



Research Article

Competitiveness of Indonesia's Gambier Exports in the Indian Market: A VECM Analysis

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A B S T R A C T

This study aims to: (1) describe the development of Indonesia's gambier exports, (2) assess the competitiveness of Indonesian gambier exports in the Indian market, and (3) identify the factors influencing the competitiveness of Indonesian gambier exports in the Indian market. A quantitative approach is employed using time-series data from 1999 to 2024, obtained from Statistics Indonesia (BPS), the International Trade Centre (ITC), UN Comtrade, and Bank Indonesia. Export competitiveness is measured using the Revealed Comparative Advantage (RCA) index, while its determinants are analysed using a Vector Error Correction Model (VECM). The findings show that Indonesia's gambier exports to India have fluctuated over time but display a long-term upward trend. The RCA values consistently fall within the category of strong comparative advantage, with the value of 21.23 to 38.25, demonstrating Indonesia's dominant position as the primary supplier of gambier in the Indian market. The VECM results reveal that, in the long run, export volume, Indonesian gambier export prices, global gambier export prices, export prices of competing countries (Italy and Singapore), and the exchange rate significantly affect export competitiveness.

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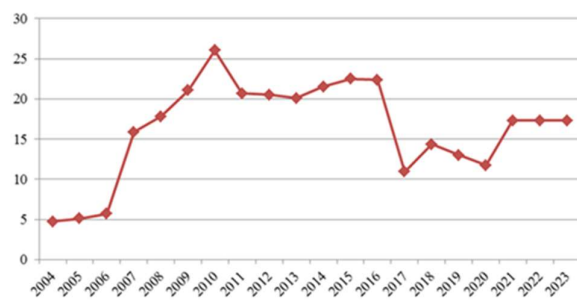
1. INTRODUCTION

Gambier is one of Indonesia's export commodities with promising commercial prospects due to its wide range of uses. Gambier is a shrubby plant belonging to the Rubiaceae family, whose benefits are derived from extracts (sap) obtained from its leaves and twigs, which contain catechin and tannin compounds (Sebayang et al., 2020). Gambier is produced in the form of dried extract obtained through boiling and pressing processes of gambier leaves and twigs (*Uncaria gambir* Roxb) (Nasrul et al., 2024). Gambier has been widely utilized for medicinal purposes, including the treatment of burns, diarrhea, headaches, and oral ulcers. In addition, it is

traditionally used for betel chewing and as a natural textile dye. The gambier plant provides extensive benefits in both health and cosmetic applications (Agriqisthi et al., 2023). Furthermore, gambier has traditionally been used to treat wounds, gastric ulcers, asthma, gastrointestinal disorders, bacterial and fungal infections, gum disease, toothache, cancer, cirrhosis, diabetes, rheumatism, dysentery, and urinary tract inflammation (Munggari et al., 2022). In 2024, gambier exports under HS Code 320190 exceeded US\$77.2 million in value, with an export volume of approximately 22.2 thousand tons (United Nations Commodity Trade, 2025).

In 2023, Indonesia exported gambier to several countries worldwide, with the three largest export destinations being India at 18,839.75 tons, Pakistan at 542.99 tons, and China at 376.02 tons (United Nations Commodity Trade, 2025). India represents the primary importer of gambier, characterized by consistently high demand. The country hosts one of the largest leather tanning industries in the world, which absorbs raw material supplies from various exporting countries, including Indonesian gambier (Widyastuti, 2021). Approximately 90% of India's gambier demand is fulfilled through imports, with more than 60% supplied by Indonesia (Indian Leather Council, 2022).

