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The Impact of AANZFTA on SMEs' Export Performance in ASEAN
A Pooled Panel Data Analysis of Indonesia, Thailand, and Vietnam (2007–2024)

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Statement of Originality

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[1] Throughout the research and writing process, AI-based tools (ChatGPT by OpenAI, Grammarly) were used to support the development of the thesis. These tools assisted with organising structure, refining academic language and the R code, and grammar checking. All substantive analysis, data interpretation, and final writing decisions were made independently by the author.

Abstract

This study examines how the ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA) influences SME export participation in Indonesia, Thailand, and Vietnam from 2007 to 2024. By employing a pooled fixed-effects panel regression, it assesses whether AANZFTA promotes SME exports and if institutional quality affects this relationship. The results indicate that the benefits of AANZFTA are more evident with high GDP growth but tend to diminish in countries with stronger formal regulatory frameworks. Because of the small sample size, this research remains exploratory and aims to provide a framework for ansalyzing SME responses to FTAs. The findings emphasize the need for further investigation into informal institutions and industry-specific data as more detailed SME-specific information becomes accessible.

Chapter 1: Introduction

Researchers and policymakers widely consider Small and Medium-sized Enterprises (SMEs)[2] as the backbone of Southeast Asian (SEA) economies (Wignaraja, 2012, 2010; Asian Development Bank (ADB), 2021). SMEs account for over 95% of all businesses in the region and employ 60–80% of the workforce (KPI Monitoring Report, 2021). Although SMEs are often the foundation of the Association of Southeast Asian Nations (ASEAN) economies, they encounter multiple significant challenges that hinder their internationalization and participation in the Global Value Chain (GVC). Recent studies conducted by the ASEAN Secretariat (2021) have shown that these difficulties result in SMEs contributing only 30% of regional exports and 30-53% of gross domestic product (GDP), depending on the country (ASEAN, 2021).

ASEAN continuously tries to boost regional internationalization and facilitate the export participation of its members. Starting with the introduction of the ASEAN Free Trade Area (AFTA) in 1992, which abolished most of the tariffs within the ASEAN area, leaders try to develop new agreements with surrounding countries to further build regional internationalization (ADB, 2021). Although researchers widely discuss the participation of large companies in GVC, there is a significant gap in research about how specific Free Trade Agreements (FTAs) impact SME export rates in the region. Although regional internationalization remains a key priority for ASEAN, the effects of FTAs on SMEs remain underexplored in academic literature. This paper focuses on one specific trade agreement between ASEAN and Australia and New Zealand (AANZFTA), signed in 2009, and its impact on SMEs' export participation in selected countries in the ASEAN region.

ASEAN is a region marked by institutional, economic, and regulatory diversity, as well as frequent data limitations, particularly SME-specific indicators. This study focuses on Indonesia, Thailand, and Vietnam, selected for their data availability, institutional variation, and economic significance. Together, they account for over 60% of ASEAN's GDP and are the only member states with consistent SME export data from the ADB's Asia SME Monitor (ADB Monitor, 2023). Despite the limited sample size (n = 54), this paper illustrates how country-level fixed effects

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[2] Definitions of SMEs differ across ASEAN member states, reflecting variations in sectoral composition, regulatory frameworks, and national development priorities. To ensure consistency while respecting these country-specific definitions, this study utilizes SME data from the Asian Development Bank's (ADB) *Asia SME Monitor*, which categorizes SMEs based on each country's official classification criteria. A full summary table of SME definitions by country is provided in Appendix A.

models can uncover trade policy impacts in data-scarce contexts. Findings should be viewed as exploratory but offer a foundation for future research as more granular data emerges.

The research acknowledges that in the past years, the awareness of SMEs' importance increased significantly, and policymakers consistently search for ways to help SMEs improve their exports. However, SMEs face crucial obstacles that slow down international expansion. These include lack of information and FTA awareness, financial struggles, and difficulties in finding export partners (KPI monitoring report, 2021).

This paper aims to understand further the conditional effect of FTA on exports by implementing theoretical frameworks. Institutional Theory is the main framework adopted in the paper. In the ASEAN context, prior research suggests that the quality of domestic institutions often mediates the effectiveness of FTAs. Specifically, policies tailored to support SME development and internationalization can be more influential than the mere presence of an FTA itself (Wignaraja, 2014). Moreover, prior studies have shown that even in the presence of high institutional support, SMEs frequently struggle to benefit from FTAs due to bureaucratic inefficiencies and limited technical capabilities (Thangavelu et al., 2017). Therefore, FTA implementation alone can be insufficient to guarantee export gains for SMEs. The institutional environment, including administrative capacity and tailored policies that support SMEs' internationalization, plays a critical moderating role.

At the same time, macroeconomic conditions also shape export outcomes. Research has established a positive relationship between GDP growth and export performance, suggesting that broader economic stability can significantly influence SMEs' capacity to internationalize (Tyler, 1981; Hsiao, 2006). For example, gravity model analyses within the ASEAN area reveal that exports tend to increase in line with the GDP growth of the exporting country (Kien, 2009).

Based on the theoretical foundations and contextual background, this study formulates and empirically tests two key hypotheses: (1) the implementation of the AANZFTA increases SMEs' export rates in Indonesia, Thailand, and Vietnam, conditional on favourable macroeconomic performance, (2) The effect of AANZFTA on SMEs' exports is moderated by institutional quality, which may either enable or constrain SME participation depending on the regulatory burden.

The key findings confirm the conditional impact of the FTA, and the subsequent sections outline practical policy implications and suggest directions for future research.

The organization of the document is as follows: Section 2 offers a complete literature review; Section 3 summarizes the theoretical and economic background; Section 4 concludes the conceptual framework by stating the hypotheses; Section 5 describes the methodology; Section 6

discusses the empirical results, followed by interpretation and policy recommendations in section 7. The paper ends with possible paper limitations (section 8), and conclusion (section 9).

Chapter 2: Literature Review

2.1 Impact of FTAs on ASEAN Economic Integration

Research consistently highlights that trade facilitation is a crucial factor in the integration of emerging markets into global value chains (OECD-WTO, 2019; ADB, 2021). Prior studies argue that FTAs, such as the AFTA, have significantly enhanced trade relations among ASEAN members by reducing tariffs and improving market access (Dianzan, 2022; Kawai & Wignaraja, 2009; Tambunan & Chandra, 2014). This has contributed to increased economic integration and regional growth. However, the literature also highlights the "noodle bowl" effect of overlapping FTAs. That creates complexity, trade diversion, and potential inefficiencies (Baldwin, 2006; Tumbarello, 2007; Kawai and Wignaraja, 2009). Despite these challenges, Kawai and Wignaraja (2009, 2011) conclude that the negative impacts do not severely harm business activity, and FTAs remain and will continue to be an integral part of ASEAN's internationalization. That emphasizes the significance of further research about the FTAs' impact in the region, especially on the biggest parts of the economies- SMEs.

2.2 Impact of FTAs on SMEs in ASEAN

While the benefits of FTAs for multinational corporations are well established, their effects on SMEs in SEA remain relatively underexplored (Conconi et al., 2024; Thu et al., 2015; Baldwin, 2006; Tumbarello, 2007). Existing studies highlight that SMEs often struggle to benefit from FTAs due to resource limitations and high compliance costs (World Trade Report, 2016; Tambunan & Chandra, 2014; Chia, 2010; Kawai & Wignaraja, 2009, 2011). Firm-level evidence from Cambodia indicates that only 13% of SMEs used regional FTAs, despite their high reliance on ASEAN markets for imports. The main reasons are lack of awareness and procedural barriers. Larger, more networked, and technologically capable firms were significantly more likely to benefit from trade integration (Thangavelu et al., 2017). Low utilization rates among SMEs are commonly attributed to difficulties in adapting to new trade regimes (Wignaraja, 2013; McClanahan, 2014).

Moreover, SME participation in regional and global trade varies considerably across ASEAN countries and is influenced by firm-specific factors such as size, foreign ownership, skills, and technological capacity (Wignaraja, 2012).

Although tariff reductions are consistently identified as the most immediate FTA benefit for SMEs, their ability to leverage these depends on internal capabilities and access to information (ERIA, 2023; Wignaraja, 2013). Additional barriers, such as non-compliance with international standards, high competition, and limited institutional support, further constrain SMEs' integration into GVC (Tambunan, 2024; Wignaraja, 2013; Achmad, 2024).

Despite these insights, there is limited research examining the impact of AANZFTA on SME export participation in SEA, specifically in Indonesia, Vietnam, and Thailand.

2.3 AANZFTA

The AANZFTA is a trade agreement involving ASEAN Member States, as well as Australia and New Zealand. It is considered the most open agreement among the current ASEAN + 1 Free Trade Agreements (FTAs), as it aims to remove over 95% of tariff lines for the majority of the participants (Fukunaga & Isono, 2013; Thangavelu et al., 2021). Existing studies show relatively high tariff reduction rates, with 93.7% for Indonesia, 98.9% for Thailand, and 94.8% for Vietnam after the adjustment period (Kuno, 2011; Fukunaga & Isono, 2013). AANZFTA is widely regarded as "the most comprehensive" of ASEAN + 1 agreements, covering a broad range of areas including intellectual property, competition policy, and electronic commerce (Enterprise Singapore, 2025).

2.3.1 Overview of AANZFTA impact of export

The primary objective of AANZFTA is to promote regional economic integration by reducing tariffs and eliminating non-tariff barriers, thereby enhancing market access for ASEAN exporters. According to the preamble of the AANZFTA (2010), these trade liberalization efforts are designed to make cross-border trade more efficient and cost-effective, thereby encouraging an increase in export activity across member states. By facilitating smoother trade flows, the agreement creates a more favourable environment for businesses, enabling them to expand their reach into international markets.

In addition to market access, the agreement emphasizes the importance of lowering business costs and fostering stronger economic partnerships among signatories (Preamble, Chapter 1, AANZFTA, 2010). This collaborative framework is expected to support the development of trade and investment initiatives, promote resource-sharing, and enhance the region's overall export capabilities. For countries such as Thailand, Indonesia, and Vietnam, the agreement offers opportunities to benefit from expanded markets and increased economies of scale through deeper economic linkages and strategic cooperation.

2.3.2 AANZFTA impact on SMEs

Although the original AANZFTA agreement does not explicitly target SMEs[3], its design includes several mechanisms that indirectly support SME internationalization. By lowering tariff and non-tariff barriers, the agreement reduces trade costs and improves market access, thereby creating more favourable conditions for exporters, including SMEs (AANZFTA, 2010, Chapters 3, 8, 11). This expanded access is particularly relevant for ASEAN SMEs, which often face limited domestic demand and seek opportunities abroad.

In addition to market access, AANZFTA enhances access to regulatory information and institutional mechanisms that support export readiness. Chapter 8 establishes consultation and transparency mechanisms, which enable exporters to stay informed about trade requirements, tariff schedules, and regulatory changes. This is crucial for SMEs that often lack the internal resources to monitor and interpret trade rules independently. However, the actual impact of these mechanisms on SMEs depends heavily on national-level adaptation efforts. Without targeted outreach, smaller firms may remain unaware of how to leverage the agreement's benefits.

Chapter 3 also introduces procedures for issuing Certificates of Origin (COO), which enable firms to claim preferential tariffs under the agreement. These procedures are intended to be accessible and minimally burdensome, with designated national authorities responsible for their implementation. For SMEs, which typically struggle with bureaucratic hurdles, the inclusion of streamlined certification procedures, such as pre-exportation origin verification, can significantly lower the costs of trade compliance.

Furthermore, the annex to the agreement mandates that issuing authorities provide information and assistance to exporters, including written responses to requests. This institutional guidance is particularly beneficial to SMEs that lack legal or regulatory capacity in-house. While these measures are not SME-exclusive, they are particularly valuable to SMEs given their typically limited capacity to absorb the administrative complexity of international trade.

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[3] It is important to note that the original AANZFTA agreement has since been updated through two formal amendments: the First Protocol, signed on 26 August 2014, and the Second Protocol, signed on 14 February 2024. Significantly, the Second Protocol was the first to explicitly recognize the role of SMEs within the agreement framework. It introduced Chapter 16, dedicated entirely to supporting SME engagement, which includes measures such as the creation of a publicly accessible information platform for sharing knowledge, experiences, and best practices among member countries, as well as the establishment of a dedicated MSMEs Committee to identify and promote avenues of support for smaller enterprises (Chapter 16, Second Protocol to Amend AANZFTA, 2024). However, given the recency of the Second Protocol and the lack of publicly available data on its implementation and outcomes, this study focuses on the original 2010 agreement.

2.3.3 AANZFTA Research

Although AANZFTA has contributed to greater market access and tariff elimination, studies indicate that its overall impact remains modest. According to a 2022 survey by the New Zealand Chamber of Commerce, only 44% of ASEAN-based firms reported using AANZFTA preferences, while 14% were entirely unaware of the agreement. Persistent barriers such as bureaucratic red tape, particularly affecting Thai and Indonesian SMEs, alongside high export costs, limited competitiveness, and restricted access to raw materials, continue to limit broader utilization (Kawai & Wignaraja, 2010; Ang, 2023; Achmad, 2024).

Thangavelu et al. (2021) conducted a macro-level analysis of AANZFTA utilization across ASEAN, Australia, and New Zealand, revealing generally low and uneven uptake among ASEAN countries. Using export intensity indexes, which compare country's exports to AANZFTA partners against those partners' global imports, the study observed modest gains for Thailand and Indonesia between 2000 and 2015 but a notable decline for Vietnam. A sharp rise in AANZFTA utilization by Indonesia and Vietnam for exports to Australia was also recorded between 2015 and 2016, following the First Protocol, while Thailand's rate remained static. However, these national-level trends do not reflect the specific challenges faced by SMEs. This paper addresses that gap by examining how institutional factors shape SME export performance under the original AANZFTA framework.

2.4 SMEs Policy Landscape in Indonesia, Thailand and Vietnam

The 2014 ASEAN SME Policy Index highlights notable differences in the institutional environments supporting SMEs across ASEAN member states (ERIA, 2014). In the Institutional Frameworks[4] dimension, which assesses the existence and quality of laws and institutions focused on SMEs, Indonesia scored 4.4, Thailand 3.9, and Vietnam 3.8 on a 6-point scale. Meanwhile, in the International Market Expansion[5] dimension, which measures the extent of policy support for SME internationalization, Thailand led with a score of 4.7, followed by Indonesia at 4.2 and Vietnam at 4.0. While the region has relatively moderate-to-strong mechanisms to support SME

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[4] The Institutional Frameworks Index is based on five key sub-dimensions: (i) a well-defined and applied definition of SMEs; (ii) strong coordination both among and within government agencies; (iii) efficient and responsive execution of the SME development strategy; (iv) an effective agency for policy implementation; and (v) suitable measures to address the challenges posed by informal SMEs. (ERIA, 2014)

[5] The International Market Expansion Index is derived from five policy sub-dimensions: (i) initiatives aimed at promoting exports, (ii) offering guidance and valuable insights into the international market, (iii) delivering capacity-building support for SMEs looking to export, (iv) providing financial resources for SMEs to facilitate exports, and (v) minimizing customs clearance costs for exports. (ERIA, 2014)

exports, the effectiveness and reach of such initiatives may vary in practice, particularly among smaller firms.

A comparative review of SME export policy landscapes in these countries further reveals differing institutional capacities and persistent gaps. Thailand demonstrates the most advanced export support infrastructure, with institutions like the Office of SME Promotion and EXIM Thailand Bank that play a key role in offering export insurance and training to potential SME exporters. However, knowledge barriers remain pronounced, as only 23.6% of SMEs understand FTA procedures, compared to 65% of large firms (Korwatanasakul et al., 2020). Indonesia exhibits moderate institutional development (score: 4.2) but suffers from fragmented governance and weak program enforcement, with only 8.47% of export credit reaching SMEs (ERIA, 2014; Anas et al., 2017). Vietnam's policy efforts include the Export Portal and SME Development Fund, yet challenges such as limited GVC integration, microenterprise dominance, and underdeveloped local institutions persist (Nguyen et al., 2021; Wignaraja, 2013). Despite formal initiatives across all three countries, practical bottlenecks, especially regarding information, coordination, and resource access, continue to constrain SME export participation. A detailed comparative overview of SMEs' tailored policies in the region is presented in Appendix C.

Chapter 3: Theoretical Framework

This study draws on Institutional Theory as its primary analytical lens and complements its insights with the Stages of Internationalization model to further understand the FTA's impact on trade flows among SMEs.

