

# ASEAN Single Window and ASEAN Trade in Goods Agreement Utilization in Indonesia

Sherly Luthfi Anita<sup>1\*</sup>, Christina Ruth Elisabeth<sup>2</sup>

<sup>1</sup>Directorate General of Customs and Excise, Ministry of Finance, Indonesia

<sup>2</sup>Faculty of Economics and Business, Universitas Indonesia, Indonesia

E-mail: <sup>1</sup>[sherly.anita@kemenkeu.go.id](mailto:sherly.anita@kemenkeu.go.id), <sup>2</sup>[ruthelisabeth@ui.ac.id](mailto:ruthelisabeth@ui.ac.id)

\*Corresponding author

---

## JEL Classification:

F10  
F13  
F14  
F15

*Received: 05 September 2025*

*Revised: 30 January 2026*

*Accepted: 02 February 2026*

*Available online: April 2026*

*Published regularly: April 2026*

## ABSTRACT

**Research Originality:** This study provides novel empirical evidence by introducing the Cross-Border Paperless Trade Index as a proxy for ASEAN Single Window implementation to examine how the depth of digital trade facilitation influences Indonesia's utilization of the ASEAN Trade in Goods Agreement.

**Research Objectives:** This research aims to analyze the impact of ASEAN Single Window implementation on Indonesia's utilization of the ASEAN Trade in Goods Agreement, both at the aggregate level and across sectors.

**Research Methods:** This study uses unpublished Indonesian import panel data from eight ASEAN member countries for the period 2018–2023, and analyzes them using two-way fixed-effects panel data to control for unobserved heterogeneity across product-trading partners and over time.

**Empirical Results:** Higher levels of ASEAN Single Window implementation in partner countries have a positive and statistically significant effect on Indonesia's ATIGA utilization, indicating that digital trade facilitation reduces transaction costs and administrative barriers.

**Implications:** These findings suggest that strengthening the effectiveness of digital trade facilitation, particularly through the ASEAN Single Window, is crucial for increasing the practical use of preferential trade agreements and supporting deeper economic integration within ASEAN.

## Keywords:

digital trade facilitation; free trade agreement utilization; international trade policy; preferential tariff scheme; regional economic integration

---

## How to Cite:

Anita, S. L., & Elisabeth, C. R. (2026). ASEAN Single Window and ASEAN Trade in Goods Agreement Utilization in Indonesia. *Signifikan: Jurnal Ilmu Ekonomi*, 15(1), 207-222. <https://doi.org/10.15408/sjie.v15i1.46436>.

## INTRODUCTION

International trade plays a pivotal role in driving global economic growth, with Free Trade Agreements (FTAs) serving as key instruments for promoting economic integration. According to the World Trade Organization (2024), as of July 2024, 374 Regional Trade Agreements (RTAs) have been implemented globally. The Association of Southeast Asian Nations (ASEAN) began its participation in regional trade cooperation through the ASEAN Free Trade Area (AFTA) in 1993. This initiative was later reinforced and institutionalized through the ASEAN Trade in Goods Agreement (ATIGA) in 2010. ATIGA aims to eliminate both tariff and non-tariff barriers and to promote the growth of intra-ASEAN trade, offering significant opportunities for regional economic development.

As a central pillar of ASEAN's economic integration agenda, ATIGA is expected to strengthen regional value chains, enhance the region's resilience to external shocks, and contribute to the realization of the ASEAN Economic Community (AEC) as a single market and production base. Despite offering preferential incentives, the use of ATIGA remains relatively low among businesses (Hayakawa et al., 2009; Sitepu & Nurhidayat, 2015). Data from the ASEAN Secretariat show that although the value of intra-ASEAN trade increased from 2010 to 2023, its share of ASEAN's total global trade has remained stagnant at around 20 percent. This data indicates that intra-ASEAN trade has not grown in proportion to the region's total trade, which is primarily driven by trade with external partners.