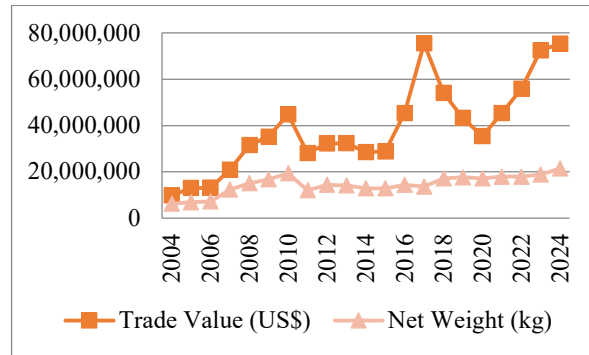
Gambier significantly supports Indonesia's national economy (Putri & Yelfiarita, 2022). However, as illustrated in Figure 1, Indonesia's gambier production exhibits fluctuations over time. These fluctuations have implications for export instability and the competitiveness of Indonesian gambier in the international market. In 2023, Indonesia exported gambier under HS Code 320190 to global markets, totalling 20,083.02 tons and a total export value of US\$74,799,406 (United Nations Commodity Trade, 2025). Indonesia remained the main supplier of gambier to the Indian market, recording an export value of US\$75.41 million and a volume of 21,389.1 tons in 2024, significantly surpassing other exporting countries such as Italy, Belgium, Singapore, and France. From a price perspective, Indonesian gambier (HS Code 320190) was exported at the lowest average price, approximately US\$3.53 per kg, compared to competing countries such as Italy, which received a substantially higher price (US\$4.52 per kg), despite exporting only a small amount (United Nations Commodity Trade, 2025).



Source: Directorate General of Estate Crops, Ministry of Agriculture of the Republic of Indonesia (DGECI), 2023

Figure 1. Indonesian Gambier Production, 2004-2023

The development of Indonesian gambier exports to the Indian market has also shown fluctuations. The highest export value was recorded in 2017 at US\$75,489,827, while the lowest was in 2004 at US\$9,813,954 (United Nations Commodity Trade, 2025).



Source: United Nations Commodity Trade Statistics Database, 2025

Figure 2. Total Export Value and Volume of Indonesian Gambier in the Indian Market, 2004-2024

Figure 2 shows Indonesia's gambier export value and volume in the Indian market from 2004 to 2024, with a fluctuating trend. Changes in total export value indicate challenges in maintaining consistency in both production and quality of Indonesian gambier, even as export value has generally increased due to rising international prices. These fluctuations may signal structural issues affecting Gambier's competitiveness at the production level, within the supply chain, and in responding to global market competition. From a macroeconomic perspective, fluctuations in the Indonesian rupiah exchange rate and domestic inflation levels also influence the export competitiveness of Indonesian gambier. The appreciation of the rupiah against the United States dollar tends to reduce Indonesia's export competitiveness in the Indian market (Putri & Yelfiarita, 2022).

Studies examining the competitiveness and determinants of Indonesian gambier exports in the Indian market remain relatively limited. This condition provides an opportunity for the present study to enrich the existing literature on the development of Indonesian gambier exports in the global market. Unlike previous studies that generally employed multiple linear regression analysis, this research offers novelty by applying Vector Autoregression (VAR) or Vector Error Correction Model (VECM). The VAR/VECM approach was selected because it can capture dynamic interrelationships among variables in multivariate time-series data and supports forecasting, structural inference, and more comprehensive economic policy evaluation (Putri et al., 2022). Based on the research background and problem formulation described above, the objectives of this study are: (1) to describe the development of Indonesian gambier exports; (2) to analyse the export competitiveness of Indonesian gambier (HS Code 320190) in the Indian market; and (3) to analyse the factors influencing the export competitiveness of Indonesian gambier Indonesian gambier in the Indian market.

2. METHOD

This study analyses the competitiveness of Indonesian gambier exports in the Indian market using a quantitative approach based on secondary time-series data. The dataset covers the period from 1999 to 2024 and is compiled from official and internationally recognised sources, including Statistics Indonesia (BPS), the United Nations Comtrade Database, the International Trade Centre (ITC), and Bank Indonesia. The unit of analysis focuses on Indonesian gambier exports (HS Code 320190) to India.

2.1 Measurement of Export Competitiveness

Export competitiveness is measured using the Revealed Comparative Advantage (RCA) index, originally proposed by Balassa. The RCA index captures a country's comparative advantage by comparing the share of a commodity in a country's exports with its share in global exports. The RCA is formulated as:

$$RCA_{ij} = \frac{(x_{ij}/x_{it})}{(w_j/w_t)} \quad (1)$$

where:

x_{ij} represents the value of Indonesian gambier exports to India,

x_{it} denotes total Indonesian exports to India,

w_j is the value of world gambier exports to India, and

w_t represents total world exports to India.

