






Full Length Research Article

Export Competitiveness of Indonesia's Uncoated Paper in the Global Forest Products Market During and After the COVID-19 Pandemic: Evidence from Constant Market Share Analysis

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ABSTRACT

Indonesia is one of the world's leading exporters of uncoated paper products, supported by abundant plantation forests. However, Indonesia's uncoated paper export declined over the period 2018–2024. The objective of this research was to examine factors affecting the export competitiveness of Indonesia's uncoated paper products in the global forest products market during and after the COVID-19 pandemic. Data on export values, exchange rates, and GDP deflators obtained from Trade Map and the IMF were analyzed using the Constant Market Share analysis. The results showed that during the COVID-19 pandemic, Indonesia's uncoated paper exports increased mainly due to favorable impacts on world trade and competitiveness. In contrast, the composition of commodities and market distribution had an unfavorable impact on Indonesia's exports. After the COVID-19 pandemic (2023–2024), Indonesia's uncoated paper exports declined due to adverse effects on global trade and a negative competitiveness effect. On the other hand, commodity composition and market distribution had a favorable impact on Indonesia's exports. For the future, Indonesia needs strategies to maintain and improve the competitiveness and market stability of HS 480256, HS 480255, and HS 480257, such as: ensuring the forest certification; maintaining sustainable production, periodically reviewing international trade barriers, tariff changes, production cost efficiency; and increasing the capacity and technology of paper products. To provide more insight, the CMS method should be combined with an econometric method that can directly model a structural change in demand and estimate important parameters, such as price, cross-price, and income elasticities.

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1. Introduction

Currently, paper products are classified under HS 48 in international trade. This 2-digit number is then divided into 23 4-digit HS codes. Of these, HS 4819 was the world's largest paper product exported, followed by HS 4810, HS 4811, and HS 4802. During the COVID-19 pandemic, supply and demand imbalance led to a decline in pulp production and an increase in demand for paper products (Liu and Ning 2023). In contrast, Indonesian pulp and paper companies have demonstrated strong financial performance, as evidenced by their net profits and long-term

liquidity, leading the Indonesian government to designate the pulp and paper industry as a strategic sector (Utomo et al. 2021).

Paper is a preeminent export commodity in Indonesia, accounting for about 30% of forest products exports. It was primarily made up of uncoated paper (HS 4802). This uncoated paper industry plays a pivotal role in the Indonesian economy and has substantial expansion potential, driven by its high competitiveness and favorable market position (Ahmad et al. 2018; Purba et al. 2024; Sidiq et al. 2019). However, Indonesia's uncoated paper exports declined during the period 2018–2024.

The full HS 4802 heading describes this category as: “Uncoated paper and paperboard, of a kind used for writing, printing or other graphic purposes, and non-perforated punch-cards and punch tape paper, in rolls or rectangular (including square) sheets, of any size, other than paper of heading 48.01 or 48.03; hand-made paper and paperboard” (World Customs Organization 2022). These papers have no coating to fill in the fibers and are generally rougher and more porous, making them highly absorbent (He et al. 2021). Despite being “uncoated”, products in this heading can undergo finishing like calendering, glazing, surface sizing, or false water-marking.

Concerning environmental and sustainability aspects, HS 4802 has a lower chemical impact because it uses fewer synthetic chemicals and polymers than coated varieties, which often require mineral- or plastic-based coatings (Naitzel et al. 2023). HS 4802 also has higher recyclability because it lacks the additives that complicate repulping. Further, HS 4802 is a biodegradable product with sustainable sourcing, i.e., it can be made from recycled or alternative fibers such as bamboo and straw (Tikhomirova et al. 2024).

At least four aspects related to the advantages and limitations of HS 4802 are usability, print quality, cost, and durability. First, HS 4802 is excellent for writing/typing, and the ink does not smudge as easily; however, it is susceptible to smudging if handled with wet hands due to its absorbent nature. Second, HS 4802 has high text clarity, a muted aesthetic, and an organic aesthetic; however, “dot gain” causes softer, less crisp images and muted colors (Shenoy and Shetty 2021). Third, HS 4802 is generally more budget-friendly due to fewer processing steps; however, it absorbs more ink, which can slightly increase ink costs in high-coverage jobs (Santos et al. 2021). Fourth, HS 4802 is easy to fold without cracking the surface when in thicker sheets; however, it is less resistant to wear, moisture, and tearing than coated paper (Lev et al. 2023). Further, applications of HS 4802 include, among others, commercial and office use, publishing, and specialty uses such as packaging and hygiene papers used in specialized hygienic or functional applications during the sanitary crisis.

