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Analysis of Tariff and Non-Tariff Barriers to Indonesian Shrimp Exports in Major Destination Countries

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ABSTRACT

Shrimp is one of the mainstays of Indonesia's fisheries exports, but market access faces varying trade barriers across destination countries. This study aims to map the trade barriers for Indonesian shrimp in five major destination countries during the 2014-2024 period. A descriptive quantitative approach was used to analyze trends in export value, applied tariffs, the accumulation of Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) measures, policy type classifications, and coverage ratios. The results indicate that the characteristics of Indonesia's shrimp export markets differ across countries. The United States remains the primary market with concentration risks; Japan is showing signs of weakening; China is promising yet volatile; the Netherlands is weakening as a European market; and Malaysia is growing as a regional market. Trade barriers also vary, with the Netherlands standing out for import tariffs and China recording the largest number of identified SPS and TBT measures. The coverage ratio indicates that nearly the entire value of Indonesia's shrimp trade to major destination countries is covered by SPS and TBT regulations. These findings underscore that Indonesia's shrimp export strategy must focus on market-specific compliance through enhanced quality, food safety, labelling, certification, inspection, and traceability.

INTRODUCTION

The fisheries subsector plays a vital role in the national economy, as evidenced by the increase in the value of fisheries GDP at constant prices from IDR 252.28 trillion in 2019 to IDR 292.56 trillion in 2024 (BPS, 2025). Shrimp is one of the flagship commodities underpinning Indonesia's fisheries export performance, with export value reaching USD 1.68 billion or 28.2% of total national fisheries exports in 2024 (Kementerian Kelautan dan Perikanan Republik Indonesia, 2025). The structure of Indonesia's shrimp export market shows a high level of concentration, with the United States accounting for 66.0% of total exports, followed by Japan at 18.0%, China at 5.4%, the European Union at 2.7%, and ASEAN at 1.9% (Kementerian Kelautan dan Perikanan Republik Indonesia, 2023). This market concentration indicates that demand dynamics and changes in market access regulations in major destination countries significantly determine the performance of Indonesia's shrimp exports.

International trade barriers are a key factor in determining market access, as they are no longer shaped solely by import tariffs but also by non-tariff barriers that affect compliance costs, administrative procedures, and technical specifications that exporters must meet. Nga et al. (2023) explain that the development of trade agreements has led to a gradual reduction in tariff barriers, while non-tariff barriers have become increasingly important in trade policy, and seafood is among the relatively sensitive commodities. Anrina & Pramahayekti (2023) also emphasize that differences in food safety standards between countries and the difficulty of harmonizing standards can develop into significant trade barriers.

The most relevant forms of non-tariff barriers for shrimp are Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT). SPS relates to the protection of human, animal, and plant health from food safety risks, contaminants, pests, and diseases, while TBT relates to technical regulations and conformity assessment procedures such as labeling, packaging, testing, inspection, and certification. These two instruments are the most common forms of non-tariff policies implemented by export destination countries to regulate product quality and safety in international markets. Increasing demands for healthy, safe, legal, and sustainable fishery products make certification and traceability increasingly important for export market access (Fuah et al., 2023).

Cases of rejection in destination markets indicate that technical compliance remains a significant issue in Indonesia's shrimp trade. Aprilia et al. (2023) note that the causes of rejection of Indonesian shrimp in destination markets are not uniform, but rejections in the United States are related to pathogenic bacteria as well as banned chemicals or those exceeding maximum residue limits. Badan Penyuluhan dan Pengembangan Sumber Daya Manusia Kelautan dan Perikanan (2021) also mentions that rejections of Indonesian fishery products are often related to heavy metal contamination, pathogenic bacteria, histamine levels exceeding thresholds, poor temperature control, quality deterioration, fecal contamination, and unauthorized food additives. Recent developments in the United States indicate that this issue remains relevant. Food and Drug Administration (2025) issued a safety alert regarding frozen shrimp from the Indonesian company PT Bahari Makmur Sejati, placed the company on an import alert list due to potential Cesium-137 contamination, and subsequently mandated import certification for shrimp from specific regions in Indonesia. This series of events demonstrates that non-tariff barriers on shrimp are not merely administrative requirements but can directly impact the smooth flow of exports. This aligns with Tristi et al. (2021), who explain that non-tariff policies in the form of SPS and TBT not only serve as trade regulations but can also hinder international trade and limit market access for exporting countries if the importing country's requirements are not met.