Institutional theory, as developed by DiMaggio and Powell (1983) and North (1990), posits that organizational behavior is shaped by both formal institutions, such as laws, regulations, and policy frameworks, and informal institutions, including social norms, beliefs, routines, and shared understandings. In the context of Southeast Asia's rapidly liberalizing trade environment, this distinction is particularly noticeable. Although ASEAN+1 FTAs like AANZFTA have eliminated or reduced tariffs and other trade barriers, evidence shows that SMEs remain underrepresented among active FTA users (Achmad, 2024; Kawai & Wignaraja, 2009). While many studies emphasize the role of informal institutional barriers, such as information asymmetries, procedural opacity, and limited trust in regulatory authorities (Chia, 2010; Wignaraja, 2013; Rayhanis et al., 2024)—this study focuses specifically on the formal dimension of institutional quality. In doing so, it examines how regulatory effectiveness, transparency, and administrative coherence shape SME responses to trade liberalization.

This decision is based on the research by Korsakienė (2015), which highlighted that while both types of institutions play a role in influencing firm decision-making, it is primarily the physical and regulatory mechanisms that mainly affect the pace of internationalization among SMEs.

Furthermore, the Stages of Internationalization model, initially developed by Johanson and Vahlne (1977), serves as a complementary framework for understanding how SMEs engage with FTAs over time. This theory views internationalization as a gradual, experience-based process in which firms transition from entirely domestic activities to occasional exports. They usually start with markets that are geographically or culturally close before progressing to consistent and strategic international trade involvement (Johanson & Vahlne, 1975).

For SMEs, the internationalization process is shaped by the gradual accumulation of market knowledge, the development of external networks, and access to institutional support. FTAs can play a pivotal role in facilitating this progression by reducing trade barriers, streamlining administrative procedures, and expanding access to foreign markets, effectively lowering the threshold for export entry (World Trade Report, 2016; UKTPO, 2020; Koo et al., 2021). However, despite AANZFTA's high level of liberalization, its geographical distance from Southeast Asia may partly limit its immediate impact. According to the gravity model of trade, geographical proximity remains a key determinant of trade flows, and agreements involving more distant partners may require more time to produce measurable outcomes (Endoh, 1999; Soloaga &

Winters, 2001; Guilhot, 2010; Sudsawasd, 2012; Thu, 2014, 2015). Supporting this view, Elliot and Ikemoto (2003) found that the effects of AFTA on trade openness were not immediately evident post-implementation but became more pronounced over time. In line with these insights, this study extends its baseline analysis by testing the delayed effects of AANZFTA on SME export rates.

Chapter 4: Hypothesis Development

AANZFTA implementation. FTAs are widely recognized for reducing tariffs and lowering trade barriers, thereby facilitating export opportunities for firms, including SMEs (Dianzan, 2022; Kawai & Wignaraja, 2009). However, while AANZFTA provides substantial preferential tariff margins, its overall utilization rate among ASEAN countries remains relatively low (Thangavelu et al., 2021). Recent studies underscore that the effectiveness of FTAs is conditional on broader macroeconomic conditions. For instance, Achmad (2024) finds that macroeconomic stability, measured by the Real Effective Exchange Rate (REER), amplifies the positive impact of FTAs on export value, as a competitive currency environment strengthens firms' export performance. Similarly, Baier and Bergstrand (2002, 2009) find that the trade-creating effects of FTAs are larger for countries with higher GDPs, supporting the conditional effect. Moreover, the benefits of FTAs may not be immediate. Ulloa and Wagner (2013), as cited in Tambunan and Chandra (2014), show that the utilization rate of the US–Chile FTA reached a plateau only two to three years after implementation, highlighting the potential for delayed effects.

Building on these insights, this first hypothesis is grounded in empirical evidence and theoretical expectations from trade integration literature, which suggest that FTA-driven export gains are more likely to materialize in supportive macroeconomic environments and may emerge progressively over time.

H1: The implementation of the AANZFTA increases SME export rates in Indonesia, Thailand, and Vietnam, conditional on favorable macroeconomic performance.

Tailored Institutional Support as an AANZFTA utilization accelerator. Institutional Theory posits that well-designed country-level formal and informal institutions can enhance the effectiveness of regional trade rules. It also emphasizes that institutional influence extends beyond formal structures and includes informal dimensions such as trust, transparency, and networks (North, 1990; DiMaggio & Powell, 1983). While this study acknowledges the role of informal institutions in shaping FTA utilization, its primary focus is on evaluating how formal regulatory frameworks in the selected countries support trade openness.

Evidence from the ASEAN-Korea FTA shows that SME export participation increases when FTAs are accompanied by capacity-building measures (Hayakawa, 2013). In well-functioning institutional environments characterized by transparent governance, policy coherence, and administrative capacity, SMEs are more likely to be aware of FTA opportunities and possess the capacity to utilize them (Wignaraja, 2013). On the other hand, empirical evidence from Thangavelu

et al. (2017) and Wignaraja (2013) shows that even where government support exists, SMEs often struggle to engage with FTAs due to limited technical skills and excessive administrative burdens. That implies that when institutions are complex or overly bureaucratic, SMEs may find compliance processes inaccessible and costly. This aligns with Tambunan and Chandra (2014), who highlight that information asymmetries and regulatory rigidity disproportionately hinder smaller firms' development.

Therefore, drawing on institutional and internationalization theory, this study posits that the export-enhancing effect of AANZFTA is moderated by the quality of domestic institutions, specifically the one created to support SMEs. Strong regulatory environments may facilitate greater SME engagement by reducing transaction costs and increasing compliance efficiency. Conversely, if institutions are not sufficiently adapted to the needs of SMEs, they may hinder the agreement's intended impact. This hypothesis is supported by previous findings that highlight how institutional quality can either enable or constrain firm-level responses to trade liberalization, depending on whether institutions are designed to support the specific needs and constraints of SMEs (Anas et al., 2017; Bao, 2024).

H2: The effect of AANZFTA on SME exports is moderated by institutional quality, which may either enable or constrain SME participation depending on the regulatory burden.

Chapter 5: Methodology

This section outlines the empirical strategy for assessing AANZFTA's impact on SME exports in Indonesia, Thailand, and Vietnam from 2007 to 2024. Using a fixed-effects model on a pooled panel of 54 observations, this study leverages within-country variation to assess how institutional quality and macroeconomic factors influence SME responses to the agreement.

While rigorous robustness and validity checks were undertaken and diagnostic tests for heteroskedasticity, multicollinearity, and reverse causality, the findings should be interpreted with caution. This study offers an exploratory model designed to guide future research as broader, more granular cross-national SME data becomes available.

AANZFTA participation is modeled using a country-specific binary variable (1 = post-implementation year, 0 = otherwise), with implementation dates 2010 for Vietnam and Thailand and 2012 for Indonesia (DFAT, 2024). Appendix D outlines country-specific export policies, SME ecosystems, and institutional contexts to support the interpretation of the regression results.

5.1 Data Sources and Panel Construction

The dataset is an annual unbalanced panel of 54 observations and 58 variables across Indonesia, Thailand, and Vietnam from 2007 to 2024.

Source	Type of Data Provided	Variables Covered
World Bank – World Development Indicators (WDI)	Macroeconomic indicators	GDP Growth, Inflation, FDI Inflows, Education Expenditure, Export Growth
World Bank – Worldwide Governance Indicators (WGI)	Institutional quality proxies	Regulatory Quality (used to capture formal institutional effectiveness)
Asian Development Bank – Asia SME Monitor (2020, 2023)	SME-specific indicators	SME Export Values, MSME Growth, National SME Definitions and Trends

Table 1. Primary Data Sources

Country-year identifiers were used to merge datasets, and missing values were handled using a two-step process: linear interpolation for internal gaps and mean imputation for edge gaps (Little & Rubin, 2002). All variables were harmonized and cleaned in R, retaining only those with at least 60% coverage. Further details on data preparation are provided in Appendix B.

5.2 SME Export Estimation for Vietnam

Due to the absence of official SME export data for Vietnam, export values were estimated by applying SME employment shares to total national exports. This method is supported by the theory linking employment to output (Feenstra & Taylor, 2014) and prior empirical work (Leichenko, 2000). Robustness was confirmed through sensitivity tests using ±10% and ±20% adjustments to the estimation, as well as by re-estimating the model without Vietnam. Detailed

results are provided in Appendix B. Although the model went through rigorous robustness checks, the paper acknowledges the potential bias in the further *Limitations* section.

5.3 Model Specification

The core specification is a fixed effects panel regression with country-level fixed effects (μ_i) and Arellano-style robust standard errors clustered by country to control for serial correlation and heteroskedasticity.

Variable Name	Definition	Role	Source(s)	Notes
SME_Exports_log	Log-transformed SME export value: log(x + 1)	**Dependent Variable**	ADB Asia SME Monitor; Author's calculation	Adjusted to accommodate zeros and reduce skewness
AANZFTA_cit	Dummy = 1 if AANZFTA is in effect for country c in year t	Key Independent	Author's coding based on AANZFTA timeline	Captures FTA implementation impact
GDP_Growth_cit	Annual real GDP growth (%)	Moderator for H1	World Bank WDI	Proxy for macroeconomic performance
Reg_Quality_cit	Regulatory Quality index	Moderator for H2	World Bank WGI	Proxy for institutional quality
Inflation	Annual inflation rate (%)	Control	Fischer (1993); Achmad (2024); Seti et al. (2025)	Proxy for macroeconomic stability
Export_Growth	Annual growth rate of total exports	Control		Controls for trade dynamics
FDI_Inflows	Foreign direct investment inflows (% of GDP)	Control	Oo et al. (2019); World Bank	Reflects external capital and global network access
Education_GDP	Public education expenditure (% of GDP)	Control	Gashi & Pugh (2014); World Bank	Proxy for human capital investment
MSME_Growth	Annual growth rate in the number of MSMEs	Control	ADB (2021)	Captures dynamism of the domestic SME sector

Note: All independent variables were mean-centered to reduce multicollinearity. Control variables were selected based on theoretical and empirical relevance.

For detailed variable description, sources, summary statistics, and correlation matrix, see Appendix C.

Table 2. Variable Description Table

Chapter 6: Results

This section presents the empirical findings from panel data analysis. Results are structured by hypothesis and include baseline FE models, interaction terms, and nonlinear specifications. Further results on delayed models and event study dynamic effect models are provided in Appendix H and I, respectively.

6.1 Hypothesis 1: Macroeconomic Conditions as Moderator

The initial model assessed the direct effect of AANZFTA implementation on SME exports[6]. The base fixed-effects model without interaction (Appendix F, Table F.1) suggests that AANZFTA alone has no statistically significant effect on SME exports (β = –0.1865, p = 0.182). This indicates that, on average, the agreement may not have directly benefited SMEs' export activity during the sample period. Theoretically, this is consistent with findings from Chia (2010) and Tambunan & Chandra (2014), which highlight limited FTA utilization by SMEs due to resource constraints, low awareness, and complex rules of origin.

This prompted an extension to examine whether the agreement's effects are conditioned by macroeconomic performance. Building on the Solow model and theories of conditional convergence (Barro & Sala-i-Martin, 1995), an interaction term between AANZFTA and GDP growth was introduced to capture heterogeneity in trade policy effectiveness. Prior research shows that trade liberalization tends to generate stronger growth and trade effects in faster-growing or more economically advanced countries (Harrison, 1996; Alcalá & Ciccone, 2004). This approach suggests that FTAs may be more effective in economies with stronger macroeconomic performance.

The resulting baseline model for Hypothesis 1 is:

$$Tlog\left(SME_{Export}\right)_{it} = \beta_0 + \beta_1 AANZFTA_{c,it} + \beta_2 GDP\ Growth_{cit} +$$
$$+\ \beta_3\left(AANZFTA_{cit} \times GDP\ Growth_{cit}\right) + Controls_{it} + \mu_i + \varepsilon_{it}$$

The interaction term was positive and statistically significant, confirming that AANZFTA's impact on SMEs' exports is conditional on favorable macroeconomic conditions (Appendix F, Table F.2). These findings are supported by a study on ASEAN countries by Thangavelu (2017), which argues that GDP growth stimulates both foreign direct investment and export activity, indicating that favorable macroeconomic performance encourages firms to expand into

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[6] All detailed model outputs and tables are presented in Appendices F and G.

international markets. Moreover, during periods of economic expansion, exporting firms are more likely to engage in learning and innovation processes, which enhance their adaptability and competitiveness in global markets. The findings also align with the argument made by DiMaggio and Powell (1983), who stress that formal institutions like FTAs must be placed within beneficial macroeconomic and organizational fields to yield performance outcomes.

Further, the growth threshold was estimated based on the results of the linear model for H1:

$$GDP\ growth\ threshold\ (centered) = \frac{\beta1}{\beta3} = \frac{0.2372}{0.1707} \approx 1.39\%$$

This inflection point indicates that AANZFTA begins to positively influence SME exports in economies experiencing GDP growth approximately 1.4 percentage points above the sample average. Given that the average growth in the sample is 4.47%, this implies a threshold of around 5.9% annual GDP growth. Below this level, the agreement may worsen existing disparities by primarily benefiting larger firms. In contrast, when economic growth surpasses the threshold, SMEs are better positioned to respond to trade liberalization. This finding supports Baier and Bergstrand's (2009) argument that FTAs often exhibit nonlinear and threshold-based effects. Figure 1 illustrates how the marginal effect of AANZFTA varies across different levels of centered GDP growth.
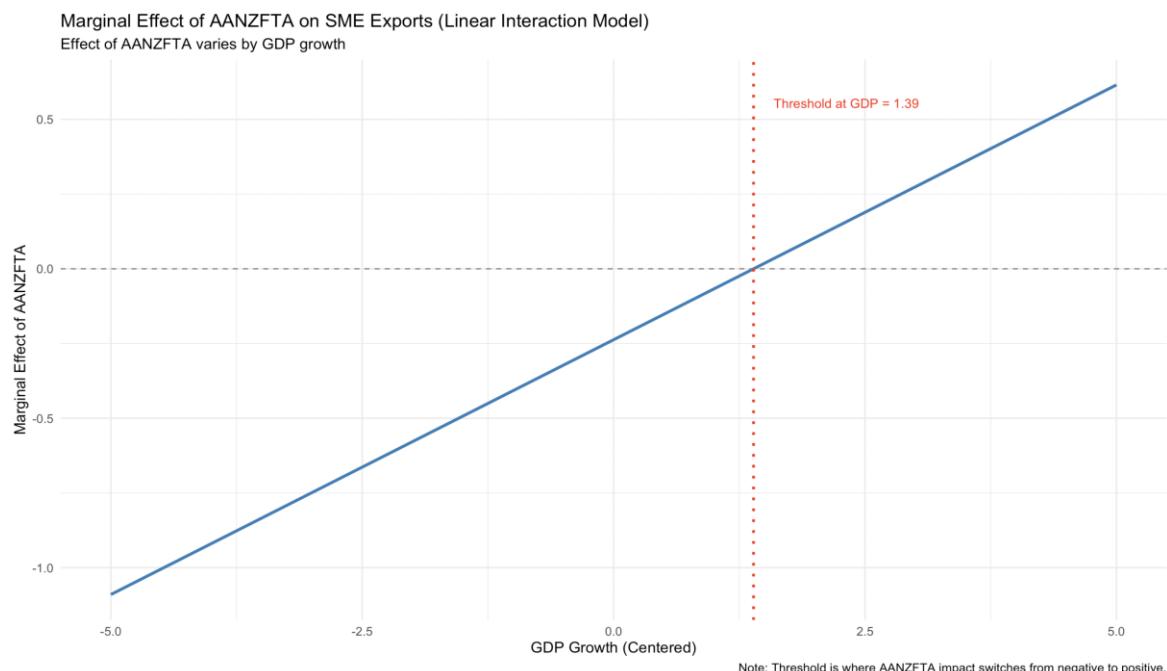
Figure 1. *Marginal Effect of AANZFTA on SME Exports Across GDP Growth (Linear Interaction Model)*

