Jurnal Agribisnis Indonesia (Journal of Indonesian Agribusiness)
Vol 14 No 1, Juni 2026; halaman 236-249
https://doi.org/10.29244/jai.2026.14.1.236-249

COFFEE EXPORT DYNAMICS AND COMPETITIVENESS: EVIDENCE FROM A HYBRID ARDL–RCA FRAMEWORK

Azhari Azhari[1], Sonny M. Ikhsan Mangkuwinata[2], Win Konadi[3]
[1)]Faculty of Economy and Business, Universitas Islam Kebangsaan Indonesia, Bireuen – Aceh, 24251
[2,3)]Faculty of Economy and Business, Universitas Almuslim, Bireuen – Aceh, 24261
e-mail: [1)]**azhari@uniki.ac.id**

(Accepted April 15, 2025/Revised June 21, 2025/Approved April 14, 2026)

ABSTRACT

Although Indonesia is one of the world's major coffee producers, maintaining competitive export performance remains challenging due to global price volatility, variations in production quality, and changing trade conditions. This study examines Indonesia's coffee export performance using a hybrid market outcome framework that integrates the Revealed Comparative Advantage (RCA) index with an Autoregressive Distributed Lag (ARDL) approach. Annual time-series data from 2001 to 2023 are employed to analyze both short-run dynamics and long-run relationships among coffee exports, production volume, exchange rates, and export competitiveness. The empirical results indicate that Indonesia exhibits a moderate comparative advantage in coffee exports, although its RCA level remains lower than that of Brazil, Vietnam, and Colombia. The ARDL–ECM results confirm the existence of a long-run equilibrium relationship, where coffee production and export competitiveness significantly influence export performance, while exchange rate movements do not exert a significant long-run effect. In the short run, fluctuations in exchange rates and competitiveness contribute to export adjustments, reflecting price and market responsiveness. These findings suggest that Indonesia's coffee export performance is shaped by the interaction between domestic production capacity and relative market competitiveness rather than by price factors alone. From a policy perspective, the results underscore the importance of improving product quality, enhancing market diversification, and aligning trade policies to strengthen export competitiveness. This study is limited by its single-country focus and the absence of explicit importer-side demand variables, indicating that future research may incorporate non-price factors and multi-country analyses to provide a broader understanding of global coffee trade dynamics.

Keywords: *ARDL, coffee export, exchange rate, RCA*

ABSTRAK

Meskipun Indonesia merupakan salah satu produsen kopi terbesar di dunia, menjaga kinerja ekspor yang kompetitif masih menjadi tantangan akibat volatilitas harga global, variasi kualitas produksi, dan perubahan kondisi perdagangan. Penelitian ini menganalisis kinerja ekspor kopi Indonesia dengan menggunakan kerangka *hybrid market-outcome* yang mengintegrasikan indeks *Revealed Comparative Advantage* (RCA) dan pendekatan *Autoregressive Distributed Lag* (ARDL). Data runtun waktu tahunan periode 2001–2023 digunakan untuk mengkaji dinamika jangka pendek dan hubungan keseimbangan jangka panjang antara ekspor kopi, volume produksi, nilai tukar, dan daya saing ekspor. Hasil empiris menunjukkan bahwa Indonesia memiliki keunggulan komparatif yang moderat dalam ekspor kopi, namun tingkat RCA Indonesia masih lebih rendah dibandingkan dengan Brasil, Vietnam, dan Kolombia. Hasil estimasi ARDL–ECM mengonfirmasi adanya hubungan jangka panjang, di mana produksi kopi dan daya saing ekspor berpengaruh signifikan terhadap kinerja ekspor, sementara pergerakan nilai tukar tidak menunjukkan pengaruh signifikan dalam jangka panjang. Dalam jangka pendek, fluktuasi nilai tukar dan perubahan daya saing berkontribusi terhadap penyesuaian ekspor, yang mencerminkan respons harga dan kondisi pasar. Temuan ini menunjukkan bahwa kinerja ekspor kopi Indonesia dibentuk oleh interaksi antara kapasitas produksi domestik dan posisi daya saing relatif di pasar global, bukan semata-mata oleh faktor harga. Dari sisi kebijakan, hasil penelitian menegaskan pentingnya peningkatan kualitas produk, diversifikasi pasar, dan penyesuaian kebijakan perdagangan guna memperkuat daya saing ekspor. Penelitian ini memiliki keterbatasan pada fokus satu negara dan belum memasukkan variabel permintaan dari negara

pengimpor secara eksplisit, sehingga penelitian selanjutnya disarankan untuk memasukkan faktor non-harga dan analisis lintas negara guna memperoleh pemahaman yang lebih komprehensif mengenai dinamika perdagangan kopi global.

Kata kunci: ARDL, ekspor kopi, nilai tukar, RCA

INTRODUCTION

In recent decades, the global coffee market has undergone significant changes. According to the International Coffee Organization (2024), Indonesia is one of the largest coffee producers in the world, after Brazil, Vietnam, and Colombia. Export is an important factor in a country's economic growth (Murindahabi et al., 2019; Osabohien et al., 2019). The concept of export competitiveness is at the core of international trade theory, which is ultimately the main determinant of a country's ability to succeed in the global market. Keynes' economic theory, where more exports generate more revenue growth through the export multiplier, refers to the amount raised in national income after a one-unit increase in domestic investment for exports (Kennedy, 1966).

In addition, Adam Smith mentioned that trade increases people's income and wealth by promoting country surpluses. It also motivates companies to achieve the highest productivity due to market availability and to achieve maximum productivity to improve efficiency (Smith, 1776). As David Ricardo explains, comparative advantages are the source of parameters that determine the country of trade. This means that if you can bring in at a lower cost than other countries, then the country has a comparative advantage over other countries, compared to other countries, and countries have a comparative advantage over other countries (Ricardo, 1817).

In the context of coffee, competitiveness goes beyond production volume, encompassing factors such as product quality, compliance with international standards, pricing strategies, and effective trade policies (Ibrahim & Ali, 2021; Murindahabi et al., 2019; Osabohien et al., 2019; Prilliadi & Birinci, 2023; Wanzala et al., 2024). Understanding and improving this dimension is crucial for coffee-producing countries to secure their market position in the global market, especially in the face of growing competition from new exporters and shifting consumer preferences.