Figure 1. Intra-ASEAN and Extra-ASEAN Trade, 2010–2022

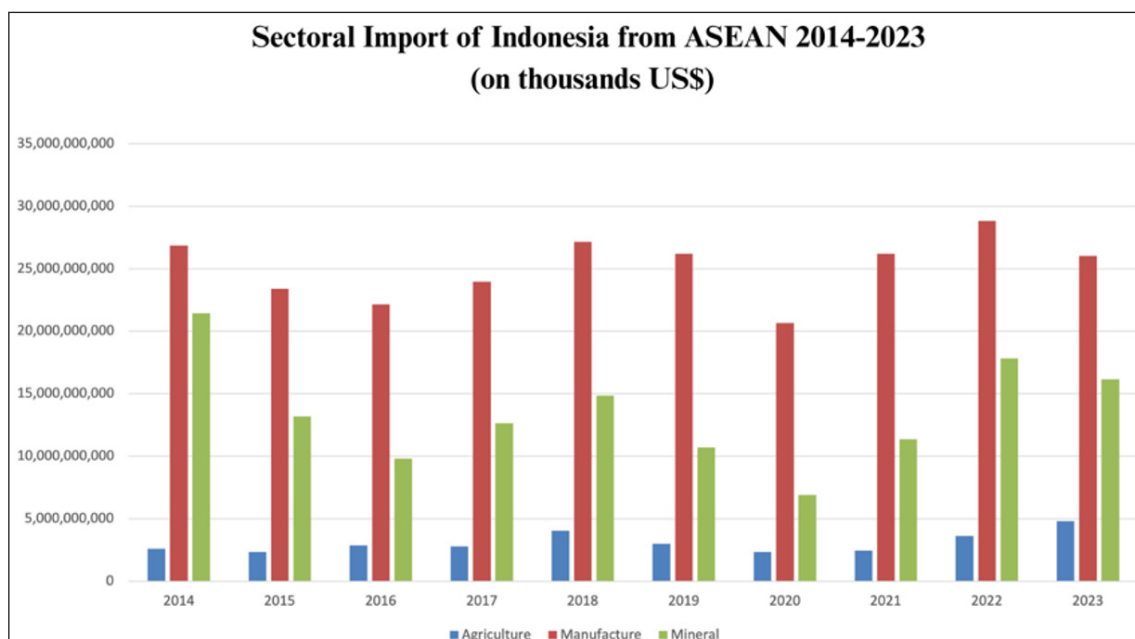


Source: aseanstats (2023)

This pattern is also evident in Indonesia's trade relations with other ASEAN member states. ASEAN remains one of Indonesia's most important trading partners,

particularly as a source of imports. According to Statistics Indonesia (2025), ASEAN is the second-largest regional source of Indonesian imports after other APEC economies. Indonesia's imports from ASEAN countries reached USD 50 billion in 2014, declined to approximately USD 37 billion in 2017, and rebounded to USD 46.8 billion by 2023. At the sectoral level, manufacturing dominates Indonesia's imports—particularly machinery, intermediate inputs, and raw materials—while mineral imports exhibit greater volatility and agricultural imports remain relatively stable. These trends highlight the strategic importance of intra-ASEAN trade for Indonesia's production structure. Nevertheless, Indonesia's trade patterns indicate that the utilization of ATIGA's preferential tariff scheme remains suboptimal.

Figure 2. Sectoral Import of Indonesia from ASEAN, 2014–2023



Source: aseanstats (2023)

Several factors contribute to low ATIGA utilization, including the complexity of rules of origin (RoO), limited access to relevant information among businesses, and administrative burdens in the certificate of origin (COO) process (Wignaraja, 2014). A study by ERIA (2021) found that ATIGA utilization remains constrained by complex regulations and high administrative costs. Hayakawa et al. (2016) estimate that fixed documentation costs for FTA usage range from 3% to 5% of product value. Jinji et al. (2020) further estimate that total administrative costs related to FTA scheme compliance can reach 27 percent, significantly exceeding the cost of RoO compliance, which is only around 4 percent per unit of production.

From a theoretical perspective, FTAs promote market integration by allowing firms to exploit economies of scale and improve productive efficiency (Krugman et al., 2012). However, due to firm heterogeneity, the benefits of trade liberalization are unevenly distributed. More productive firms are better positioned to absorb fixed compliance

costs, while less productive firms face higher barriers to participation. Within this framework, firms' decisions to utilize FTAs are shaped by cost-benefit considerations, including margins of preference and compliance costs (Estevadeordal & Suominen, 2003; Hayakawa et al., 2014; Jinji et al., 2020; ERIA, 2021; Arini, 2022; Qu & Zhang, 2023; Legge & Lukaszuk, 2024; Qu et al., 2024). As a result, many firms may find the cost of FTA compliance outweighs its benefits, especially if margins of preference are low.

In response to these challenges, ASEAN introduced the ASEAN Single Window (ASW) as a regional digital trade facilitation platform. The World Customs Organization (WCO) defines SW as a platform that allows traders to submit all required data and documents through a single access point using standardized formats (APEC, 2018). ASW integrates the National Single Windows (NSWs) of ASEAN member states and enables real-time electronic exchange of trade documents and data. According to UN/CEFACT, a Single Window enables traders to submit standardized information through a single entry point to meet all trade-related regulatory requirements. A key feature of ASW is the electronic exchange of Certificates of Origin via e-Form D, which directly supports the application of ATIGA preferences. By digitalizing and harmonizing trade procedures, ASW is expected to reduce administrative delays, enhance transparency, and lower fixed trade costs associated with FTA utilization (ASEAN Secretariat, 2023b; ASEAN Secretariat, 2024; Meng et al., 2024). Thus, ASW plays a crucial role in enhancing the implementation of ATIGA by creating a more efficient, transparent, and integrated trade system across ASEAN. While ATIGA focuses on reducing tariffs and non-tariff barriers to boost intra-regional trade, ASW complements this by accelerating customs procedures and cross-border document exchange. By linking each member state's National Single Window, ASW functions as an integrated digital platform that enables businesses to access tariff information, trade regulations, and customs procedures in real time, while streamlining communication between traders and regulatory agencies. Beyond serving as a centralized information system, it operates as a hub for inter-agency coordination, real-time validation, and secure data exchange, thereby enhancing transparency, improving administrative efficiency, and reducing uncertainty, compliance burdens, and transaction costs (Intal et al., 2014; Martinez-Zarzoso & Chelala, 2020).