This dynamic is further reinforced in the conditional predictions shown in Figure 2. At low GDP growth (–1 SD), predicted SME exports remain flat. At higher growth (+1 SD), exports rise significantly post-AANZFTA, confirming that SMEs only benefit under strong economic conditions.
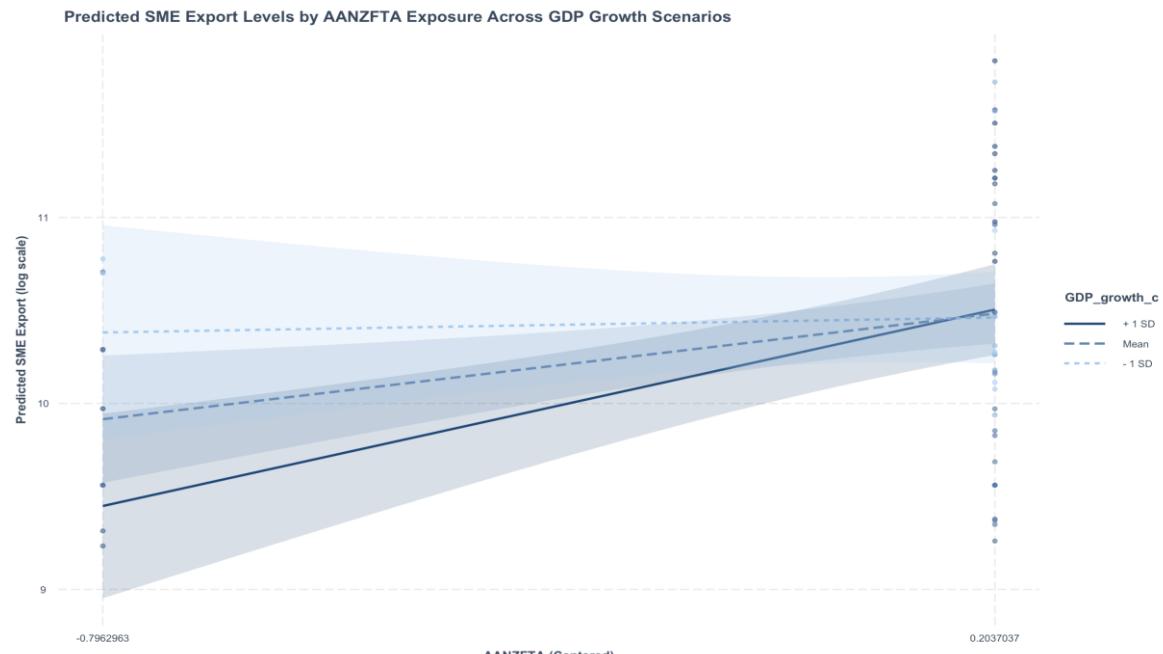
Figure 2. *Predicted SME Export Levels by AANZFTA Exposure Across GDP Growth Scenarios*

To test robustness, a nonlinear model was estimated. The positive and significant squared interaction term ($\beta > 0$, $p < 0.05$) suggests a U-shaped relationship (Appendix G, Table G.1). The marginal effect of AANZFTA on SME exports is weakest when GDP growth is around 1.76%, well below the sample average of 4.47%, and becomes stronger as economic growth improves (Figure 3). This supports threshold-based trade dynamics, where FTAs yield greater benefits under more favorable macroeconomic conditions. As exports rise, they may also reinforce growth momentum, generating a positive feedback loop between trade and economic expansion (McNab & Moore, 1998).
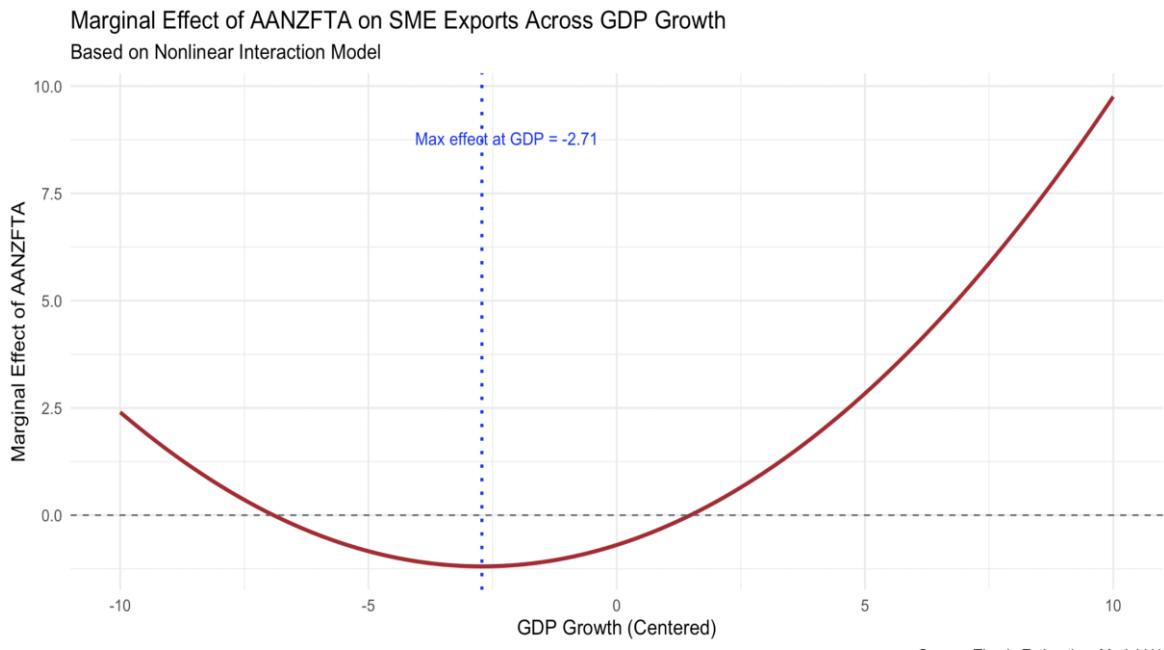
Figure 3. *Marginal Effect of AANZFTA on SME Exports Across GDP Growth*

To evaluate potential delayed effects, interaction terms with 1–to 3–year lags were tested, reflecting the idea that FTA benefits may take time to emerge and typically reach peak utilization two to three years after implementation. (Ulloa & Wagner, 2013; Tambunan & Chandra, 2014). The results show a consistent positive impact of AANZFTA across all lag specifications. This suggests that the moderating effect of GDP growth on SME export responsiveness to AANZFTA is both immediate and sustained. Detailed results and robustness checks are provided in Appendix H and I.[7]

6.2 Hypothesis 2: Institutional Quality as Moderator

To assess whether the effectiveness of AANZFTA in promoting SME exports is contingent on domestic institutional conditions, this study incorporates Regulatory Quality from the Worldwide Governance Indicators as a moderator. Among several institutional proxies evaluated, Regulatory Quality was selected based on its strong theoretical alignment with trade facilitation and superior empirical performance (see Appendix E). This indicator, measured on a scale from -2.5 to 2.5, captures key dimensions such as trade policy design, regulatory burden, ease of starting a business governed by local law and market organization, and accessibility. All of these are especially relevant for SMEs navigating international markets (Rodrik et al., 2004; Seti, 2025).

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[7] Additional checks addressed global economic shocks, alternate institutional proxies, and reversed causality (Appendix B and E).

Drawing on Institutional Theory, the model posits that FTAs alone are insufficient to boost SME exports unless supported by a capable regulatory environment. Accordingly, an interaction term between AANZFTA and Regulatory Quality was included to capture this conditional effect:

$$T \log(SME_E xport)_i t = \beta_0 + \beta_1 AANZFTA_c it + \beta_2 Reg_Q uality_c it +$$
$$+\beta_3 (AANZFTA_c it \times Reg_Q uality_c it) + Controls_i t + \mu_i + \varepsilon_i t$$

The centered interaction term is statistically significant and negative ($\beta = -1.276$, $p < 0.001$), while the main effect of AANZFTA is also negative ($\beta = -0.339$, $p < 0.001$) (Appendix F, Table F.3). This indicates that the agreement, in isolation, is associated with a decline in SME exports, and this negative effect intensifies in countries with stronger regulatory environments.

To further explore this relationship, the threshold level of regulatory quality at which the marginal effect of AANZFTA on SME exports shifts from positive to negative was calculated. As shown in Figure 4, the threshold is located at approximately –0.27 (centered). This implies that AANZFTA has a positive marginal effect on SME export performance, only in countries with below-average regulatory quality. In better-regulated institutional contexts, the trade agreement becomes increasingly ineffective, or even detrimental, for SME exporters.
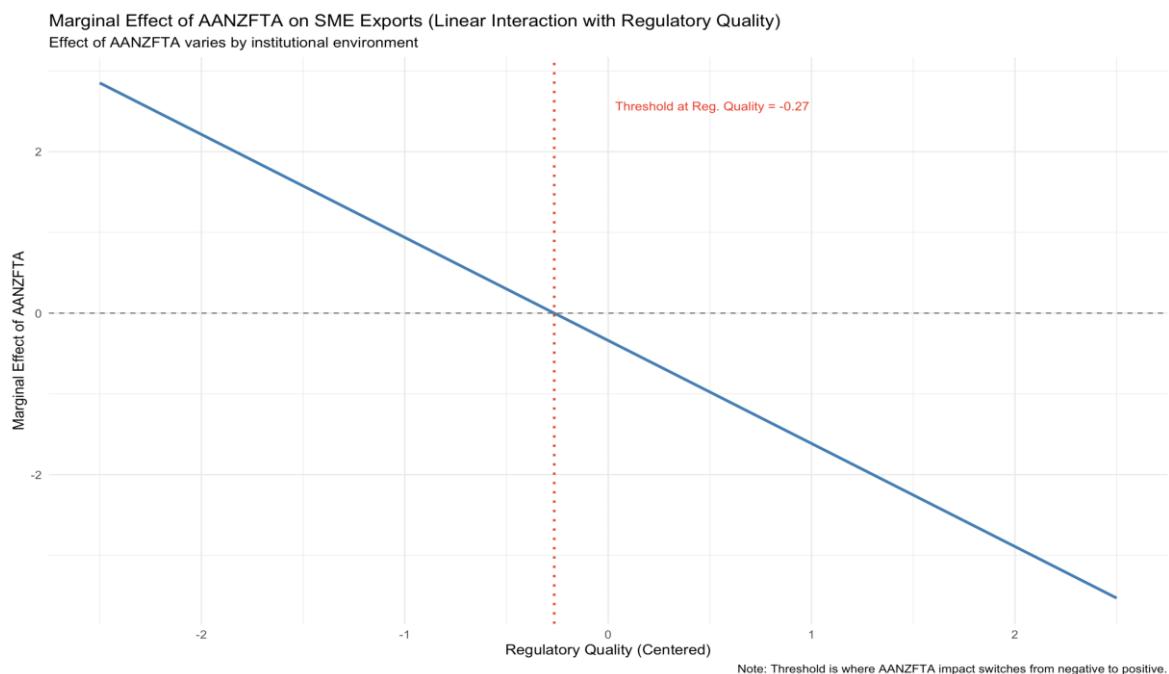
Figure 4. *Marginal Effect of AANZFTA on SME Exports Across Regulatory Quality Index*

This result is further supported by the visualization of predicted SME export levels under varying institutional quality scenarios (Figure 5).

Predicted SME Export Levels across different Institutional Quality scenarios
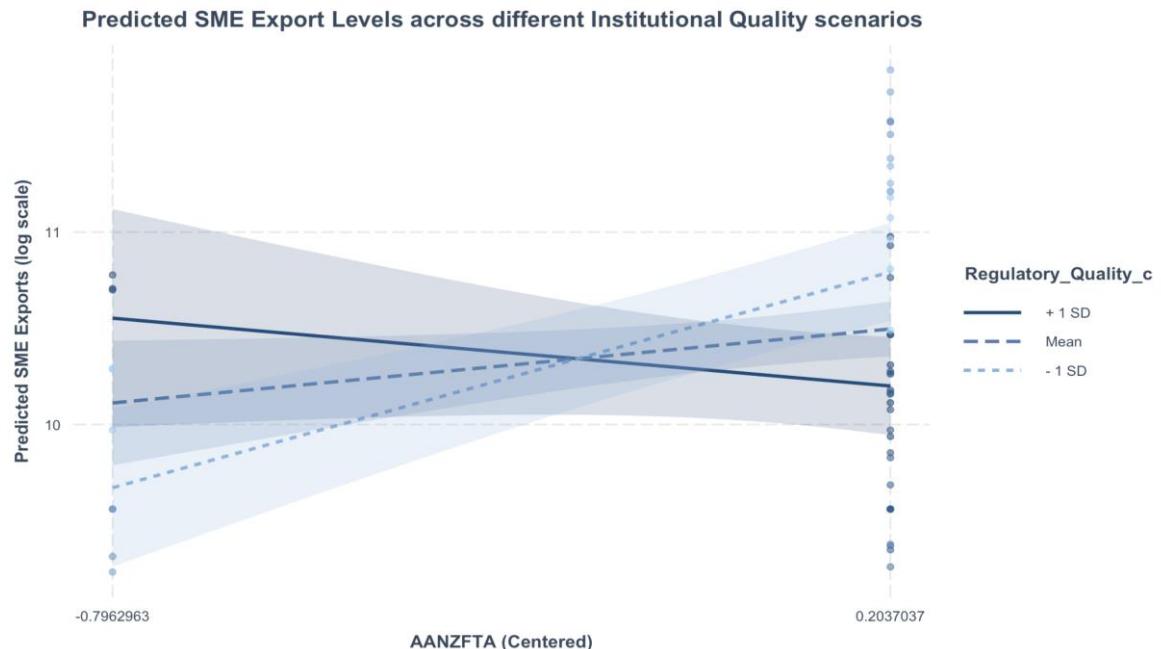
Figure 5. *Predicted SME Export Levels under AANZFTA Across Varying Levels of Regulatory Quality*

This result persists across lagged interaction models, confirming the persisting consistency of the negative moderation effect (Appendix H, Table H.2).

To explore potential nonlinear moderation, squared terms for regulatory quality and its interaction with AANZFTA were added to the baseline model. The linear interaction between AANZFTA and regulatory quality remained strongly negative and statistically significant ($\beta = -1.284$, $p < 0.001$). The squared term for regulatory quality was also negative and significant ($\beta = -1.452$, $p < 0.001$), indicating diminishing marginal returns to institutional quality. However, the squared interaction term was not statistically significant, suggesting that while the marginal effect of AANZFTA declines beyond a threshold, the curvature is not robustly supported (Appendix G, Table G.2).

The insignificance of the squared interaction term may reflect several factors. First, the small sample size likely reduces the model's power to detect higher-order effects, as noted by Judson and Owen (1999). Second, the regulatory quality index shows limited within-country variation (–2.5 to 2.5), which weakens the influence of squared terms. Finally, the negative linear interaction may already capture the true relationship, making additional curvature empirically redundant.

Although the squared interaction term was not statistically significant, the marginal effect plot is included for illustrative purposes (Figure 6). It visualizes the estimated curvature and

highlights a potential turning point in AANZFTA's effectiveness around moderate regulatory quality levels.
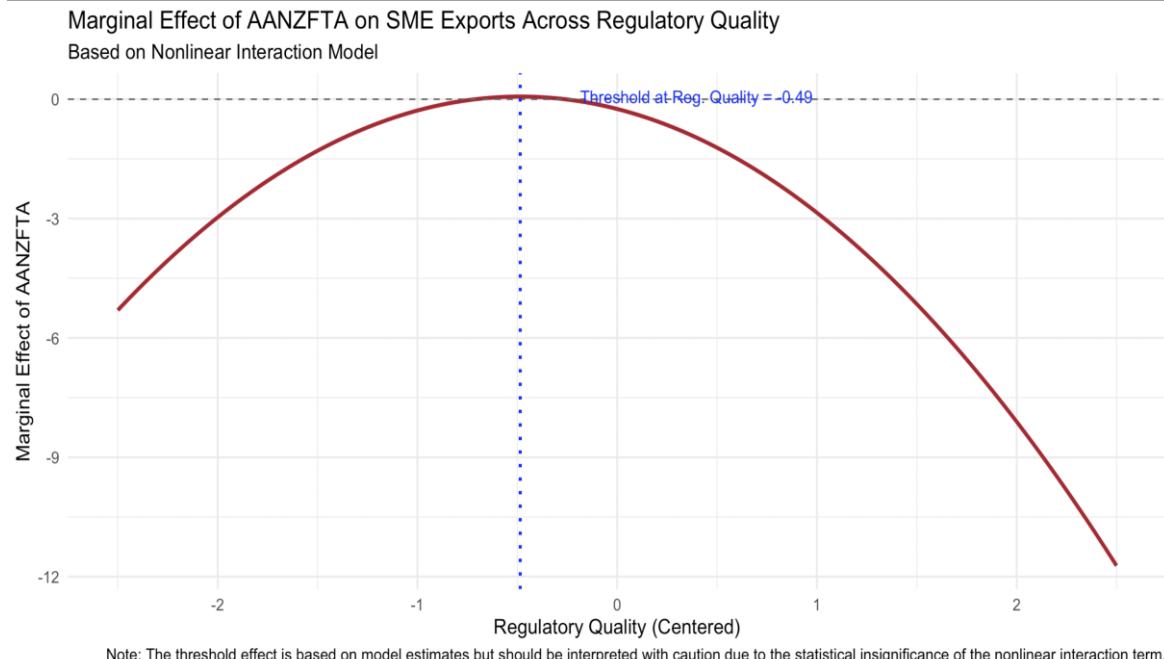
Figure 6. *Marginal Effect of AANZFTA on SMEs export rates with Regulatory Quality as a moderator (based on Non-Linear model)*

Chapter 7: Discussion and Policy Implications

Taken together, these findings suggest that AANZFTA, on its own, does not consistently enhance SME export participation. The effectiveness of AANZFTA appears conditional on GDP growth rather than being uniformly beneficial, and the results for Hypothesis 2 suggest that stronger formal institutional quality does not necessarily enhance, and may even hinder, the effectiveness of AANZFTA for SMEs.