Previous studies have analyzed the competitiveness and determinants of Indonesia's pulp and paper trade flow, showing that Indonesian paper has comparative and competitive advantages in several markets (Malau et al. 2022; Natalia et al. 2024; Simangunsong and Wulandari 2016). Further, Nasution (2023) found that non-tariff measures positively affect pulp exports but negatively affect paper exports. Atasha et al. (2025) and Ramadani et al. (2021) stated that export demand for paper is price-elastic, implying that an increase in export prices will reduce export value.

These findings indicate that various economic factors, including income, prices, trade barriers, and policy interventions, influence Indonesia's paper competitiveness. The objective of this research was to examine the factors affecting the export competitiveness of Indonesian uncoated paper in the global forest products market during and after the COVID-19 pandemic.

The results can serve as a guideline for formulating an effective strategy to improve the export performance of Indonesian uncoated paper in international markets.

2. Materials and Methods

2.1. Data

The definition of uncoated papers in this study follows the Harmonized System Code. Indonesia's uncoated papers under investigation are HS 480255, 480256, 480257, and 480258. The latest data available covering the period 2018–2024 were gathered from [Trade Map \(2025\)](#). The period 2018–2024 was then divided into three sub-periods to examine structural change driven by the COVID-19 pandemic. They are 2018–2019 (before COVID-19), 2020–2022 (during COVID-19), and 2023–2024 (after COVID-19). The export performance was then analyzed for each period.

The main markets for Indonesia's uncoated paper exports were selected based on data completeness. They are Malaysia, Vietnam, Taipei-Chinese, Australia, Saudi Arabia, India, China, United Arab Emirates, Kenya, Thailand, and Others; and the world export markets were also grouped accordingly. All export values were expressed in real 2018 USD. To obtain these values, first; current USD Indonesia's and world's export values to main country export destinations (Malaysia, Vietnam, Taipei-Chinese, Australia, Saudi Arabia, India, China, United Arab Emirates, Kenya, Thailand, and Others) were converted into current (country) local-currency values by multiplying them with country-specific exchange rates in a given year (local currency units/USD). Second, real (country) local-currency values were determined by dividing current (country) local-currency values by the country-specific GDP deflator. Finally, real 2018 USD values were obtained by dividing real (country) local-currency values by the 2018 exchange rate. For the Others category, real 2018 USD values were obtained by dividing current USD values by a US deflator. All GDP deflators must use the same base year. Data on the GDP deflator (in indices with various base years) and exchange rates (in local currency units/USD) were obtained from the International Monetary Fund ([IMF 2025](#)).

2.2. Constant Market Share Analysis

The Constant Market Share (CMS) analysis is the commonly accepted procedure for examining the sources of a country's export performance, especially for analyzing aggregated commodity exports. It measures a country's competitiveness relative to other countries. The CMS analysis is a technique for decomposing a country's export growth into components that correspond to holding its market shares constant at various levels.

There are several decompositions in the literature ([Batista 2008](#); [Bonanno 2016](#); [Fagerberg and Sollie 1987](#); [Jepma 1986](#); [Leamer and Stern 1970](#); [Milana 1988](#); [Richardson 1971](#)), but each leaves factors influencing export behavior unexplained. However, as [Richardson \(1971\)](#) pointed out, it has intuitive appeal. To analyze the performance of Indonesia's uncoated paper exports, the original CMS model ([Leamer and Stern 1970](#)) was applied. This model provides a clear, identity-based decomposition of export growth and is often more intuitive for policymakers than the complex mathematical derivations found in new CMS models. While developing an improved method, [Fagerberg and Sollie \(1987\)](#) even argued that the traditional CMS methodology remained a useful descriptive tool. [Gilbert \(2017\)](#) advocates traditional CMS because it is a relatively simple

way to analyze complex growth patterns, with a strong theoretical foundation derived from the Armington trade model. Finicelli et al. (2008) used the traditional CMS to compare the export performance of advanced economies (the US, Japan and Italy) with that of emerging markets such as China, showing that static effects can still explain significant shifts in market share. Kumar (2022) also used the traditional CMS to study Indian agricultural exports. Further, using real values (inflation-adjusted) rather than current values may isolate volume changes from price-level fluctuations and improve the model's empirical validity (Ahmadi-Esfahani 2006; Fagerberg and Sollie 1985). The original CMS model is shown in Equation 1.

$$V'_{..} - V_{..} = rV_{..} + \sum_i (r_i - r) V_{i..} + \sum_i \sum_j (r_{ij} - r_i) V_{ij} + \sum_i \sum_j (V'_{ij} - V_{ij} - r_{ij} V_{ij}) \quad (1)$$

(1) (2) (3) (4)

where $V'_{..}$ is the total export value in period 2, $V_{..}$ is the total export value in period 1, V'_{ij} is the export value of commodity i to country j in period 2, V_{ij} is the export value of commodity i to country j in period 1, V_i is the export value of commodity i in period 1, r is the total world exports growth rate from period 1 to period 2, r_i is the world exports growth rate of commodity i from period 1 to period 2, and r_{ij} is the world exports growth rate of commodity i to country j from period 1 to period 2.