An RCA value greater than one ($RCA > 1$) indicates that Indonesia possesses a comparative advantage in gambier exports, while a value less than one ($RCA < 1$) reflects a comparative disadvantage. Following Hinloopen and Van Marrewijk (2001), RCA values are further classified into four levels: weak, moderate, and strong comparative advantage, with $RCA > 4$ indicating a strong competitive position.

2.2 Model Specification and Variables

To analyze the determinants of export competitiveness, this study employs a Vector Error Correction Model (VECM), which is appropriate for non-stationary time-series data that are cointegrated. The VECM framework allows the estimation of both long-run equilibrium relationships and short-run dynamic adjustments among variables.

The model specification is expressed as:

$$\Delta \ln RCA_t = \alpha_0 + \sum_{i=1}^p \beta_i \Delta \ln RCA_{t-i} + \sum_{i=1}^p \gamma_i \Delta Z_{t-i} + \lambda ECT_{t-1} + \varepsilon_t$$

where Z_t is a vector of explanatory variables, ECT_{t-1} is the error correction term representing long-run equilibrium deviations, and λ reflects the speed of adjustment.

The explanatory variables are selected based on international trade theory and empirical studies on export competitiveness, and include:

- Export volume (VEKS): reflects production capacity and supply strength
- Indonesian export price (HINDO): represents domestic price competitiveness
- World price (HWORLD): captures global market conditions
- Competitor prices (Italy and Singapore) (HITALY, HSING): represent substitution effects in the importing market
- Exchange rate (KURS): reflects macroeconomic competitiveness through currency valuation

All variables were transformed into natural logarithms to stabilise variance and allow elasticity interpretation. All econometric analyses were conducted using EViews software. The variables involved in the model are described below.

LnRCA	=	Natural logarithm of Indonesian gambier export competitiveness in the Indian market;
LnVEKS	=	Natural logarithm of Indonesian gambier export volume to the Indian market;
LnHINDO	=	Natural logarithm of the average export price of Indonesian gambier in the Indian market;
LnHWORLD	=	Natural logarithm of the average world export price of commodity in the Indian market;
LnHITALY	=	Natural logarithm of the average export price of Italy's Hcommodity in the Indian market;
LnHSING	=	Natural logarithm of the average export price of Singapore's HS commodity in the Indian market;
LnKURS	=	Natural logarithm of the Rupiah exchange rate against the United States Dollar;

3. RESULTS AND DISCUSSION

3.1. Development of Indonesian Gambier Exports

Indonesia exports gambier to several countries across Asia and the Americas. In 2024, the ten largest

destination countries for Indonesian gambier exports were India, Pakistan, Bangladesh, China, Japan, South Korea, Singapore, the United States, Thailand, and Taiwan (Directorate General of Estate Crops, Ministry of Agriculture of the Republic of Indonesia, 2025) as presented in Table 1.

Table 1. Indonesian Gambier Exports to Selected Countries in 2024

Destination	Trade Value (US\$)	Net Weight (kg)
World	77,253,646	22,299,524
Bangladesh	465,449	228,490
Cambodia	1,750	200
China	357,744	150,450
Japan	91,737	22,060
Rep. of Korea	87,058	17,020
Other Asia	2,850	500
Pakistan	746,876	430,500
India	75,412,653	21,389,100
Singapore	53,486	31,984
Sweden	641	20
Thailand	7,938	2,400
USA	25,460	26,800

Source: United Nations Commodity Trade Statistics Database (2025).

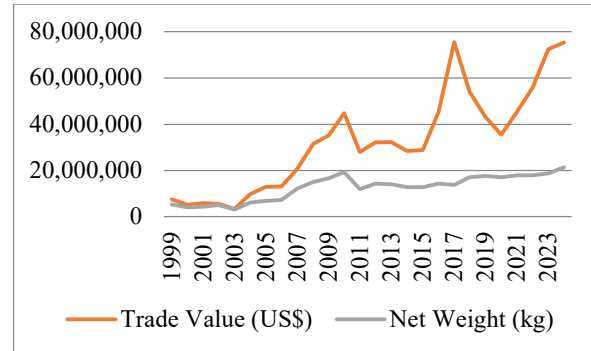
Indonesia exported gambier to various destination countries, with a total export value of US\$ 77.25 million and a total export volume of 22.30 million kilograms in 2024. Importing countries utilise gambier for various purposes, including as a raw material in the food, pharmaceutical, dye, wood adhesive, and textile industries. In India, gambier has traditionally been used by local communities for skin care, particularly as a natural moisturiser.