This finding aligns with Kohl's (2014) observation that over half of all economic integration agreements fail to generate significant trade effects, particularly when institutional implementation is weak or fragmented. Importantly, Kohl also finds that nearly 10% of trade agreements in the literature are associated with adverse trade outcomes, with ASEAN featuring among these cases. He attributes this in part to the complexity of coordinating among a diverse group of negotiating governments with conflicting interests, an institutional challenge also emphasized by Bhagwati (2008).

Furthermore, SMEs often face disproportionate barriers to realizing the benefits of FTAs due to small production volumes, limited export readiness, and compliance burdens (Hayakawa, 2013). Even when FTAs provide extensive tariff liberalization, their effects on aggregate trade may be muted if liberalization is concentrated in a narrow set of product lines with low SME participation (Kohl, 2014).

This study focused on formal institutions, such as regulatory burden and trade policy, which were found to negatively affect SME exports. This outcome can be better understood by integrating insights from the Uppsala Model and Institutional Theory. The Uppsala Model suggests that SMEs internationalize gradually, beginning with culturally and geographically proximate markets as they build experiential knowledge (Johanson & Wiedersheim-Paul, 1975). For firms in emerging markets like Indonesia, Thailand, and Vietnam, Australia and New Zealand may appear distant and unfamiliar, limiting their immediate engagement with AANZFTA. At these early stages of internationalization, informal institutions, such as trust-based networks, access to informal market knowledge, and family ties, often play a more critical role than formal regulations. As Roche (2005, as cited in Högberg, 2009) notes, informal networks and family traditions frequently guide business decision-making in Asian contexts.

This intersection between the two theories becomes especially important where formal institutional support for SMEs is limited or poorly tailored. For example, Wignaraja (2013) finds that ASEAN+1 FTA utilization by SMEs rarely exceeds 25%, largely due to low awareness and weak outreach. Similarly, Hashim (2012) observes that Malaysian SMEs continue to struggle with global integration despite government initiatives, primarily due to deficits in knowledge, skills, and

product quality. In such institutional voids, informal mechanisms often compensate. Chandra et al. (2020) demonstrate how SMEs form strategic partnerships and networks to overcome barriers and accelerate internationalization. These findings underscore the value of a unified conceptual framework that combines the Uppsala Model's stages of learning with Institutional Theory's emphasis on both formal and informal structures. Future research should further explore how informal institutions, especially relational and informational networks, moderate SME progression through internationalization stages in emerging economies.

Another possible explanation for the negative relationship between Regulatory Quality and AANZFTA's impact on SME exports lies in institutional bottlenecks. Prior research consistently identifies bureaucratic complexity and compliance burdens as key obstacles to SME internationalization (Hayakawa, 2013). This reflects the broader "red tape paradox," where improvements in regulatory frameworks inadvertently increase procedural complexity without enhancing SMEs' capacity to manage these requirements. As Chia (2010) notes, trade liberalization in ASEAN has often benefited larger firms, while smaller enterprises are left behind due to limited outreach and support. Such findings are supported by survey-based evidence from another ASEAN country- Cambodia, where even in the presence of government-led integration strategies, SMEs struggled to utilize FTAs due to bureaucratic complexity and technical capacity limitation (Thangavelu et al., 2017). Kawai and Wignaraja (2009, 2011) also emphasize that excessive administrative demands significantly reduce SME participation in FTAs. Moreover, studies by Ho & Nguyen (2024) showed that a lack of transparency in local authorities also constrains SME internationalization. In this context, high regulatory quality may unintentionally act as a barrier, excluding less-resourced firms and reinforcing existing inequalities in trade access.

These findings suggest a threshold model of institutional overload for SMEs. While regulatory quality is generally assumed to promote transparency and rule-based governance, it might be beneficial to a certain point. This, in line with the emerging markets characteristics, suggests that as the bureaucratic complexity increases, the companies that lack the capacity to absorb regulatory information and adapt to formal processes are stopped in the early stages of internationalization.

The results can also be understood from the perspective of Institutional Theory, particularly the concept of isomorphic pressures. DiMaggio and Powell (1983) argue that formal institutions often impose uniform rules and expectations on all firms, regardless of their size or capacity. This can lead to rigid, standardized environments that primarily benefit large, well-resourced firms capable of meeting complex compliance demands. In contrast, SMEs typically struggle in highly regulated settings due to limited technical capacity, financial constraints, and the

burden of navigating formal procedures (Tambunan & Chandra, 2014; Wignaraja, 2013). These findings reinforce the idea that institutions only facilitate FTA utilization when they are specifically designed to accommodate the needs of SMEs. Supporting this view, Achmad (2024) finds that SME export participation in Indonesia remains low despite policy initiatives, largely due to weak institutional coordination and the lack of real-time data to effectively target high-potential firms.

Finally, while this study operationalizes AANZFTA as a binary policy intervention, it is essential to acknowledge that FTAs operate as multi-layered institutional packages. Beyond tariff reductions, agreements like AANZFTA involve procedural requirements, certification systems, and information dissemination mechanisms. For SMEs, engaging with an FTA is not simply a matter of eligibility but also of awareness, interpretation, and administrative capacity. Future research should move toward a more behavioral understanding of FTA uptake, viewing utilization as a firm-level process shaped by how enterprises perceive and enact policy tools within their institutional environments. This would help generalize findings beyond AANZFTA and deepen theoretical models of SME engagement with trade liberalization.

The paper offers several policy recommendations based on the discussion:

Recommendation	Description
1. Strengthen SME-Oriented Regulatory Frameworks and Institutional Support	Implement government-led initiatives to guide SMEs through FTA procedures, improve access to financing for internationalization, and adapt regulatory structures to accommodate firms lacking the scale and capacity of larger enterprises.
2. Target Export-Ready SMEs with Tailored Programs	Develop customized support through business associations, training seminars, and awareness campaigns. Create targeted platforms such as dedicated websites or business-oriented media (e.g., television programs) to increase transparency and promote informal learning networks. (Kawai and Wignaraja, 2011)
3. Improve SME Data Collection and Monitoring Systems	Establish more comprehensive and up-to-date SME databases to identify export-ready firms and design targeted policies. Improved data infrastructure is critical for supporting strategic and evidence-based interventions.

Table 3. Policy Recommendation Table

These recommendations are supported by prior studies emphasizing the need for targeted government assistance, clearer FTA information, and capacity-building programs to help SMEs engage in international trade (Thangavelu et al., 2017; Wignaraja, 2010; Seti, 2025).

Chapter 8: Limitations

One key limitation of this study concerns the estimation of SME export values for Vietnam. Due to the lack of official SME export data, exports were approximated using the SME employment share multiplied by total exports. This method is theoretically supported by the relationship between employment and output (Feenstra & Taylor, 2014) and empirically justified by evidence linking employment and export performance (Leichenko, 2000). Although the OECD (2008) does not explicitly endorse this proxy, it recognizes employment as a widely accepted indicator of SME economic contribution when direct export data are unavailable. To address potential bias, sensitivity analyses and models excluding Vietnam were conducted, with results remaining consistent (see Appendix B), supporting the robustness of the findings.

Another limitation is the relatively small sample size, consisting of three countries over a limited time frame. This restricts statistical power and may limit generalizability. Nonetheless, the use of fixed effects and cluster-robust standard errors addresses potential concerns related to unobserved heterogeneity and small-sample size. The study should thus be viewed as exploratory, offering a structured foundation for further empirical validation.

Third, measuring institutional quality may present constraints. While the Regulatory Quality index from the Worldwide Governance Indicators is theoretically sound and widely used, it lacks SME-specific components and shows limited variation within the sample, potentially constraining the identification of more nuanced or non-linear effects. Moreover, the proxy does not capture informal institutional dimensions, such as trust or network ties, which are highly relevant for SME behavior in emerging markets. Future research should consider alternative governance indicators, or mixed-method approaches to capture better both formal and informal institutional influences on SME internationalization.

Finally, the use of country-level panel data does not allow for analysis of the within-country heterogeneity, such as regional disparities, sectoral dynamics, or firm-level characteristics. These factors may significantly shape SME export outcomes and are particularly important in diverse or decentralized economies. Future research should investigate the heterogeneity among firms by examining how different types of SMEs across various industries respond to FTAs and regulatory environments.

Despite these limitations, the study contributes meaningfully to the literature by applying a theory-driven empirical approach in a data-constrained context. It demonstrates how structured country-level panel models can yield policy-relevant insights. It also lays the groundwork for future research using more granular firm-level and regional data to further examine how FTAs impact SMEs' export participation.

Chapter 9: Conclusion

FTAs like AANZFTA are not silver bullets. Their success depends on supportive macro conditions, such as GDP growth and institutional facilitation. For SMEs to capitalize on trade agreements, governments should enhance export-readiness support during economic upswings and provide buffers in downturns. This research has shown that AANZFTA increases SME exports only when GDP growth exceeds a certain threshold. In some contexts, higher institutional quality may hinder rather than help SME participation in FTAs, likely due to increased compliance burdens and asymmetric institutional access.

These nuanced results contribute to the literature by emphasizing the conditional and non-linear nature of FTA outcomes among SMEs. The findings underscore the need for a more integrated policy approach that combines macroeconomic stability with institutional designs and informal support that helps not just large enterprises. Given data constraints and the limited country sample, the study serves as an exploratory framework.

Future research should evaluate the impact of the AANZFTA Second Protocol, which introduced Chapter 16 focused on SMEs aimed at reducing participation barriers. Finally, expanding the analysis to include informal institutions, such as network ties and relational trust, would offer a more comprehensive understanding of the institutional factors influencing SMEs' engagement with FTAs.

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Appendix

To support transparency and technical rigor, this thesis includes an extensive appendix organized by theme. Each section aligns with a specific hypothesis, methodological process, or robustness check discussed in the main chapters.

Readers are encouraged to use this appendix to verify the credibility of the models and gain a deeper understanding of the modelling decisions and country-specific nuances discussed throughout Chapters 5 and 6.

- **Appendix A** details country-specific SME definitions used for data harmonization.
- **Appendix B** outlines data construction, cleaning, and diagnostic tests.
- **Appendix C** explains the case study selection and compares institutional SME policies.
- **Appendix D** contains variable definitions, descriptive statistics, and correlation matrices.
- **Appendix E** describes the selection and justification of institutional quality proxies for Hypothesis 2.
- **Appendix F** presents results from linear models testing Hypotheses 1 and 2, including interaction terms.
- **Appendix G** reports non-linear model extensions for both hypotheses.
- **Appendix H** explores delayed effects using lagged variables.
- **Appendix I** contains results from event study specifications analyzing temporal dynamics.
- **Appendix J** includes a robustness check summary table for all the models.

Appendix A SMEs definition by country

This appendix supports Section 2: *Literature Review* and 5: *Methodology* and presents a comprehensive summary of the SMEs' definition in Indonesia, Thailand and Vietnam.

Country	Enterprise Size	Employment	Revenue/Sales	Capital/Assets
Indonesia	Micro	1–4 people	< Rp300 million	< Rp50 million
	Small	5–19 people	Rp300 million – Rp2.5 billion	Rp50 million – Rp500 million
	Medium	20–99 people	Rp2.5 billion – Rp50 billion	Rp500 million – Rp10 billion
Thailand	Micro (after 2019)	1–5 (manufacturing/services)	≤ B1.8 million	Not specified
	Small	6–50 (mfg), 6–30 (svc/trd)	> B1.8m to ≤ B100m (mfg), ≤ B50m (svc/trd)	Not specified
	Medium	51–200 (mfg), 31–100 (svc)	> B100m to ≤ B500m (mfg), ≤ B300m (svc/trd)	Not specified
Vietnam	Micro	1–10 employees	≤ D3 billion	≤ D3 billion
	Small	11–100 (agriculture/services), 11–200 (industry)	≤ D50 billion	≤ D20 billion (agriculture/industry), ≤ D50b (services)
	Medium	101–200	≤ D200 billion (agr/industry), ≤ D300b (services)	≤ D100 billion (agriculture/industry/services)

Source: ADB Asia SME Monitor 2023, based on national SME policies and statistical agencies.

Table A. 1 *SMEs definition by country*

Notes:

- Thailand's classification changed after November 2019. Only the post-2019 definition is shown for simplicity.
- "B" = Thai Baht; "Rp" = Indonesian Rupiah; "D" = Vietnamese Dong.
- Definitions vary slightly by sector in Thailand and Vietnam.

Appendix B Data Cleaning and Preparation

This appendix supports section 5: *Methodology* and outlines the data construction, cleaning, and robustness testing procedures undertaken to prepare the panel dataset for empirical analysis.

B.1. SME and Macroeconomic Data Integration

The initial stage of data construction involved compiling SME-specific indicators for Vietnam, Indonesia, and Thailand from the *Asian Development Bank (ADB) Asia SME Monitor* reports (2020, 2023). Separate country-level spreadsheets were manually extracted and consolidated into a unified Excel file (*SMEs Data.xls*), retaining only variables with the most complete temporal coverage. To enhance data continuity, additional SME metrics from the 2020 ADB Monitor were integrated wherever possible.

Subsequently, SME data were merged with relevant macroeconomic variables from the *World Bank's World Development Indicators (WDI)* and *Worldwide Governance Indicators (WGI)* databases. The macroeconomic indicators included annual data on exports and imports of goods and services (in current million USD), official exchange rates (for Thailand and Indonesia, as their SMEs export rates were documented in the national currencies), and governance proxies. SME export values and contributions to GDP (in USD) were computed using prevailing exchange rates.

During the data merging process in R, both datasets were further combined using common country-year identifiers. The resulting dataset was then cleaned by converting all variables to numeric format. Missing values were addressed in two stages: time-series interpolation filled gaps within the country-specific time sequences, while mean imputation addressed missing edge values. Variables with more than 40% missingness were excluded. Final panel construction was performed using the plm package in R, yielding a structured dataset suitable for fixed-effects regression analysis across the three ASEAN economies.

A fixed effects model (FE) was selected over a random effects specification based on theoretical expectations that unobserved country-level heterogeneity, such as structural trade policies and regulatory institutions, correlates with key explanatory variables. Moreover, given the limited number of countries, a random effects approach is statistically infeasible due to insufficient between-country variation.

To validate the robustness of the constructed dataset and analytical results, several diagnostic checks were performed. These included heteroskedasticity-consistent (clustered) standard errors using the Arellano method, serial correlation tests (Wooldridge test), and cross-sectional dependence tests (Pesaran CD test).