Exports growth of a country as represented by the Equation 1 is decomposed into: (1) World trade effect - an overall world exports growth, (2) Commodity effect (positive if exports are concentrated in commodities in which world demand is growing relatively quickly); (3) Market distribution effect (positive if exports are concentrated in markets which are experiencing relatively rapid growth); and (4) Competitiveness effect (a positive value is interpreted as an increase in competitiveness).

3. Results and Discussion

3.1. World Trade Effect

As global trade competition intensifies, analyzing export performance is essential for policy formulation to achieve positive economic impacts for Indonesia. Factors that can influence export performance include growth in global demand, changes in the composition of exported commodities, shifts in export market distribution, and export competitiveness (Leamer and Stern 1970; Singh 2014). The world trade effect represents the growth in Indonesia's exports of uncoated papers, assuming its share of the world market remained unchanged. This effect can be positive or negative, depending on the general growth of world export of uncoated during the period of analysis (Djaja 1992). Indonesia's share of world uncoated paper exports by commodity and destination country is shown in **Table 1**. The CMS component is shown in **Table 2**. Indonesia's and the world's growth in coated paper exports by HS Code is shown in **Table 3**.

The data show that during the period 2018–2019, Indonesia's uncoated paper exports decreased by 5.1%. As a result, Indonesia's export share to the world market decreased from 15.5% to 15.3% (**Table 1**). The world trade of uncoated papers had an unfavorable impact on Indonesia's exports, as indicated by the world trade effect of –USD 86.1 million (**Table 2**). This was due to a lower decrease in Indonesia's exports (–5.1%) than in world trade exports (–3.7%) over the period 2018–2019 (**Table 3**). This condition resulted from the slowdown in global trade and demand in 2018, which contributed to weaker export performance (Huong and Phuong 2019). The ongoing trend toward digitalization is driving a decline in global demand for printing and writing paper.

Digitalization has increased public awareness and concern about sustainability worldwide. This has encouraged people to reduce their paper consumption by limiting the use of printed materials to essential matters only (Vivas et al. 2024).

Table 1. Indonesia's share of the world uncoated paper exports by commodity and country destination

Commodity / Country destination	Year					
	2018 (%)	2019 (%)	2020 (%)	2022 (%)	2023 (%)	2024 (%)
Commodity	15.5	15.3	14.9	14.8	16.4	16.1
HS 480255	11.3	10.6	10.4	11.3	11.5	10.1
HS 480256	22.1	23.4	21.1	21.5	24.5	24.1
HS 480257	10.9	8.4	12.6	11.2	12.4	12.7
HS 480258	10.4	9.4	8.9	9.5	10.5	10.9
Country destination	15.5	15.3	14.9	14.8	16.4	16.1
Malaysia	43.2	46.4	49.3	55.7	48.5	49.3
Vietnam	45.4	39.3	41.7	43.3	48.0	44.3
Taipei-Chinese	41.2	36.9	41.0	42.8	42.0	38.0
Australia	36.6	36.4	25.6	32.7	49.8	39.0
Saudi Arabia	68.3	60.5	54.5	62.8	76.4	82.9
India	69.3	60.3	42.9	64.6	59.7	53.4
China	57.5	54.7	66.9	47.5	43.3	40.8
United Arab Emirates	35.6	66.8	41.2	52.4	63.2	34.7
Kenya	30.8	34.1	24.9	41.9	49.8	39.7
Thailand	29.9	26.7	29.5	30.6	37.7	30.7
Others	10.3	10.2	8.9	10.6	10.6	10.8

Table 2. The constant market share estimate of Indonesia's exports to the total world uncoated paper market

CMS Component	Period		
	2018–2019 (USD million)	2020–2022 (USD million)	2023–2024 (USD million)
World trade effect	-86.1	318.0	-211.2
Commodity effect	3.2	-47.3	14.8
Market distribution effect	-50.5	-329.5	142.9
Competitiveness effect	12.3	360.6	-199.8
Total effect	-121.0	301.8	-253.3

Table 3. Indonesia's and the world's uncoated paper exports growth by commodities

