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Export Demand of Non-Timber Forest Products: A Case Study of Cinnamon Products in Indonesia

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ABSTRACT

Indonesia is a major cinnamon (*Cinnamomum* sp.) exporting country in the world. Previous research generally measured the information on competitiveness. To improve performance, export demand behavior should also be known. This study aimed to estimate Indonesia's cinnamon export demand function. The panel data model was investigated using panel data exports to 11 country destinations from 2010 to 2020. The classical assumption test of heteroscedasticity and autocorrelation and the model specification test were conducted. The results show that the export demand function can be represented well by the fixed-effects model, which explains about 96% of its variance. The obtained income and price elasticities were 1.08 and -0.30, indicating normal goods with inelastic export demand. It implies that countries with high-income growth should be prioritized in export expansion, and raising an export price might be a good policy option. Research on global supply chains and price volatility is needed. In addition, this study results in formulating policies related to developing the cinnamon product industry and trade.

1. Introduction

Indonesia has been the center of world spice trade since ancient times. One spice that is in great demand is cinnamon (*Cinnamomum* sp.) products, either in the form of pieces, rolls, or powders used as food seasonings, cosmetic basic ingredients, tea flavors, or essential oils (Herwita and Eliza 2019; Nurhayati et al. 2019; Setiawan and Widiputera 2020). According to Ministry of Forestry Decree No. 35/Menhut-II/2007, cinnamon is a non-timber forest product that positively impacts the income of the people who dwell in and on the fringe of forests. This cinnamon product comes from the bark of the cinnamon tree. In Indonesia, cinnamon products generally come from the bark of the *Cinnamomum burmanii* tree, with the main production centers in Jambi and West Sumatra Provinces, particularly in Kerinci Regency, which supplies 80% of Indonesia's total cinnamon exports (Center for Research and Development of Plantation Plants 2010; Ferry 2013; Firlawanti and Fatmawati 2021; Inisa et al. 2021). The contribution of the Indonesian cinnamon product exports in terms of quantity and value to world cinnamon product exports during the 2010–2020 period was 34.4% and 22.0%, respectively. The main destination countries for exports in that period were the United States (41.87%), the Netherlands (8.45%), and Brazil (4.23%) (UN Comtrade 2023).

Furthermore, the export quantity of Indonesian cinnamon products increased from 46.05 thousand tons in 2010 to 67.05 thousand tons in 2020, an increase of 3.8% per year, while the real value of cinnamon product exports increased by about US$ 90 million over the period 2010–2020, an increase of 11.0% per year. Meanwhile, the world exports of cinnamon products increased from 118.23 thousand tons in 2010 to 171.74 thousand tons in 2020, an increase of 3.8% per year, while the real value of world cinnamon product exports increased by about US$ 450 million over the period 2010–2020, an increase of 11.5% per year (UN Comtrade 2023).

The annual growth percentage of the real value and quantity exports of Indonesian and world cinnamon products in 2010–2020 was relatively similar. However, its value contribution to the world (22.0%) was much lower than its quantity contribution (34.4%). This tendency shows that Indonesia's average cinnamon export value is lower than the average cinnamon export value of the world. Nevertheless, the positive growth of cinnamon product exports during the period 2010–2020 shows that the cinnamon product industry is an industry that needs to be maintained and even improved.

Previous research has generally measured the information on competitiveness (Annisa et al. 2021; Nurhayati et al. 2019; Sari and Divinagracia 2021) or competitiveness in the United States (Iskandar et al. 2012; Putri et al. 2020). Information on competitiveness needs to be complemented by an understanding of economic variables, such as export price and income of importer country that affect the export performance to various other export destination countries as a consideration in formulating policies related to the development of the cinnamon product industry. Therefore, this study aims to estimate the demand function of cinnamon exports to 11 destination countries, which have covered around 80% of Indonesia's total cinnamon exports.