This study addresses the limited availability of market-access profiles that simultaneously examine export performance, applied tariffs, SPS and TBT measures, policy classifications, and the share of trade value covered by these measures in major destination markets for Indonesian shrimp. While previous studies have focused on the trade effects of non-tariff measures or specific food safety and technical requirements, this study combines these complementary indicators to provide a structured comparison of market-access conditions across destination countries. The analysis covers five major destination countries and four shrimp product groups (HS 030617, 030636, 160521, and 160529) during 2014-2024, with particular attention to the breadth, types, and coverage of identified trade measures. This approach provides a market-specific profile of trade barriers without interpreting the number of measures as a direct indicator of regulatory restrictiveness or trade impact.

METHOD

Data Types, Sources, and Scope

This study employs a descriptive quantitative approach, with the unit of analysis comprising five major destination countries for Indonesian shrimp exports: the United States, Japan, China, the Netherlands, and Malaysia, during 2014-2024. The destination selection was based on Indonesia's shrimp export market structure. In 2022, the United States, Japan, and China ranked as the three largest individual destination markets, with export values of USD 1.42 billion, USD 0.39 billion, and USD 0.12 billion, respectively, while the European Union and ASEAN accounted for USD 0.06 billion and USD 0.04 billion (Kementerian Kelautan dan Perikanan Republik Indonesia, 2023). The Netherlands and Malaysia were subsequently selected to represent the European Union and ASEAN markets, respectively, at the country level. This selection is further supported by UN Comtrade data for 2020-2024, in which the Netherlands recorded an average export value of USD 22.949 million and was the largest European destination, while Malaysia recorded USD 14.212 million and was the highest-ranked

ASEAN destination. The shrimp product groups in this study encompass four Harmonized System (HS) codes: HS 030617 for frozen shrimp, HS 030636 for fresh shrimp, HS 160521 for processed or preserved shrimp not in airtight containers, and HS 160529 for processed or preserved shrimp in airtight containers.

Table 1. Variable, Data Sources, and Extraction Parameters

Variable	Unit	Source	Extraction Parameters
Shrimp export value	USD	UN Comtrade	Indonesia as reporter; destination countries as partners; 2014-2024; HS 030617, 030636, 160521, and 160529
Applied tariff	%	International Trade Centre MacMap	Indonesia as exporting country; five destination countries; 2014-2024; HS 030617, 030636, 160521, and 160529
SPS and TBT measures	Number of identified measures	International Trade Centre MacMap	Five destination countries; 2014-2024; HS 030617, 030636, 160521, and 160529
SPS and TBT coverage ratio	%	International Trade Centre MacMap (reprocessed)	Country-year level; HS 030617, 030636, 160521, and 160529; 2014-2024; calculated separately for SPS and TBT using trade-value-weighted coverage

The data were processed using Microsoft Excel and organized by destination country, HS code, and year. Export values were obtained from UN Comtrade, while applied tariffs, SPS and TBT measures were obtained from International Trade Centre MacMap. Applied tariffs are represented by the average applied tariff across the four shrimp HS codes for each destination country. SPS and TBT measures are identified from International Trade Centre and summarized by destination country and HS code. Identical measures appearing across multiple HS codes are consolidated and counted once, whereas additional measures specific to particular HS codes are retained. Therefore, the measure counts describe the breadth of identified regulatory measures rather than regulatory intensity or restrictiveness.