Commodity	Indonesia's export growth			World export growth		
	2018–2019 (%)	2020–2022 (%)	2023–2024 (%)	2018–2019 (%)	2020–2022 (%)	2023–2024 (%)
HS 480255	-11.2	37.7	-22.3	-5.9	27.1	-11.7
HS 480256	2.5	10.9	-8.8	-3.1	8.8	-7.5
HS 480257	-23.2	2.1	-12.1	-0.9	14.7	-14.4
HS 480258	-12.6	38.4	-0.9	-4.1	29.6	-4.1
Total	-5.1	16.6	-12.3	-3.7	17.5	-10.2

By contrast, the growth of Indonesia's uncoated paper exports during the 2020–2022 period increased by 16.6% in 2018 constant prices. This growth was lower than the 17.5% growth in world trade of uncoated papers in 2018, in constant prices during the same period (Table 3). As a result, Indonesia's share of uncoated paper exports to the world market continued to decrease from

14.9% (2020) to 14.8% (2022) (**Table 1**). Further, world trade had a positive effect (+USD 318.0 million) on Indonesia's export performance over the 2020–2022 period (**Table 2**). During the 2020–2022 period, the COVID-19 pandemic hit the global economy. Digitalization became a necessity driven by customer needs, and a digital mindset became essential for ensuring survival and growth in the post-COVID-19 era ([Brinton 2021](#)). COVID-19 caused global trade to decline and shifted demand toward packaging paper amid the growth of e-commerce ([Gurtu et al. 2022](#)).

During the period 2023–2024, Indonesia's uncoated paper exports decreased by 12.3% in 2018 constant prices. Meanwhile, world trade in uncoated papers decreased by only 10.2% in constant 2018 prices (**Table 3**). As a result, Indonesia's share of uncoated paper exports to the world market decreased from 16.4% (2023) to 16.1% (2024). World trade effect had a negative value of –USD 211.2 million (**Table 2**). This implied that world trade had an unfavorable impact on Indonesia's uncoated paper exports during the 2023–2024 period. Stability under uncertainty caused by COVID-19 has led to a slowdown in the global economy ([Ahmed et al. 2021](#)). The global economy has been at risk of recession since the outbreak of COVID-19, followed by the Russia-Ukraine war, which has the potential to disrupt global economic stability and trigger further measures and changes ([Benabed and Moncea 2023](#)). Furthermore, the decline in demand for printing and writing paper, driven by global competitive pressures, has reduced the global market for these products ([Grutu et al. 2022](#)).

3.2. Commodity Effect

The commodity effect measures the concentration of Indonesia's exports in commodities whose world import demand grows relatively quickly or slowly during the period. A positive value implies a high concentration in fast-growing commodities ([Fatimah et al. 2020](#); [Kumari and Paladugu 2024](#); [Xiuqin et al. 2023](#)), whereas a negative value implies a concentration in relatively stagnated commodities. Indonesia's and the world's uncoated paper exports by commodity are shown in **Table 4**.

Table 4. Indonesia's and the world's uncoated paper exports by commodity

Commodity	Indonesia						World					
	2018 (%)	2019 (%)	2020 (%)	2022 (%)	2023 (%)	2024 (%)	2018 (%)	2019 (%)	2020 (%)	2022 (%)	2023 (%)	2024 (%)
HS 480255	23.6	22.1	23.2	27.3	24.5	21.7	32.4	31.7	33.2	35.9	35.0	34.4
HS 480256	57.3	62.0	54.9	52.2	55.1	57.3	40.1	40.3	38.8	35.9	37.0	38.1
HS 480257	14.3	11.6	17.9	15.7	16.2	16.2	20.4	21.0	21.3	20.8	21.4	20.4
HS 480258	4.7	4.3	4.0	4.7	4.2	4.8	7.0	7.0	6.7	7.4	6.6	7.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

In the period 2018–2019, Indonesia's uncoated paper exports to world markets decreased, except for HS 480256 (**Table 1**). Despite 2018–2019 being the year of the digital era, HS 480256 paper is still widely used for administrative, office, and educational purposes as end-use products ([Oliviera et al. 2021](#)). By contrast, it increased across all commodity groups during 2020–2022, except for HS 480257. The COVID-19 era has led to a sharp decline in demand for HS 480257 paper, a high-end printing paper used for commercial printing, such as magazines and catalogs. However, there has been a shift in demand, with HS 480255 as a raw material for printing and HS

480256 as a finished product for office and educational paper being substituted for e-commerce logistics purposes (Vivas et al. 2024). Meanwhile, HS 480258, with a higher weight (over 150 g/m²), is being used as a substitute for shipping documents, e-commerce product labels and delivery (Quyen 2023).

