likewise, specialised in producing this commodity. Mirzanti et al. (2018) in their research concluded that it is important to enhance entrepreneurship in improving national competitiveness by creating innovation. Although Indonesia has revealed comparative advantage for its cinnamon products, innovation of its product is necessary to sustain its export of cinnamon in the world market.

**Table 4** Percentage change in exports, 1989–2017

<i>Year</i>	<i>Indonesia's cinnamon exports to USA</i>	<i>Indonesia's all-goods exports to USA</i>	<i>World's cinnamon exports to USA</i>	<i>World's all-goods exports to USA</i>
1989–1990	−0.08	−0.03	0.02	0.12
1990–1991	0.01	0.04	0.00	0.04
1991–1992	0.03	0.26	0.09	0.21
1992–1993	0.24	0.18	0.28	0.25
1993–1994	−0.03	0.11	−0.04	−0.03
1994–1995	−0.19	0.08	−0.33	0.14
1995–1996	−0.12	0.07	−0.11	0.18
1996–1997	0.23	0.05	0.20	0.31
1997–1998	−0.19	−0.02	−0.18	0.06
1998–1999	−0.42	−0.02	−0.20	0.11
1999–2000	−0.18	0.23	−0.06	0.17
2000–2001	−0.13	−0.09	−0.04	−0.07
2001–2002	0.03	−0.02	0.23	0.03
2002–2003	0.04	−0.02	0.02	0.08
2003–2004	0.11	0.19	0.09	0.16
2004–2005	−0.06	0.13	0.02	0.12
2005–2006	0.55	0.14	0.34	0.13
2006–2007	0.14	0.03	0.04	0.04
2007–2008	0.21	0.12	0.15	0.06
2008–2009	−0.21	−0.17	−0.13	−0.38
2009–2010	0.59	0.31	0.42	−0.01
2010–2011	0.27	0.15	0.29	0.69
2011–2012	−0.34	−0.10	−0.19	0.03
2012–2013	0.76	0.06	0.47	0.01
2013–2014	0.28	0.05	0.27	0.05
2014–2015	−0.04	−0.02	−0.06	−0.04
2015–2016	0.00	−0.01	0.15	−0.03
2016–2017	0.66	0.10	0.22	−0.47
<i>TOTAL</i>	<i>2.16</i>	<i>1.84</i>	<i>1.95</i>	<i>1.97</i>

The negative market distribution effect signifies that Indonesia is not able to increase its cinnamon export to the relatively growing US market compared to the world's cinnamon exports to the same destination.

The positive sign of the competitiveness of cinnamon shows the ability of Indonesia to improve its export position as well as its capability to respond to the changing situation and environment of the supply of cinnamon. A study by Santosa (2018) suggested that an export promotion policy to strengthen and speed up the competitiveness of Indonesia's commodity, especially in agroindustry products, is necessary. While Indonesia has difficulties to increase its cinnamon exports in the US market, it will be beneficial for Indonesia to promote and design modified cinnamon products for more usage among young consumers. It is not only about acceptability of new product features but also the promotion of the core benefits of Indonesian cinnamon is important (Hendrawan and Nugroho, 2018).

**Table 5** Constant market share (CMS) effects

<i>Item measured</i>	<i>Values</i>
$V_{(t)} - V_{(t-1)}$	146,781,933,106
$R_{world}$	11.9146402
$R_i$	9.526074408
$R_{ij}$	3.052789796
$r_{ij} - r_i$	-6.473284613
$V_{(t-1)ij}$	22,767,000
$V_{(t)ij}$	68,982,313
$V_{(t)ij} - V_{(t-1)ij}$	46,215,313
$V_{(t-1)}$	22,028,109,824
$V_{(t-1)i}$	33,701,000
	266,180,895,882.90
World trade effect	+262,457,002,797.05
Commodity composition effect	+3,825,055,043.62
Market distribution effect	-147,377,270.78
Competitiveness of product	+46,215,313.00

To capture other potential markets, the Indonesian government should facilitate the production and modification of cinnamon at the farmers' level. This integration with institutionalisation, increased quality and network will bring better production and economic growth for Indonesia (Sergi et al., 2019). In the study of Ranathilaka and Arachchi (2019), provision of appropriate agricultural facilities are crucial for enhancement of production and eventually, to the farmers' income. For the cinnamon commodity of Indonesia, the government can provide more infrastructure and facilities to develop cinnamon production. These include more land to grow, availability of fertilisers, and application of appropriate planting techniques, among others. Moreover, Jaya et al. (2009) indicated the multiplier effect of the development of cinnamon to the commodity itself, and the farmers in the long term; and suggested the integration between the farmer-based cinnamon price and exporter's price to revitalise the function of cooperation and have a bigger contribution of cinnamon to the national economy.

The changing cinnamon market could occur in the future, based on the trends shown in figures provided in this paper, as the culture, beliefs, needs, wants and managerial sides of global business change (Adeloka and Sergi, 2017). If cinnamon is still considered as an important export commodity, the Indonesian, especially entrepreneurs or cinnamon planters, along with the government, should work together to maintain the comparative position and market share position of this commodity either in US market or world market.

## 5 Conclusions

USA is a major importer of Indonesian cinnamon since 1989. The results showed that Indonesian cinnamon has comparative advantage in either the world or US markets. This advantage of Indonesian cinnamon in the world market makes it worthy to focus on the cinnamon commodity development strategies in the country. The Indonesian cinnamon performance measured by the constant market share (CMS) analysis indicated that the increase of Indonesian exports is supported by the positive sign of the world effect.

Indonesia has been developing and focusing on cinnamon these recent years to target a higher and positive commodity growth effect. However in the US market, Indonesian cinnamon faces stiff competition with other cinnamon producers in the world which also export their cinnamon to the USA. Thus, the market distribution effect is negative.

A positive value of competitiveness of Indonesian cinnamon means that Indonesian cinnamon export position is maintained well. With a competitive US market, it is recommended that exporters of Indonesian cinnamon must identify other potential export destinations where no cinnamon producer captures a significant market share.

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