Model	AANZFTA × GDP	AANZFTA × Reg	L1	L2	L3	Non-linear	Event Study	Trend Test	VIF OK	Serial Corr. Wooldridge test Fixed	CD Pesaran Test OK	R²	Comments
Model 1	✓	✗	✓	✓	✓	✓	✓ (✗ sig.)	✓	✓	✓ (Arellano)	✓	0.61	Final model H1
Model 2	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓ (Arellano)	✓	0.63	Final model H2

Table B.1 *Robustness Checks and Model Extensions Summary Table*

B.2. Estimating SME Export Rates for Vietnam

Given the absence of official SME export data for Vietnam, SME exports were estimated using the SME employment share as a proxy.

$$SME\ Export\ Value = Exports\ of\ goods\ and\ services\ (current\ million\ US\$) \times (Employment\ by\ MSMEs\ /\ Total\ Employment)$$

To test the sensitivity of this assumption, the model for H1 was recalculated, assuming the SME export share was ±10% and ±20% different from the employment share. Panel regression models were re-estimated using these adjusted values for Vietnam.
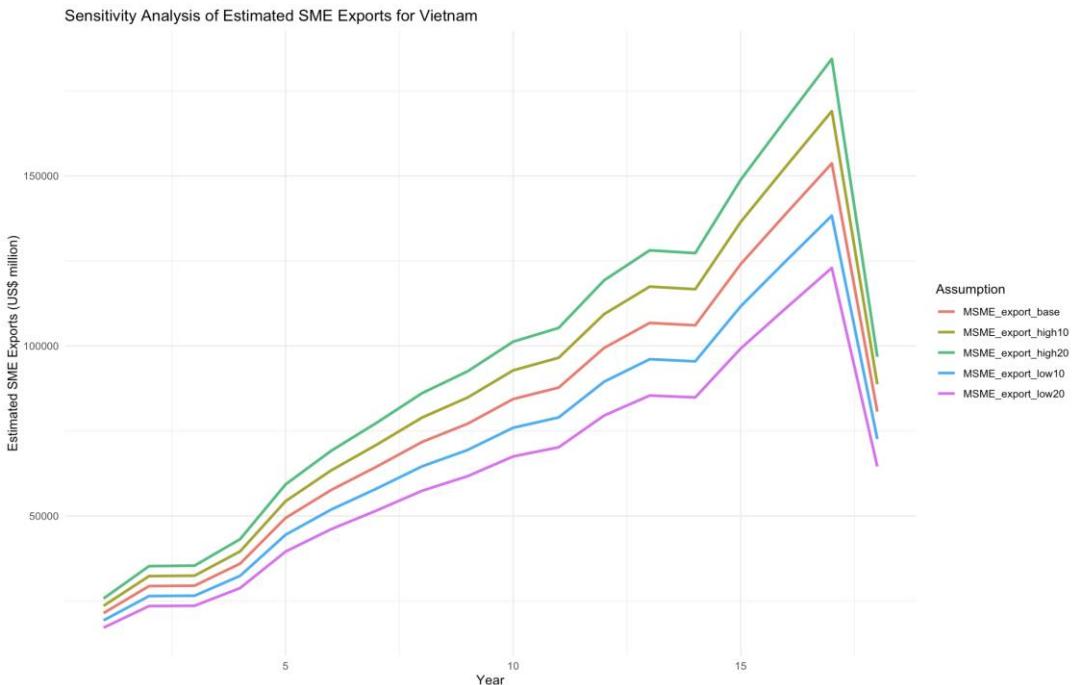
Figure B.1 *Sensitivity Analysis: Estimated SME Export Rate Scenarios for Vietnam*

Variable	Estimate (Base)	Estimate (Low -20%)	Estimate (High +20%)
AANZFTA_c	-0.2372219	-0.21917958	-0.21917993
GDP_growth_c	0.0375334	0.03880819	0.03880803

interaction_term_h1	0.1704677	0.16549782	0.16549702
Inflation_consumer_price	0.003067	-0.00059555	-0.00059544
Export_growth	-0.0016215	-0.00253541	-0.00253542
FDI_inflows_percent_of_GDP	-0.0657077	-0.07532026	-0.07531936
Education_spending_percent_of_GDP	-0.1929072	-0.18394823	-0.18394809
MSME_growth	-0.0367186	-0.03320701	-0.03320686

Table B.2 *Robustness Check Results for model 1 (H1) with different SMEs export rates for Vietnam*

The stability of coefficient signs and magnitudes across scenarios suggests that the main results are robust to estimation uncertainty for Vietnam.

Additionally, a separate regression was run excluding Vietnam entirely to test whether findings were driven by its estimated SME export data. The results remained qualitatively similar, with only minor changes in coefficients, suggesting the overall findings are not excessively sensitive to the inclusion of Vietnam.

Variable	Estimate	Std. Error	t-value	p-value	Significance
AANZFTA_c	−0.1975	0.0320	−6.1739	0.00000157	***
GDP_growth_c	0.0282	0.0119	2.3725	0.0254	*
AANZFTA_c × GDP_growth_c (interaction_term_h1)	0.1309	0.0205	6.3881	0.00000091	***
Inflation (consumer price)	0.0394	0.0146	2.7112	0.0172	*
Export_growth	−0.0017	0.0036	−0.4692	0.6429	
FDI_inflows (% of GDP)	−0.0408	0.0527	−0.7728	0.4466	
Education_spending (% of GDP)	−0.1773	0.0626	−2.8311	0.0088	**
MSME_growth	−0.0233	0.0016	−14.4648	< 0.000001	***

Table B.3 *H1 Linear Model Results excluding Vietnam used to access credibility of the proxy (Dependent Variable: SME Exports (log-transformed))*

B.3. Accounting for Time Trends and Global Shocks

To rule out bias from time-specific global or regional economic shocks, a robustness check was conducted using year fixed effects. These dummies aimed to capture major macroeconomic disruptions, including:

- The Global Financial Crisis (2008–2009)
- The China Slowdown (2014–2015)
- US- China Trade War (2018-2019)
- The COVID-19 pandemic (2020–2021)
- Inflation shocks from the Russia–Ukraine war (2022–2024)

Although this approach is common in trade impact analysis (Dianzan, 2022; Achmad, 2024), year dummies were mostly statistically insignificant and did not improve model fit. Consequently, year fixed effects were excluded from the final model.

Variable	Estimate	Std. Error	t-value	p-value	Significance
AANZFTA_c	−0.1381	0.3452	−0.4001	0.6923	
GDP_growth_c	0.0882	0.0271	3.2490	0.0032	**
AANZFTA_c × GDP_growth_c (interaction_term_h1)	0.1835	0.0337	5.4391	0.000011	***
Inflation (consumer price)	−0.0244	0.0209	−1.1682	0.2533	
Export_growth	−0.0130	0.0037	−3.4731	0.0018	**
FDI_inflows (% of GDP)	−0.0506	0.0082	−6.1692	0.000002	***
Education_spending (% of GDP)	−0.1483	0.0676	−2.1348	0.0424	*
MSME_growth	−0.0393	0.0077	−5.1401	< 0.0001	***

Year	Estimate	Std. Error	t-value	p-value	Significance
Year2008	0.7279	0.5599	1.3000	0.2049	
Year2009	−0.3457	0.1443	−2.3958	0.0204	*
Year2010	0.0426	0.2653	0.1607	0.8736	
Year2011	0.3924	0.3309	1.1858	0.2464	
Year2012	−0.0917	0.3319	−0.2762	0.7845	
Year2013	−0.2177	0.5079	−0.4287	0.6717	
Year2014	−0.1981	0.3693	−0.5365	0.5962	
Year2015	−0.3258	0.4579	−0.7111	0.4832	
Year2016	−0.1063	0.5709	−0.1864	0.8536	
Year2017	−0.0695	0.6824	−0.1019	0.9196	
Year2018	−0.1421	0.6193	−0.2294	0.8203	
Year2019	−0.1249	0.6013	−0.2077	0.8370	
Year2020	0.1992	0.4972	0.4007	0.6919	
Year2021	0.3162	0.7371	0.4289	0.6715	
Year2022	0.5184	0.6471	0.8001	0.3977	
Year2023	−0.1682	0.5003	−0.3361	0.7395	
Year2024	0.0515	0.4673	0.1101	0.9131	

Table B.4 *Model 1 (H1) Time trend test (Year as fixed effect) results*

Variable	Estimate	Std. Error	t-value	p-value	Significance
AANZFTA_c	−0.2334	0.3416	−0.6833	0.5007	
Regulatory_Quality_c	0.8817	0.1889	4.6681	< 0.0001	***
AANZFTA_c × Regulatory_Quality_c (interaction_term_h2)	−0.9686	0.1853	−5.2260	< 0.0001	***
GDP_growth	0.0959	0.0304	3.1545	0.0042	**
Export_growth	−0.0134	0.0039	−3.4351	0.0021	**
Inflation (consumer price)	−0.0162	0.0180	−0.8976	0.3779	
FDI_inflows (% of GDP)	−0.0608	0.0052	−11.6605	< 0.0001	***
Education_spending (% of GDP)	−0.1629	0.0346	−4.6900	0.0010	***

	Estimate	Std. Error	t-value	p-value	Significance
MSME_growth	−0.0375	0.0086	−4.3482	< 0.0001	***

Year	Estimate	Std. Error	t-value	p-value	Significance
Year2008	0.9236	0.6477	1.4260	0.1662	
Year2009	0.0952	0.2461	0.3865	0.7024	
Year2010	0.4094	0.1997	1.5489	0.1339	
Year2011	0.4907	0.4018	1.2212	0.2334	
Year2012	0.1689	0.3391	0.4983	0.6264	
Year2013	−0.0316	0.5281	−0.0598	0.9527	
Year2014	−0.0166	0.4144	−0.0401	0.9684	
Year2015	−0.1095	0.4321	−0.2532	0.7640	
Year2016	0.0397	0.5221	0.1864	0.8536	
Year2017	0.1477	0.5261	0.2809	0.7941	
Year2018	0.1042	0.4677	0.2147	0.8317	
Year2019	0.0773	0.4704	0.1644	0.8796	
Year2020	0.1895	0.4595	0.4123	0.8145	
Year2021	0.3922	0.6715	0.5840	0.5613	
Year2022	0.1919	0.6185	0.3101	0.7590	
Year2023	−0.1981	0.4905	−0.4038	0.6882	
Year2024	0.2357	0.4469	0.5268	0.6029	

Table B.5 *Model 2 (H2) Time trend test (Year as fixed effect) results*

This conclusion is visually supported by Figure B.2, which displays total export trends for Thailand, Indonesia, and Vietnam from 2007 to 2024. The timeline overlays shaded global shocks and vertical markers for AANZFTA implementation, offering contextual validation that, while global shocks were present, their effect was not statistically dominant in the empirical model.
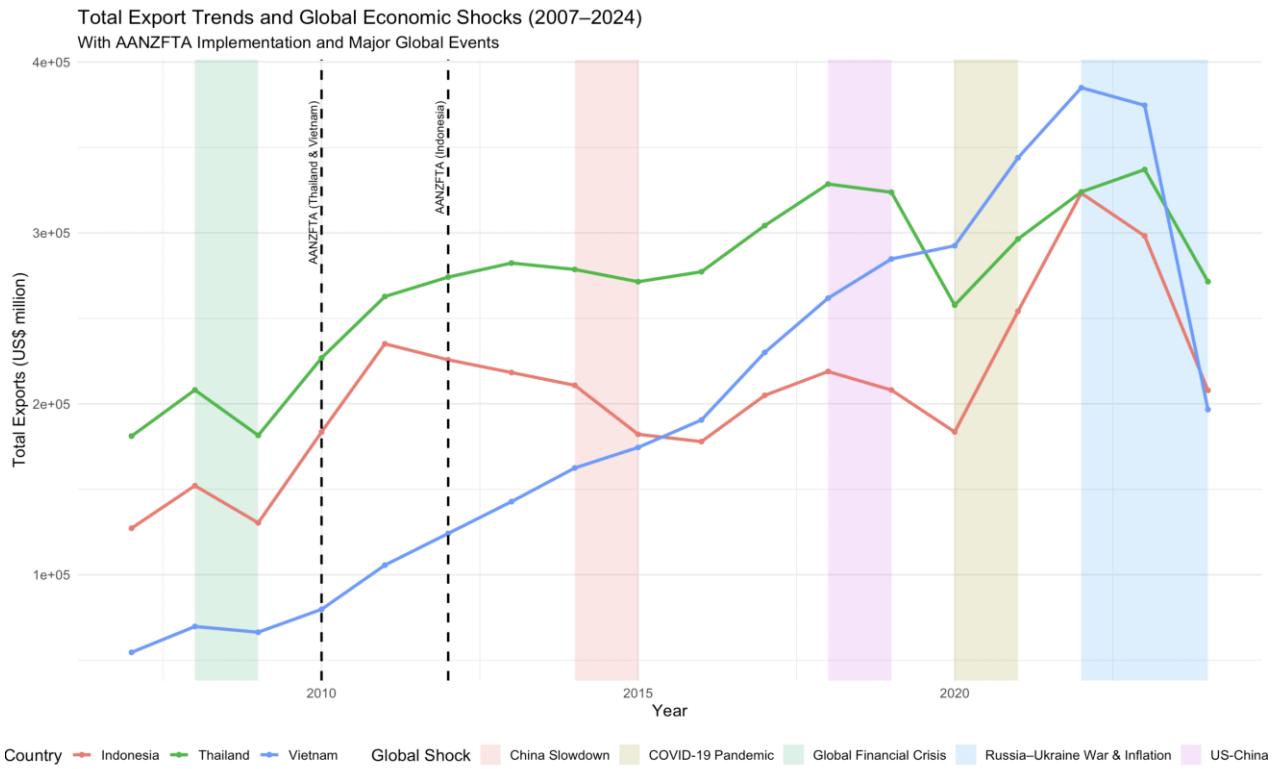
Figure B.2 *Total Export Trends and Global Economic Shocks (2007-2024).*

B.4. Reverse Causality Test

While GDP growth is modeled as an exogenous moderator of SME export activity, consistent with gravity-based trade models (Endoh, 1999; Soloaga & Winters, 2001), a reverse causality check was conducted to ensure validity. Specifically, a fixed effects regression was estimated with GDP growth as the dependent variable and SME exports as a predictor.

The analysis found a positive and statistically significant relationship between SME exports and GDP growth, suggesting potential reversed effects. Nonetheless, GDP growth remains conceptually justified as an independent moderator in the primary models, as it reflects broader macroeconomic conditions. The possibility of bidirectional causality is acknowledged, and future work might address this with instrumental variable approaches.

Variable	Estimate	Std. Error	t-value	p-value	Significance
log_MSME_export	2.2101	0.4898	4.5121	0.000047	***
AANZFTA	1.4507	0.9599	1.5113	0.1379	
Inflation (consumer price)	−0.1209	0.0901	−1.3421	0.1864	
Export_growth	0.0711	0.0158	4.5086	0.000047	***
FDI_inflows (% of GDP)	0.7906	0.4305	1.8364	0.0731	·
Education_spending (% of GDP)	1.1364	0.1314	8.6511	< 0.000001	***
MSME_growth	0.0931	0.0465	1.9995	0.0518	·

Table B.6 *H1 Fixed Effect Reversed Causality Model Results (Dependent Variable: GDP_growth)*

Appendix C Country Selection Rationale and Comparative Policy Overview

This appendix supports sections 2: *Literature Review* and 5: *Methodology* and outlines the rationale for selecting Indonesia, Thailand, and Vietnam as case countries, followed by a structured comparison of their SME export policy environments. The selection is based on institutional diversity, economic relevance, and the availability of reliable SME data. It also includes official AANZFTA implementation timelines and country-specific diagnostics.

Country Selection Justification

Data Availability: These are the only ASEAN countries with consistent, disaggregated SME indicators reported by the Asian Development Bank's Asia SME Monitor.

Institutional Diversity:

- *Indonesia*: The region's largest economy with a complex regulatory structure and lower institutional quality.
- *Thailand*: An upper-middle-income country with relatively advanced infrastructure and governance.
- *Vietnam*: A highly export-oriented, lower-middle-income country with deep integration into global value chains.

Economic Relevance: All three economies are major ASEAN players with differing levels of trade openness and FTA engagement, providing variation critical for identifying heterogeneous AANZFTA effects.

AANZFTA Implementation Timelines

- **Vietnam**: January 1, 2010
- **Thailand**: March 12, 2010
- **Indonesia**: January 10, 2012

Source: Australian Department of Foreign Affairs and Trade (DFAT, 2024)

Comparative Overview of SME Export Policy Environments

This section provides a comparative overview based on official data from the ASEAN SME Policy Index (ERIA, 2014) and academic literature. It outlines key institutional indicators, major government initiatives, and implementation challenges affecting SME export participation.

Indonesia

Indonesia's SME sector is dominated by micro and small enterprises, particularly in agriculture and trade-related sectors, yet these firms contribute less than 20% to the country's non-oil exports

and face significant barriers to internationalization (Mourougane, 2012; ERIA, 2014). Key challenges include informality, limited access to finance, and informational deficits, especially among firms operating in primary sectors, which are more exposed to non-tariff barriers (Anas et al., 2017). Moreover, over 60% of exporting SMEs do not use FTAs because they lack awareness or knowledge of procedures (Anas et al., 2017). In response, the Indonesian government has introduced several initiatives to support SME development and export capacity. These include the Kredit Usaha Rakyat program, which provides credit guarantees to MSMEs across sectors such as agriculture, fisheries, and industry via state and Islamic banks, and the SME Service Centre, which offers guidance on finance, HR, marketing, and intellectual property rights. Additionally, the DGNED's International Export Training Centre has trained over 45,000 participants to improve export competitiveness since 1990.