Research Methodology

The analysis was conducted in two stages. The first stage involved a descriptive analysis to illustrate trends in the value of Indonesia's shrimp exports, applied tariffs, and the accumulation of SPS and TBT measures in each destination country. The second stage involved calculating the coverage ratio to indicate the extent to which the value of shrimp trade falls under the scope of SPS or TBT measures. The coverage ratio was calculated using the following formula:

$$CR_{jt} = \left[\frac{\sum_i (D_{ijt} \cdot V_{ijt})}{\sum_i V_{ijt}}\right] \times 100$$

Descriptions:

CR_{jt} : SPS/TBT Coverage Ratio in country *j* in year *t* (%)

D_{ijt} : Dummy variable indicating the presence or absence of SPS/TBT for Indonesian shrimp in year *t* (1 = SPS/TBT present, 0 = SPS/TBT absent)

V_{ijt} : Value of shrimp imports from Indonesia to country *j* in year *t* (USD)

i : Shrimp commodity

j : Importing country (United States, Japan, China, Netherlands, Malaysia)

The coverage ratio is calculated separately for SPS and TBT so that the coverage of each type of non-tariff barrier can be examined in greater detail. The coverage ratio is expressed as a percentage ranging from 0 to 100%. A high coverage ratio indicates a larger proportion of shrimp trade value covered by SPS or TBT.

RESULT AND DISCUSSION

Trends in the Value of Indonesian Shrimp Exports to Major Destination Countries

Trends in the value of Indonesian shrimp exports to the five major destination countries during the 2014-2024 period show varied dynamics. These variations reflect distinct market characteristics. The United States and Japan exhibit the characteristics of established major markets; China displays the characteristics of a volatile, growing market; the Netherlands represents a weakening European market; while Malaysia illustrates a regional market developing on a smaller scale. These trends in export value are illustrated in Figure 1.

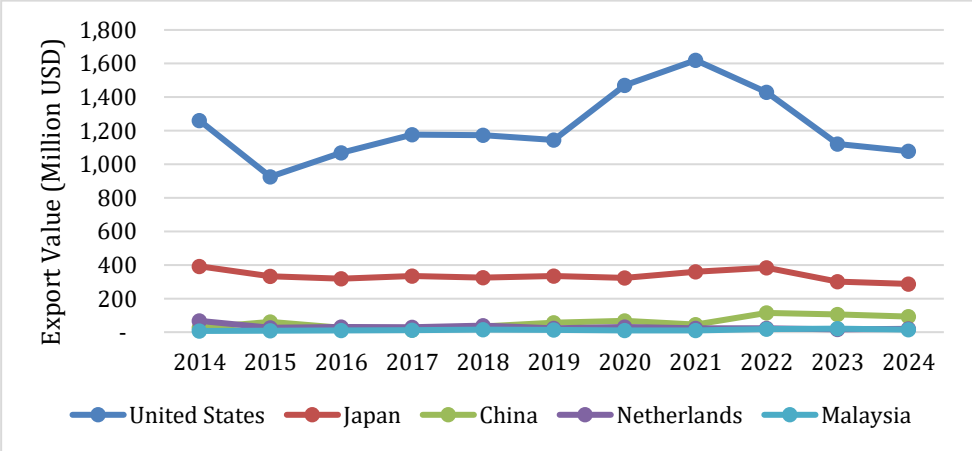


Figure 1. Value Trends of Indonesian Shrimp Exports to Major Destination Countries
Source: UN Comtrade (2025) reprocessed

The United States was the primary market with the highest export value during the observation period. Export value to the United States saw its largest decline in 2015, down 26.6% from 2014, before rebounding and peaking at USD 1,619.6 million in 2021. Export value declined again to USD 1,078.7 million in 2024, or 14.5% lower than in 2014. These figures indicate that the United States remains the primary market, but this position also creates a concentration risk. When the largest market experiences a decline, Indonesia's overall shrimp export performance is likely to weaken as well. Export strategies must not only maintain sales volume to the United States but also strengthen compliance with quality and food safety standards and pursue market diversification to avoid excessive reliance on a single market.

Japan has shown a relatively more stable trend compared to the United States, but the direction of its growth is generally downward. Export value to Japan fell by 26.7%, from USD 392.4 million in 2014 to USD 287.5 million in 2024. These figures indicate that Japan is an established market with relatively consistent demand, but its contribution is beginning to weaken over the long term. Exports to Japan require a strategy to maintain market loyalty through consistent quality, compliance with food safety standards, and the strengthening of value-added products to prevent the decline from continuing.

