ANALYZING THE IMPACT OF THE AUTHORIZED ECONOMIC OPERATOR (AEO) PROGRAM IN INDONESIA

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Abstract

This study investigated the impact of the Authorized Economic Operator (AEO) program on imports in Indonesia using the Difference-in-Differences (DiD) methodology with yearly panel data of imports at the firm level. The independent variable represents whether a firm obtains AEO status. The analysis indicates that implementing the AEO program has had a statistically significant and positive effect on imports in Indonesia. Specifically, the findings suggest that the program contributed to a substantial increase in trade volume, likely increasing total import values by 35% and improving overall trade performance. These results underscore the importance of trade facilitation programs, such as AEO, in boosting economic activity and supporting sustainable trade growth. The positive impact observed highlights the potential benefits of expanding the program to include more firms, thereby amplifying its contribution to Indonesia's trade and economic development.

Keywords: supply chain, AEO, trade facilitation, import

INTRODUCTION

After the September 11th terrorist attacks in the United States, there has been a notable increase in emphasis on securing and ensuring the reliability of supply chains. This situation led the World Customs Organization (WCO) to develop a program to address members' concerns about maintaining their global supply chains. Prior to the attacks, customs administrations worldwide had implemented initiatives focused on customs compliance and trade facilitation aimed at streamlining international trade. Authorized traders who complied with customs regulations were entitled to various benefits, including expedited clearance of goods, as the Revised Kyoto Convention outlined. In today's rapidly evolving customs environment, advancements in information technology have enabled WCO member countries to better understand the necessity of improving their services to meet stakeholders' demands. Customs play a unique role in international trade by providing increased security while facilitating the legitimate flow of goods, making their role indispensable (Japan Customs & Tariff Bureau, 2023, p. 1). In line with this, Indonesia Customs has implemented a customs clearance system based on the WCO Risk Management Compendium to determine the treatment of imported goods. For example, customs officers will conduct physical and document checks if the system identifies the red line for imported goods. Conversely, goods on the green line and firms with the AEO certificates will not undergo on-clearance inspection. The AEO-certified firms can rely on electronically submitted import data to send goods directly to their warehouses before customs officers release them. This streamlined clearance process has become a critical issue within the Directorate General of Customs and Excise (DGCE), a body under the authority of the Indonesian Ministry of Finance.

At the June 2005 World Customs Organization Council Sessions in Brussels, WCO Members adopted the SAFE Framework of Standards to Secure and Facilitate Global Trade. This unique international instrument ushered in modern supply chain security standards and heralded the beginning of a new approach to the end-to-end management of goods moving across borders while recognizing the significance of a closer partnership between customs and business (WCO, 2005). The AEO program has many definitions. The AEO program originated from one of the WCO SAFE Framework pillars, which is a customs-business partnership to ensure the safety and security of the international trade supply chain. The program is widely acknowledged as a key driver for a solid Customs-Business Partnership, a secure, transparent and predictable trading environment, and, in a wider context, enhanced economic prosperity (WCO, 2020). Another definition suggests that an EU AEO certification seems to be beneficial for all companies exporting and importing goods from/to the EU (Wolffgang & Natzel 2007; TAXUD 2012; Polner 2012). The AEO was developed by both customs authorities and economic operators to ensure a common understanding and uniform application of legislation and safety measures in an attempt to integrate stakeholders more cohesively into the process of moving goods and people across borders (Campos et al., 2018).
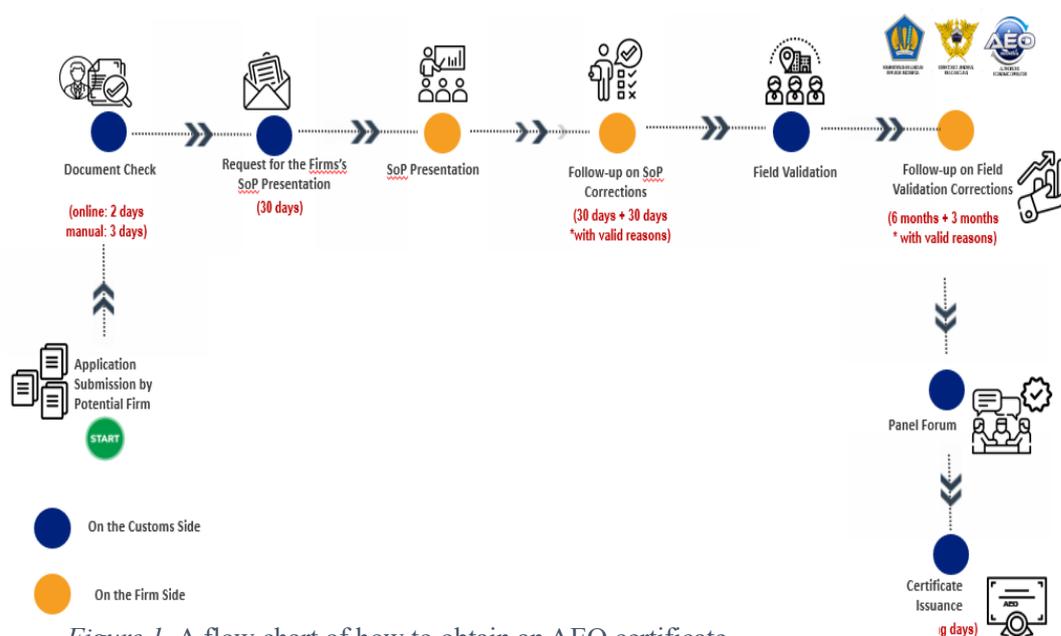