However, institutional fragmentation remains a significant obstacle. Although PEPI (National Team for Increasing Exports and Investments) was established to coordinate export promotion across ministries, it lacks enforcement capacity, leading to weak implementation (ERIA, 2014). Financial instruments such as those offered by the Indonesia Eximbank (LPEI) are also skewed toward larger firms, with only 8.47% of export credit reaching SMEs in 2011 (ASEAN SME Policy Index, 2014). Despite a moderate institutional framework score (4.4) and relatively strong market expansion rating (4.2), Indonesia's policy landscape continues to suffer from structural inefficiencies and inadequate outreach to micro and small exporters (ASEAN SME Policy Index, 2014).

Thailand

SMEs are a fundamental component of the Thai economy, accounting for 99.5% of all businesses, 42% of the national GDP, and employing a significant share of the workforce, particularly in the manufacturing sector, where they comprise 93.8% of firms (Chittithaworn et al., 2011; MSME News Network, 2012, ERIA, 2014). Despite this strong domestic presence, only 28.4% of SMEs are engaged in export activities, with concentrations in "food and beverage, textiles and apparel, and wood products" as quoted by ERIA (2014), from MSME News Network (2012). To support SME development and internationalization, the Thai government has implemented several initiatives. These include the Office of SME Promotion (OSMEP), which oversees SME policy and capacity-building programs; the SME Development Bank, which provides financial services such as loans and venture capital; and the SME Thailand Club, a knowledge-sharing platform. In addition, EXIM Thailand Bank plays a key role in offering export insurance and training to potential SME exporters (ERIA, 2014). Thailand's high score of 4.7 in the International Market Expansion dimension of the ASEAN SME Policy Index (2014) reflects the spread of these formal

supports. However, their effectiveness is limited by informal institutional barriers. Studies show that 63% of SMEs do not utilize FTA forms, primarily due to a lack of awareness, and only 23.6% understand how FTAs function—compared to 65% of large firms (Korwatanasakul et al., 2020; Kuno & Sato, 2010). As a result, SME export participation remains disproportionately low at 25.5% of national exports, suggesting that formal mechanisms alone are insufficient without corresponding efforts to address informational and cognitive gaps (Korwatanasakul et al., 2020).

Vietnam

SMEs constitute a critical component of Vietnam's economy, accounting for over 97.2% of all enterprises, contributing approximately 47% to GDP, and generating over 5.63 million jobs (Ministry of Planning and Investment Vietnam, 2020; Nguyen et al., 2021). Although Vietnam is one of the most open economies in the region, SME participation in GVCs remains limited, with only 21.6% of SMEs engaged, significantly lower than, for instance, in Thailand and Malaysia (Wignaraja, 2013; Nguyen et al., 2021). Since transitioning to a market economy in the mid-1980s, Vietnam has experienced rapid export-driven growth. However, the SME sector remains dominated by microenterprises, which made up 69.8% of firms as of 2011 (General Statistics Office, 2012; Breu et al., 2012; ERIA, 2014).

To support SME internationalization, the government has introduced several initiatives, including the SME Partner Vietnam mentorship and training platform. This platform provides mentorship and practical training to new and aspiring SME owners by facilitating partnerships between experienced business leaders and entrepreneurs. Moreover, the SME Development Fund launched in 2013 aims to mobilize and administer financial resources for SME growth through direct funding and trust-based mechanisms, beginning with an initial capital allocation of US$100 million. Furthermore, Vietnam established the Export Portal, which connects Vietnamese exporters with global buyers. Additionally, the Vietnam Trade Promotion Agency under the Ministry of Industry and Trade provides market intelligence, training, and networking opportunities to facilitate export expansion (ERIA, 2014). However, institutional challenges persist. As Nguyen et al. (2021) emphasize, improvements in local governance, access to finance, innovation support, and skilled labour are necessary to enhance SME competitiveness and GVC integration. While Vietnam scored 4.0 in the International Market Expansion dimension of the ASEAN SME Policy Index (ASEAN SME Policy Index, 2014), the structural and institutional gaps for SMEs continue to hinder broader export participation.

Appendix D Summary Statistics Tables

This appendix supports Section 5: *Methodology*, by providing detailed summary statistics and definitions for all variables used in the empirical models testing H1 and H2.

Variable	Description	Measurement / Unit	Source
MSME_export	Annual exports by micro, small and medium-sized enterprises	Indonesia and Thailand- values calculated from local currencies to US$ based on Current Exchange rate (from WB-WDI) Vietnam calculated in US$ based on the total export multiplied by proportion of SMEs employment	Asian Development Bank or MSMEs export rates in local currencies World Bank- WDI, for Current Exchange Rate
AANZFTA	Participation in the ASEAN-Australia-New Zealand Free Trade Agreement	Dummy: 1 = in force, 0 = otherwise	Manually coded from FTA implementation years
GDP_growth	Annual GDP growth rate	Percentage (%)	World Bank – World Development Indicators
Export_growth	Annual total export growth rate	Percentage (%)	World Bank – WDI
Inflation_consumer_price	Consumer price index annual growth	Percentage (%)	World Bank – WDI
FDI_inflows_percent_of_GDP	Foreign direct investment net inflows as % of GDP	Percentage (%)	World Bank – WDI
Education_spending_percent_of_GDP	Government expenditure on education as % of GDP	Percentage (%)	World Bank – WDI
MSME_growth	Year-on-year change in number of MSMEs	Percentage (%)	Asian Development Bank
Gov_Effectiveness	Perceptions of government quality, policy implementation & service delivery	Index: –2.5 (weak) to +2.5 (strong)	World Bank – Worldwide Governance Indicators
Corruption	Perception of corruption in public sector	Index: –2.5 to +2.5	World Bank – WGI
Voice	Perception of political participation and expression	Index: –2.5 to +2.5	World Bank – WGI
Political_Stability	Likelihood of political instability and violence	Index: –2.5 to +2.5	World Bank – WGI
Regulatory_Quality	Perception of market-friendly policies	Index: –2.5 to +2.5	World Bank – WGI
Rule_of_Law	Confidence in the legal system	Index: –2.5 to +2.5	World Bank – WGI
Governance_Index	Composite average of six governance indicators	Index: –2.5 to +2.5 (averaged)	Author's calculation from WGI (Voice, Corruption, Political Stability, Gov Effectiveness, Rule of Law, Regulatory Quality)

interaction_term_h1	Interaction between AANZFTA and GDP growth	Continuous	Author's calculation: AANZFTA_c × GDP_growth_c
interaction_term_h2	Interaction between AANZFTA and Regulatory Quality	Continuous	Author's calculation: AANZFTA_c × Regulatory_Quality_c

Table D.1 *Variable Description Table*

	MEAN	SD	MIN	MEDIAN	MAX	N
Year	-	-	2007	-	2024	54
AANZFTA	0.80	0.41	0.00	1.00	1.00	54
MSME_export	41113.34	32086.5	10233.4	28860.50	138999.48	54
GDP_growth	4.48	2.62	-6.05	5.06	8.12	54
Export_growth	8.40	13.38	-20.40	7.69	40.75	54
Inflation_consumer_price	4.33	4.17	-0.90	3.52	23.12	54
FDI_inflows_percent_of_GDP	3.10	1.96	-0.86	2.47	9.66	54
Education_spending_percent_of_GDP	3.13	1.02	0.86	3.41	4.89	54
Gov_Effectiveness	0.04	0.23	-0.33	0.09	0.58	54
Corruption	-0.50	0.13	-0.89	-0.48	-0.29	54
Voice	-0.67	0.63	-1.53	-0.65	0.18	54
Political_Stability	-0.48	0.50	-1.44	-0.51	0.27	54
Regulatory_Quality	-0.16	0.30	-0.68	-0.06	0.30	54
Rule_of_Law	-0.27	0.24	-0.70	-0.24	0.24	54

Table D.2 *Summary Statistics of Variables*

	MSME_export	AANZFTA	GDP_growth	Export_growth	Inflation consumer_price	FDI_inflows%_of_GDP	Education_spending%_of_GDP	Gov_Effectiveness	Corruption	Voice	Political Stability	Regulatory Quality	Rule_of_Law
MSME_export	1.00	0.25	0.24	0.15	-0.09	0.44	0.26	0.12	0.38	-0.68	0.45	-0.43	0.32
AANZFTA	0.25	1.00	-0.08	-0.14	-0.32	-0.20	-0.24	0.39	0.46	-0.09	0.23	0.23	0.46
GDP_growth	0.24	-0.08	1.00	0.45	0.38	0.51	0.07	-0.46	-0.27	-0.16	0.33	-0.55	-0.38
Export_growth	0.15	-0.14	0.45	1.00	0.43	0.37	0.02	-0.18	-0.13	-0.21	0.18	-0.32	-0.19
Inflation_consumer_price	-0.09	-0.32	0.38	0.43	1.00	0.53	0.29	-0.59	-0.46	-0.18	0.37	-0.55	-0.55
FDI_inflows_%_of_GDP	0.44	-0.20	0.51	0.37	0.53	1.00	0.45	-0.32	-0.11	-0.67	0.61	-0.68	-0.17
Education_spending_%_of_GDP	0.26	-0.24	0.07	0.02	0.29	0.45	1.00	-0.40	-0.22	-0.62	0.08	-0.48	-0.10
Gov_Effectiveness	0.12	0.39	-0.46	-0.18	-0.59	-0.32	-0.40	1.00	0.68	0.05	-0.27	0.71	0.73
Corruption	0.38	0.46	-0.27	-0.13	-0.46	-0.11	-0.22	0.68	1.00	-0.08	-0.15	0.40	0.54
Voice	-0.68	-0.09	-0.16	-0.21	-0.18	-0.67	-0.62	0.05	-0.08	1.00	-0.60	0.62	-0.23

Table D.3 *Correlation Matrix*

Appendix E Institutional Quality Proxy Selection for Hypothesis 2

This appendix supports section 6: *Results* and gives a comparison of different proxies used for the creation of Model 2 (H2)

To empirically assess how institutional quality moderates the effect of AANZFTA on SME's export participation, three alternative proxies were evaluated. These included two World Governance Indicators (WGIs), Government Effectiveness and Regulatory Quality, and a composite Governance Index created by the author.

The WGI indicators were selected for their conceptual alignment with the literature on trade institutions.

Government Effectiveness measures perceptions of public service quality, civil service independence, policy formulation and implementation competence, and the credibility of government commitments (WGI, World Bank, 2024).

Regulatory Quality, in contrast, captures perceptions of the government's capacity to formulate and enforce policies that promote private sector development. This includes aspects such as trade policy design, the business regulatory environment, prevalence of non-tariff barriers, and discriminatory practices in taxation and pricing (WGI, World Bank, 2024).

Additionally, a composite **Governance Index** was constructed by averaging six WGI dimensions: Voice and Accountability, Rule of Law, Government Effectiveness, Regulatory Quality, Control of Corruption, and Political Stability/Absence of Violence. This index was tested to capture the broader institutional environment influencing SME export decisions.

After estimating models for each proxy, Regulatory Quality was selected for inclusion in the final specification due to both its strong theoretical justification, specifically its direct relevance to trade and business regulation, and its superior statistical performance. The full estimation outputs for all three models are available in Table E.1

Source: Worldwide Governance Indicators, 2024 Update, World Bank (www.govindicators.org)

Variable	Governance Index	Regulatory Quality	Government Effectiveness
AANZFTA	−1.8479 (0.1235) ***	−0.5467 (0.0397) ***	−0.3444 (0.0665) ***
Institutional Proxy	4.2811 (1.2730) **	1.8888 (0.5443) **	1.5787 (0.5649) **
GDP_growth	0.0594 (0.0089) ***	0.0616 (0.0107) ***	0.0618 (0.0076) ***
Export_growth	−0.0016 (0.0057)	−0.0204 (0.0041)	−0.0016 (0.0047)
Inflation (CPI)	0.0033 (0.0071)	0.0053 (0.0046)	0.0003 (0.0034)
FDI_inflows (% of GDP)	−0.0768 (0.0229) **	−0.0693 (0.0350) ·	−0.0937 (0.0168) ***
Education_spending (% of GDP)	−0.1016 (0.1477)	−0.1076 (0.0985)	−0.1228 (0.0879)
MSME_growth	−0.0293 (0.0092) **	−0.0287 (0.0059) ***	−0.0303 (0.0078) ***
Interaction (AANZFTA × Proxy)	−3.5655 (0.3925) ***	−1.2762 (0.1496) ***	−1.3893 (0.1845) ***

Table E.1 *Model results for H2 using different indicators as an Institutional Quality Proxy*

Results:

Model 1: The magnitude is high, but interpretation is more abstract because it's an average of six different dimensions.

Model 2: Conceptually focused: regulatory quality links directly to business ease, legal enforcement, and policy consistency. (Best balance of interpretability and statistical strength.)

Model 3: Broader than regulatory quality, includes delivery of public services and bureaucracy. (Still valid, but less specifically aligned with trade facilitation.)

Appendix F Results for Linear Models H1 and H2

This appendix supports Section 6: *Results* by presenting residual plots and fixed effects results for both H1 and H2.

F.1. Linear Model H1 Results

To establish a baseline, the analysis began with a fixed-effects panel model estimating the direct effect of AANZFTA on SME export performance (Table F.1). However, this specification revealed that the AANZFTA coefficient was statistically insignificant, suggesting that, on average, the agreement may not directly influence SME exports across the sample. This finding prompted a refinement of the model by incorporating an interaction term between AANZFTA and GDP growth to explore potential conditional effects (Table F.2). The modified model revealed a significant and positive interaction term, indicating that the trade agreement is more effective in macroeconomic environments with stronger GDP growth. This supports the hypothesis that AANZFTA's impact is contingent on favorable economic conditions rather than being uniformly positive.