In the period 2023–2024, Indonesia's share of the world market decreased for HS 480255 and HS 480256, but it increased for HS 480257 and HS 480258. During this period, the paper industry experienced a recovery and structural adjustment following the pandemic. The COVID-19 pandemic led to increased digitalization across all sectors, thereby causing a decline in demand for standard office paper (HS 480255 and HS 480256). On the other hand, the e-commerce sector has remained strong even after the COVID-19 pandemic (Luo 2021; Vivas et al. 2024), leading to increased demand for higher-grade paper (HS 480257 and 480258) that offers premium packaging quality.

Table 2 showed that the commodity effect was positive (+USD 3.2 million) in the period 2018–2019, negative (–USD 47.3 million) in the period 2020–2022, and positive (+USD 14.8 million) in the period 2022–2024. These commodity effects can be explained by the composition of commodities in each period. In all periods, HS 480256 accounted for the highest share of Indonesia's uncoated paper exports (51.8–57.3%), followed by HS 480255 (21.7–27.3%), HS 480257 (14.3–17.9%), and HS 480258 (4.0–4.8%). This order of commodity share was also found for the world's uncoated paper exports (**Table 4**).

Although Indonesia's uncoated paper exports decreased at a faster rate than the world's for all commodities except HS 480256, a commodity effect in the period 2018–2019 was positive due to an export increase in HS 480256. A negative commodity effect in the period 2020–2022 was due to an increase in Indonesia's uncoated paper exports at a slower rate (+16.6%) than the world's (+17.5%). Meanwhile, a negative commodity effect in the period 2023–2024 was due to a faster decline in Indonesia's uncoated paper exports (–12.3%) than in the world as a whole (–10.2%) (**Table 3**). Further, the commodity composition effect has been enhanced since 2022 because Indonesia has focused on exporting HS 480256, HS 480255, and HS 480257, which have experienced rapid global import demand growth (**Table 4**).

3.3. Market Distribution Effect

The market distribution effect is a measure of the concentration of Indonesia's exports to rapidly or slowly growing markets relative to the world average (Djaja 1992). This measure can be positive or negative, with an interpretation similar to that of the commodity composition effect. Indonesia's and the world's uncoated paper exports by country destination are shown in **Table 5**, whereas Indonesia's and the world's export changes by country destination are shown in **Table 6**.

The primary export markets for Indonesia's uncoated papers were China, Malaysia, India, Vietnam, Taiwan, Saudi Arabia, the United Arab Emirates, and Thailand. The Asian market received about 40.0% in 2018, 47.5% in 2020, 33.6% in 2022, and 38.4% in 2024. Indonesia's uncoated paper export market distribution has been relatively more even since 2022. The Indonesian paper export market has become more evenly distributed because the center of gravity for paper product imports has shifted from the United States and Japan to Indonesia. As an emerging market, Indonesia can capitalize on the US-China trade friction to increase its market share (Cheng et al. 2023). Meanwhile, the pattern of the world's uncoated paper market appears steady during the 2018–2024 period, except in China, Vietnam, and Saudi Arabia (**Table 5**). The

study by [Hetemäki and Hurmekoski \(2016\)](#) found that the impact of structural changes driven by digital media in high-income countries also affects China's paper market.

Table 5. Indonesia's and the world's uncoated paper exports by country destination

Commodity	Indonesia						World					
	2018 (%)	2019 (%)	2020 (%)	2022 (%)	2023 (%)	2024 (%)	2018 (%)	2019 (%)	2020 (%)	2022 (%)	2023 (%)	2024 (%)
Malaysia	6.6	7.1	6.6	6.9	6.9	7.7	2.4	2.3	2.0	1.8	2.3	2.5
Vietnam	4.2	3.7	4.7	4.8	6.4	6.4	1.4	1.4	1.7	1.7	2.2	2.3
Taipei-Chinese	3.1	2.7	3.4	3.1	3.1	3.3	1.1	1.1	1.2	1.1	1.2	1.4
Australia	1.3	1.4	1.1	0.9	2.5	3.0	0.5	0.6	0.6	0.4	0.8	1.2
Saudi Arabia	2.4	2.7	2.3	2.4	2.2	2.6	0.5	0.7	0.6	0.6	0.5	0.5
India	5.5	7.4	2.6	4.8	9.3	6.5	1.2	1.9	0.9	1.1	2.6	1.9
China	14.5	8.8	23.6	6.2	4.2	4.8	3.9	2.5	5.3	1.9	1.6	1.9
United Arab Emirates	2.4	5.0	3.0	4.4	5.9	5.4	1.0	1.1	1.1	1.2	1.5	2.5
Kenya	1.3	1.5	0.9	2.2	2.1	1.9	0.7	0.7	0.5	0.8	0.7	0.8
Thailand	1.4	1.3	1.4	1.1	1.7	1.6	0.7	0.7	0.7	0.5	0.8	0.8
Others	57.3	58.4	50.6	63.3	55.6	56.7	86.4	87.0	85.4	88.9	85.8	84.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 6. Indonesia and world export change, by country destination