Despite its historical and economic importance, the coffee export performance of many producing countries remains uneven (International Cofffe Organization, 2024). Countries such as Brazil and Vietnam have established themselves as dominant players in the global market, consistently increasing their export volumes and market share. In contrast, other producers, including Indonesia, struggle to fully utilize their potential, resulting in a persistent gap in global competitiveness. For Indonesia, this challenge is particularly striking given its long history of coffee cultivation, diverse coffee varieties, and favourable agro-climatic conditions (Alexander & Nadapdap, 2019; Daspar et al., 2024; Dermoredjo et al., 2021; Manalu et al., 2022; Mayang Sari, 2024; Sudrajat, 2023; Zacharie & Denny, 2024).

The critical issue underlying this gap is the complexity of factors affecting coffee export competitiveness. While production capacity and cost efficiency are critical, they alone do not determine success in international markets. Quality certification, adherence to sustainability standards, trade infrastructure, and government policies are equally important. (Alexander & Nadapdap, 2019; Beno et al., 2022; Fofanah, 2020; Phimmavong et al., 2023; Tasya et al., 2022). In addition, external factors such as global demand fluctuations, price volatility, and the bargaining power of importing countries further complicate the competitiveness equation (Kabayiza et al., 2021; Muhire & Job Kibiwot Lagat and Oscar Ingasia Ayuya, 2018; Wanzala et al., 2024). For Indonesia, identifying and addressing these determinants is critical to closing the gap with more competitive countries.

Jurnal Agribisnis Indonesia (Journal of Indonesian Agribusiness)
Vol 14 No 1, Juni 2026; halaman 236-249

This study differs from previous research that often focuses only on production volume or macroeconomic indicators with one analytical tool, and this study adopts a multidimensional approach, integrating domestic and international factors that affect export performance. Previous studies have only used one analytical tool to look at coffee export competitiveness with Revealed Comparative Advantage. Several studies have been conducted, including Alexander & Nadapdap (2019), which examines the competitiveness of Indonesian coffee bean exports for the period 2002-2017. The results of this study provide an overview that Indonesian coffee bean exports have superior competitiveness values. Likewise, based on the research results of Beno et al. (2022) and Novariani et al. (2021), Indonesian coffee exports have comparative competitiveness in the Japanese market. Dermoredjo et al. (2021) examined the opportunities for Indonesian coffee in the Regional Comprehensive Economic Partnership (RCEP) market. The result is that Indonesia has a high opportunity if the products to be exported are of high quality. Research analyzing the competitiveness of Indonesian coffee for the period 2008-2017 was also conducted by Hamzah et al. (2020). The results found that the highest RCA value was obtained in 2008, and the lowest was in 2011.

Next, research conducted by Daspar et al. (2024) resulted in the finding that the value of Indonesia's coffee export competitiveness is still below Vietnam's. Similarly, research conducted by Manalu et al. (2022) and Tasya et al. (2022) found that the value of export competitiveness in Indonesia is still below world coffee-exporting countries such as Brazil, Vietnam, and Colombia. Then, research was conducted by Nasution et al. (2024), which analyzed the competitiveness of coffee exports in the United States and Japan. The result is that the competitiveness of Indonesian coffee exports is higher in the US market than in the Japanese market. Another study conducted by Sudrajat (2023) examined the competitiveness of Indonesian and Vietnamese coffee exports in the ASEAN market. The result is that the competitiveness of Vietnam's coffee exports outperformed Indonesia for the 2010-2020 period. Finally, Zacharie Denny (2024) researched the competitiveness of Indonesian coffee exports for the 2015-2022 period. The result is that the 2017 and 2018 periods have significantly decreased the RCA value.

In addition, studies that use Autoregressive Distributed Lag (ARDL) analysis tools to look at factors affecting coffee exports include Jalata (2021), who examined the determinants of coffee export success in Ethiopia. The result is that in the long run, coffee production, world prices, and exchange rates have a positive and significant effect on coffee exports. Muhire et al. (2018) tested the exchange rate on Rwandan coffee exports for the period 2001-2016. The result is that in the short term, there is a positive relationship between the two variables, while in the long term, the exchange rate has a negative relationship. Furthermore, Murindahabi et al. (2019) examined the impact of coffee exports on economic growth in 32 countries. Using ARDL, this study found that coffee exports have an impact on economic growth.

Furthermore, Nguyen Vo (2021) examined the role of the coffee industry in economic sustainability in Vietnam. The result is that the coffee industry has an impact on Vietnam's GDP in the long and short term. Another case is the research conducted by Osabohien et al. (2019), which examines the export of agricultural products on economic growth in Nigeria. By using ARDL analysis, it was found that agricultural products have an effect on economic growth.

As such, this research provides a more nuanced understanding of how countries like Indonesia can improve their competitive position in the global coffee market. The novelty of this study lies in its methodological and conceptual contributions. Methodologically, this study utilizes two analytical tools such as the Revealed Comparative Advantage (RCA) index and an econometric model, to measure competitiveness and identify its key drivers.

METHOD

This study employs a market outcome oriented ARDL model, where export performance is influenced by price competitiveness (exchange rate), production capacity, and revealed comparative advantage, while demand side effects are indirectly captured through RCA. This study employs an Autoregressive Distributed Lag (ARDL) framework to examine the determinants of coffee export performance. The ARDL approach is particularly suitable given the mixed order of integration among variables and its ability to capture both short-run dynamics and long-run equilibrium relationships.

Export performance is modeled as a function of exchange rate movements, domestic production capacity, and revealed comparative advantage (RCA). The exchange rate represents price competitiveness in international markets, production reflects domestic export capacity, and RCA captures Indonesia's relative position in the global coffee market.

The empirical specification follows an error correction representation, allowing short-run adjustments toward long-run equilibrium to be identified through the error correction mechanism. The existence of a long-run relationship among variables is tested using the bounds testing approach proposed by Pesaran et al.