China showed the sharpest fluctuations compared to other destination countries. The lowest export value was recorded in 2017 at USD 14.0 million, while the most drastic increase occurred in 2022 with a 148.6% rise compared to 2021. Overall, the value of exports to China in 2024 was 247.9% higher than in 2014. This figure indicates that China is a promising market with significant growth potential, but its trajectory remains unstable. Exports to China remain highly responsive to changes in demand, market conditions, and import regulations.

The value of Indonesia's shrimp exports to the Netherlands has also fluctuated, but has generally declined from approximately USD 67.4 million in 2014 to USD 19.6 million in 2024, a 70.9% drop. These figures indicate a weakening of the Netherlands' position as a destination market for Indonesian shrimp and as a gateway to the European market. The Netherlands

market's capacity to absorb Indonesian shrimp has become increasingly limited compared to the beginning of the period, necessitating an evaluation.

Malaysia shows an upward trend, although its export value remains relatively small. Export value to Malaysia rose from USD 7.3 million in 2014 to USD 15.2 million in 2024, or an increase of 109.6%, with the highest value recorded in 2023 at USD 21.0 million. These figures indicate that Malaysia has potential as a growing regional market. Malaysia can be positioned as a supporting market in a diversification strategy, particularly to expand the export base within the ASEAN region.

Tariff and Non-Tariff Barriers on Shrimp

Trade barriers for Indonesian shrimp in major destination countries take the form of two main instruments: import tariffs and non-tariff barriers. The tariffs in Table 2 serve as a concise indicator of the level of price-based barriers in each destination country. Table 2 also presents the cumulative occurrence of SPS and TBT measures, which describes the breadth of identified regulatory measures across destination countries during the observation period.

Table 2. Barriers to Shrimp Trade in Major Destination Countries (2014-2024)

Countries	Import Tariff (%)	Number of SPS	Number of TBT
United States	3%	45	15
Japan	0%	7	1
China	0%	52	40
Netherlands	17%	19	13
Malaysia	0%	16	5

Source: International Trade Centre (2025) reprocessed

The Netherlands imposes the highest import tariff, at 17%, followed by the United States at 3%, while Japan, China, and Malaysia impose a 0% tariff. These figures indicate that tariff-based barriers are not evenly distributed across all markets. The Netherlands is the market with the highest applied tariff, so export strategies must account for price competitiveness, whereas strategies for countries with 0% tariffs should focus more on compliance with non-tariff standards since the primary barriers no longer lie in tariffs.

Netherlands tariffs are linked to the European Union's Common Customs Tariff system, a uniform tariff applied across all member states for goods from non-EU countries (Czermińska, 2025). Tariff rates within this system depend on the product classification and country of origin. US International Trade Commission (2023) states that U.S. import tariffs, recorded at 3%, follow a general tariff structure based on product classifications in the Harmonized Tariff Schedule, a classification system used to determine import duty rates based on the type of imported product. This rate indicates that the U.S. market is not yet entirely free of tariff-based barriers, although its level of protection is relatively lower compared to the Netherlands market.

Japan, China, and Malaysia apply a 0% tariff on Indonesian shrimp based on different policies. The zero tariff in Japan aligns with the Indonesia-Japan Economic Partnership Agreement (IJEPA), which provides for immediate tariff elimination on prawns and processed prawn products, while the zero tariff in China aligns with the trade scheme under the ASEAN-China Free Trade Area (ACFTA), which offers opportunities for reduced import duties among member states (Aswad & Azijah, 2021). Malaysia applies a zero tariff through the ASEAN Trade in Goods Agreement (ATIGA), which provides preferential tariff treatment for goods originating from member countries as long as they meet the rules of origin (Fahri et al., 2022). Differences in tariff levels among countries indicate that price-based barriers are influenced by the prevailing trade preference schemes.