Variable	Estimate	Std. Error	t-value	p-value	Significance
AANZFTA	−0.1865	0.1378	−1.3531	0.1829	
GDP_growth	0.0586	0.0086	6.8517	< 0.001	***
Inflation (consumer price)	−0.0043	0.0058	−0.7502	0.4571	
Export_growth	−0.0044	0.0034	−1.0031	0.3213	
FDI_inflows (% of GDP)	−0.0851	0.0361	−2.3591	0.0228	*
Education_spending (% of GDP)	−0.1981	0.0307	−6.4464	< 0.001	***
MSME_growth	−0.0276	0.0068	−4.0473	< 0.001	***

Table F.1 *Fixed Effects Model Output for H1 (Direct AANZFTA Effect)*

Variable	Estimate	Std. Error	t-value	p-value	Significance
AANZFTA_c	−0.2372	0.0208	−11.3887	< 0.001	***
GDP_growth_c	0.0375	0.0141	2.6555	0.0111	*
AANZFTA_c × GDP_growth_c (interaction_term_h1)	0.1705	0.0232	7.3541	< 0.001	***
Inflation (consumer price)	0.0044	0.0075	0.6403	0.5253	
Export_growth	−0.0016	0.0033	−0.4866	0.6290	
FDI_inflows (% of GDP)	−0.0651	0.0255	−2.5720	0.0137	*
Education_spending (% of GDP)	−0.1293	0.0366	−5.2708	< 0.001	***
MSME_growth	−0.0367	0.0076	−4.8596	< 0.001	***

Table F.2 *Fixed Effects Model Output for H1 with an interaction term*

F.2. Linear Model H1 Robustness Checks

Visual inspection of the residual plot for the H1 model reveals that residuals are approximately mean-centered with no clear autocorrelation pattern or heteroskedasticity. This supports the model's validity, complementing formal robustness tests and justifying the use of fixed effects with Arellano-style robust standard errors.
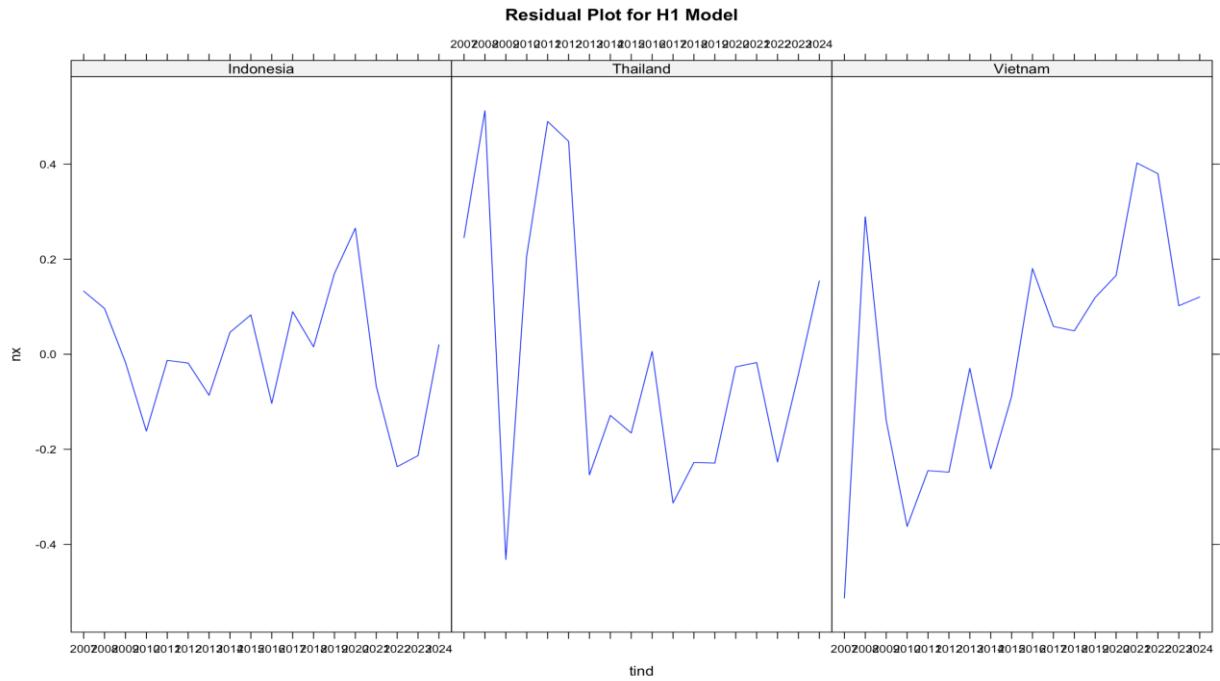

Figure F.1 *Time-Series Residual Plot by Country – Fixed Effects Model (H1)*

The histogram of residuals (Figure F.2) for the H1 fixed effects model shows a roughly symmetric and centered distribution, indicating that the residuals approximate normality. This strengthens confidence in the model's inference, particularly in combination with robust standard errors and formal autocorrelation tests.

Histogram of Residuals for H1 Model
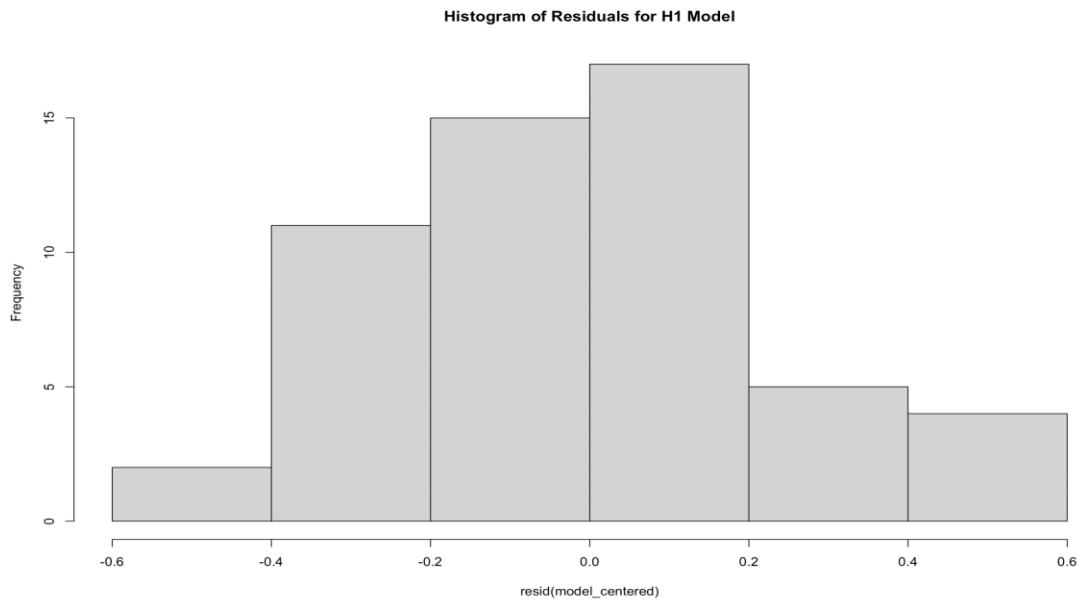
Figure F.2 *Histogram of Residuals – Fixed Effects Model (H1)*

F.3. Linear Model H2 Results

The final H2 model output (Table F.3) shows that the interaction term between AANZFTA and regulatory quality is negative and highly significant ($\beta = -1.276$, $p < 0.001$), while the main effects of AANZFTA and GDP growth are also significant. The model explains approximately 63.7% of the variance in SME exports ($R^2 = 0.637$), indicating strong explanatory power.

Variable	Estimate	Std. Error	t-value	p-value	Significance
AANZFTA_c	−0.3386	0.0497	−6.8183	< 0.001	***
Regulatory_Quality_c	0.8726	0.6462	1.3578	0.1818	
AANZFTA_c × Regulatory_Quality_c (interaction_term_h2)	−1.2762	0.1496	−8.5288	< 0.001	***
GDP_growth	0.0616	0.0107	5.7717	< 0.001	***
Export_growth	−0.0024	0.0041	−0.5424	0.5908	
Inflation (consumer price)	0.0059	0.0046	1.3042	0.1993	
FDI_inflows (% of GDP)	−0.0693	0.0350	−1.9622	0.0564	.
Education_spending (% of GDP)	−0.1076	0.0985	−1.0926	0.2808	
MSME_growth	−0.0287	0.0060	−4.8393	< 0.001	***

Table F.3 *Fixed Effects Model Output for H2 with Regulatory Quality from WGI as an Institutional Quality proxy*

Appendix G Results for Non- Linear Models Hypothesis 1 and 2

This appendix supports the analysis discussed in Sections 6.1 and 6.2 by testing nonlinear extensions of interaction terms for H1 and H2.

G.1 Non-Linear Model Results H1

To examine whether the effect of AANZFTA on SME exports changes non-linearly with macroeconomic conditions, the baseline fixed effects model was extended by including a squared term for GDP growth (GDP_growth_sq) and a nonlinear interaction term (interaction_sq_h1). The model was estimated using fixed effects with Arellano-style heteroskedasticity-consistent standard errors clustered at the country level to address potential autocorrelation and heteroskedasticity. The results show that the squared GDP growth term is negative and statistically significant, indicating a U-shaped relationship where AANZFTA's marginal impact is weakest at moderate growth levels but increases again as growth becomes stronger.

Variable	Estimate	Std. Error	t-value	p-value	Significance
AANZFTA_c	−0.6947	0.1360	−5.1083	< 0.001	***
GDP_growth_c	0.0879	0.1463	0.6014	0.5509	
interaction_term_h1	0.3677	0.0719	5.1093	< 0.001	***
GDP_growth_sq	−0.0098	0.0039	−2.5284	0.0154	*
interaction_sq_h1	0.0677	0.0186	3.6392	< 0.001	***
Export_growth	−9.34e−05	0.0031	−0.0303	0.976	
Inflation (consumer price)	0.0145	0.0623	0.0230	0.982	
FDI_inflows (% of GDP)	−0.1633	0.2721	−0.6002	0.552	
Education_spending (% of GDP)	−0.2031	0.0508	−3.9997	< 0.001	***
MSME_growth	−0.0493	0.0050	−9.9755	< 0.001	***

Table G.1 *Non-Linear Fixed Effects Model (H1) Coefficient Output with Robust SEs*

Figure G.1 compares predicted export trajectories from linear and nonlinear models. The nonlinear prediction exhibits curvature and a rebound in export performance, providing stronger alignment with real-world SME dynamics than the linear form.

Predicted SME Exports Across GDP Growth
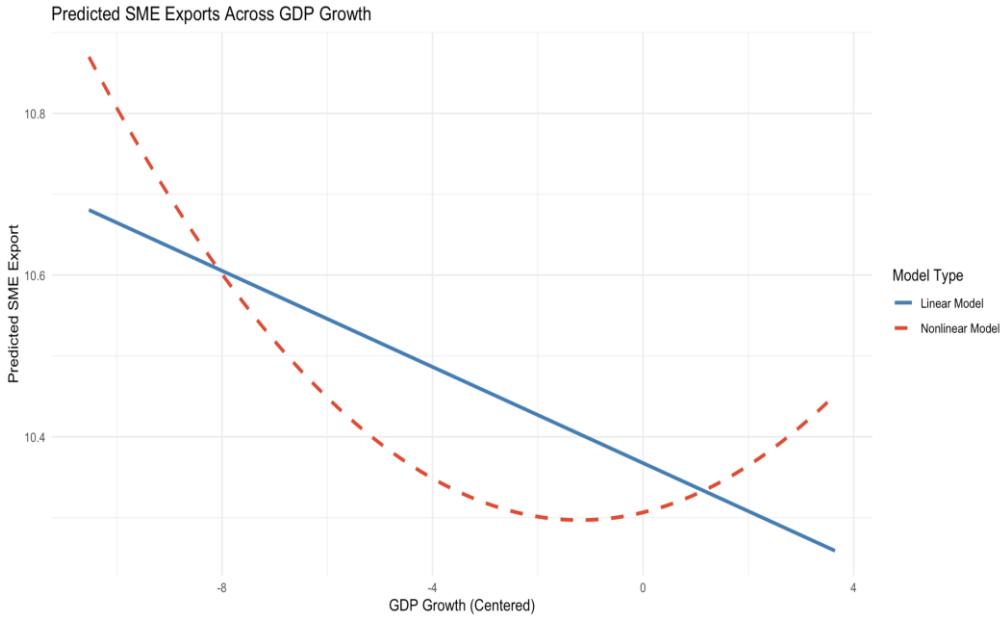
Figure G.1 *Predicted SME Exports Across GDP Growth: Linear vs. Nonlinear Model Comparison*

G.2 Non-Linear Model Results H2

The squared term for Regulatory Quality and its interaction were tested. The linear interaction remained significant, while the squared interaction was not, suggesting diminishing returns but no curvature reversal. This suggests that while the baseline relationship is strong, additional curvature is limited (Table G.2). Visual inspection confirms this, as the predicted SMEs' exports decline steadily with increasing Regulatory Quality in both linear and nonlinear plots, indicating diminishing returns rather than a reversal of effect. (Figure G.2)

Variable	Estimate	Std. Error	t-value	p-value	Significance
AANZFTA_c	−0.2454	0.2001	−1.2261	0.2273	
Regulatory_Quality_c	1.1028	0.4413	2.4992	0.0165	*
interaction_term_h2	−1.2843	0.2567	−5.0033	< 0.001	***
Reg_Quality_sq	−1.4521	0.2884	−5.0346	< 0.001	***
interaction_sq_h2	−1.3230	2.0983	−0.6306	0.5319	
GDP_growth	0.0579	0.0149	3.8770	< 0.001	***
Export_growth	0.0003	0.0047	0.0586	0.9535	
Inflation (consumer price)	0.0124	0.0082	1.5024	0.1408	
FDI_inflows (% of GDP)	−0.0991	0.0397	−2.5000	0.0166	*
Education_spending (% of GDP)	−0.0860	0.1027	−0.8372	0.4075	
MSME_growth	−0.0254	0.0027	−9.4972	< 0.001	***

Table G.2 *Non-Linear Fixed Effects Model (H2) Coefficient Output with Robust SEs*
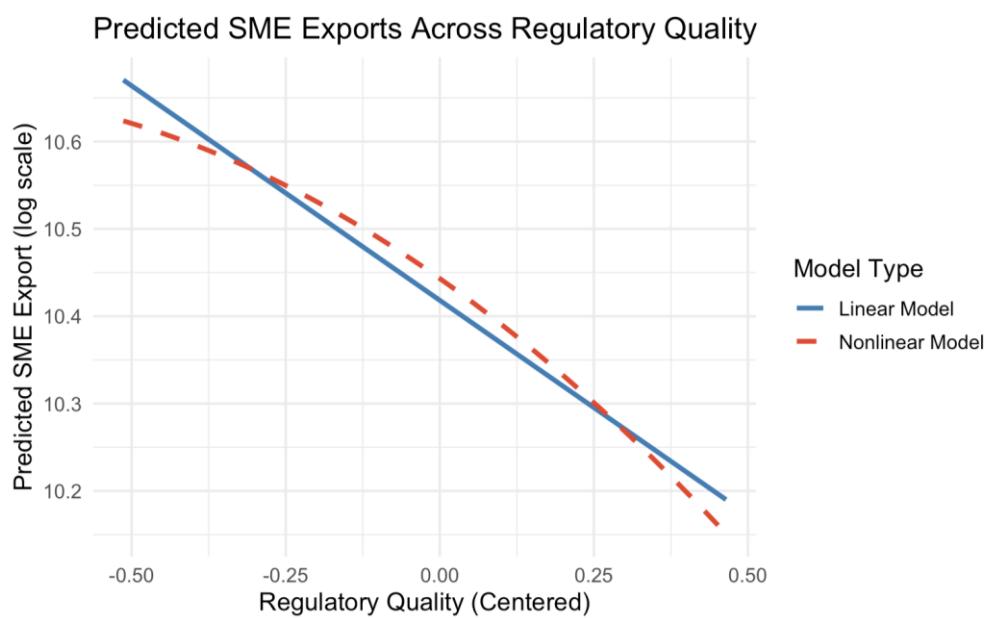
Figure G.2 *Predicted SME Exports Across Regulatory Quality – Linear vs. Nonlinear Model*

Appendix H Lagged model results H1 and H2

This appendix supports Section 6.1 and 6.2 by estimating lead-lag models to assess the potential delayed effect for AANZFTA implementation.

H.1 Delayed Effect Model Results H1

To assess whether the effect of AANZFTA on SME exports exhibits any delayed pattern, the model was re-estimated using one-, two-, and three-year lags of the AANZFTA dummy variable. Each lag was interacted with centered GDP growth to evaluate time-distributed impacts.

All interaction terms remained positive and statistically significant across lag structures ($p < 0.001$), and their coefficients were nearly identical, as shown in Table H.1. This indicates that the effect of AANZFTA is consistent over time and not front-loaded or diminishing. The interaction terms between AANZFTA (lagged) and GDP growth confirm that the policy's impact is not highly sensitive to immediate implementation but persists in subsequent years.

Variable	Lag 1 Estimate	Lag 2 Estimate	Lag 3 Estimate
AANZFTA_lagX_c	-0.2372 ***	-0.2372 ***	-0.2372 ***
GDP_growth_c	0.0375 **	0.0375 **	0.0375 **
interaction_lagX_h1	0.1705 ***	0.1705 ***	0.1705 ***
Export_growth	-0.0016	-0.0016	-0.0016
Inflation_consumer_price	0.0031	0.0031	0.0031
FDI_inflows_percent_of_GDP	0.0657 *	0.0657 *	0.0657 *
Education_spending_percent_of_GDP	-0.1929 ***	-0.1929 ***	-0.1929 ***
MSME_growth	-0.0367 ***	-0.0367 ***	-0.0367 ***

Table H.1 *Lagged model coefficient outputs for H1, showing consistent and significant positive interaction effects across 1–3 year lags.*
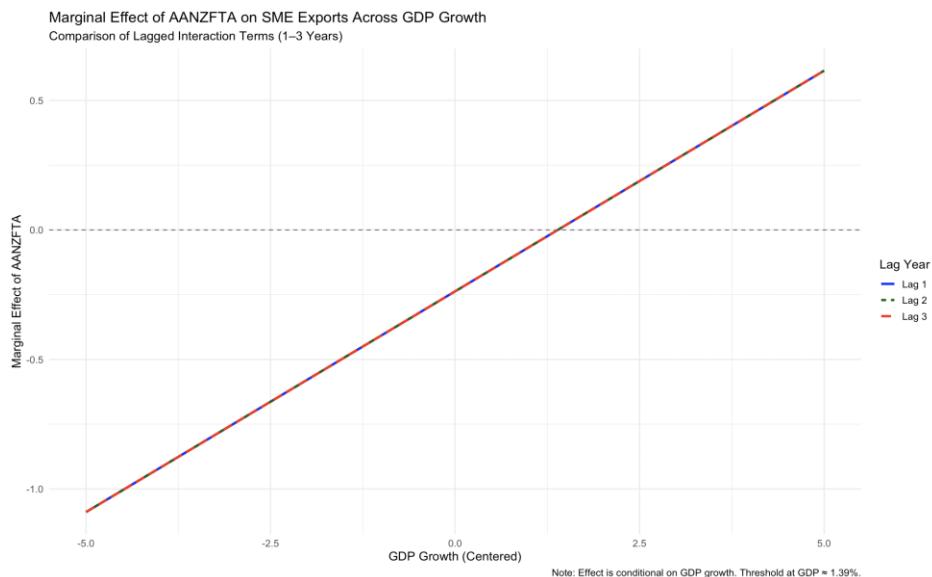

Figure H.1 *Marginal Effect of AANZFTA on SME Exports Across GDP Growth (Lagged Interaction Models)*

H.2 Delayed Effect Model Results H2

The same lag structure was applied to test H2, evaluating the moderating effect of Regulatory Quality on the relationship between AANZFTA and SME exports. The model included three-year lags of AANZFTA and its interaction with Regulatory Quality.