This study develops a simultaneous model to explain the relationship between export supply and demand in one system, not just the supply side. Such a model is fundamental to understanding export dynamics as influenced by the interaction of both demand and supply in the context of international trade (Goldstein & Khan, 2017). A similar study demonstrated the use of simultaneous equation models to study export and import elasticities in several African countries, by assessing price responses to both the demand and supply sides simultaneously (Arize, 1987). Rudy Rahmaddi and Ichihashi (2012) examined the effects of foreign and domestic demand on Indonesia's export performance in a supply-demand framework using aggregate data. Although the specific context is different, this approach shows how both sides (demand and supply) can be analyzed together in an empirical economic model of exports

Following Goldstein & Khan (1985), this study recognizes that export performance is theoretically determined by the simultaneous interaction between structural export demand and export supply equations. In this framework, export demand depends on external market conditions such as relative prices and foreign income, while export supply is driven by domestic production capacity and cost conditions. The observed export volume therefore represents a market equilibrium outcome, rather than a pure demand- or supply-driven process.

However, estimating a full system of simultaneous export demand and supply equations requires detailed data on foreign income, export prices, and domestic cost structures, which are often unavailable or unreliable for long time-series analyses in developing countries. Consequently, consistent with Goldstein & Khan (1985) and Helpman & Krugman (1985), this study adopts a reduced-form export equation, where export volume is modeled as a function of key variables influencing both sides of the market.

Although export demand is the ultimate outcome of international trade, this specification does not explicitly model importer side demand variables. Instead, it captures export performance as a hybrid market-outcome model, where competitiveness and supply capacity jointly determine export dynamics.

This study uses secondary data obtained from various official and reliable sources, such as the International Coffee Organization, World Bank, Bank Indonesia, WTO, UN Comtrade and Statistics Indonesia. The data analyzed includes exchange rates, coffee production and coffee export volumes. Data was obtained in annual format over the period 2001 to 2023.

The theoretical framework of competitiveness can present the most known indexes that analyze the export competitiveness of federal

states. Competitiveness measured by RCA explains the most important competitiveness measured by comparative advantage. If the product is described as competitive, this means there are comparative benefits.

Since the procedure was refined and popularized by Balassa (1965), This procedure is known as the Balassa Index. ITC (2016) indicates that the Revealed Comparative Advantage of a particular country in trade of a particular industry product measures the industry's share in the country's exports relative to its share in world trade. More specifically, if BI^AJ is the land balassign index and the normalized export share of industry-j, which is defined as:

$$BI^AJ = \frac{\text{Share industry J in country A export}}{\text{Share industry I in reference country export}} \ldots..(1)$$

If BI^Aj > Country A is said to have a revealed comparative advantage in industry j because this industry plays a more significant role in Country A's exports compared to the exports of the reference country.

Based on the above estimation method, the RCA of Indonesian coffee exports is estimated as follows:

$$RCA_t = \frac{\text{Coffee export of Indonesia/commodities export of Indonesia}}{\text{World coffee export/world export coffee}} \ldots(2)$$

Here: T is the season. The RCA index gets a value between zero and +∞. If you require less than 1, the country cannot specialize in exporting this product, but the index is greater than 1 (ITC, 2016). Erkan and Sarıçoban (2014) express comparative advantage into four categories as follows: Classification 1 → 0 < RCA ≤ 1; No comparative advantage. Classification 2→ 1 < RCA ≤ 2; There is a comparative advantage. Classification 3→ 2 < RCA ≤ 4; Moderate comparative advantage exists. Classification 4→ 4 < RCA: There is a strong comparative index.

This study conceptualizes coffee export performance as a hybrid market outcome shaped by the interaction between domestic production capacity, price competitiveness, and revealed comparative advantage. The ARDL–ECM framework enables the identification of both short-run dynamics and long-run equilibrium relationships, providing a comprehensive understanding of export performance beyond a purely supply- or demand-driven perspective

Pesaran et al. (2001) introduced the Joint Integration Cointegration Test for Authors of Distributed LAG (ARDL). This approach has many economic benefits over other approaches. It can be used if the variable is stationary. Second, use the optimal number of delays in the data generation process or enable the optimal delay length that differs for each variable in the model. Third, it provides robust and consistent results with small sample sizes. Fourth, it deals with the issue of endogeneity (Pesaran et al., 2001).

ARDL was used to analyze the short-run and long-run relationships between coffee export levels and their determinants, such as competitiveness, production, and exchange rates. This technique was chosen for its flexibility in dealing with data with different stationary levels and its ability to identify long-term dynamics. An ARDL model was formulated to evaluate the effect of these factors on coffee exports as the dependent variable. The analysis was conducted in two stages: first, testing the short-run relationship through a lag distribution model, and second, estimating the long-run relationship through a cointegration procedure. All analyses were conducted using appropriate statistical software.

After determining the data regression model in a data stationarity test using an extended Dicky Fuller (ADF), the decision rule is based on not rejecting the null hypothesis without a random walk if all variables from the order level are hospitalized. Otherwise, it will not reject the null hypothesis, leading to a station artery examination (Dickey & Fuller, 2012). Then, determine the optimal lag, which will be used in the research at a later stage. According to Pesaran et al. (2001), Lag selection is the second step for the autoregressive distributive lag (ARDL) model.

Before conducting the Autoregression Distributed Lag (ARDL) test, each variable undergoes a cointegration test using a bounds

test. The purpose of this test is to determine whether there is cointegration among the investigated variables. During the model estimation process, short-run and long-run elasticities are estimated using both ARDL and Error Correction Model (ECM) approaches. Following the ARDL test, it is essential to conduct classical assumption testing to ensure that the resulting regression model serves as a reliable predictive tool. The econometric equation for the model to be estimated is:

$$Exp_t = \beta_0 + \beta_1 Kurs_t + \beta_2 Prod_t + \beta_3 RCA_t + \varepsilon_t \ldots\ldots (3)$$

Description Exp = export amount, Exchange rate = exchange rate, Prod = coffee production amount, RCA = RCA value, β_0= Intercept or Constant, $\beta_1, \beta_2, \beta_3$ = Regression Coefficient, ε_t = Error Term

Using the ARDL model equation, we can analyze the linear relationship between coffee exports, exchange rates, coffee production, and RCA.

$$\Delta Exp t = \alpha_0 + \sum_{i=1}^{n} \alpha 1 i \Delta Kurst\ 1 + \sum_{i=1}^{n} \alpha 2 i \Delta Prodt1 + \sum_{i=1}^{n} \alpha 3 i \Delta RCAt1 + \beta_1 Kurs_{t=1} + \beta_2 Prod_{t=1} + \beta_3 RCA_{t=1} \ldots\ldots (4)$$

Where Δ represents the lag. The coefficients (β_1-β_3) represent the long-run relationship, while the coefficients (α_1-α_3) represent the short-run dynamics of the model.