The SPS and TBT measure counts in Table 2 describe the breadth of identified regulatory measures across the four shrimp product groups during the observation period. Identical measures appearing across multiple HS codes were consolidated and counted once, while additional measures specific to particular HS codes were retained. Therefore, differences in measure counts should not be interpreted as differences in regulatory intensity or

restrictiveness, as the counts may also reflect differences in regulatory classification and reporting. The analysis does not estimate the causal effects of these measures on trade or the compliance costs faced by exporters.

The policy aggregation shows that SPS measures are more numerous than TBT measures in the identified regulatory inventory, with 139 SPS measures and 74 TBT measures. These figures describe the breadth of identified regulatory measures, with SPS measures appearing more frequently than TBT measures in the regulatory inventory reported by MacMap. The difference in the number of measures should not be interpreted as a direct indication of regulatory intensity or restrictiveness, as the count may also reflect differences in regulatory classification and reporting. As a fishery food product, shrimp is subject to requirements related to food safety, residues, contaminants, hygiene, certification, inspection, and other product-related controls. However, this study does not estimate the trade effects or compliance costs associated with these measures.

China records the largest number of identified measures, with 52 SPS and 40 TBT measures. Food import controls in China include requirements related to government regulation, importer oversight, traceability, and record-keeping (Tong et al., 2024). The relatively large number of identified measures indicates broader regulatory coverage in the inventory examined, but it does not by itself establish that China imposes more restrictive regulations or greater compliance costs than other destination countries. Conversely, Japan records the smallest number of identified measures, with 7 SPS and 1 TBT measure. This lower count should not be interpreted as evidence of less stringent market regulation, Matsumoto (2022) explains that Japanese regulations tend to focus on core rules regarding food safety, so while the number of control instruments is fewer, they remain stringent. Setiawan et al. (2025) emphasize that improving quality standards and strengthening downstream industries are crucial components in maintaining the sustainability of exports in the global market.

The United States has 45 SPS measures and 15 TBT measures, indicating a relatively broad range of identified SPS and TBT requirements in the regulatory inventory. Steinkruger et al. (2025) explain that the Seafood Import Monitoring Program in the United States is designed to strengthen the traceability of imported seafood and curb products related to illegal, unreported, and unregulated fishing as well as seafood fraud. Compliance risks in the United States have strategic implications because the value of its exports dominates the structure of Indonesia's shrimp market.

The Netherlands records 19 SPS measures and 13 TBT measures, accompanied by the highest import tariff of 17%. Its regulatory requirements include labelling and product information for seafood under the European Union regulatory framework (Paolacci et al., 2021). Malaysia records 16 SPS measures and 5 TBT measures, with its food safety framework supported by the Food Act 1983, Food Regulations 1985, and Food Hygiene Regulations 2009 Halim et al. (2024). These country-level differences describe the distribution and types of identified measures but do not provide a direct estimate of their restrictiveness or economic burden.

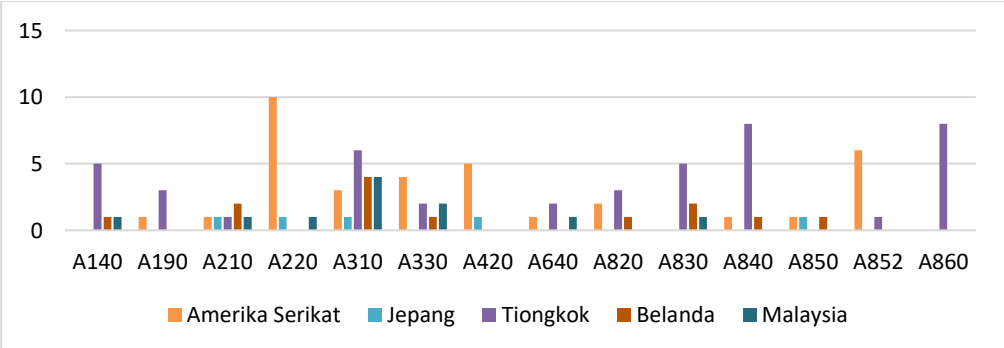


Figure 2. Classification of SPS Measures Enforced by Major Destination Countries
Source: International Trade Centre (2025) reprocessed