Figure 1. A flow chart of how to obtain an AEO certificate
Note. The chart is sourced from the Indonesia AEO Center (2024)

The fact that Indonesia Customs has granted AEO status to only 161 firms out of more than 217,000 importers and exporters is a growing concern. This number suggests that either the AEO program, as one of the government's incentives, is not well known among firms or the program is not as beneficial as other trade-inducing policies. Consequently, I believe observing the impact of the AEO program in Indonesia is necessary to better understand how the program affects global trade. This study addresses the question: "How does the AEO program affect imports in Indonesia?".

LITERATURE REVIEW

There is extensive literature on the impact of the AEO program upon which many customs administrations worldwide rely, and researchers have used various models to observe the impact of the AEO program on trade facilitation. One of the most well-known theories of the AEO program is that governments should vigorously encourage AEO certification to leverage network externalities and establish it as a global standard (Butter, Liu & Tan, 2011). Several empirical studies have found that security and trade facilitation are benefits of the AEO program. These can include either easier access to certain customs simplifications or certain facilitations from customs security and safety controls, or both (Tweddle, 2008). Pratama and Everett (2017) suggested that the benefits of AEOs, compared with earlier security endeavours, offer greater benefits in terms of global perspectives and a balanced approach to security, control, and trade facilitation, while Kulchev (2023) found that in balancing the growing demands on customs administrations for international trade security and safety with merchants' desire for easy and quick customs clearance, 'simplified customs procedures,' particularly AEO status, play a crucial role. Also, Liwen and Yongfei (2021) observed that the government would need to collaborate with enterprises to develop basic conditions for AEO certification, recognizing and addressing problems as they arise while striving to maintain customs clearance facilitation for law-abiding and sustainable trade routes, ensuring security.

Another widely established view is the fiscal impact of the AEO program in Kenya, which states that it resulted in reduced clearance time, higher customs value, and higher trade volume compared to non-AEO firms (Wanjiru, 2022). Meanwhile, Ballestero (2023) examined the effect of the AEO program on total value, total weight, taxes collected, and clearance time in Brazil. Using the DID method with panel data at the company level, the study found a significant positive relationship between the program and total value, total weight, and taxes collected, as well as a negative relationship between the program and clearance time.

However, Prasongnijjakij (2017) conducted a cross-country data analysis with country and year-fixed effects to examine the effect of AEO programs on border efficiency among 217 countries worldwide. The study revealed that the effects of AEO implementation were statistically insignificant. On average, the countries that implement the AEO show a higher index of efficiency in customs procedures and a higher increment in container port throughput than those countries that do not.