The error correction model derived from the preceding ARDL equation can:

$$\Delta Exp t = \alpha_0 + \sum_{i=1}^{n} \alpha 1 i \Delta Kurst1 + \sum_{i=1}^{n} \alpha 2 i \Delta Prodt1 + \sum_{i=1}^{n} \alpha 3 i \Delta RCAt1 + \Upsilon\ ECT_{t=1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where Υ represents the parameter for speed adjustment, and ECT denotes the residual from the cointegration model calculation of the equation (4).

RESULTS AND DISCUSSION

Before further discussion, descriptive statistics will explain each variable in Table 1 from 2001 to 2023. From the table, it can be seen that the highest export of Indonesian coffee for twenty-three years was in 2013, with an export amount of 532,156 tons, while the lowest in 2001 was only 248,924 tons. On the other hand, the highest coffee production in 2022 was 794,800 tons, with the lowest production level in 2001 at 610,640 tons.

Furthermore, the highest rupiah exchange rate occurred in 2022 at IDR15,731/USD, while the lowest was in 2003 at IDR8,465/USD. Finally, the lowest RCA value occurred in 2022, while the highest RCA value was obtained in 2008. Something is interesting about the data. If we look at 2022, the rupiah exchange rate and coffee production level have the highest value, while the RCA value is the lowest during this study period. Further discussion will be discussed in the results of the next discussion.

The results of the Revealed Comparative Advantage (RCA) analysis from 2001 to 2023 show that Indonesian coffee exports exhibit a moderate level of competitiveness in the global market. Although Indonesia's RCA value consistently exceeds one, signalling a comparative advantage, it remains lower than major competitors such as Brazil, Vietnam and

Table 1. Descriptive Statistics of Export Coffee, Exchange Rate, Production and RCA

Statistic Indicators	Export Coffee (Ton)	Exchange Rate (IDR)	Production (Ton)	RCA
Mean	391.497,51	11.598	723.119,6	5,28
Max	532.156,60	15.731	794.800,0	7,22
Min	248.924,70	8.465	610.640,0	3,17
Std. Dev	78.219,20	2.450	43.612,5	1,18
No. Obs	23	23	23	23

Sources: Data sources from UN Comtrade, UNCTAD, and Bank Indonesia

Table 2. RCA Value of Coffee of World Exporting Countries, 2001-2023

Year	Countries			
	Indonesia	Brazil	Vietnam	Colombia
2001	3,85	30,65	24,59	73,73
2001	5,17	26,03	26,74	87,76
2003	5,62	34,52	24,51	84,84
2004	5,31	32,59	24,39	76,47
2005	6,59	26,10	24,62	80,48
2006	6,50	34,57	24,06	67,82
2007	5,93	41,93	22,39	60,85
2008	7,22	34,74	21,56	51,71
2009	6,32	27,13	22,21	42,43
2010	4,50	22,53	22,72	41,88
2011	3,55	19,76	21,87	32,05
2012	5,23	24,42	18,81	25,27
2013	6,68	20,97	20,85	35,28
2014	5,34	19,78	24,40	41,04
2015	6,68	12,04	24,22	58,98
2016	5,77	14,10	21,93	65,33
2017	6,00	12,39	18,72	58,99
2018	4,68	34,59	12,04	56,67
2019	5,58	42,31	8,66	61,75
2020	4,86	67,23	6,57	77,27
2021	3,76	60,42	6,29	78,27
2022	3,17	50,71	6,20	56,34
2023	3,20	68,52	6,26	50,86

Source: Processed data, 2024

Colombia. Based on Table 2, the competitiveness of coffee exports in the four countries has competitiveness, and this is evidenced by the resulting RCA value> 1.

Indonesia has not fully utilized its potential compared to leading exporters such as the three countries. The low competitiveness of Indonesian coffee exports is influenced by several factors, including coffee plantations managed by smallholder plantations, where the technology used is still simple and premature harvesting often occurs. (Fadah, 2016; Narulita et al., 2014; Rosiana et al., 2017). In addition, coffee producers prioritize the quantity of coffee products rather than the quality of the coffee products themselves. (Sinta et al., 2017). Furthermore, Baroh et al. (2014) revealed that it is not uncommon for coffee farmers to not pay attention to the post-harvest process, resulting in poor-quality coffee for export.

To further understand Indonesia's positioning in the global coffee trade, a Spearman rank correlation analysis was conducted to examine the relational dynamics of export competitiveness measured by the Revealed Comparative Advantage (RCA) among major coffee exporting countries. To deepen the comparative analysis of coffee export competitiveness, a Spearman rank correlation was conducted using RCA (Revealed Comparative Advantage) data from 2001 to 2023. This non-parametric method captures the monotonic relationship between the RCA rankings of Indonesia and other major coffee-exporting countries, namely Brazil, Vietnam, and Colombia.

Table 3. Result of Spearman Rank

Country	Spearman's correlation with Indonesia
Brazil	–0,357
Vietnam	0,351
Colombia	0,041

Source: Processed data, 2024

The results reveal a moderate negative correlation between Indonesia and Brazil (ρ = –0.357), indicating that when Brazil's export

competitiveness improves, Indonesia's tends to decline, and vice versa. This suggests a substitution effect in global markets, where gains by Brazil—due to its economies of scale and dominance in commodity-grade coffee—may coincide with losses for competitors like Indonesia.

In contrast, a moderate positive correlation was observed between Indonesia and Vietnam (ρ = +0.351). This suggests that both countries tend to experience similar trends in competitiveness, potentially driven by shared exposure to global demand for Robusta coffee and similar vulnerabilities to price volatility and market access challenges.

The correlation between Indonesia and Colombia is minimal (ρ = +0.041), suggesting that their export competitiveness moves independently. This could be attributed to their differing product positioning—Colombia is known for specialty Arabica coffee and has carved a premium niche in consumer perception, whereas Indonesia's exports remain more diversified and price-sensitive.