2. Materials and Methods

2.1. Data Types and Sources

Estimation of the cinnamon product export demand function using data panel in the form of total quantity and total export value of three Indonesian cinnamon product commodities, namely HS 090611 (spices: cinnamon, neither crushed nor ground), HS 090619 (spices: cinnamon and cinnamon-tree flowers, other than cinnamon neither crushed nor ground), and HS 090620 (spices: cinnamon and cinnamon-tree flowers crushed nor ground) to 11 export destination countries, namely Australia, Brazil, Germany, India, Israel, Malaysia, Netherland, Singapore, Thailand, United States of America, and Vietnam for the period 2010–2020, which covered about 80% of the total export value during that period. The period 2010–2020 was selected based on the availability and completeness of the data. Data panels on export quantity and value, GDP and GDP deflator, and exchange rates were taken from the UN Comtrade (2023) and the World Bank (2022). The nominal price of Indonesian cinnamon products was obtained as follows: (export value/export quantity). All values are then expressed in 2010 prices.

2.2. Theoretical Model

Based on consumer theory, the demand for a particular commodity is expressed by Equation 1 (Nicholson and Snyder 2012).

$$Y_{it} = f(P_{it}, P_{ijt}, \dots , P_{ikt}, GDP_{it}, Z_t, U_{it}) \quad (1)$$

where Y_{it} is the export quantity of cinnamon products to country *i* during year *t*, P_{it} is export price, P_{ijt}, ..., P_{ikt} is the export price of competitor country, GDP_{it} is the income destination country, Z_t is other explanatory modifiers at *t-th* time, and U_{it} is random error.

In addition to export prices (P_{it}), export demand shifters that have the most significant influence based on literature were also considered as explanatory variables, such as the export prices of competing countries for the same commodity (P_{ikt}) and the income of importing countries (GDP_{it}). Asrini et al. (2021) and Humaira and Rochdiani (2021) found that export prices significantly affect export demand for Indonesian cinnamon products. Hence, a simpler equation is postulated as Equation 2 follows (Djaja 1992; Simangunsong et al. 2021).

$$Y_{it} = f(P_{it}, P_{kt}, GDP_{it}, U_{it}) \quad (2)$$

UN Comtrade (2023) showed that there are four cinnamon exporting countries in the world as potential competitors for Indonesia, namely China, Vietnam, Madagascar, and Sri Lanka; however, only Vietnam has complete data with export destinations to the same 11 countries as Indonesia. Further observations showed that Vietnam's cinnamon export price was far above Indonesia's, so Vietnam could not be considered as Indonesia's competitor. Therefore, this study used only export prices and the income of the destination country as explanatory variables. Equation 2 is further simplified to Equation 3. To eliminate the effect of inflation (money illusion) and measurement errors, all values were expressed in 2010 prices. They are real export prices (RP_{it}) and the GDP of importing countries ($RGDP_{it}$).

$$Yit = f(RP_{it}, RGDP_{it}, U_{it}) \quad (3)$$

The empirical model of the cinnamon product export demand function Equation 3 was then transformed into a double-log-linear form Equation 4 to reduce heteroscedasticity (Gujarati 2015; Gujarati and Porter 2009; Simangunsong et al. 2021) and produce parameters that are easy to interpret, namely elasticity.

$$log\ Y_{it} = \alpha_{it} + \beta_1\ log\ RP_{it} + \beta_2\ log\ RGDP_{it} + U_{it} \quad (4)$$

Requirements for U_{it} are to be purely random ($U_{it} \sim IIDN(0, \sigma^2)$).

2.3. Empirical Model

Panel data analysis was applied to estimate Equation 4. Having more informative data makes estimation more efficient. Individual heterogeneity can also be controlled. Logarithmic transformation can further reduce collinearity between variables and heteroscedasticity (Gujarati 2015; Gujarati and Porter 2009; Simangunsong et al. 2021). Three kinds of empirical models, such as pooled, fixed effects, and random effects, were examined to find a better representation of the cinnamon product export demand function.