Several empirical studies suggested that simplified trade procedures and improved access to information positively influence firms' participation in FTA schemes (Wignaraja, 2014; Legge & Lukaszuk, 2024). However, the evidence on digital trade facilitation remains mixed. Martinez-Zarzoso (2023) found that aggregate measures of digital trade facilitation do not always yield statistically significant effects, while OECD (2018) and Song (2022) cautioned that poorly designed digital systems may introduce new technical and procedural complexities. Moreover, sectoral studies indicate that the benefits of digital trade facilitation tend to be concentrated in sectors that are highly integrated into global value chains (Carballo et al., 2016; Martinez-Zarzoso, 2023). Other previous studies on digital trade facilitation have examined its impact on trade or on GVCs (Roy & Huang, 2020).

Despite extensive research on FTA utilization, the literature largely explains low utilization rates through trade cost barriers such as tariff complexity, rules of origin compliance, and administrative documentation costs (Estevadeordal & Suominen, 2003; Hayakawa et al., 2014; Jinji et al., 2020; ERIA, 2021; Arini, 2022; Qu & Zhang, 2023; Qu et al., 2024). While these studies highlight important constraints faced by firms, they provide limited empirical evidence on whether digital trade facilitation mechanisms function as enabling policies that actively increase FTA utilization. In particular, empirical studies directly linking the implementation of regional Single Window systems to actual FTA usage remain scarce, especially within ASEAN and at the sectoral level. Moreover, existing studies on digital trade facilitation primarily examine its impact on aggregate trade flows, customs efficiency, or participation in global value chains, rather than on firms' utilization of preferential tariff schemes (Martinez-Zaroso, 2023; Legge & Lukaszuk, 2024). These studies often rely on binary adoption indicators or broad facilitation indices, which do not capture cross-country and intertemporal variation in the depth and effectiveness of digital system implementation. As a result, it remains unclear whether deeper and more effective digital trade facilitation translates into higher FTA utilization.

This study addresses these gaps by examining digital trade facilitation as an enabling mechanism for FTA utilization, using the ASEAN Single Window as a case study. The key contribution of this research is the use of the Cross-Border Paperless Trade Index as a proxy for the depth of Single Window implementation, allowing for a more granular assessment of digital facilitation intensity beyond formal adoption. To the best of our knowledge, this approach has not been applied in the FTA utilization literature.

Accordingly, this study aims to estimate the impact of implementing the ASEAN Single Window on Indonesia's utilization of the ASEAN Trade in Goods Agreement at both the aggregate and sectoral levels. Using product-level import panel data and a two-way fixed-effects framework, the analysis explicitly links variation in the intensity of digital trade facilitation to observed FTA utilization outcomes, ensuring consistency among the research question, empirical strategy, and policy implications.

## METHODS

This study employed unpublished panel data from the Ministry of Finance, covering the period from 2018 to 2023. The selection of the study period was constrained by data availability and institutional validation requirements. Disaggregated import transaction data identifying ATIGA utilization at the product and partner-country level were only reliably available for this period at the time the study was conducted. In particular, utilization data for 2024 had not yet been finalized, validated, or formally authorized for research use by the Ministry of Finance. Given that the empirical analysis relied exclusively on officially verified utilization records to ensure data consistency and measurement accuracy, extending the sample to include unvalidated observations would have risked

introducing measurement error and biasing the estimation results. Earlier years were also excluded because the Ministry of Finance did not release comparable, consistently recorded utilization data for research purposes.

Accordingly, the chosen period represented the longest feasible and methodologically sound time span for rigorous empirical analysis. Future research may revisit this limitation as more recent, fully validated data become available. The starting year, 2018, was particularly relevant for analytical purposes as it coincided with the initial operational implementation of the ASEAN Single Window, including the electronic exchange of Certificates of Origin (e-Form D) among ASEAN member states. Focusing on the post-implementation period allowed the analysis to capture meaningful variation in the depth of ASEAN Single Window implementation and to assess its role as a digital trade facilitation mechanism influencing ATIGA utilization. Consequently, the selected time frame ensured both data consistency and conceptual alignment between the policy intervention and the empirical analysis.

The dataset covered Indonesia's imports from eight ASEAN member countries—Brunei Darussalam, Cambodia, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam—at the 6-digit level of the Harmonized System (HS) Code 2017. Lao PDR was excluded from the analysis due to the unavailability of data on ATIGA utilization. These data were obtained from Indonesian Customs and Excise and were sourced from Indonesia's import declaration system. This level of product classification enabled detailed analysis of trade flows and utilization patterns across different product categories, ensuring consistency in international trade reporting standards and comparability across countries. The dataset served as the basis for calculating the ATIGA utilization rate, which reflects the extent to which importers actually obtained and applied the tariff preferences under the agreement. By adopting a granular, product-level approach, the analysis captured sector-specific dynamics in FTA usage. It provided more precise insights into which industries or product categories benefited from preferential access. Such granularity was essential for evaluating the effectiveness of trade agreements and identifying sectors with underutilized potential.