Despite the growing significance of the supply chain and ease of business, research on this topic in Indonesia is limited. With few exceptions, most previous studies have concentrated on the time clearance for imported goods, a focal point in most of the WCO developing countries due to its substantial impact on international trade. These studies often present narrowly focused arguments, hindering a comprehensive understanding of customs' role in trade facilitation.

AEO PROGRAM IN INDONESIA

Trade facilitation policies are crucial for advancing transparency and predictability throughout global and complex supply chains, enabling economic resilience and diversification along these chains (OECD, 2023).

To enroll in the AEO programs, firms must meet a specific set of preliminary requirements. Firstly, they must have never engaged in criminal acts related to customs, excise, or taxation. Secondly, they need to possess audited financial reports by a public accounting firm within the last two years (DGCE, 2023).

In addition to the preliminary requirements, firms must meet criteria set by the DGCE, which are adopted from the WCO SAFE Framework. First, firms must demonstrate compliance with customs regulations, as shown by a good reputation for compliance, the absence of unresolved customs duties and tax matters, standard operating procedures, and monitoring and evaluation tools that support compliance. Second, they need a satisfactory system for managing commercial records, which includes a traceable accounting system and good internal control, and they must provide access for data exchange with customs. Third, firms must show financial viability with financial statements audited by a public accountant within the last two fiscal years. Fourth, firms must consult, cooperate, and communicate by appointing an AEO program manager, integrating communication channels, and collaborating with the DGCE. Fifth, firms should educate employees and raise awareness about secure supply chains. Sixth, they must have a safety and security management system covering information exchange, access and confidentiality, cargo security, conveyance security, premises security, personnel security, trading partner security, and crisis management and incident recovery. Lastly, firms need to measure, analyze, and improve by analyzing risks, mitigating them, and conducting internal audits.

As shown in Figure 1, obtaining AEO status involves multiple interactions between the firm and customs, each with specific timelines. The most crucial step is field validation, ensuring the firm's operations meet the necessary standards. After successfully completing all steps, Indonesia Customs will issue an AEO certificate to the firm within 10 working days.

Since the inception of the AEO program in 2015, Indonesia Customs has granted 161 AEO certificates, showcasing its commitment to facilitating international trade and ensuring compliance with customs regulations (DGCE, 2023). However, it is indispensable to observe the program's impact on the country's import volume and underscore the importance of adopting one of the WCO programs.

METHODOLOGY

I investigate the impact of the AEO program on imports in Indonesia using Difference-in-Differences (DiD) with panel data of imports at the firm level. To investigate the relationships, I estimate the following log-linear regression model:

$$\ln Import_{iy} = \beta_0 + \beta_1 T_{iy} + Firm_i + Year_y + \varepsilon_{iy}$$

$\ln Import_{iy}$ shows the outcome or dependent variable, which is the import volume of firm "i" in year "y". The variable is measured by using the import value of goods declared in the import document by the firm "i" in year "y".

β_0 is the intercept.

T_{im} is the treatment in the study (the AEO program) as the main independent variable, and I investigate whether it impacts the import volume. If firm "i" has treatment (AEO) in year "y", the T_{iy} will have a value of 1 and will have a value of 0 (zero) if firm "i" has no treatment (non-AEO) in year "y".

β_1 is the coefficient of the T_{im}, which is the parameter. That β_1 equals zero can also be tested using the T-statistic. In the regression model, β_1 represents the effect of the AEO program on import.

$Firm_i$ is the firm FE controlling for factors that are constant over time but varies across entities, e.g. geographic location.

Year_y is the time FE controlling for constant factors across firms but vary over time. The COVID-19 pandemic is a good example, as it caused a significant common decrease among firms. The time FE is used to control for that.

(Note: Two-Way Fixed Effects, Firm_i and Year_y, capture the fixed effect estimation.)

ε_{iy} is error term. During regression, I employed clustered standard error because there might be a serial correlation of error terms within each firm over time. The error term contains other factors not included in the equation.