To enhance the competitiveness of Indonesian coffee exports, it is essential to involve stakeholders, including farmers and the government, in dealing with these weaknesses. According to Manalu and Frisnory et al. (2024; 2022), Increasing the competitiveness of Indonesian coffee exports can be started by cultivating coffee, maintaining, harvesting, post-harvesting through government programs and implementing quality certification of the coffee.

Before estimating the ARDL model, the first step is to test the stationary of each variable. The stationary test uses ADF (Augmented Dickey-Fuller). The test results are free from unit-roots if the probability value is greater than the alpha value of 0.05.

Table 4 reveals that the export and coffee production variables are stationary at the level, while the RCA and exchange rate variables are not stationary at the level. However, at the first difference level, all variables are stationary. Thus, the variables studied did not experience spurious regression.

Table 4. Stationary Test Results

Variabel	Level		First Difference		Remark
	t-Statistic	Prob	t-stat	Prob	
RCA	-2.1873	0.2159	-5.2687	0.0004	I(1)
Kurs	-4.838	0.8768	-4.9132	0.0008	I(1)
Exp	-3.9270	0.0071	-4.2130	0.0045	I(0)
Prod	-3.2492	0.0304	-7.3629	0.0000	I(0)

Source: Processed data, 2024

The subsequent step involves testing for cointegration utilizing the bound test. This test is designed to ascertain the presence of initial cointegration among the variables. When the dependent and independent variables in this study are stationary, and there is no initial cointegration, then the suitable model to use is ARDL.

This test is conducted to ascertain the existence of a long-term relationship within the context of this study. The decision-making criteria in this test are if the F-statistic value is greater than the upper bound value, then cointegration occurs. This means that the variables used in this study have a long-term relationship.

Table 5. Bound Cointegration Test Results

Test Statistic	Values	Significant Level	Bound Crticial Value	
			I (0)	I (1)
F-Statistic	5.0641	10%	2.37	3.2
		5%	2.79	3.67
		2,5%	3.15	4.08
		1%	3.65	4.66

Based on the results of cointegration testing with the Bound Test approach, the F-statistic value is 5.0641. This value exceeds the upper bound at the 10% alpha level, which is 3.20. Consequently, it can be concluded that the RCA, exchange rate, and coffee production variables exhibit a long-term relationship with coffee exports in Indonesia.

The ARDL test uses lag in the test. The long-term model estimation results can be seen in Table 6.

Referring to the results in Table 6 it shows that there are ARDL (2,0,1,2) model selection results. This means that the coffee export variable is on lag 2, the production variable is

Jurnal Agribisnis Indonesia (Journal of Indonesian Agribusiness)
Vol 14 No 1, Juni 2026; halaman 236-249

on lag 1, and the RCA variable is on lag 2. Based on the ARDL estimation results it shows that the exchange rate variable does not affect coffee exports in the short run. On the other hand, coffee production affects coffee exports in the first lag year, while in the second lag, coffee production does not affect coffee exports.

Table 6. ARDL Short-Run Results

Variable	Coefficient	P Value
Constant	-225.5656	0.9897
DEX (-1)	0.223150	0.5887
DEX (-2)	-0.834196	0.0738
DKURS	-24785.43	0.9058
DPROD	575630.8	0.2015
DPROD (-1)	849174.5	0.0834
DRCA	80091.66	0.0042
DRCA (-1)	-50176.44	0.1707
DRCA (-2)	75527.74	0.0464
R2	0.76887	
R2 Adjust	0.06007	
F-Stat	4.57405	0.0114

Note: **indicate significant at 5%, *significant at 10%

Finally, the Revealed Comparative Advantage (RCA) variable influences coffee exports in the same calculation year and the second-year lag; however, it exhibits no effect in the first-year lag. The results of the Autoregressive Distributed Lag (ARDL) test indicate that all variables, including coffee production, exchange rates, and RCA, simultaneously affect coffee exports, with a probability value of 0.0014. Finally, overall, the variables of coffee production, exchange rate and RCA can affect coffee exports in Indonesia by more than 60 per cent.

Furthermore, the estimation of the long-term relationship is presented in Table 7.

Table 7. ARDL Long-Run Results

Variable	Coefficient	P Value
Constant	-140.0119	0.9897
D(KURS)	-153484.68	0.9056
D(PROD)	884397.8	0.1119
D(RCA)	63587.87	0.0194***

Note: *** indicates significant at 1%

Table 7 shows that only the RCA variable has a positive and significant effect on Indonesian coffee exports in the long run.

Based on the results of the RCA calculation in Table 2, Indonesia's coffee export competitiveness is still in the top four coffee exporting countries in the world. This research is in line with several previous ones, including Alexander & Nadapdap (2019), Beno et al. (2022) Novariani et al. (2021), Dermoredjo et al. (2021), Hamzah et al. (2020) Daspar et al. (2024), Manalu et al., (2022) dan Tasya et al., (2022), Nasution et al., (2024), Sudrajat (2023), Zacharie & Denny (2024).

Although of the four countries, Indonesia still occupies the last position in my world coffee export competitiveness. This is not excessive because coffee plantations in Indonesia are still smallholder plantations (Fadah, 2016; Narulita et al., 2014; Rosiana et al., 2017). It is not uncommon for coffee farmers' coffee production to be more concerned with the quantity of coffee production than the quality of coffee (Sinta et al., 2017). It is said that the coffee farmers themselves still lack managerial skills in managing their business, so the quality of export coffee is still below that of other exporting countries. (Baroh et al., 2014).

For this reason, good cooperation is needed between coffee farmers, entrepreneurs, and the government to increase the competitiveness of Indonesian coffee exports. Collaboration and connectivity between government programs and coffee farmers are needed to increase competitiveness at the regional and global levels (Dermoredjo et al., 2021). According to Alexander and Nadapdap (2019), if Indonesia wants to become a superior coffee exporter from other countries, diversification or differentiation of coffee products is a must by having superior or different coffee beans from competing countries. Furthermore, to improve the competitiveness of agricultural products such as coffee, integration and innovation of products, environmental conditions, post-harvest coffee care and business management are needed. (Dermoredjo et al., 2021; Frisnoiry, 2024; Manalu et al., 2022).