A two-way fixed-effects panel data model was used to assess the impact of ASEAN Single Window implementation on the utilization of the ASEAN Trade in Goods Agreement. This approach was chosen to control for potential bias arising from unobserved but time-invariant factors at the product-country and year levels. The model incorporated product-country fixed effects to account for heterogeneity in the complexity of rules of origin across products and countries of origin, as well as year fixed effects to capture common external influences such as global economic fluctuations and the COVID-19 pandemic. This empirical specification was consistent with previous studies by Legge and Lukaszuk (2024) and Hayakawa et al. (2023), which examined the effects of free trade agreements.

The dependent variable is the utilization rate of ATIGA ( $U_{ijt}$ ), measured as the proportion of Indonesia's imports conducted under ATIGA preferential tariffs relative to total imports for each product and partner country. The implementation of the ASEAN

Single Window (ASW) was measured using two components. First, the year of initial live operation of ASW implementation in each ASEAN member state (*dummysw<sub>jt</sub>*) was used to assess the impact of ASW on the utilization of the ASEAN Trade in Goods Agreement (ATIGA). Second, the Cross-Border Paperless Trade Index will serve as a proxy to measure the level of ASW implementation in each ASEAN member state (*indexpaperless<sub>jt</sub>*). To date, no study has examined the impact of single-window implementation, as measured by the Cross-Border Paperless Trade Index (CBPTI), on the utilization of Free Trade Agreements (FTAs). The approach using the CBPTI has been employed by the United Nations (2024) and Martinez-Zarzoso (2023) in studies analysing the impact of digital trade facilitation on trade costs and firm productivity. Both studies concluded that digital trade facilitation reduced trade costs and improved firm productivity. The Cross-Border Paperless Trade Index was considered an appropriate component because the survey elements closely aligned with the facilities intended under the ASW—namely, the exchange of electronic customs declarations, electronic certificates of origin, and electronic sanitary and phytosanitary data. The United Nations (2023) report on trade facilitation also stated that survey results on cross-border paperless trade in ASEAN countries reflected the level of implementation of the ASEAN Single Window. This variable of interest was derived from the UN Global Survey on Digital and Sustainable Trade Facilitation.

To ensure robust results, the model controlled for several additional variables. Margin of Preference (*MOP<sub>ijt</sub>*), defined as the tariff margin between the Most-Favoured Nation (MFN) rate and the preferential tariff under ATIGA at the product level (6-digit HS 2017 level) of an ASEAN member country, captures the benefit firms gain from trade under an FTA. Based on Hayakawa et al. (2014), a higher tariff margin increased the attractiveness of utilizing FTAs for traders. GDP per capita of the exporting country (*GDPP<sub>jt</sub>*) served as an indicator of economic development and export capacity (Hayakawa et al., 2017). A higher GDP per capita suggested better infrastructure and compliance capability with FTA rules, increasing the likelihood of FTA utilization. It also proxied the level of ICT infrastructure development, which influenced the implementation of trade facilitation tools such as Single Window (SW) systems (Kok Yaw, 2016; OECD, 2018). The exchange rate of the exporting country's currency against the USD (*ER<sub>jt</sub>*) was included as a control variable in this model. As suggested by Hayakawa et al. (2017), a depreciation in the exporter's currency could enhance FTA utilization by making it easier to meet rules of origin (ROO) requirements. The final control variable, Indonesia's import value at the product level from ASEAN countries (*Import<sub>ijt</sub>*), was included to control for the size of export transactions. Higher import volumes may reflect greater demand and scale economies, increasing the incentive for exporters to utilize FTAs (Hayakawa et al., 2014; 2023).

Based on the description above, the following regression model was specified to measure the impact of the implementation of ASW on the utilization of ATIGA:

$$U_{i_{jt}} = \beta_0 + \beta_1 dummysw_{jt} + \beta_2 indexpaperless_{jt} + \beta_3 MOP_{i_{jt}} + \beta_4 \ln Import_{ijt} + \beta_5 \ln GDPP_{jt} + \beta_6 \ln ER_{jt} + \rho_{ij} + \delta_t + \varepsilon_{ijt}$$

## RESULTS AND DISCUSSION

The main finding of this study shows that the **depth of ASEAN Single Window (ASW) implementation**, rather than its initial launch, significantly increases the utilization of the ASEAN Trade in Goods Agreement (ATIGA), especially in the manufacturing sector. The official launch of ASW did not immediately affect ATIGA utilization. However, deeper and more mature digital trade facilitation reduces administrative barriers and encourages firms to use preferential tariffs. This highlights the importance of operational quality and institutional readiness in ensuring that digital trade reforms produce real trade benefits.

Table 1 presents the aggregate estimation results. The ASW implementation dummy variable (*dummysw*), which represents the year a country officially started ASW operations, shows an insignificant effect on ATIGA utilization. This indicates that formal participation in ASW alone is not enough to change firms' trade behavior. This finding is consistent with Martinez-Zarzoso (2023), who argues that digital trade facilitation is a gradual process moving from "not implemented" to "fully implemented," with stronger trade effects over time.