Country destination	Indonesia Export Change			World Export Change		
	2018–2019 (%)	2020–2022 (%)	2023–2024 (%)	2018–2019 (%)	2020–2022 (%)	2023–2024 (%)
Malaysia	1.5	22.4	-2.1	-5.4	8.4	-3.7
Vietnam	-16.5	20.6	-13.0	-3.5	16.3	-5.8
Taipei-Chinese	-16.8	6.9	-5.1	-7.1	2.4	5.0
Australia	4.1	-4.5	7.9	4.7	-25.3	37.8
Saudi Arabia	8.6	24.5	3.3	22.6	8.0	-4.9
India	28.7	112.5	-39.1	47.9	41.0	-32.0
China	-42.1	-69.3	1.1	-39.2	-56.8	7.0
United Arab Emirates	101.1	71.1	-19.4	7.1	34.4	46.7
Kenya	6.9	197.0	-23.1	-3.5	76.6	-3.5
Thailand	-17.7	-11.2	-18.6	-8.0	-14.4	-0.2
Others	-3.5	45.9	-10.5	-3.0	22.4	-12.1
Total	-5.1	16.6	-12.3	-3.7	17.5	-10.2

As shown in **Table 2**, the market distribution effect was a negative for the period 2018–2019 (–USD 50.5 million) and 2020–2022 (–USD 329.5 million), this finding is in line with the study of [Setyoko et al. \(2024\)](#), which states that the market effect tends to be negative for Indonesian export products during financial crises in export destination markets such as Japan, China, India, and Australia. While the market distribution effect was positive in the period 2023–2024 (+USD 142.9 million). Furthermore, these market distribution effects can be explained by the pattern of export destinations by country in each period.

A negative market distribution effect in the period 2018–2019 was due to the concentration of Indonesia's exports to slow-growing markets relative to the world average (–3.7%). They were China (–39.2%), Thailand (–8.0%), Taiwan (–7.1%), and Malaysia (–5.4%). The market distribution effect during 2020–2022 was also negative (–USD 329.5 million). This was due to Indonesia's export concentration in slow-growth markets relative to the world average (+17.5%). They were China (–56.8%), Australia (–25.3%), Thailand (–14.4%), Taiwan (+2.4%), Saudi Arabia (+8.0%), Malaysia (+8.4%) and Vietnam (+16.3%). In the period 2023–2024, the market

distribution effect was positive (+USD 142.9 million). This was due to Indonesia's export concentration in rapidly growing markets relative to the world average (−10.2%). All of Indonesia's export destinations were among the world's fastest-growing markets relative to the world average, except India (**Table 6**).

3.4. Competitiveness Effect

Indonesia's uncoated paper competitiveness effect in million USD, by commodity, country destination, and period, is shown in **Table 7**. The competitiveness effect had a favorable impact on Indonesia's exports in the period 2018–2019 (+USD 12.3 million) and in the period 2020–2022 (+USD 360.6 million). This indicates that Indonesia's competitiveness effect continued to trend positively throughout the COVID-19 pandemic. This finding aligns with the study by [Poudel and Dahal \(2025\)](#), which found that despite significant disruptions from the COVID-19 pandemic, the U.S. forest products industry demonstrated resilience and positive economic performance in 2022.

Table 7. Indonesia's uncoated paper competitiveness effect in million USD, by commodity, country destination, and period

Commodity/Country destination	Competitiveness effect		
	2018–2019 (USD million)	2020–2022 (USD million)	2023–2024 (USD million)
Commodity	12.3	360.6	−199.8
HS 480255	−6.0	211.1	−55.8
HS 480256	112.4	98.8	−63.8
HS 480257	−79.0	38.9	−78.0
HS 480258	−15.1	11.8	−2.1
Country destination	12.3	360.6	−199.8
Malaysia	9.2	13.9	0.1
Vietnam	−15.0	3.7	−10.3
Taipei-Chinese	−1.0	−0.8	−6.2
Australia	0.7	3.4	−33.9
Saudi Arabia	−6.1	30.7	−11.8
India	−20.0	34.6	−11.4
China	1.9	−37.5	−4.9
United Arab Emirates	54.3	25.8	−110.5
Kenya	4.9	13.9	−7.5
Thailand	−1.4	2.3	−6.7
Others	−15.2	270.6	3.4

However, during the period 2023–2024, the competitiveness effect had an unfavorable impact on Indonesia's exports (−USD 199.8 million) (**Table 2**). This phenomenon occurs due to the heightened intensity of global competition during the post-pandemic recovery phase ([Bruhn et al. 2023](#)). Furthermore, international logistics efficiency has not yet recovered, reducing price competitiveness and export distribution ([Bayraktar et al. 2025](#)). Studies based on the CMS also indicate a decline in competitiveness due to limited capacity to adapt to changes in market demand ([Bulut 2025](#)). The challenges faced by Indonesia's paper industry—including technological limitations and low production efficiency—are intensifying pressure on export competitiveness.