2.3.1. Pooled

In pooled models α and β are assumed to be the same in all countries. This model in compact form is shown in Equation 5. The Pooled Ordinary Least Squares method was then used to estimate parameters using all data.

$$Y_{it} = \alpha + \beta'\ X_{it} + U_{it} \quad (5)$$

where X_{it} is exogenous variables (P_{it} and GDP_{it}), α is intercepted, and β is sloped ($\beta 1$, $\beta 2$).

2.3.2. Fixed effects

The assumption of the same intercept and slopes across the country and over time is considered incompatible with the intended use of the panel data. This fixed-effect model then assumes α_i was specific to country *i* and constant over time, while slopes are the same across the country and over time (β_L). This difference is captured in Equation 6 and then estimated using the Least Square Dummy Variable (LSDV).

$$Yit = \alpha_i + \beta_L' X_{it} + U_{it} \quad (6)$$

2.3.3. Random effects

In this model, the difference between states is entered into error (v_i), whose value is specific to country *i* and constant over time. The slopes (β_R) are the same across the country and over time. It is the error component model as formulated in Equation 7.

$$Y_{it} = \alpha + \beta_R' X_{it} + v_i + U_{it} \quad (7)$$

The Feasible Generalized Least Squares (FGLS), as proposed by Greene (1997) and Hsiao (1986) and used by Simangunsong et al. (2021), was applied to estimate Equation 7.

2.4. Classical Assumption Test

2.4.1. Heteroscedasticity

Heteroscedasticity means that error variance is not constant. As a result, parameter variance is inefficient even though the alleged parameter values remain unbiased and consistent. The presence of heteroscedasticity in the panel data can be detected using the Modified Wald test method. The FGLS method with white heteroscedasticity will be applied if heteroscedasticity is detected.

2.4.2. Autocorrelation

Autocorrelation occurs when errors in one time period are correlated with errors in other periods. Although the unbiasedness of the parameter is not affected, it makes estimation inefficient. The Durbin-Watson (DW) statistic can be used to detect autocorrelation. If the DW value is around two, it indicates an absence of autocorrelation (Gujarati 2015; Gujarati and Porter 2009; Simangunsong et al. 2021).

2.5. Model Selection

2.5.1. Chow specification test

The Chow test is commonly referred to as the F test. It is a specification test. This research is used to choose between pooled (H_0) or fixed effects (H_1). The tested hypotheses are as follows:

H_0: $\alpha_1 = \alpha_2 = ... = \alpha_n$ *given* $\beta_1 = \beta_2 = ... = \beta_n$

H_1: $\alpha_1 \neq \alpha_2 \neq ... \neq \alpha_n$ *given* $\beta_1 = \beta_2 = ... = \beta_n$

If the p-value of Chow < 0.05, then a fixed effect would be chosen.

2.5.2. Hausman specification test

The Hausman specification test is a Chi-square test. It is used to choose between random effects (H_0) or fixed effects (H_1). The tested hypotheses are as follows:

H_0: $E(\alpha_{i|xi}) = 0$

H_1: $E(\alpha_{i|xi}) \neq 0$

If the Hausman value is greater than the critical value Chi-square, then fixed effects would be chosen.

2.5.3. The Breusch-Pagan specification test

The BP test is a Lagrange Multiplier test. It is used to choose between pooled (H_0) or random effects (H_1). The tested hypotheses are as follows:

H_0: $\sigma_v^2 = 0$

H_1: $\sigma_v^2 \neq 0$

If the LM value is greater than the critical value of Chi-square, then random effects would be chosen.

3. Results and Discussion

Statistical descriptions for export quantity, real price of cinnamon products exports, and real GDP of export destination countries are presented in **Table 1**. Meanwhile, initial parameter estimates of three-panel data models, pooled, fixed effects, and random effects were obtained and summarized in **Table 2**.