The Autoregressive Distributed Lag (ARDL) model, shown in Table 6, reveals the relationship between the determinants of

coffee export competitiveness in the short run. Structural factors such as coffee production volume and RCA and quality standards emerge as key drivers of sustainable coffee exports. Interestingly, the ARDL analysis highlights a relatively weak relationship between the exchange rate and Indonesian coffee exports. This contrasts with previous studies by several researchers that the exchange rate has a strong relationship with coffee exports (Mayang Sari, 2024; Mbunduki & Raphael, 2024; Muhire & Job Kibiwot Lagat and Oscar Ingasia Ayuya, 2018). In contrast, the study conducted by Wanzala et al. (2024) revealed that the exchange rate can be detrimental to the value of coffee exports in Kenya. In the long run, the exchange rate exerts a negative influence on the volume of Rwandan coffee exports (Kabayiza et al., 2021).

Furthermore, the quality of coffee beans is a variable that must be considered in increasing the level of coffee exports. This can be done in various ways. For example, policies aimed at improving coffee quality through certification programs or facilitating access to international markets through trade agreements can have a direct impact on export performance (Dermoredjo et al., 2021; Fadah, 2016; Manalu et al., 2022; Phimmavong et al., 2023; Rosiana et al., 2017; Zacharie & Denny, 2024). In addition, the development of infrastructure and support mechanisms for smallholder farmers, who face unique challenges in scaling up production to meet domestic and export demand (Demise, 2017; Fadah, 2016; Kalle Hirvonen, Elia Machado, 2024; Tamirat, 2023; Wanzala et al., 2024).

The competitiveness of Indonesian coffee in international markets is critically shaped by both domestic production capacities and the trade policies of importing countries. This interaction creates a complex landscape that Indonesian exporters must navigate, particularly influenced by tariff and non-tariff barriers (NTBs).

In examining tariff structures, Indonesia's raw coffee exports generally benefit from lower tariff rates, often adhering to World Trade Organization (WTO) obligations and preferential trade agreements. However, value-added products such as roasted coffee face considerably higher tariffs, sometimes reaching 15% in key markets like the European Union and the United States (Fadilah et al., 2024; Putri & Salam, 2019). This tariff escalation constitutes a significant disincentive for Indonesia to enhance its coffee processing capabilities and diversify its export portfolio. The limited incentive to shift from raw to processed coffee limits the potential for Indonesian producers to realize higher profit margins from their exports (Zuhdi et al., 2021; Zuhdi & Yusuf, 2021).

NTBs present an additional layer of complexity, particularly with stringent sanitary and phytosanitary (SPS) standards and technical requirements that are increasingly being imposed by major importing countries (Nasution et al., 2024). The EU's Green Deal, for instance, mandates traceability and sustainability criteria that require Indonesian exporters to demonstrate compliance with new environmental regulations addressing deforestation (Putri & Salam, 2019). Such regulations not only raise compliance costs for exporters but particularly affect smallholder farmers who may lack the resources needed to meet these rigorous standards (Hakim & Rifin, 2023).

CONCLUSION

This study aims to examine the level of competitiveness of Indonesian coffee exports in the global market and the factors that influence it. By utilizing Revealed Comparative Advantage (RCA) and Autoregressive Distributed Lag (ARDL) analyses, the findings indicate that Indonesia demonstrates a moderate comparative advantage in coffee exports, although it still lags behind major exporting countries such as Brazil and Vietnam. These results emphasize the importance of improving coffee production quality, efficient price management, as well as adaptation to evolving global market trends. Factors such as exchange rate, competitiveness, and production volume are shown to have a signi-

ficant impact on Indonesia's coffee export levels, both in the short and long term. Structural factors such as infrastructure and production capacity remain key in strengthening Indonesia's position in the international coffee trade.

This study highlights the need for Indonesia to realign its coffee export strategy by responding more effectively to global demand dynamics. To enhance its competitiveness, Indonesia should prioritize demand-side policies that focus on understanding consumer preferences, differentiating products, and strengthening compliance with importing countries' standards. Key recommendations include investing in market intelligence to capture shifting tastes in major coffee-consuming regions; promoting value-added branding that emphasizes origin, sustainability, and cultural narratives; and facilitating exporters' adherence to non-tariff requirements such as environmental and ethical certifications. Furthermore, Indonesia should pursue bilateral trade agreements that align with importer expectations and actively engage in consumer education initiatives through experience marketing and global events. By embracing a demand-driven approach, Indonesia can position its coffee exports more strategically in an increasingly segmented and value-conscious global market.

REFERENCES

Alexander, I., & Nadapdap, H. J. (2019). Analisis Daya Saing Ekspor Biji Kopi Indonesia Di Pasar Global Tahun 2002-2017. *JSEP (Journal of Social and Agricultural Economics)*, *12*(2), 1. https://doi.org/10.19184/jsep.v12i2.11271

Arize, A. (1987). The supply and demand for imports and exports in a simultaneous model. *Applied Economics*, *19*(9), 1233–1247. https://doi.org/10.1080/00036848700000070

Balassa, B. (1965). *Comparative Advantage Indices Measure Revealed Comparative Advantage from International Comparisons of exports data, and are blind to possible sources of advantage*.

Baroh, I., Hanani, N., Setiawan, B., & Koestiono, D. (2014). Indonesian Coffee Competitiveness in the International Market: Review from the Demand Side. *International Journal of Agriculture Innovations and Research*, *3*(2), 605–609. https://doi.org/10.5923/j.economics.20140404.03

Beno, J., Silen, A. ., & Yanti, M. (2022). COMPETITIVENESS OF INDONESIAN COFFEE EXPORTS TO JAPAN. *Perwira Journal of Economics and Business (PJEB)*, *33*(1), 1–12.

Daspar, Kamiliya, N., Savitri, M., Eliza, N. N., & Megawati, A. (2024). Analisis Usaha Ekspor Kopi Indonesia Dan Malaysia Di Pasar Asean. *Jurnal Ekonomi Dan Bisnis Digital*, *02*(01), 215–219.