To increase understanding, the competitiveness effect might be divided into two parts. They are the competitiveness effects by commodity group and by market distribution, as shown in **Table 7**. In the period 2018–2019, the largest positive competitiveness effect was attributed to the export

of HS 480256 (+USD 112.4 million), whereas other commodities had a negative competitiveness effect: HS 480255 export (–USD 6.0 million), HS 480257 export (–USD 79.0 million) and HS 480258 export (–USD 15.1 million) (**Table 7**). Indeed, during that period, Indonesia’s three groups of commodity exports declined faster than the world’s exports (**Table 3**).

During 2020–2022, the positive competitiveness effect was observed across all commodities (**Table 7**). During this period, exports of all commodities were increased (**Table 3**). Moreover, Indonesia’s exports to all destination countries increased, except to China, Thailand, and Australia (**Table 6**). Indonesia’s exports to China decreased by 69.3% (**Table 6**); however, China’s share in Indonesia’s export composition also decreased from 23.6% in 2020 to 6.2% in 2022 (**Table 5**).

In the period 2023–2024, the competitiveness effect was negative. This negative competitiveness effect was attributed to all commodities. Since Indonesia’s uncoated paper export market distribution was relatively more even, a positive competitiveness effect from market distribution was observed only in Indonesia’s exports to Malaysia, as shown in **Table 7**.

3.5. Export Performance in the Period 2018–2019

Indonesia’s uncoated paper exports decreased by USD 121.0 million during 2018–2019. This decline was mainly due to a decrease in the standard growth factor (world trade effect) of –USD 86.1 million and the market distribution effect of –USD 50.5 million. This reflects the weakening of global market demand for uncoated paper, influenced by external factors such as the 2018 trade war between the United States and China, which disrupted global supply chains ([Arisanto and Wibawa 2021](#)).

In contrast, the competitiveness factor contributed positively by +USD 12.3 million, indicating that Indonesia’s uncoated papers could compete with those of other countries. The commodity composition factor also showed a positive contribution of USD 3.2 million, indicating that the export structure aligned with global market needs.

3.6. Export Performance in the Period 2020–2022

In 2020, the world was hit by the COVID-19 pandemic. This caused a decline in exports of almost all types of paper products due to disruptions to global trade ([Ningrum and Deviani 2022](#)). However, as reported by [CEPI \(2021\)](#), the European association representing the paper industry, the high demand for specific types of uncoated paper (HS 480258 and HS 480255), particularly sanitary paper products and packaging materials, led to an increase in the world’s uncoated paper exports. These products were widely used by essential sectors such as healthcare, pharmaceuticals, logistics, and government, which remained operational during the pandemic. The need for high-quality, durable print media, especially for health documents, safety protocols, public information, and essential product labeling, has increased demand for these products during the pandemic.

Indonesia’s export performance improved by USD 301.8 million. The largest increase came from the standard growth factor (+USD 318.0 million). Commodity composition contributed negatively by –USD 47.3 million, indicating that Indonesia’s export product structure is still not fully aligned with global demand preferences. The competitiveness factor contributed positively to +USD 360.6 million. This could be due to a decrease in supply from competing countries, creating opportunities for Indonesia to fill the global market gap. However, the market distribution factor had a considerable negative impact (–USD 329.5 million). This indicates that Indonesia remained overly dependent on traditional markets that did not grow optimally during the pandemic

and was less aggressive in diversifying into higher-growth markets during the global economic recovery.

3.7. Export Performance in the Period 2023–2024

Indonesia's uncoated paper exports decreased again by USD 253.3 million. This was largely due to a decline in world trade (–USD 211.2 million), which was in line with weakening global demand. Competitiveness also declined (–USD 199.8 million), indicating that Indonesia lost its competitive advantage, possibly due to declining quality, increased competition, or inefficiency. Nevertheless, there was improvement in terms of commodity composition (+USD 14.8 million) and market distribution (+USD 142.9 million), indicating that Indonesian products are beginning to meet market demand and reach more targeted export destinations.

Indonesia and the world again experience a decline in the export value of uncoated paper during 2023–2024. This decline shows that the world uncoated paper market remains vulnerable to economic dynamics and to changes in demand structures driven by digitalization, improved paper-use efficiency, or shifts in market preferences. The COVID-19 pandemic is suspected to have played an important role in changing international trade patterns, including supply chain disruptions and fluctuations in raw material prices due to lockdown policies implemented by several countries that are also Indonesia's export destinations, affecting Indonesia's export performance (Ningrum and Deviani 2022). In addition, price competition from other exporting countries that are strengthening their international market positions could affect Indonesia's competitiveness.