Results again show robust and consistent findings across all lagged specifications. The interaction terms remained negative and highly significant ($p < 0.001$), reinforcing the conclusion that higher regulatory quality may dampen the effectiveness of AANZFTA for SMEs over time. This supports the theory that institutional factors may create persistent structural barriers, rather than temporary frictions, for SMEs.

However, the lack of variation across lag lengths (in both models) may also reflect data limitations, particularly the short panel and small number of countries, which reduce the model's sensitivity to detecting temporal shifts in policy effects.

Variable	Lag 1 Estimate	Lag 2 Estimate	Lag 3 Estimate
AANZFTA_lagX_c	-0.3387 ***	-0.3387 ***	-0.3387 ***
Regulatory_Quality_c	0.8726	0.8726	0.8726
interaction_lagX_h2	-1.2762 ***	-1.2762 ***	-1.2762 ***
GDP_growth	0.0616 ***	0.0616 ***	0.0616 ***
Export_growth	-0.0024	-0.0024	-0.0024
Inflation_consumer_price	0.0059	0.0059	0.0059
FDI_inflows_percent_of_GDP	-0.0693 *	-0.0693 *	-0.0693 *
Education_spending_percent_of_GDP	-0.1076	-0.1076	-0.1076
MSME_growth	-0.0287 ***	-0.0287 ***	-0.0287 ***

Table H.2 *Coefficient outputs for H2 lagged interaction models (1–3 year lags of AANZFTA × Regulatory Quality)*
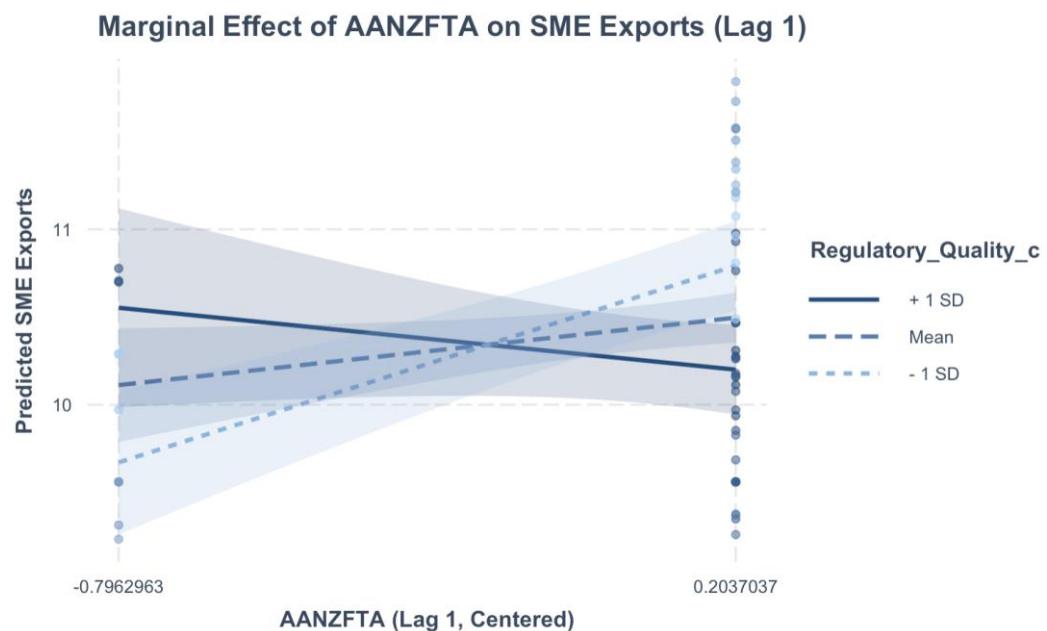
Figure H.2. *Marginal effect of AANZFTA (Lag 1) on SME exports at different levels of GDP growth (–1 SD, mean, +1 SD). Shaded regions show 95% confidence intervals.*

Appendix I Results and Robustness Checks Event Study Models H1 and H2

This appendix compliments Section 6.1 and 6.2 by estimating event study models to assess the timing and dynamic response to AANZFTA implementation.

This approach is employed to explore the temporal dynamics of policy impact. It aligns with recent trade literature that emphasizes the importance of modeling time-varying and nonlinear policy effects (Kohl, 2014; Baier & Bergstrand, 2009).

I.1 Event Study Results H1

To explore whether AANZFTA effects on SME exports evolve over time, an event study specification was estimated with leads and lags surrounding the agreement's implementation. However, as shown in Table I.1, only one post-treatment year (lag 3) reached statistical significance. The absence of a consistent pattern across leads and lags suggests that the agreement's export-enhancing effects may not follow a uniform dynamic trajectory.

Variable	Estimate	Std. Error	t value	Pr(>|t|)	Significance
event_lead4	0.4034903	0.3019759	1.3362	0.18988	
event_lead3	-0.0611698	0.2794363	-0.2189	0.827961	
event_lead2	0.7619963	0.681483	1.1181	0.270912	
event_lag0	0.0426621	0.2373357	0.1798	0.858353	
event_lag1	0.3053927	0.4995311	0.6114	0.544804	
event_lag2	0.1615039	0.2840175	0.5686	0.573131	
event_lag3	-0.0460267	0.0056053	-8.2113	9.077e-10	***
event_lag4	-0.2035821	0.1348327	-1.5099	0.1398	
event_lag5	-0.1392747	0.1967103	-0.708	0.483493	
GDP_growth	0.0733705	0.0214808	3.4156	0.001592	**
Export_growth	-0.0087051	0.0032504	-2.6782	0.011084	*
Inflation_consumer_price	-0.0254033	0.0318758	-0.7969	0.430707	
FDI_inflows_percent_of_GDP	-0.0653955	0.0442698	-1.4772	0.148316	
Education_spending_percent_of_GDP	-0.218699	0.0292949	-7.4654	8.126e-09	***
MSME_growth	-0.0324506	0.0144043	-2.2528	0.030459	*

Table I. 1 *Event Study Results H1 with Cluster-robust standard errors (Arellano style)*

Figure I.1 visualizes the coefficient estimates and confidence intervals relative to the baseline year (-1). While some post-treatment years show positive effects, wide confidence intervals limit interpretability. Overall, these results suggest weak dynamic adjustment effects for H1.
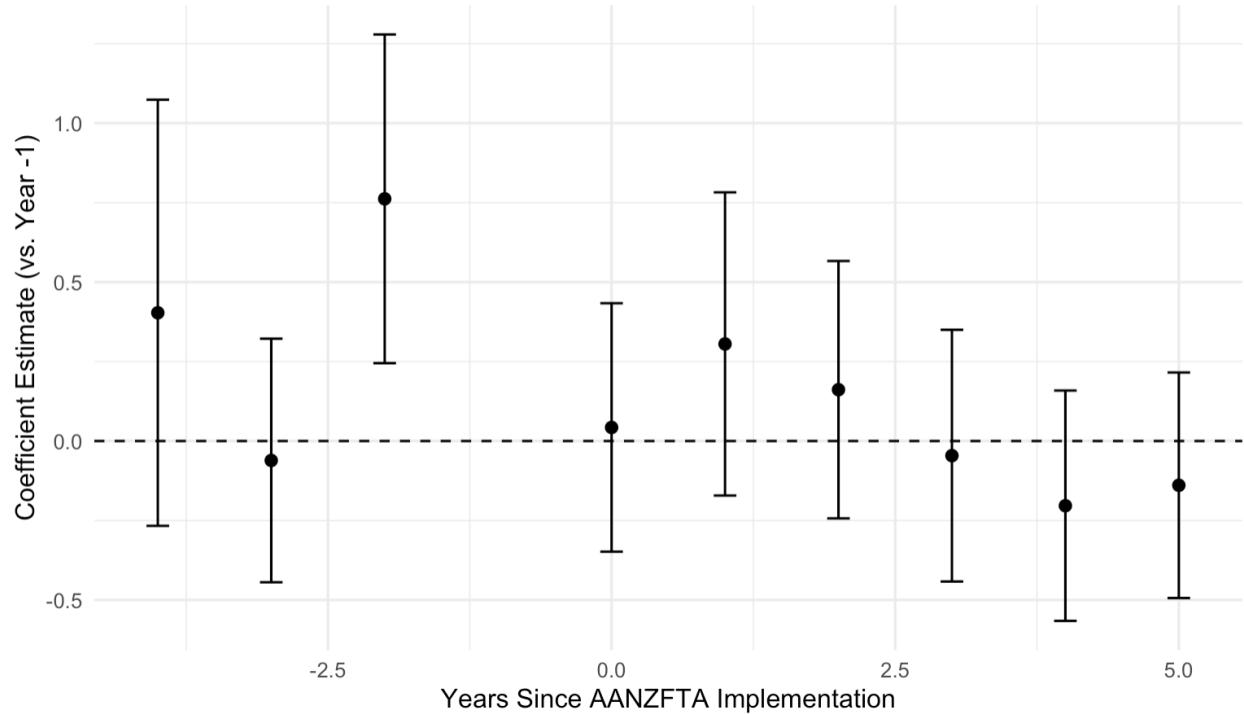
Figure I.1 *Event Study Results Visualization H1*

I.2 Event Study Results H2

For H2, a dynamic specification of the AANZFTA × Regulatory Quality interaction was modeled to test whether institutional effects also vary with time since implementation. Results in Table I.2 show multiple significant coefficients for interaction years, especially immediately after the agreement's enforcement. However, similar to H1, the significance is not uniformly distributed across years.

Variable	Estimate	Std. Error	t value	Pr(>|t|)	Signif.
event_lead4_int	0.49416955	0.38369223	1.2879	0.20622	
event_lead3_int	2.06260040	0.35463932	5.8161	1.349e-06	***
event_lead2_int	1.63404121	0.52371187	3.1201	0.00361	**
event_lag0_int	1.69759645	0.08483970	20.0095	< 2.2e-16	***
event_lag1_int	1.99817100	0.21811066	9.1613	7.969e-11	***
event_lag2_int	1.19136335	0.08002296	14.8878	< 2.2e-16	***
event_lag3_int	0.24180780	0.54739519	0.4417	0.66139	
event_lag4_int	0.24976539	0.62435195	0.4000	0.69156	
event_lag5_int	0.16813853	0.27536831	0.6106	0.54541	
Regulatory_Quality_c	-0.10507342	0.51949822	-0.2023	0.84089	
GDP_growth	0.03096208	0.00676685	4.5756	5.741e-05	***
Export_growth	-0.00052904	0.00292427	-0.1809	0.85748	
Inflation_consumer_price	0.02632775	0.01343834	1.9592	0.05810	.
FDI_inflows_percent_of_GDP	-0.08694158	0.03712119	-2.3421	0.02499	*

Education_spending_percent_GDP	-0.18264286	0.09052011	-2.0177	0.05134	.
MSME_growth	-0.01631398	0.01057219	-1.5431	0.13180	

Table I.2 *Event Study Results H2 with Cluster-robust standard errors (Arellano style)*

Figure I.5 illustrates the estimated dynamic interaction effects, showing a general decline in marginal benefits of AANZFTA as time progresses. This provides suggestive evidence that stronger regulatory environments amplify early-stage FTA gains, but diminishing effects may emerge over time due to institutional rigidity or absorption limits.
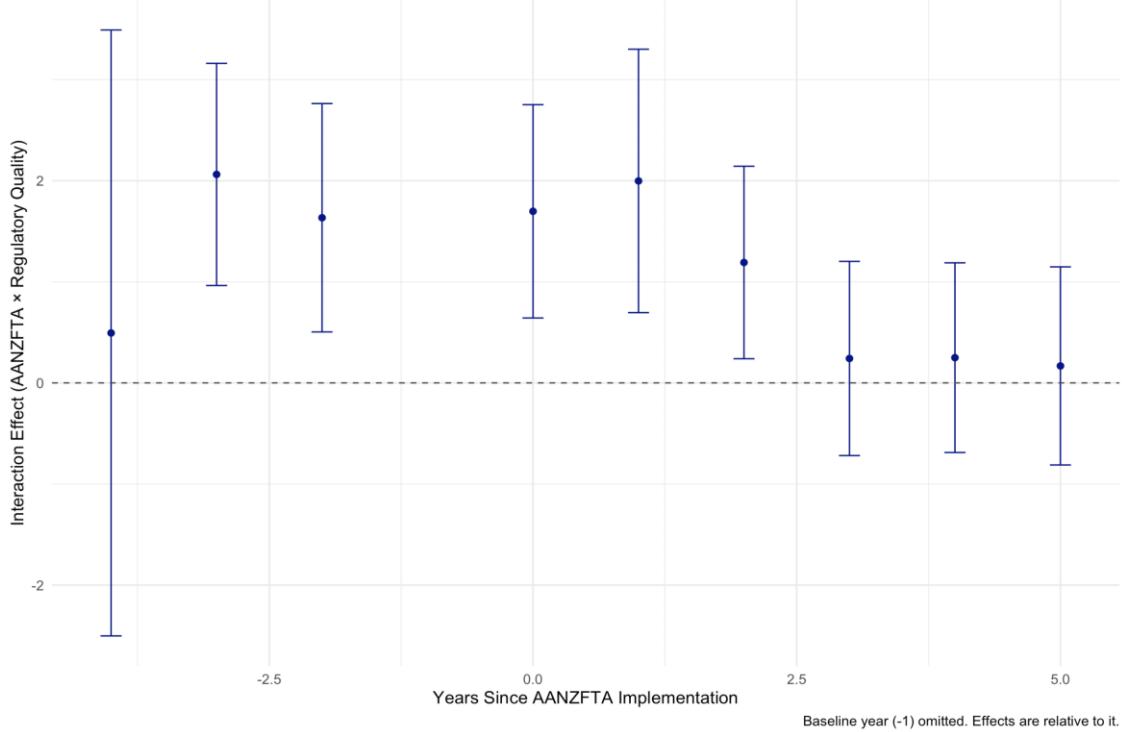

Figure I.2 *Event Study Results Visualization H2*

Appendix J Robustness checklist

All models developed to test H1 and H2 were subjected to a comprehensive robustness checks to ensure the reliability of the findings. Each specification, including base models, lagged variants (L1–L3), nonlinear extensions, and event study designs, was tested for heteroskedasticity, serial correlation, cross-sectional dependence (CD), and multicollinearity.

Heteroskedasticity and autocorrelation were addressed using cluster-robust Arellano standard errors, while Pesaran's CD test confirmed no significant cross-sectional dependence in the panel. Initial diagnostics identified multicollinearity concerns due to correlated independent variables; this was effectively mitigated by mean-centering the interaction and independent variables in all relevant models.

As a result, all final specifications satisfy key robustness criteria, enhancing the credibility and internal validity of the empirical results.

Model	Heteroskedasticity	Serial Corr. (Wooldridge)	CD (Pesaran)	Multicollinearity
H1 – Base Model	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H1 – Lag L1	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H1 – Lag L2	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H1 – Lag L3	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H1 – Nonlinear	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H1 – Event Study	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H2 – Base Model	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H2 – Lag L1	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H2 – Lag L2	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H2 – Lag L3	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H2 – Nonlinear	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered
H2 – Event Study	✓ (Arellano SEs)	✓	✓	✗ → Mean-centered

Table J.1 *Robustness checklist of all the models*