Data

I obtained data from the Indonesia Customs Data Center in April 2024, consisting of monthly datasets spanning January 2014 to December 2023. This sample period was chosen because the AEO program in Indonesia was fully implemented in 2015. Firms apply for AEO status independently and may obtain it in different years, meaning the timing of the treatment varies and is not confined to 2015. To prepare the data for analysis, I extracted the year from the date variable and aggregated the monthly data at the firm level for each year. During this process, I observed a significant variation in import values, with many firms reporting low import values and a small number of firms having exceptionally high values. To address this skewness and reduce the impact of extreme outliers, I excluded the top 5% of import values from the dataset.

Table 1. *Summary of The Variables*

Table 1 shows the summary statistics of the dependent variable, which is the import value. I

Variable	Observation	Mean	*SD*	Minimum	Maximum
Import (USD)	283,173	810,087.4	1,654,786	0	10,855,839

Note. The observation column shows firm-level observations included in the analysis. The minimum import value is zero.

also created a dummy variable indicating whether a firm participated in the AEO program, assigning a value of 1 if the firm participated and 0 if it did not. The analysis included two groups: the treatment group (AEO firms) and the control group (non-AEO firms).

Table 2. *Annual Count of Firms Obtaining the AEO Status*

Year	Observation	Percentage
2015	5	3.11%
2016	31	19.25%
2017	34	21.12%
2018	33	20.50%
2019	26	16.15%
2020	2	1.24%
2021	6	3.73%
2022	10	6.21%
2023	14	8.70%
Total	161	100%

Note. The first column shows the year when a firm obtained AEO status. The second column shows the number of firms that obtained AEO status in the corresponding year. The third column indicates the percentage of the firms in the second column relative to all AEO firms.

As shown in Table 2, the highest number of observations was in 2017, with 34 recorded two years after the AEO program was introduced in Indonesia. However, there was a significant drop in 2020, most likely due to the COVID-19 pandemic, severely affecting the supply chain. After 2020, the number of observations gradually increased, reaching 14 in 2023.

Table 3. *Descriptive Statistics*

Year	Observation	Total Import (in 1,000 USD)	AEO Status	
			Non- AEO	AEO
2014	(*N*=17,780)	1,100 (2,000)	17,731 (99.7%)	49 (0.3%)
2015	(*N*=19,567)	1,000 (1,800)	19,519 (99.8%)	48 (0.2%)
2016	(*N*=21,548)	950 (1,800)	21,491 (99.7%)	57 (0.3%)
2017	(*N*=25,076)	910 (1,700)	25,015 (99.8%)	61 (0.2%)
2018	(*N*=28,867)	840 (1,700)	28,805 (99.8%)	62 (0.2%)
2019	(*N*=32,328)	730 (1,600)	32,267 (99.8%)	61 (0.2%)
2020	(*N*=34,235)	670 (1,500)	34,162 (99.8%)	73 (0.2%)
2021	(*N*=34,658)	710 (1,600)	34,594 (99.8%)	64 (0.2%)
2022	(*N*=35,048)	730 (1,600)	34,991 (99.8%)	57 (0.2%)
2023	(*N*=34,066)	720 (1,500)	34,014 (99.8%)	52 (0.2%)

As illustrated in Table 3, the mean import values decreased from 1.1 million USD in 2014 to 720,000 USD in 2023. I believe this decreasing trend indicates changes in import activities, possibly due to economic factors, trade policies, or other market conditions. The standard deviations also decreased, indicating less variation in import values over time. Additionally, almost all firms consistently

Note. The Total Import column represents the import value in 1,000 USD, with the mean followed by the standard deviation in parentheses. The AEO status column indicates the number of observations and the percentage of firms with and without AEO status.

lack AEO status, with about 99.7% to 99.8% not holding AEO status each year. Along the way, firms can both obtain and lose AEO status. This situation occurs when a firm fails to comply with customs regulations, prompting DGCE to decide not to prolong the AEO program with the firm. This explains why, in Table 4, the number of AEO firms from 2014 to 2015 decreased, even though there was an addition of AEO firms in 2015, as shown in Table 2.