3.8. Policy Impacts

During 2018–2024, several global economic events occurred. In 2018, tariff escalation from the United States disrupted international trade and required adjustments (Amiti et al. 2019). In 2020, the COVID-19 pandemic affected the world. This led to restrictions on activities. Demand for hygienic tissue products increased. Lifestyle and consumer behavior changed—electronic purchases and the e-commerce industry rose. Demand for eco-friendly packaging paper has also risen. Developing other types of paper is a crucial consideration (Vivas et al. 2024). In 2021, both Indonesia and the world began to recover, with an increase in re-export values. The export value of HS 480255, HS 480256 and HS 480258 products in Indonesia began to increase again, reflecting the recovery of global supply chains, market adjustment to new conditions and industry adaptation to changes in trade policy. Similar trends are also seen at the global level, with some products again experiencing an increase in export value, signaling the beginning of an international demand recovery as lockdown policies are eased and economic activity returns.

The United States is the world's largest paper producer. Right now, its production capacity is experiencing a continuous decline. This is because paper consumption in the United States tends to decline due to massive digitalization (Vivas et al. 2024; Chaucan and Meena 2021; Zhang and Nguyen 2018). In addition, the United States has shifted its focus to converting and further closing inefficient factories that contribute to emissions and excess waste, while expanding factories that produce recycled paper and other types of packaging paper (Chang et al. 2019). Meanwhile, global awareness of sustainability, health, and the environment is increasing. Coupled with shifts in people's behavior, demand for environmentally friendly products is increasing. Further, Palmer and Cohen (2020) highlight that pulp and paper companies in the United States and the European

Union have to diversify their paper production into other business lines, including forest land management, packaging materials such as boxboard, linerboard, and corrugating medium, tissue and hygiene products, pulp products, and pulp by-products such as lignin and bioenergy.

World paper demand has been shifting to Asian countries, especially China. This is an advantage of Asian countries as paper producers. They have abundant natural resources, which can provide sustainable raw materials. The large populations increase domestic demand. Their paper production costs are much cheaper than those in the United States. This implies that many factors and policies should be considered to maintain the stability of Indonesia's paper export prices and market. Several strategies that papers industries can implement to maintain the competitiveness of Indonesian paper include: ensuring the forest certification and maintaining sustainable paper production (Chen et al. 2020; Silva et al. 2016), increasing the added value and uniqueness of paper exported by Indonesia; and periodically reviewing international trade barriers, tariff changes, production cost efficiency, and prices from competitor countries, along with increasing the capacity and technology of Indonesia's paper products. These strategies would enable Indonesia to adapt and even foster sustainable global forestry development.

4. Conclusions

During the COVID-19 pandemic (2020-2022), Indonesia's uncoated paper exports increased mainly due to favorable impacts on world trade and competitiveness. This was caused by high demand for specific types of uncoated paper, particularly sanitary paper products and packaging materials. After the COVID-19 pandemic (2023-2024), Indonesia's uncoated paper export declined. This was largely due to the adverse effects of global trade on Indonesia's exports and a negative competitiveness effect, indicating that Indonesia lost its competitive advantage, possibly due to increased competition, the vulnerability of the uncoated paper market to economic dynamics, digitalization, improvements in paper use efficiency, or shifts in market preferences. For the future, Indonesia needs strategies to maintain and improve competitiveness and market stability for HS 480256, HS 480255, and HS 480257 commodities, such as ensuring forest certification, maintaining sustainable production, periodically reviewing international trade barriers, tariff changes, production cost efficiency, and prices from competitor countries, and increasing the capacity and technology of paper products. To provide more insight into the demand side of Indonesia's uncoated paper exports, the CMS method should be combined with an econometric method. This method can directly model a structural change in a demand equation and then estimate important parameters such as price, cross-price and income elasticities.

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Author Contributions

E.G.T.M.: Conceptualization, Methodology, Software, Validation, Formal Analysis, Investigation, Resources, Data Curation, Writing – Original Draft Preparation, Writing – Review and Editing, Visualization; B.C.H.S.: Conceptualization, Methodology, Software, Validation, Formal Analysis, Investigation, Resources, Writing – Original Draft Preparation, Writing – Review and Editing; M.A.: Validation, Investigation, Review and Editing – Original Draft Preparation.

Conflict of Interest

The authors declare no conflict of interest.

Declaration of Generative AI And AI-Assisted Technologies in the Manuscript Preparation

Not applicable.

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