Table 1. Export quantity, real price, and real GDP in 2010–2020 by destination country

Destination Country	Export quantity (thousand tons)				Real price (USD/ton)				Real GDP (Billion USD)			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Australia	0.39	0.09	0.21	0.51	2,743	1,138	1,441	4,902	1,382	139	1,148	1,554
Brazil	2.09	0.41	1.43	2.91	2,257	1,258	814	4,582	2,321	64	2,209	2,423
Germany	1.20	0.36	0.75	1.94	2,552	1,161	1,219	4,175	3,701	181	3,400	3,964
India	1.03	0.36	0.46	1.86	2,531	1,392	684	4,493	2,270	451	1,676	2,871
Israel	0.29	0.15	0.10	0.56	2,723	1,686	796	5,720	287	34	235	334
Malaysia	1.45	0.32	0.93	1.97	2,044	1,046	915	4,093	329	49	255	400
Netherlands	4.17	1.48	2.30	7.58	2,402	1,178	1,130	4,336	892	43	847	965
Singapore	0.56	0.33	0.16	1.14	2,844	1,610	985	5,491	296	33	240	340
Thailand	1.54	0.32	1.02	2.13	2,971	1,564	1,281	5,808	397	38	341	453
United States	20.65	2.68	15.34	24.14	2,457	1,290	1,109	4,695	16,645	1,102	15,049	18,297
Vietnam	1.71	0.73	0.54	2.88	2,140	1,053	962	3,834	199	40	147	262

Sources: UN Comtrade 2023; World Bank 2022.

Table 2 shows that all pooled elasticities had the expected signs. They were also significant at the 5% level. The obtained price and GDP elasticities were -0.40 and 0.54, respectively. However, the DW value of 0.14 indicated a positive serial correlation. Further, the heteroscedasticity test showed that the error variance was not constant and significant, as indicated by the Likelihood Ratio (LR) value of 83.3 with a p-value of 0.00. The unequal error variance comes from a cross-section. Corrections for serial correlation and heteroscedasticity were required. The FGLS was then used to re-estimate the pooled model. However, serial correlation was still persistent after correction. The FGLS with robust white covariances was then used to re-estimate the pooled model, and the results are presented in **Table 3**. The sign of price elasticity (0.09) was wrong and not significant. The sign of income elasticity (0.43) was as expected but insignificant at the 5% level. The adjusted R^2 obtained was high, at 0.95. Regarding the expected signs and statistical significance, these obtained price and income elasticities were worse than those found by Simangunsong et al. (2021), showing both had the expected signs and were significant at 5%. It might be due to the different products, such as wooden furniture, even though they used the same estimation procedures.

Table 2. Initial parameter estimates

Item	Pooled Model			Fixed effects Model			Random Effects Model		
	Coef	S.E	p-value	Coef	S.E	p-value	Coef	S.E	p-value
Variable									
C	6.60	1.33	0.00	1.79	2.85	0.53	4.89	1.24	0.00
LRPRICE	-0.40	0.16	0.02	-0.37	0.11	0.00	-0.27	0.07	0.00
LRGDP	0.54	0.06	0.00	1.20	0.51	0.02	0.64	0.20	0.00
Statistic									
R^2	0.36			0.92			0.12		
Adjusted R^2	0.35			0.91			0.10		
S.E of Reg	0.97			0.36			0.36		
F-Stat	33.27		0.00	100.54		0.00	7.75		0.00
DW	0.14			1.06			0.94		
LR Test	83.3		0.00						

Notes: Coef = Coefficient (parameter estimates), S.E = Standard Error of Coefficient, C = Intercept, LRPRICE = Logarithm of Real Export Price, LRGDP = Logarithm of Real Gross Domestic Product, Reg = Regression, F-Stat = F-Statistic, DW = Durbin-Watson Statistic, LR Test = Likelihood Ratio Test.

Table 2 also shows that all elasticities of the fixed effects model had the expected signs and were significant at the 5% level. The price and income elasticities were -0.37 and 1.20, respectively. However, the DW value of 1.06 indicated a positive serial correlation. Correction for serial correlation was needed. Like the pooled model, serial correlation persisted after correction with AR (1). The FGLS with white robust covariances was then applied to re-estimate the fixed effects model. The revised estimates are shown in **Table 3**. The sign of elasticities was as expected and significant at the 5% level. The obtained price and GDP elasticities were -0.30 (p-value of 0.00) and 1.08 (p-value of 0.00), respectively. The adjusted R^2 value was 0.96 and higher than that value from the pooled. This result again shows the importance of the country effect (**Table 1**). These obtained price and income elasticities were similar to those found by Simangunsong et al. (2021), in which both elasticities had the expected signs and were significant at 5%.