**Table 1. Estimation Results of the Impact of the Implementation of ASW on the Utilization of ATIGA**

Variables	Utilization
<i>dummysw</i>	0.0117 (0.0121)
<i>indexpaperless</i>	0.131* (0.0726)
<i>mop</i>	0.0144** (0.00643)
<i>lnimport</i>	0.0288*** (0.00155)
<i>lngdpp</i>	0.254*** (0.0344)
<i>lnrer</i>	0.481*** (0.0706)
Constant	-4.147*** (0.523)
Observations	21,774
R-squared	0.842

Robust standard errors in parentheses

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1

Source: Author's estimation

In contrast, the Cross-Border Paperless Trade Index (*indexpaperless*), which measures the quality and level of digital trade facilitation, shows a positive effect at the 10 percent

level. The estimated coefficient suggests that a one-unit increase in the index increases ATIGA utilization by 0.131, *ceteris paribus*. Since the index ranges from 0 to 1, this effect is economically meaningful and shows that improvements in digital trade systems can increase the use of free trade agreements. This finding supports trade facilitation theory, which states that reducing administrative and information barriers encourages firms to participate in trade agreements.

One key mechanism is the real-time electronic exchange of e-Form D among ASEAN member states. By replacing manual, paper-based verification with automated electronic systems, ASW shortens document processing time and speeds up customs clearance, thereby reducing logistics costs (APEC, 2018; Legge & Lukaszuk, 2024; Noor, 2023). These efficiency gains lower the fixed costs of claiming preferential tariffs and encourage firms to use ATIGA preferences (Wignaraja, 2014).

The positive impact of the ASEAN Single Window (ASW) on ATIGA utilization is also explained by improved access to information and a single-entry system for regulatory compliance. Single Window systems simplify information exchange between firms and government authorities, especially in meeting trade regulations (Weber, 2011). Firms can submit all required trade data and documents through a single integrated portal in a standardized format. This reduces duplication, fragmented information, and coordination problems among border agencies.

In the ASEAN context, ASW applies this principle by allowing firms to comply with rules of origin and customs procedures through a unified electronic platform. This reduces informational and procedural complexity. As noted by APEC (2018), the Single Window system allows traders to submit required information to border authorities only once. This improves transparency, reduces uncertainty in document processing, and helps firms better understand trade rules and procedures. The results show that digital trade facilitation increases FTA utilization by lowering costs and improving information access, but only when the system reaches sufficient operational maturity, meaning that formal adoption alone is not enough to change firms' behavior (Martinez-Zarzoso, 2023).

In contrast, this study does not support the argument that technology-based trade facilitation may reduce FTA utilization due to higher compliance costs, as suggested by the OECD (2018). OECD (2018) noted that building Single Window systems from scratch can be costly. However, in ASEAN, ASW builds on existing national systems and operates through cross-country interoperability. Most implementation costs are borne by governments rather than firms. As a result, firms benefit from simpler procedures and better information exchange without facing additional costs. This explains why ASW implementation in this study is associated with lower trade costs and higher FTA utilization, highlighting the importance of implementation design and cost-sharing arrangements in digital trade facilitation.

The control variables behave as expected, supporting the validity of the model. The margin of preference (MOP) shows a positive effect, meaning that larger tariff

differences encourage firms to use FTAs. This is because a wider preferential margin yields greater savings on import duties than the Most Favored Nation (MFN) tariff rate. As margins increase, firms gain greater cost advantages from using FTA schemes (Arini, 2022; Hayakawa et al., 2014; Qu & Zhang, 2023; Qu et al., 2024). Therefore, higher MOP values improve the cost–benefit calculation of compliance and increase firms’ willingness to use preferential trade agreements. From a policy perspective, this suggests that procedural improvements alone cannot maximize FTA utilization if tariff margins decline due to MFN tariff reductions.

**Table 2. Estimation Results of the Impact of Implementation of ASW on Utilization of ATIGA Sectoral**

Variables	(1)	(2)	(3)
	Agriculture	Manufacture	Mineral
dummysw	-0.0161 (0.0445)	0.0131 (0.0127)	0.0522 (0.0629)
indexpaperless	0.0824 (0.326)	0.142* (0.0746)	-1.094 (0.855)
mop	-0.0404 (0.0285)	0.0177*** (0.00662)	-0.0847 (0.0729)
lnimport	0.0262*** (0.00757)	0.0290*** (0.00159)	0.0161 (0.0158)
lngdpp	-0.116 (0.151)	0.271*** (0.0355)	0.580*** (0.214)
lner	-0.354 (0.300)	0.524*** (0.0729)	0.839 (0.599)
Constant	2.557 (2.200)	-4.502*** (0.541)	-6.954** (3.303)
Observations	1,424	20,076	274
R-squared	0.829	0.837	0.907

Robust standard errors in parentheses \*\*\*p<0.01, \*\*p<0.05, \*p<0.1  
Source: Author’s estimation

Import value also has a positive, highly significant effect, indicating that firms with higher trade volumes are more likely to use ATIGA preferences. This result reflects the fixed costs associated with FTA utilization, such as administrative costs for obtaining certificates of origin and adjustments to meet rules-of-origin requirements. Firms with larger import volumes can spread these costs across bigger transactions, making FTA utilization more economically feasible (Hayakawa et al., 2009; Hayakawa et al., 2023). Higher transaction values also mean greater tariff savings when preferential rates are applied (Hayakawa et al., 2014; Legge & Lukaszuk, 2024). As a result, firms with higher trade

volumes face a more favorable cost–benefit balance and are more likely to claim FTA preferences (Hayakawa et al., 2009).