Figure 2 shows that the most prevalent SPS classifications are A310, A220, A840, A330, A830, and A860. Based on the United Nations Conference on Trade and Development (2019) classification, A220 relates to restrictions on the use of certain substances in food, feed, and materials in contact with food; A310 relates to labeling requirements directly related to food safety; A330 regulates packaging requirements; A830 refers to certification requirements; A840 to inspection requirements; and A860 to quarantine requirements. The dominance of these codes indicates that SPS measures for Indonesian shrimp form two layers of control: product risk control and proof of compliance. Risk control is evident through restrictions on certain substances, residues, contaminants, and food safety requirements. Demonstration of compliance is evident through labelling, packaging, certification, inspection, and quarantine.

The distribution of SPS measures across countries reveals a pattern of non-uniform barriers. China is most active in SPS measures related to certification, inspection, and quarantine, while the United States stands out in restrictions on specific substances. The Netherlands and Malaysia tend to focus more on labelling and packaging, while Japan is relatively limited to a few types of regulations. This pattern indicates that some markets emphasize risk control through product content, while others place greater emphasis on administrative and physical verification of product safety. SPS compliance strategies need to be tailored specifically to the destination country, rather than using a single approach for all markets.

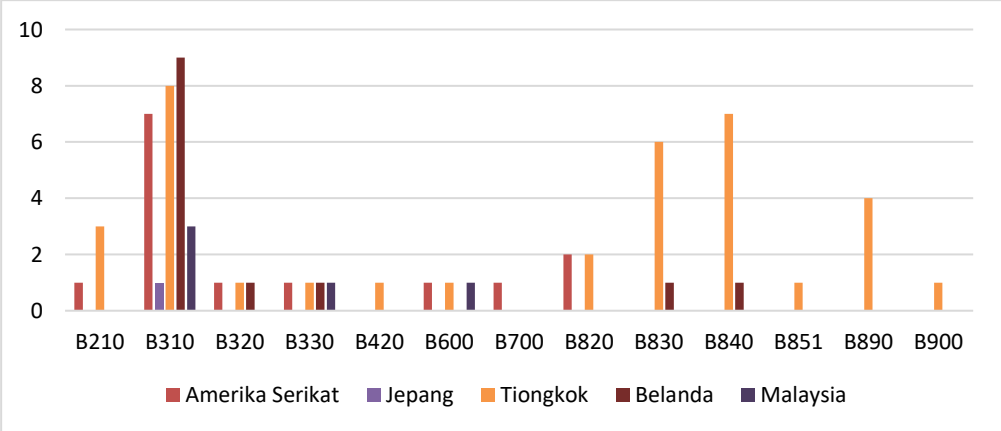


Figure 3. Classification of TBT Measures Enforced by Major Destination Countries
Source: International Trade Centre (2025) reprocessed

Figure 3 shows that the most prevalent TBT classification is B310, which refers to labelling requirements regarding the information that must be included on product packaging or labels, followed by B830 and B840, which relate to certification and inspection as part of conformity assessment procedures. These figures indicate that TBT barriers to Indonesian shrimp exports are primarily related to product information management and proof of conformity. Destination countries not only assess whether a product is safe but also evaluate whether product information is presented accurately, completely, and verifiably. Rimbawan et al. (2023) emphasize that food labelling serves as a crucial tool for protecting consumer health and preventing product rejection and recalls. Failure to meet requirements can also increase the risk of document revisions, thereby adding to export costs.

China records the largest number of identified TBT measures, particularly in the areas of certification and inspection, while the Netherlands and the United States have a relatively large number of measures related to labelling. These patterns describe differences in the types of TBT requirements recorded across destination countries rather than differences in regulatory restrictiveness. The Chinese market requires attention to certification and inspection requirements, while the Netherlands and the United States markets require careful

management of labelling and product information in accordance with importing-country regulations.