All coefficients of the random effects model had the expected signs and were significant at the 5% level (**Table 2**). The price elasticity was -0.27, and the income elasticity was 0.64. However, the DW value of 0.94 was much lower than 2, which indicated the presence of serial correlation in the model. Like the fixed effects model, correction for serial correlation was necessary. The FGLS with white robust covariances was used to re-estimate the model. The results are shown in **Table 3**. The sign of price and income elasticity was as expected and significant at the 5% level. The price elasticity was -0.27, and the income elasticity was 0.64. However, the obtained adjusted R^2 value of 0.10 was low. In terms of statistical significance, these obtained price and income elasticities were better than those found by Simangunsong et al. (2021), in which both elasticities had the expected signs but were not significantly different from 0 at the 5% level.

Table 3. Revised parameter estimates

Item	Pooled Model			Fixed effects Model			Random Effects Model		
	Coef	S.E	p-value	Coef	S.E	p-value	Coef	S.E	p-value
Variable									
C	-8.47	41.61	0.84	2.03	2.18	0.35	4.89	1.34	0.00
LRPRICE	0.09	0.18	0.62	-0.30	0.11	0.00	-0.27	0.10	0.00
LRGDP	0.43	0.59	0.47	1.08	0.39	0.00	0.64	0.16	0.00
Statistic									
R^2	0.96			0.97			0.12		
Adjusted R^2	0.95			0.96			0.10		
S.E of Reg	0.35			0.36			0.37		
F-Stat	762.17		0.00	263.36		0.00	7.76		0.00
DW	2.28			1.35			1.00		

Notes: Coef = Coefficient (parameter estimates), S.E = Standard Error of Coefficient, C = Intercept, LRPRICE = Logarithm of Real Export Price, LRGDP = Logarithm of Real Gross Domestic Product, Reg = Regression, F-Stat = F-Statistic, DW = Durbin-Watson Statistic, LR Test = Likelihood Ratio Test.

The results of the specification test for three-panel data models are presented in **Table 4**. The Chow test ensures that the intercept is different for each country, as indicated by the statistical value F of 157.98 with a p-value of 0.00. This result means the fixed effects model is chosen over the pooled model. The Breusch-Pagan test ensures that country errors are heterogeneous and do not correlate with exogenous variables, as indicated by the LM stat of 83.30 with a p-value of 0.00. This tendency implies that random effects are more appropriate than pooled ones for estimating export demand. Further, the Hausman test indicates that the specification of random effects was not rejected, as indicated by a Chi-square value of 3.23 and p-value of 0.20. This Hausman test result differed from the Hausman test result obtained by Simangunsong et al. (2021), indicating a specification error from the random-effects model compared to the fixed-effects model.

Table 4. The results of the specification test of an export demand function

Test	Type	Value	p-value
Chow test	F Stat	157.98	0.00
Breusch-Pagan Test	LM Stat	83.30	0.00
Hausman test	Chi-Square	3.23	0.20

Overall, the fixed effects model is the best model to represent the export demand function of Indonesian cinnamon products. The sign price and income elasticities were as expected and significant at 5%. Moreover, the obtained adjusted R^2 value was also high. The fixed effects model can explain export demand variance very well. The price elasticity value of -0.30 indicates that export demand for cinnamon products is inelastic (Mankiw 2015), which means that if there is an increase or decrease in the price of cinnamon by 1%, it will decrease or increase the cinnamon demand by 0.30%. Meanwhile, the positive GDP (income) elasticity (1.08) indicates that Indonesian cinnamon is a normal good.