GDP per capita of exporting countries (GDPP) is also positively related to ATIGA utilization. This indicates that exporters from more developed economies are more likely to use FTA preferences. Firms in higher-income countries generally have better knowledge, experience, and internal systems to handle the complex documentation and procedures required for FTA utilization. Stronger institutions and more advanced digital systems also help them comply with rules of origin and other regulatory requirements (Hayakawa et al., 2017). This finding suggests that policymakers should reduce gaps in digital capacity and institutional readiness across ASEAN countries. Efforts such as harmonizing customs procedures, improving national single-window systems, and providing technical support to less developed members can help ensure more inclusive use of ATIGA.

Finally, the exchange rate (ER) variable shows a positive effect, indicating that currency depreciation increases ATIGA utilization. A depreciation of the exporter's currency raises export prices in local-currency terms, which can increase the value-added share of exported products and help firms meet the Regional Value Content (RVC) requirements under FTA rules (Hayakawa et al., 2017). This makes it easier for exporters to qualify for preferential tariffs and strengthens their incentive to use FTA schemes. The result also shows that FTA utilization is influenced by broader macroeconomic conditions, highlighting the importance of coordinating trade policy with macroeconomic stability. Previous research, including Martinez-Zarzoso (2023), suggests that the effects of cross-border paperless trade facilitation may differ across product sectors. Based on this idea, this study analyzes the impact of ASEAN Single Window (ASW) implementation on ATIGA utilization across three sectors: agriculture, manufacturing, and minerals. The results in Table 3 show clear differences across sectors, indicating that the benefits of digital trade facilitation depend on sector characteristics and the institutional readiness of exporting countries.

The sectoral estimates show that ASW implementation has a positive effect only in the manufacturing sector, while the coefficients for agriculture and minerals, although positive, are not statistically significant. One possible explanation is the difference in sample size. The number of observations in agriculture (1,424) and minerals (274) is much smaller than in manufacturing (20,076), which may reduce the statistical strength of the estimates. Beyond this statistical issue, the results are also consistent with trade facilitation theory. Digital trade facilitation tends to be more effective for products deeply integrated into global value chains (GVCs), where rapid information exchange and efficient procedures are essential. Manufacturing goods—especially intermediate inputs and capital goods—are usually more involved in GVCs than primary products such as agriculture and minerals, making them more responsive to improvements in digital trade systems (Li & Wang, 2025; Martinez-Zarzoso, 2023). Similar findings are reported by Carballo et al. (2016), who show that trade facilitation measures,

including simplified document processing, have stronger effects on industrial inputs and manufactured goods.

Similarly, the OECD (2018) notes that trade facilitation reforms are especially important for high-technology manufactured components, which are highly sensitive to procedural delays and administrative uncertainty. Overall, these findings suggest that the benefits of ASW implementation are sector-specific and strongest in sectors with fragmented production and high time sensitivity. In the agriculture sector, the ASW implementation index also shows a positive sign, but the effect is not statistically significant. This may reflect the continued importance of non-tariff measures (NTMs), especially sanitary and phytosanitary (SPS) regulations, which limit the use of ATIGA in agricultural trade. Although ASEAN began exchanging electronic SPS (e-SPS) data in 2022, its implementation was limited to only two countries—Indonesia and Thailand—and covered only one year of the sample period, which likely reduced its measurable impact. The results also suggest that FTA utilization in agriculture is driven more by transaction value than by digital procedures. As shown in Table 2, import value has a positive and significant effect, meaning that larger transactions create greater tariff savings and stronger incentives to use FTA preferences. This finding is consistent with previous studies showing that firms are more likely to claim FTA benefits when tariff savings are large enough to offset compliance costs (Arini, 2022; Hayakawa et al., 2009; Hayakawa et al., 2014). These results indicate that, in agriculture, economic scale currently plays a greater role than digital trade facilitation, especially because electronic SPS systems remain limited.

Across all sectors, the ASW dummy variable—which marks the year of official ASW activation—shows no statistically significant effect. The coefficients are negative for agriculture and small but positive for manufacturing and minerals. This supports the earlier conclusion that the timing of ASW launch does not necessarily reflect its effectiveness. The ASEAN Secretariat (2021) also noted that although all ASEAN countries formally joined the ASW framework, the level of system integration and use varies widely across ASEAN countries, depending on digital infrastructure and institutional capacity.

Regarding the control variables, import value consistently shows a positive, significant effect in agriculture and manufacturing, indicating that higher trade volumes increase ATIGA utilization. This reflects the economic logic that firms are more likely to claim tariff preferences when transaction values are larger. The margin of preference (MOP) also has a significant positive effect in manufacturing, showing that larger tariff differences create stronger incentives to use FTAs. In contrast, GDP per capita and exchange rates show mixed but statistically insignificant effects across sectors. This suggests that while these macroeconomic factors may influence ATIGA utilization at the aggregate level, their role becomes less clear when analyzed by specific product sectors.