Demise, T. H. (2017). *Coffee market performance and producer welfare upon the introduction of the Ethiopian Commodity Exchange* [The Netherlands Organization for International cooperation in Higher Education (NUFFIC]. https://biblio.ugent.be/publication/8521216

Dermoredjo, S. K., Pasaribu, S. M., Azahari, D. H., & Yusuf, E. S. (2021). Indonesia's coffee and cocoa agribusiness opportunities in Regional Comprehensive Economic Partnership trade cooperation. *IOP Conference Series: Earth and Environmental Science*, *892*(1). https://doi.org/10.1088/1755-1315/892/1/012071

Dickey, D. A., & Fuller, W. A. (2012). Distribution of the Estimators for Autoregressive Time Series With a Unit Root. *Journal of the American Statistical Association*, *July 2015*, 37–41. https://doi.org/10.1080/01621459.1979.10482531

Erkan, B., & Sarıçoban, A. (2014). Comparative Analysis of the Competitiveness in the

Export of Science-Based Goods Regarding Turkey and the EU+13 Countries. *International Journal of Business and Social Science*, *5*(8). www.ijbssnet.com

Fadah, I. (2016). Potential And Problems Of Small And Large Scale Processed Coffee Businesses In Jember Regency. *Review Integrative Business and Economics Research*, *5*(2), 105. http://buscompress.com/journal-home.html

Fadilah, M. R., Tain, A., & Agustina, Y. (2024). Competitiveness Analysis of Indonesian Coffee Exports to the European Union Market. *International Journal of Multidisciplinary Research and Analysis*, *07*(03). https://doi.org/10.47191/ijmra/v7-i03-38

Fofanah, P. (2020). Impact of Real Exchange Rate Fluctuations on Aggregate Cocoa and Coffee Exports in Sierra Leone. *Journal of Economics and Behavioral Studies*, *12*(2), 34–56. https://doi.org/10.1016/j.jnc.2020.125798%0Ahttps://doi.org/10.1016/j.smr.2020.02.002%0Ahttp://www.ncbi.nlm.nih.gov/pubmed/810049%0Ahttp://doi.wiley.com/10.1002/anie.197505391%0Ahttp://www.sciencedirect.com/science/article/pii/B9780857090409500205%0Ahttp:

Frisnoiry, S. et al. (2024). ANALISIS DAYA SAING KOMODITI EKSPOR NON-MIGAS INDONESIA PADA SEKTOR PERTANIAN (KOPI, KARET, DAN KAKAO) DI PASAR INTERNASIONAL 2013-2020. *Inovasi Dan Kreatifitas Dalam Ekonomi*, *6*(4), 1.

Frisnory, S. et. a. (2024). ANALISIS DAYA SAING KOMODITI EKSPOR NON-MIGAS INDONESIA PADA SEKTOR PERTANIAN (KOPI, KARET, DAN KAKAO) DI PASAR INTERNASIONAL 2013-2020. *Inovasi Dan Kreativitas Dalam Ekonomi*, *6*(4), 1.

Goldstein, M., & Khan, M. (1985). *Income and price effects in foreign trade* (R. W. Jones & P. B. Kenen (eds.); Vol. 2, Issue 20, pp. 1041-1105 BT-Handbook of International Economics). Elsevier. https://econpapers.repec.org/RePEc:eee:intchp:2-20

Goldstein, M., & Khan, M. S. (2017). The supply and demand for exports: A simultaneous approach. *Trade, Currencies, And Finance*, *60*(2), 83–104. https://doi.org/10.1142/9789814749589_0002

Hakim, R. I., & Rifin, A. (2023). Does State-Financed Organic Coffee Certification Increase Smallholder Farmers' Income? *Sustainability Science and Resources*, *4*, 1–17. https://doi.org/10.55168/ssr2809-6029.2023.4001

Hamzah, Y. I., Tarik Ibrahim, J., Baroh, I., & Mufriantie, F. (2020). Analisis Daya Saing Kopi Indonesia di Pasar Internasional. *Journal of Agricultural Sosioeconomics and Business*, *3*(1), 17–21. http://ejournal.umm.ac.id/index.php/agriecobis

Helpman, E., & Krugman, P. (1985). *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy* (Vol. 1). The MIT Press. https://econpapers.repec.org/RePEc:mtp:titles:026258087x

Ibrahim, A. M. M., & Ali, M. S. Y. (2021). The mediating role of product planning and development on the relationship between markets strategies and export performance. *Uncertain Supply Chain Management*, *9*(2), 329–342. https://doi.org/10.5267/j.uscm.2021.2.009

International Cofffe Organization. (2024). *Historical Data on the Global Coffee Trade*. ICO. https://ico.org/what-we-do/world-coffee-statistics-database/

ITC. (2016). *International Trade Centre*. ITC. http//:www.intracen.org

Jalata, D. H. (2021). Competitiveness and Determinants of Coffee Export in Ethiopia: An Analysis of Revealed Comparative Advantage and Autoregressive Distributed Lag Model. *Journal of Economics and Sustainable*

Development, *12*(5), 43–62. https://doi.org/10.7176/jesd/12-5-05

Kabayiza, Muhire, R., Nsabimana, S., Kabarungi, M., Ningabire, Y. B., & Niyitanga, F. (2021). Effect of exchange rate volatility on Rwandan coffee price and export volumes. *Agro-Science*, *21*(1), 1–6. https://doi.org/10.4314/as.v21i1.1

Kalle Hirvonen, Elia Machado, A. M. S. (2024). DETERMINANTS OF COFFEE EXPORT IN ETHIOPIA: AN APPLICATION OF CO-INTEGRATION AND VECTOR ERROR CORRECTION APPROACH. *AgEcon Search*, *5*(4), 32–53. file:///F:/Spec 2/Traffic Delay Model.pdf

Kennedy, C. (1966). Keynesian theory in an open economy. In *Social and Economic Studies* (Vol. 15, Issue 1).

Manalu, D. S. T., Harianto, Suharno, & Hartoyo, S. (2022). Analisis Daya Saing Serta Faktor-Faktor yang Memengaruhi Pangsa Pasar Negara Eksportir Utama Kopi di Negara Importir Utama Kopi. *Buletin Ilmiah Litbang Perdagangan*, *16*(1), 1–24. https://doi.org/https://doi.org/10.30908/bilp.v16i1.445

Mayang Sari, D. (2024). Analysis of Exports, Inflation, Exchange Rates, Interest Rates on Foreign Exchange Reserves: ARDL Approach. *Journal of Economics, Finance And Management Studies*, *07*(06), 3226–3234. https://doi.org/10.47191/jefms/v7-i6-18

Mbunduki, & Raphael. (2024). Effects of exchange rate variability on coffee export growth in Tanzania. *Internastional Journal of Agriculture Economics*, *9*(2), 120–133. https://doi.org/https://doi.org/10.11648/j.ijae.20240902.18

Muhire, R., & Job Kibiwot Lagat and Oscar Ingasia Ayuya. (2018). Effect of Exchange Rate Volatility on Rwanda Coffee Export between Years 2001-2016. *ADRRI JOURNAL OF AGRICULTURE AND FOOD SCIENCES*, *3*(12).