Annisa et al. (2021) also found that the world's demand for Indonesian cinnamon powder was inelastic. Besides being the world's main producer, Indonesia still has a comparative advantage in the cinnamon trade in the global market (Sari and Divinagracia 2021). However, Indonesia had difficulty maintaining its export growth consistently in the international market. Its Export Competitive Index (ECI) value was not greater than those ECI values of Madagascar and

Vietnam (Sa'diyah and Darwanto 2020). Inconsistencies can be caused by difficulties in producing standardized and certified products according to international market demand (Menggala and Damme 2018). Furthermore, the relatively low and fluctuating price of cinnamon products received at the farmer level significantly affects farmers' income, so farmers have not been able to prosper by trading cinnamon products. These erratic price fluctuations occur due to marketing and product prices controlled by middlemen commonly found in simple trading systems. Information on price changes at the exporter level, the reference market price, does not reach the farmer level. This tendency shows that cinnamon trading is inefficient (Firlawanti and Fatmawati 2021; Hidayani 2012). To address this issue, farmers should join and take advantage of the role of farmer groups and cooperatives to improve their bargaining position and facilitate information in accessing markets. Moreover, the government should assist farmers in terms of market access.

The cinnamon product was found to be normal goods with inelastic demand. Based on the magnitude of elasticities, export quantity is more sensitive to income changes than price changes. As normal goods, countries with high income growth should be prioritized in export expansion, and their required cinnamon products quality should also be considered. Meanwhile, inelastic demand implies that export quantity is hardly affected when price changes. Raising an export price might be a good policy option since an increase in export price would hardly decrease export demand. Formulating policies related to the improvement of the Indonesian cinnamon product industry and trade research on supply chain and price volatility is needed in addition to understanding the effect of cinnamon product prices and importer country income on cinnamon production export demand that has been obtained from this study.

4. Conclusions

The fixed effects model can represent the export demand function of Indonesian cinnamon products. About 96% of export demand variance can be explained by the fixed-effects model. Cinnamon products are normal goods with inelastic demand. Inelastic demand implies that export quantity is hardly affected when price changes. Raising an export price might be a good policy option since an increase in export price would hardly decrease export demand. Moreover, research on the global supply chain and the price volatility of cinnamon products is needed. Coupled with understanding price and importer country income effects on export demand obtained from this study, understanding the global supply chain and price volatility is needed to formulate policies to improve the Indonesian cinnamon product industry and trade.

References

Annisa, D. I., Rifin, A., and Novianti, T. 2021. Analysis of Indonesian Cinnamon Powder Demand in The World Market. *Indonesian Journal of Agricultural Sciences* 26(3): 363–369. DOI: 10.18343/jipi.26.32010.363

Asrini, Y. N., Hodijah, S., and Nurhayani. 2021. Analysis of Indonesian Cinnamon Export Volume to the United States. *E-Journal Industrial Trade and Moneter* 9(2): 107–120.

Center for Research and Development of Plantation Plants. 2010. *Getting to Know How to Harvest and Process Cinnamon in Kerinci Regency*. Semi-Popular Magazine of Spice Plants and Industry.

Djaja, K. 1992. Export Performance and Export Demand of Indonesian Forest Products. Iowa State

University. Iowa, USA.

Ferry, Y. 2013. Development Prospects of Cinnamon (*Cinnamomum burmanii*) in Indonesia. *Sirinov* 1(1): 11–20.

Firlawanti, L. B., and Fatmawati, K. 2021. Value Chain Analyst and Revenue Contribution to the Utilization of Cinnamon HHBK on Tidore Island. *Journal of Research Innovation* 1(9): 1787–1794.

Greene, W. H. 1997. *Econometric Analysis. 3rd edn*. Prentice Hall, Upper Saddle River.

Gujarati, D. N., and Porter, D. C. 2009. *Basic Econometric. 5th Ed*. McGraw Hill, New York.

Gujarati, D. N. 2015. *Econometrics by Example. 2nd Ed*. Palgrave, London.