## CONCLUSION

This study analyzes whether the implementation of the ASEAN Single Window (ASW) affects Indonesia's utilization of the ASEAN Trade in Goods Agreement (ATIGA) at both aggregate and sectoral levels. The results show that the initial implementation of ASW—represented by the introduction of the electronic Certificate of Origin—does not significantly increase ATIGA utilization. This indicates that simply introducing a digital policy is not enough to change firms' behavior. However, deeper ASW implementation—reflected in stronger digital infrastructure, better system integration, and improved functionality—has a positive and significant impact on ATIGA utilization at the aggregate level. This effect is mainly observed in the manufacturing sector, where firms are more integrated into regional production networks and benefit more from efficient trade procedures. In contrast, the effects are not significant in the agriculture and mineral sectors, likely due to persistent non-tariff barriers and limited digital coverage.

The findings also show that macroeconomic factors such as tariff margins, transaction values, exporters' income levels, and exchange rate movements remain important drivers of ATIGA utilization. Overall, the study suggests that increasing the use of free trade agreements requires deeper and more effective digitalization, stronger regional coordination among ASEAN members, and better domestic coordination among government agencies to support efficient and integrated trade systems.

## REFERENCES

- Akbar, S., Mendoza, M. W., & Febriansyah. (2025). ASEAN Single Window Implementation: Exploring Benefits, Challenges, Solutions, and Future Roadmap. *Journal of Principles Management and Business*, 4(1), 186–209. <https://doi.org/10.55657/jpmb.v4i01.229>.
- Arini, T. (2022). Determinants of ASEAN–China Free Trade Agreement (ACFTA) Utilization for Indonesia's Imports. (*Unpublished Thesis*). International Institute of Social Studies, Erasmus University.
- ASEAN Secretariat. (2021). *ASEAN Digital Integration Index (ADII) Report 2021*. Jakarta: ASEAN Secretariat.
- ASEAN Secretariat. (2023a). *ASEAN Statistical Highlights 2022*. Jakarta: ASEAN Secretariat.
- ASEAN Secretariat. (2023b). *ASEAN Annual Report 2022–2023*. Jakarta: ASEAN Secretariat.
- ASEAN Secretariat. (2024). *ASEAN Annual Report 2023 (June–December)*. Jakarta: ASEAN Secretariat.
- Asia-Pacific Economic Cooperation. (2018). *Study on Single Window Systems' International Interoperability: Key Issues For Its Implementation*. Singapore: APEC Policy Support Unit.
- Basu Das, S. (2017). *ASEAN Single Window: Advancing Trade Facilitation for Regional Integration* (ISEAS Perspective No. 72). Singapore: ISEAS–Yusof Ishak Institute.
- Carballo, J., Schaur, G., & Volpe Martincus, C. (2016). Trust No One? Security and International Trade. *IDB Working Paper No. 7684, Inter-American Development Bank*.

- Chow, N. (2018). The Single Window and the TFA: ASEAN's Best Chance at a Common Rule of Law. *Asian Journal of Law and Economics*, 9(2), 1-12. <https://doi.org/10.1515/ajle-2017-0022>.
- Czapnik, B., & Saeed, M. (2025). Trade Facilitation: Making Trade More Efficient. In Prakash, A (Ed). *Asia–Europe connectivity vision 2025: Challenges and opportunities*, 96–107. Economic Research Institute for ASEAN and East Asia.
- Economic Research Institute for ASEAN and East Asia. (2021). *Impact of the ATIGA on Intra-ASEAN Trade*. Jakarta: ERIA.
- Estevadeordal, A., & Suominen, K. (2003). Rules of Origin: A World Map and Trade Effects. *Conference Papers, Purdue University, Global Trade Analysis Project*.
- Ferracane, M. F., González Ugarte, S., & Rogaler, T. (2025). Global trends in digital trade policies and practices: Evidence from the Digital Trade Integration Database. *World Trade Review*, 25(1), 127–151. <https://doi.org/10.1017/S1474745625100955>.
- Ha, N. N., & Phuong, D. M. (2025). Trade Facilitation in ASEAN through Customs Cooperation: Advancing towards Sustainable Development Goals 8, 9, and 17. *Journal of Lifestyle and SDGs Review*, 5(4), 5642. <https://doi.org/10.47172/2965-730X.SDGsReview.v5.n04.pe05642>.
- Hayakawa, K., Hiratsuka, D., Shiino, K., & Sukegawa, S. (2009). Who Uses Free Trade Agreements? *ERIA Discussion Paper Series, ERIA-DP-2009-2*.
- Hayakawa, K., Kim, H., & Lee, H. H. (2014). Determinants of Utilization of the Korea–ASEAN Free Trade Agreement: Margin Effect, Scale Effect, and ROO Effect. *World Trade Review*, 13(3), 499–515. <https://doi.org/10.1017/S1474745613000323>.
- Hayakawa, K., Laksanapanyakul, N., & Urata, S. (2016). Measuring the Costs of FTA Utilization: Evidence from Transaction-Level Import Data of Thailand. *Review of World Economics*, 152, 559–575. <https://doi.org/10.1007/s10290-016-0248-y>.
- Hayakawa, K., Kim, H.-S., & Yoshimi, T. (2017). Exchange Rates and Utilization of Free Trade Agreements: Focus on Rules of Origin. *Journal of International Money and Finance*, 75, 93–108. <https://doi.org/10.1016/j.jimonfin.2017.05.002>.
- Hayakawa, K., Laksanapanyakul, N., & Yoshimi, T. (2023). Firm-Level Utilization Rates of Regional Trade Agreements: Importers' Perspective. *Journal of Asian Economics*, 86, 101610. <https://doi.org/10.1016/j.asieco.2023.101610>.
- Intal, P. S., Jr., Fukunaga, Y., Kimura, F., Han, P., Dee, P., & Narjoko, D. (2014). ASEAN and AEC: Progress and Challenges. In *ASEAN Rising: ASEAN and AEC beyond 2015* (pp. 1–52). ERIA.
- Jinji, N., Hayakawa, K., Laksanapanyakul, N., Matsuura, T., & Yoshimi, T. (2020). A New Approach for Quantifying the Costs of Utilizing Regional Trade Agreements. *Discussion Paper No. e-19-010, Kyoto University*.
- Junaidi, A. (2019). Estimating the Impact of the ASEAN–China Free Trade Agreement on Indonesia's Trade Balance. (*Unpublished Thesis*). Depok: Universitas Indonesia.