Coverage Ratio of SPS and TBT Measures on Indonesian Shrimp Trade

The coverage ratio is an indicator that shows the proportion of trade value covered by a non-tariff policy. The coverage ratio was calculated separately for SPS and TBT at the country-year level using the trade-value-weighted formula presented in the methodology. The calculation uses the four shrimp HS codes and their corresponding binary indicators of measure presence. Annual coverage ratios were subsequently averaged over the 2014-2024 period to obtain the period-level values. Table 3 shows that SPS coverage of Indonesia's shrimp trade in major destination countries is very extensive. The United States, China, the Netherlands, and Malaysia each recorded an SPS coverage ratio of 100%, while Japan recorded 90.91%. On the TBT side, the United States, China, and the Netherlands also reached 100%, Japan 90.91%, and Malaysia 72.73%. These figures indicate that nearly the entire value of Indonesia's shrimp trade to major destination countries falls under the scope of SPS and TBT regulations.

Table 3. SPS and TBT Coverage Ratios for Major Destination Countries (2014-2024)

Countries	Coverage Ratio SPS (%)	Coverage Ratio TBT (%)
United States	100%	100%
Japan	90.91%	90.91%
China	100%	100%
Netherlands	100%	100%
Malaysia	100%	72.73%

Source: Processed Data (2025)

Identical coverage ratios do not imply that the underlying regulatory requirements are the same. The coverage ratio reflects the proportion of trade value associated with identified SPS or TBT measures rather than the number, regulatory restrictiveness, or economic burden of those measures. The indicator therefore describes the scope of trade value covered by identified measures, while trade effects and compliance costs are not estimated in this study.

The United States, China, and the Netherlands have an SPS and TBT coverage ratio of 100%. This figure indicates that the entire value of Indonesia's shrimp trade with these three countries falls under regulatory coverage. The high coverage ratios indicate that a large share of trade value in these markets falls within the scope of identified non-tariff requirements. Exporters targeting these markets must ensure compliance from the production stage through to export documentation, as non-compliance with even a single requirement can disrupt market access.

Japan has an SPS and TBT coverage ratio of 90.91%. This figure indicates that the majority of Indonesia's shrimp trade value to Japan remains within the scope of SPS and TBT regulations, even though the number of recorded policies is relatively small. Japan records a relatively small number of identified measures, while its coverage ratio remains high. This indicates that the identified measures are associated with a large share of Indonesia's shrimp trade value to Japan. Malaysia exhibits a slightly different pattern, as the SPS coverage ratio has reached 100%, while the TBT coverage ratio stands at 72.73%. The higher SPS coverage ratio indicates that a larger share of Malaysia's shrimp trade value falls within the scope of identified SPS measures than TBT measures.

A coverage ratio in the 95-100% range indicates that a large proportion of the observed shrimp trade value falls within the scope of identified SPS or TBT measures. The coverage ratio therefore complements the measure count by showing the share of trade value associated with regulatory measures. The results demonstrate that the distribution of identified trade measures differs across destination countries: the Netherlands is notable for its higher import tariff, while China records the largest number of identified SPS and TBT measures. Export

strategies must take into account the characteristics of each market. However, these descriptive indicators do not establish differences in regulatory restrictiveness, trade effects, or compliance costs. Further analysis would be required to estimate the extent to which specific SPS and TBT measures affect export performance or impose costs on exporters.

CONCLUSION

Indonesia's shrimp exports to its five main destination countries during the 2014-2024 period exhibited varying dynamics across countries. The United States remained the primary market and a source of concentration risk; Japan exhibited a declining trend; China emerged as a promising but volatile market; the Netherlands experienced a decline as a European market; while Malaysia showed growth as a regional market. Trade measures also varied across destinations. The Netherlands recorded the highest import tariff, while China recorded the largest number of identified SPS and TBT measures. However, the number of measures should be interpreted as an indicator of regulatory breadth rather than regulatory intensity or restrictiveness, as differences in counts may also reflect regulatory classification and reporting practices. The coverage ratio further indicates that a large proportion of Indonesia's shrimp trade value to the selected destination countries falls within the scope of identified SPS and TBT measures. These findings provide a descriptive market-access profile that can support destination-specific compliance planning, particularly regarding sanitary standards, traceability, labelling, certification, inspection, and export documentation.

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