Indonesian gambier exports to India reached US\$75.41 million and 21.39 million kg in 2024, highlighting Indonesia's strong competitiveness in terms of price, quality, and suitability for India's processing industries.

As shown in Figure 3, exports to India have generally increased over time despite annual fluctuations. Rapid growth occurred during 2007–2010, with export values rising from US\$35.12 million in 2009 to US\$44.79 million in 2010, reflecting stronger demand in the Indian market. However, exports declined in 2011 and 2014, likely due to changes in international prices, trade policies, and economic conditions affecting India's import demand.

Entering the 2015–2018 period, Indonesian gambier exports showed a considerable recovery and growth. In 2017, the export value of Indonesian gambier to India surged to US\$75.49 million, but declined the following year. Export performance improved again after 2020, despite the global economic slowdown caused by the pandemic. In 2024, the export value of Indonesian gambier to India reached US\$ 75.41 million, with an

export volume of 21.39 million kilograms. This achievement represents one of the highest export performances during the observation period and confirms that India remains the primary and most strategic market for Indonesian gambier exports.



Source: United Nations Commodity Trade, 2025

Figure 3. Indonesian gambier export to the Indian market, 1999–2024

3.2. Competitiveness Analysis of Indonesian Gambier Exports in the Indian Market

Competitiveness refers to the ability of producers to produce high-quality commodities at relatively low production costs, enabling production activities to remain profitable at prevailing market prices (Salvatore, 1997). Product competitiveness reflects the extent to which a product possesses a comparative advantage compared to similar products exported by other countries (Muharami & Novianti, 2018). In this study, the export competitiveness of Indonesian gambier in the Indian market is analyzed using the Revealed Comparative Advantage (RCA) indicator. The RCA index measures the comparative advantage of a commodity by comparing the share of the commodity's exports in a country's total exports with the share of the same commodity in total world exports. An RCA value greater than one ($RCA > 1$) indicates that a country has a comparative advantage, whereas an RCA value less than one ($RCA < 1$) indicates the absence of comparative advantage (Tambunan, 2001). Furthermore, RCA index values can be classified into four categories: Class A ($0 < RCA \leq 1$): no comparative advantage, Class B ($1 < RCA \leq 2$): weak comparative advantage, Class C ($2 < RCA \leq 4$): moderate comparative advantage, and Class D ($RCA > 4$): strong comparative advantage (Hinloopen & Van Marrewijk, 2001).

Based on the RCA results for the 1999–2024 period (Table 2), Indonesian gambier exports to India consistently recorded RCA values far above 1, indicating a strong comparative advantage. All values fall within class d ($RCA > 4$), which reflects a very high level of competitiveness in the Indian market.

These findings differ from those of Putri et al. (2021), who analysed the competitiveness of Indonesian gambier in the global market using a case study of West Sumatra. Their study found that Indonesian gambier had not yet achieved strong global competitiveness. However, both studies reach a similar conclusion regarding the Indian market: Indonesia has a strong comparative advantage in its main export destination and has maintained a competitive position relative to other exporting countries, particularly during the 2010–2019 period.

The differences in RCA values between the two studies are mainly due to variations in data coverage and calculation methods. This study calculates RCA using four variables: the value of Indonesian gambier exports to India, total Indonesian exports to India, world gambier exports to India, and total world exports to India. The analysis follows Balassa's RCA formulation, which is widely applied in international trade studies. In contrast, Putri et al. (2021) use total plantation commodity exports as a proxy for the world export component, resulting in different RCA index values.