Parallel Trend Assumption

The parallel trends assumption, or the common trends assumption, is a key requirement in Difference-in-Differences (DiD) analysis. It is imperative to verify the validity of this assumption before applying DiD. The assumption might hold under several conditions. Firstly, firms in both the treatment and control groups should not systematically differ in ways that could independently affect their import volumes over time. For instance, if the AEO firms tend to be larger or more efficient, these inherent differences must be accounted for, as they might influence import patterns regardless of AEO status. External shocks or policy changes that

affect firms indiscriminately should be evenly distributed across both groups. This includes macroeconomic factors, changes in trade regulations, or industry-specific developments that impact all firms similarly. The AEO firms are not selected based on their potential for import growth. However, as the treatment group, they tend to have higher import volumes if they are of larger firms.

RESULTS

This paper investigated the following research question: 'How does the AEO program affect import in Indonesia?'. To answer this, I employed a regression of the logarithm of total import value on the AEO program treatment, including firm FE and year FE.

Table 4. *Regression Result*

	(1)
	Log (Total Import)
AEO	0.350***
	(0.0178)
Firms FE	Yes
Year FE	Yes
Observations	262,033
Mean of Dep. Variable	11.15

Note. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The sample years period is from 2015 to 2023

As shown in Table 4, the coefficient for the treatment variable is 0.3503, suggesting a strong and positive relationship between AEO status and the log of total imports. Since the minimum import value is zero, I added 1 before calculating the log import value. Specifically, participating in the AEO program is associated with a 35% increase in the total value of imports, holding other factors constant. The standard error of 0.0178 is quite small, indicating that the coefficient is statistically significant at the 1% level ($p < 0.0001$). The analysis is based on 262,033 observations, and the mean of the dependent variable (log of total imports) is 11.15. The firm fixed effects (FE) and year fixed effects (FE) are appropriately absorbed, ensuring that the model accounts for these potential sources of bias.

CONCLUSION AND RECOMMENDATIONS

Limitation And Recommendations

The first limitation of this study originates from the fact that the AEO program law was first enacted in Indonesia in 2014 and subsequently implemented in 2015. However, firms seeking to obtain AEO certification must independently submit the required documents to the DGCE, resulting in varying dates or years for certification being granted across firms. The second limitation stems from importing data declared by importers with diverse characteristics. For instance, comparing manufacturers to pharmaceutical importers may lead to disproportionate or less meaningful comparisons.

To address those limitations, future research should focus on analyzing data for each specific year when AEO certifications were granted. Additionally, it would be beneficial to compare the impact of the AEO program at the firm level within the same industry or business sector, such as AEO paper firms versus non-AEO paper firms.

Conclusion

By employing the Difference-in-Differences method to investigate the impact of the AEO program on imports in Indonesia, this study found that the program has a significant and positive effect, as depicted by the increased total value of imports in the country. The estimate aligns with the findings reported by Ballestero (2023), who focused on the effect of the AEO program participation on four dependent variables: the logarithm of total imports, total weight, total taxes, and clearance time. He found a higher increase (14.8%) for AEO firms in Brazil compared to non-AEO firms after the treatment year of 2019. There are several reasons why the size of my findings differs from Ballestero's. One possibility is geographic location; as Redding (2022) suggested, geography is an important dimension along which the distributional consequences of international trade occur. Another possibility is the number of AEO firms: Brazil Customs has granted AEO status to 499 firms since 2014, one year before the implementation of the AEO program in Indonesia.

The results highlight the crucial need for implementing the AEO program to increase import volume in Indonesia significantly. The study's findings hold important implications for international trade, enabling the DGCE to escalate import volume and maintain balanced information among stakeholders. However, the AEO program has not yet reached micro, small, and medium enterprises (SMEs) in Indonesia, which are essential for increasing international trade, especially in the aftermath of the COVID-19 pandemic. Expanding the program to include SMEs could offer substantial benefits through improved trade facilitation. To achieve this, the DGCE should intensify its efforts to promote the AEO program and strategically identify the types of firms that stand to gain the most from such incentives.

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