- Kohpaiboon, A., & Jongwanich, J. (2022). Restrictiveness of RCEP Rules of Origin: Implications for Global Value Chains in East Asia. *ERIA Discussion Paper No. 455*.
- Kok Yaw, W. (2016). The Study of ASEAN's Readiness in Implementing a Single Window: Perspective from Malaysia's IT Development. *International Journal of Business & Management Science*, 2(4), 1-9. <https://doi.org/10.53555/eijbms.v2i4.17>.
- Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2012). *International Economics: Theory and Policy* (9th ed.). New Jersey: Pearson Education.
- Legge, S., & Lukaszuk, P. (2024). The Firm-Level Costs of Utilizing Free Trade Agreements. *International Economics*, 178, 100484. <https://doi.org/10.1016/j.inteco.2024.100484>.
- Li, Y., & Wang, Z. (2025). Digital Trade Facilitation and GVC Restructuring: Implications For Manufacturing Upgrading in Developing Countries. *Finance Research Letters*, 86(B), 108413. <https://doi.org/10.1016/j.frl.2025.108413>.
- Martínez-Zarzoso, I., & Chelala, S. (2020). The Impact of Single Windows on Trade. *IAI Discussion Paper No. 245*. University of Göttingen.
- Martínez-Zarzoso, I. (2023). Trade Facilitation and Global Value Chains in a Post-Pandemic World. *ADB Working Paper No. 1378*. Asian Development Bank Institute.
- Meng, J., Lu, H., & She, S. (2024). An Analysis of How Digital Technology Impacts Trade Costs: Evidence from RCEP Countries. *Financial Economics Letters*, 3(3), 31. <https://doi.org/10.58567/fel03030001>.
- Moisé, E., & Sorescu, S. (2013). Trade Facilitation Indicators: The Potential Impact on Developing Countries' Trade. *OECD Trade Policy Paper No. 144*. OECD Publishing.
- Noor, M. M. (2023). *ASEAN Single Window (ASW) & Indonesia National Single Window (INSW): Best practice of cross-border paperless trade integration*. UNESCAP.
- Organisation for Economic Co-operation and Development (OECD). (2018). *Trade Facilitation And The Global Economy*. Paris: OECD.
- Qu, Y., & Zhang, R. (2023). Assessing the Effects of Rules of Origin and Tariff Margins on China–ASEAN FTA Utilization. *PLOS ONE*, 18(5), e0286106. <https://doi.org/10.1371/journal.pone.0286106>.
- Qu, Y., Yang, H., Wu, K., & Jiao, Y. (2024). Exploring the Effects of Rules of Origin and Tariff Margins on China's Export Enterprises Under the China–Korea FTA. *Asia-Pacific Economic Literature*, 39(1), 65-85. <https://doi.org/10.1111/apel.12426>.
- Roy, C. K., & Huang, X. (2020). Effects of Paperless Trade Policy and Aid for Trade on Export Performance. *Asian Development Policy Review*, 8(1), 61–74. <https://doi.org/10.18488/journal.107.2020.81.61.74>.
- Sitepu, E. M. P., & Nurhidayat, R. (2015). Measuring Indonesia's FTA utilization: A Case Study. *Kajian Ekonomi dan Keuangan*, 19(3), 1-15.
- Song, J.-H. (2022). Empirical Analysis of Factors Affecting FTA Utilization by Exporting SMEs. *East Asian Economic Review*, 26(3), 227–253. <https://doi.org/10.11644/KIEP.EAER.2022.26.3.412>.

- UNESCAP. (2023). *Digital and Sustainable Trade Facilitation: Global Report 2023*. Retrieved from: <https://www.untsurvey.org/report/2023>.
- Weber, R. H. (2011). Legal Framework for the Single Window Concept in ASEAN. *Asian Journal of Law and Economics*, 2(4), 78–95.
- Wignaraja, G. (2014). The Determinants of FTA Use in Southeast Asia: A Firm-Level Analysis. *Journal of Asian Economics*, 35, 32–45. <https://doi.org/10.1016/j.asieco.2014.10.002>.