Herwita, I., and Eliza, M. 2019. Cinnamon Cultivation and Post-Harvest Technology (*Cinnamomum burmanii*). Research Institute of Medicinal Plants and Spices. <http://libang.pertanian.go.id> (May. 2023).

Hidayani, N. 2012. Analysis of Cinnamon Commerce (*Cinnamomum burmanii* Blume) in Kerinci District, Jambi Province. IPB University. Bogor, Indonesia.

Hsiao, C. 1986. *Analysis of Panel Data*. Cambridge University Press, New York.

Humaira, F. A., and Rochdiani, D. 2021. Factors Affecting the Export Volume of Indonesian Cinnamon. *Journal of Agribusiness-Minded Scientific Community Thinking* 7(1): 437–449. DOI: 10.25157/ma.v7i1.4675

Inisa, A., Junaidi, J., and Bhakti, A. 2021. Income Analysis of Cinnamon Bark (*Cassia vera*) Smallholders: A Case Study in Pengasi Lama Village, Bukit Kerman District, Kerinci Regency. *E-Journal Industrial Trade and Moneter* 9(3): 107–120.

Iskandar, S., Jauhari, H., Mulyana, A., and Dewata, E. 2012. Analysis of Determinant Factors Influencing Cinnamon Export and Prices in Indonesia. *Proceeding The 13th Malaysia Indonesia Conference on Economics, Management and Accounting (MIICEMA)* 955–965.

Mankiw, N. G. 2015. *Pengantar Ekonomi Ed ke-2 Jilid 1*. PT. Gelora Aksara Pratama, Jakarta.

Menggala, S. R., and Damme, P. V. 2018. Improving Indonesian Cinnamon (*C. burmannii* (Nees and t. nees) Blume) Value Chains for Greater Farmers' Incomes. *IOP Conference Series: Earth and Environmental Science* 129(1): 012026. DOI: 10.1088/1755-1315/129/1/012026

Nicholson, W., and Snyder, C. 2012. *Microeconomic Theory: Basic Principles and Extensions, Eleventh Edition*. South-Western Cengage Learning, Ohio.

Nurhayati, E., Hartoyo, S., and Multasih, S. 2019. Analysis of the Development of Indonesian Nutmeg, Lawang, and Cardamom. *Indonesian Journal of Economics and Development* 19(2): 173–190. DOI: 10.21002/jepi.v19i2.847

Putri, I. U., Sentosa, S. U., and Sofyan, E. 2020. Analysis of Factors Affecting Indonesia's Cinnamon Exports to The United States. *Padang International Conference on Education, Economics, Business and Accounting* 124: 384–390. DOI: 10.2991/aebmr.k.200305.094

Sa'diyah, P. F. I., and Darwanto, D. H. 2020. Indonesian Cinnamon Competitiveness and Competitor Countries in International Market. *Journal Agraris* 6(2):123–135. DOI: 10.18196/agr.6296

Sari, E. T., and Divinagracia, M. R. G. 2021. Revealed Comparative Advantage and Constant Market Share Analysis of Indonesian Cinnamon in The World Market. *International Journal of Economic Policy in Emerging Economies* 14(2): 187–198. DOI: 10.1504/ijepee.2021.113583

Setiawan, B., and Widiputera, F. 2020. Internalization Strategy of Conscious Awareness of Spices Lane as National Brand and National Pride of Indonesian Nation. *Technium Social Sciences*

Journal 7: 337–350.
Simangunsong, H. S. M. U., Simangunsong, B. C. H., and Manurung, E. G. T. 2021. Estimation of Indonesia Wooden Furniture Export Demand Function. *Jurnal Sylva Lestari* 9(3): 357–367. DOI: 10.23960/jsl.v9i3.482
UN Comtrade. 2023. International Trade Statistics Database. United Nations Commodity Trade (UN Comtrade). <https://comtrade.un.org/data/> (Jan. 4, 2023).
World Bank. 2022. World Bank Data Bank. <https://databank.worldbank.org/home.aspx> (Nov. 10, 2020).