Table 2. RCA Value of Indonesian Gambier Exports in the Indian Market

Year	Xij/Xit	Wj/Wt	RCA
1999	0.00823	0.00024	34.2988
2000	0.00458	0.00013	34.5347
2001	0.00558	0.00016	33.9613
2002	0.00432	0.00014	29.9103
2003	0.00192	8.16E-05	23.5171
2004	0.00452	0.00015	30.4442
2005	0.00449	0.00014	33.0704
2006	0.00383	0.0001	38.2546
2007	0.00421	0.00011	36.9045
2008	0.00441	0.00014	32.6247
2009	0.00472	0.00017	28.0659
2010	0.00452	0.00016	27.6086
2011	0.0021	8.50E-05	24.7111
2012	0.00257	9.20E-05	27.9801
2013	0.00248	0.0001	24.0585
2014	0.00232	8.84E-05	26.2647
2015	0.00245	9.68E-05	25.3292
2016	0.00449	0.00016	27.9016
2017	0.00536	0.00022	24.8664
2018	0.00393	0.00014	27.4486
2019	0.00366	0.00012	30.2477
2020	0.0034	0.00012	27.5842
2021	0.00339	0.0001	32.7163
2022	0.00239	0.00011	21.2254
2023	0.00358	0.00015	23.5569
2024	0.0037	0.00017	21.6851

Indonesia's gambier exports consistently exhibited a very strong comparative advantage in the Indian market throughout 1999–2024, with RCA values remaining far above 1 in all years. The RCA value was 34.30 in 1999 and peaked at 38.25 in 2006, reflecting Indonesia's dominant position as India's primary supplier of gambier. Although RCA values fluctuated and generally declined

after 2008, they remained within the range of 21.23–32.72 during 2020–2024, indicating that Indonesia continued to maintain a strong comparative advantage. According to Hinloopen and Van Marrewijk (2001), these RCA values fall under Class D, representing a strong comparative advantage. The observed fluctuations likely reflect changes in export structures, global market conditions, increasing competition, and trade disruptions such as the COVID-19 pandemic rather than a loss of competitiveness.

3.3. Analysis of Factors Affecting the Competitiveness of Indonesia's Gambier Export (HS Code 320190) in the Indian Market

The analysis employed the Vector Error Correction Model (VECM) approach, which involves several sequential stages, including data stationarity testing, VAR stability testing, determination of the optimal lag length, cointegration testing, VECM model estimation, Impulse Response Function (IRF) analysis, and Variance Decomposition (VD) analysis (Widarjono, 2018).

3.3.1. Stationarity Test

A dataset is considered stationary when the ADF statistic is less than the critical value at a specified significance level (Basuki, 2019). Based on the results of the Augmented Dickey-Fuller (ADF) test at the level form presented in Table 3, all research variables, namely LNRCA, LNVEKS, LNHINDO, LNHWORLD, LNHITALY, LNHSING, and LNKURS, were found to be non-stationary at the level, as indicated by probability values exceeding 0.05 for each variable. This condition indicates that the time series data used in this study exhibit long-term trends and do not fluctuate around a constant mean value.

Table 3. Results of the Stationarity Test at Level and First Difference

Level					
Variables	ADF t-Stat	Test critical values			Probability
		1%	5%	10%	
LNRCA	-2.54	-3.75	-3.00	-2.64	0.12
LNVEKS	-1.39	-3.74	-2.99	-2.64	0.57
LNHINDO	-1.44	-3.72	-2.99	-2.63	0.55
LNHWORLD	-1.32	-3.72	-2.99	-2.63	0.60
LNHITALY	-0.80	-3.72	-2.99	-2.63	0.80
LNHSING	-0.82	-3.74	-2.99	-2.64	0.79
LNKURS	0.17	-3.75	-3.00	-2.64	0.96
first difference					
Variables	ADF t-Stat	Test critical values			Probability
		1%	5%	10%	
LNRCA	-6.88	-3.74	-2.99	-2.64	0.00
LNVEKS	-2.69	-3.79	-3.01	-2.65	0.09
LNHINDO	-4.71	-3.77	-3.00	-2.64	0.00
LNHWORLD	-4.67	-3.77	-3.00	-2.64	0.00
LNHITALY	-3.56	-3.74	-2.99	-2.64	0.01
LNHSING	-4.85	-3.77	-3.00	-2.64	0.01
LNKURS	-5.15	-3.74	-2.99	-2.64	0.00

To avoid spurious regression, further stationarity testing is required at the first-difference level. Methodologically, these results also provide a strong basis for proceeding to the cointegration test and the estimation of the Vector Error Correction Model (VECM), since variables that are non-stationary at the level but stationary in first differences are categorised as integrated of order one.

After testing all variables at the first-difference level, it can be concluded that all research variables are non-stationary in levels but become stationary in first differences. Thus, all variables are integrated of order one. This condition satisfies the requirement to conduct a cointegration test and subsequently estimate the Vector Error Correction Model (VECM) to capture both the long-run relationships and short-run adjustment dynamics among the variables examined in this study.