Murindahabi, T., Li, Q., Nisingizwe, E., & Ekanayake, E. M. B. P. (2019). Do coffee exports have impact on long-term economic growth of countries? *Agricultural Economics (Czech Republic)*, *65*(8), 385–393. https://doi.org/10.17221/283/2018-AGRICECON

Narulita, S., Winandi, R., & Jahroh, S. (2014). Analisis Dayasaing Dan Strategi Pengembangan Agribisnis Kopi Indonesia. *Jurnal Agribisnis Indonesia*, *2*(1), 63. https://doi.org/10.29244/jai.2014.2.1.63-74

Nasution, S. P., Wibowo, R. P., Supriana, T., & Iskandarini. (2024). Analysis of Indonesia coffee exports competitiveness in the United States and Japan to promote sustainable market. *IOP Conference Series: Earth and Environmental Science*, *1302*(1). https://doi.org/10.1088/1755-1315/1302/1/012137

Nguyen, H. A. T., & Vo, T. H. T. (2021). The role of the coffee industry in sustainable economic development in Vietnam. *Accounting*, *7*(3), 683–690. https://doi.org/10.5267/j.ac.2020.12.008

Novariani, C., Muchtolifah, M., & Sishadiyati, S. (2021). Analisis Daya Saing dan Faktor yang Mempengaruhi Volume Ekspor Biji Kopi Indonesia Ke Jepang. *Eksis: Jurnal Ilmiah Ekonomi Dan Bisnis*, *12*(1), 16. https://doi.org/10.33087/eksis.v12i1.226

Osabohien, R., Akinpelumi, D., Matthew, O., Okafor, V., Iku, E., Olawande, T., & Okorie, U. (2019). Agricultural Exports and Economic Growth in Nigeria: An Econometric Analysis. *IOP Conference Series: Earth and Environmental Science*, *331*(1). https://doi.org/10.1088/1755-1315/331/1/012002

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289–326. https://doi.org/10.1002/jae.616

Phimmavong, S., Maraseni, T. N., Keenan, R. J., Phongoudome, C., & Douangphosy, B. (2023). Impact of the coronavirus pandemic on financial returns of smallholder coffee plantations in Lao PDR. *Agroforestry Systems*, *97*(4), 533–548. https://doi.org/10.1007/s10457-023-00808-4

Prilliadi, H., & Birinci, A. (2023). A Study on Determinants of Coffee Export from Indonesia to The United States of America. *Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, *13*(3), 2174–2184. https://doi.org/10.21597/jist.1227055

Putri, S. Y., & Salam, S. (2019). The Role of Indonesian Government in Improving Coffee Competitiveness in the Eu-Indonesia Partnership and Cooperation Agreement Framework. *Book Chapters of the 1st Jakarta International Conference on Social Sciences and Humanities (Jicossh)*, *3*, 311–322. https://doi.org/10.33822/jicossh.v3i0.23

Rahmaddi, R., & Ichihashi, M. (2012). How Do Foreign and Domestic Demand Affect Exports Performance? An Econometric Investigation of Indonesia's Exports. *Modern Economy*, *03*(01), 32–42. https://doi.org/10.4236/me.2012.31005

Ricardo, D. (1817). The Principles of Political Economy and Taxation. In *Batoche Books. Kitchener, Ontario,Canada*. Batoche Books. Kitchener, Ontario,Canada. https://doi.org/10.4324/9781351291521-9

Rosiana et al. (2017). Tingkat keunggulan komparatif produsen utama kopi dunia. *Buletin Ilmiah Litbang Perdagangan*, *11*(2), 227–246.

Sinta, N., Alamsyah, Z., & Elwamendari. (2017). Analisis Daya Saing Ekspor Kopi Indonesia Dan Vietnam Di Pasar Asean. *Jurnal Ilmiah Sosio Ekonomika Bisnis*, *20*(1).

Smith, A. (1776). An inquiry into the nature and causes of the wealth of nations. In *University of Lon- don at the London School of Economics Ed.* https://doi.org/10.2307/2221259

Sudrajat, M. A. (2023). Analisis Daya Saing Eskpor Kopi Indonesia dan Vietnam di Pasar Asean. *EDUCATIONIST: Journal of Educational and Cultural Studies*, *2*(2), 105–116.

Tamirat, N. (2023). Determinants of technical efficiency of coffee production in Jimma Zone, Southwest Ethiopia. *Heliyon*, *9*(4). https://doi.org/10.1016/j.heliyon.2023.e15030

Tasya, S., Suhaeni, & Wijaya, I. P. E. (2022). Analisis daya saing komparatif komoditas kopi (Coffea Sp.) Indonesia di pasar internasional. *Jurnal Ilmiah Wahana Pendidikan*, *8*(12), 335–341. https://doi.org/10.5281/zenodo.6945650

Wanzala, Marwa, & & Lwangsa. (2024). Impact of exchange rate volatility on coffee export in Kenya. *Cogent Economics and Finance*, *12*(1). https://doi.org/10.1080/23322039.2024.2330447

Zacharie, R., & Denny, S. (2024). Analisis Daya Saing Biji Kopi Indonesia di Pasar Internasional. *Jurnal Informatika Ekonomi Dan Bisnis*, *6*(4), 3–6. https://doi.org/10.37034/infeb.v6i4.907

Zuhdi, F., Windirah, N., & Maulanda, A. S. (2021). Analysis of Indonesian Coffee Export Performance to the Global Market Using Vector Autoregression (Var) Approach. *Jurnal Agrisep Kajian Masalah Sosial Ekonomi Pertanian Dan Agribisnis*, *20*(2), 381–396. https://doi.org/10.31186/jagrisep.20.2.381-396

Zuhdi, F., & Yusuf, R. (2021). Export Competitiveness of Indonesian Coffee in Germany. *Habitat*, *32*(3), 130–140. https://doi.org/10.21776/ub.habitat.2021.032.3.15