3.3.2. Optimal Lag Length Test

Based on the five information criteria employed, it can be concluded that most criteria, namely the Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ), consistently selected lag 2 as the optimal lag length, while only the Likelihood Ratio (LR) criterion recommended lag 1. Given the majority rule among the criteria and the study's objective of capturing both short-run and long-run dynamics among variables more comprehensively, lag 2 was determined to be the optimal lag length and was subsequently used in the VECM analysis.

3.3.3. VAR (Vector Autoregression) Stability Test

The VAR stability test is conducted by evaluating the roots of the characteristic polynomial. A VAR model is considered stable when all generated roots have moduli less than 1 (< 1), indicating that the system is stable (Basuki & Nano, 2017).

Based on the results of the VAR stability test with lag specifications of 1-2, several roots of the characteristic polynomial were obtained with varying modulus values. Most of the roots lie within the unit circle, as indicated by the modulus values of the complex roots of 0.955, 0.847, 0.791, 0.669, and 0.528, as well as several real roots with modulus values of 0.733, 0.296, and 0.107. Modulus values smaller than 1 indicate that the majority of the VAR system dynamics satisfy the stability condition and converge following a shock.

However, the test results also indicate the presence of one root with a modulus value of 1.015729, which lies slightly above one. The existence of a root outside the unit circle

implies that the VAR system does not fully satisfy the stability condition. The presence of a unit root or a root slightly exceeding one may reflect the characteristics of the original data experiencing temporary exponential growth, allowing the model to capture the actual economic dynamics without artificially forcing the series into a stationary pattern, which could otherwise obscure the true economic behaviour (Sims et al., 1990). Nevertheless, this level of instability can be classified as marginal, given that the modulus exceeding 1 is relatively small and remains very close to the stability boundary.

3.3.4. Cointegration Test

Cointegration was determined by comparing the trace statistic and the maximum eigenvalue with their corresponding critical values at the 5% significance level. If the test statistic exceeds the critical value, it can be concluded that a cointegration relationship exists among the variables (Basuki & Nano, 2017). The results of the Johansen cointegration test, based on both the trace statistic and the maximum eigenvalue approaches, indicate the presence of three cointegrating vectors at the 5% significance level, suggesting long-run equilibrium relationships among the variables in the system. These findings imply that all variables in the model are cointegrated and exhibit structural long-term interrelationships. It implies that estimating a VAR model in level form is less appropriate for analyzing long-run dynamics. Therefore, the Vector Error Correction Model (VECM) approach was selected as the subsequent analytical method to capture both long-run equilibrium relationships and short-run adjustment mechanisms affecting the competitiveness of Indonesia's gambier exports in the Indian market.

3.3.5. VECM Estimation Results

Table 4 presents the results of the long-run VECM estimation. All variables significantly influence comparative advantage of Indonesian gambier export at α 0.05.

Table 4. Long-Run VECM Estimation

Independent Variable	Coefficient	t-Statistic
LNVEKS(-1)	0.513*	12.784
LNHINDO(-1)	-11.803*	-19.379
LNHWORLD(-1)	11.259*	17.888
LNHITALY(-1)	0.634*	6.837
LNHSING(-1)	-0.112*	-6.763
LNKURS(-1)	0.975*	7.293

*significant

Indonesia's gambier export volume (LNVEKS) has a positive coefficient of 0.513, indicating a positive and statistically significant effect on the competitiveness of Indonesia's gambier exports in the Indian market in the long run. This finding suggests that a 1 per cent increase in export volume leads to an approximately 0.51 per cent increase in export competitiveness. This result is consistent with the findings of Manik et al. (2023), which emphasise the role of export volume as an indicator of competitiveness strength and comparative advantage of a commodity, and is further supported by the concepts of production advantage and efficiency in international trade (Gilarso, 1992; Krugman et al., 2018).

Indonesia's gambier export price (LNHINDO) has a significant negative effect on competitiveness, with a coefficient of -11.803, indicating that higher export prices reduce competitiveness. This finding is consistent with the study of Chaprilia & Yuliawati (2018), the law of demand proposed by Salvatore (1997), and the concept of price competitiveness in international trade introduced by Porter (1990). In contrast, the world gambier price (LNHWORLD) shows a positive coefficient of 11.259, indicating that an increase in world prices strengthens the competitiveness of Indonesian gambier exports. This result is in line with the findings of Maulani et al. (2021) and the global supply-demand equilibrium theory proposed by Salvatore (1997).

Italy's gambier price (LNHITALY) also has a positive and significant effect on competitiveness, with a coefficient of 0.634, reflecting the substitution effect among exporting countries, as supported by Manik et al. (2023). Meanwhile, Singapore's gambier price (LNHSING) shows a significant negative effect, with a coefficient of -0.112, indicating Singapore's role as a re-export hub influencing regional price dynamics (Yantika et al., 2024). In addition, the Rupiah exchange rate (LNKURS) has a positive and significant effect, with a coefficient of 0.975, suggesting that Rupiah depreciation enhances the competitiveness of Indonesian gambier exports. This finding is consistent with Zulvani (2019) and Salvatore's (1997) theory of exchange rate competitiveness. Overall, the VECM estimation results indicate that the economic factors analyzed in this study exert a stronger influence on the competitiveness of Indonesian gambier exports in the long run rather than in the short run. Based on the estimation results, the long-run equilibrium equation can be expressed as follows:

$$\begin{aligned} \text{LnRCAt} = & -20,711 + 0,513\text{LnVEKSt-1} \\ & -11,803\text{LnHINDOt-1} + 11,259\text{LnHWORLDt-1} \\ & + 0,634\text{LnHITALYt-1} - 0,112\text{LnHSINGt-1} \\ & + 0,975\text{LnKURSt-1} \end{aligned}$$

3.3.6. Results of the Impulse Response Function (IRF) and Variance Decomposition (VD) Analyses

The results of the Impulse Response Function (IRF) analysis indicate that the competitiveness of Indonesian gambier exports (LNRCA) responds most strongly to shocks originating from the variable itself, with relatively stable effects in the medium term. Shocks in export volume (LNVEKS), Indonesian gambier export prices (LNHINDO), world prices (LNHWORLD), Italy's gambier prices (LNHITALY), and Singapore's gambier prices (LNHSING) generally generate negative responses to LNRCA. In contrast, exchange rate shocks (LNKURS) produce a positive, although relatively limited, response. These findings suggest that the dynamics of Indonesian gambier export competitiveness are more strongly influenced by internal factors and price structures, while the role of the exchange rate remains relatively limited in the short run. The results of the Variance Decomposition (VD) analysis reveal that the variation in the competitiveness of Indonesian gambier exports (LNRCA) throughout the observation horizon is predominantly explained by internal shocks to LNRCA itself, contributing 100% in the initial period and remaining substantially high at 92.99% by the tenth period. Meanwhile, the contributions of other variables are relatively small, particularly export value (LNVEKS) at 3.45%, world prices (LNHWORLD) at 1.78%, and Italy's gambier prices (LNHITALY) at 0.99%. These findings indicate that the competitiveness of Indonesian gambier exports is structural and relatively stable, with limited external influence. Nevertheless, world prices, competitor-country prices, and export performance continue to play an important role in shaping the dynamics of Indonesia's gambier trade in the Indian market.

4. CONCLUSIONS

Based on the findings of this study, it can be concluded that gambier is a strategic Indonesian commodity in international trade, with its export market highly concentrated in India, the primary destination. This condition creates a dependency that potentially leads to a market structure approaching monopsony conditions. During the 1999-2024 period, the competitiveness of Indonesian gambier exports in the Indian market, as measured by the Revealed Comparative Advantage (RCA) index, demonstrated a very strong and relatively stable comparative advantage in the long run, despite fluctuations and a declining trend after 2020 due to the dynamics of global trade.

The results of the Vector Error Correction Model (VECM) analysis indicate that export volume, Indonesian

gambier export prices, world gambier prices, competitor-country prices, and the exchange rate have significant long-run equilibrium relationships with the competitiveness of Indonesian gambier exports, while their short-run effects are relatively weak. These findings further suggest that Indonesia tends to be a price taker in the global gambier trade. Consequently, although Indonesia maintains a strong export position in international markets, improvements in competitiveness have not been fully matched by stronger domestic value added and enhanced farmer welfare, as price formation remains largely determined by international market mechanisms and global value chains.

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