



Does Implementing Trade Facilitation Improve Social Welfare? In Case of ASEAN

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ABSTRACT: In recent years, the members of the Association of Southeast Asian Nations (ASEAN) have been concentrating on increasing trade facilitation (TF) goals. Ineffective commitment to TF can have a variety of detrimental consequences on a country's welfare. The impact of three TF metrics on social well being in ASEAN countries is investigated in this study. The analysis shows that improvements in institutions, market efficiency, and infrastructure will enhance employment, school enrollment, and life expectancy using the System Generalized Method of Moments (SGMM) estimator with data gathered between 2000 and 2021. This progress even contributes to a reduction in the country's annual traffic incidents. As a result, TF is a critical tool for improving a country's social welfare.

KEYWORDS: ASEAN, System Generalized Method of Moments, Social welfare.

I. INTRODUCTION

Improvements to trade facilitation (TF) are a set of activities aimed at lowering the costs of trade transactions and creating a more open and healthy trading environment. Its coverage encompasses a wide range of topics, including not only ordinary Customs processes but also facility perfection, rules and regulations, and so on. The country's competitiveness may be harmed as a result of this inefficiency in improvement. It even has a negative impact on the country's economic and social well being. In general, we can see how TF is linked to a country's socioeconomic (Narayanan et al., 2016; Sakyi et al., 2018). Transport infrastructure is one of the issues that needs to be improved in TF. People from various places can quickly obtain employment prospects due to the ease with which they can move around them (Chakrabarti, 2018; Glaeser & Ponzetto, 2018; Hernandez et al., 2020; Laborda & Sotelsek, 2019; H. Nguyen, 2020; Yu & Luu, 2022). They can find occupations that match their abilities, allowing them to enhance their income and provide better educational possibilities for their children (Jouanjan et al., 2016; Sakyi et al., 2018). Furthermore, free mobility not only increases the region's competitiveness but also allows the logistics business to thrive (Mangla et al., 2016; Montoya-Torres et al., 2016; H. Nguyen, 2020). Numerous studies also suggest that bad transport infrastructure makes it difficult for workers to find work. As a result, mental instability can arise, leading to an increase in traffic crashes and even suicides (Law et al., 2012; Men et al., 2022; Yakubu & Muhammed, 2021). All of the above points to the possibility that TF is linked to social welfare. Improvements in a country's market and institutional efficiency can have a positive impact on its citizens' well being. Because this enhancement makes the business climate more appealing and attracts more investment, more employment and social benefits are created.

Although many previous studies have consistently underlined the benefits of TF, there are obstacles associated with these benefits. TF can improve a country's economic openness, resulting in a trade imbalance in less competitive countries. The increase in FDI and trade deficit as a result of the improved business environment might lead to a slew of negative security issues (Kurtishi-Kastrati, 2013). Furthermore, improving TF puts a lot of pressure on governments because they have to invest a lot of money for infrastructure development, such as Customs processing technology, road infrastructure upgrades, port renovations, and so on. All of these factors can have a substantial impact on TF commitment in countries with low financial resources (Perera, 2016).

There are several reasons why TF studies are relevant to ASEAN countries, despite the fact that many past studies have consistently stressed this. To begin with, ASEAN has consistently prioritized TF improvement in recent years. Intra-ASEAN has inked TF agreements including the ASEAN trade in services agreement, the ASEAN framework agreement on goods in transit facilitation, and the ASEAN trade in goods agreement, among others. Implementing TF effectively can provide major economic benefits to ASEAN, such as increased production and the assurance of intermediate product imports, among other things. Second,



as previously said, policymakers in countries are always focused on measures that provide both economic and social benefits. As a result, studying these subjects is always encouraged.

The purpose of this study is to assess the impact of TF reform on ASEAN countries' social welfare from 2000 to 2021. According to the report, this change will benefit countries in a variety of ways. We suggest that the impact of TF on worker welfare in these countries is likely to have improved using statistics on employment, life expectancy, traffic incidents, and school enrollment rates. Improvements in these countries' institutions led to a 9.74% reduction in traffic incidents, a 3.63% gain in overall employment, a 17.2% increase in secondary education enrolment, and a 0.121% increase in people's life expectancy. As a result of transport infrastructure improvements, traffic collisions have decreased by 9.74%, secondary school enrollment has increased by 8.58%, employment opportunities have improved by 2.55%, and people's life expectancies have increased by 0.0842%. Market efficiency decreases collisions by 8.89%, boosts employment by 3.79%, raises life expectancy by 0.138%, and increases secondary school attendance by 20.7%. The overall effect of TF produces comparable outcomes. According to the findings, TF reforms are all key variables in increasing a country's social well being.

The rest of the section is organized as follows: Section 2 covers the viewpoints of prior studies on this research subject; Section 3 explains the estimating approach and data processing utilized in this study; Section 4 explains the acquired results and discusses them; and Section 5 concludes and gives recommendations.

II. LITERATURE REVIEW

Many studies have long demonstrated the advantages of trade, such as economic growth, foreign exchange, technological transfer, employment, poverty alleviation, and so on (Abbott et al., 2017; Agrawal, 2015; Le Goff & Singh, 2014; V. Nguyen, 2015; Sakyi et al., 2015, 2018; Yu & Luu, 2020; Zahonogo, 2018). TF is a critical aspect in a country's ability to create long-term trade. TF, in essence, can lower trade costs and eliminate undesirable aspects of cross-border interactions, resulting in large societal welfare gains (Abbott et al., 2017; Narayanan et al., 2016; V. Nguyen, 2015; Sakyi et al., 2018). Furthermore, TF impacts enhance transport infrastructure. This not only improves the infrastructure, but it also expands job prospects in a variety of businesses (Yu & Luu, 2022). Indeed, TF upgrades always include transport infrastructure improvements, which not only make mobility more convenient, but also boost regional connectivity. As a result, it fosters connections between people from various backgrounds and expands their work chances. According to Jouanjean et al. (2016), the deployment of TF measures leads to higher output and income, as well as improved quality of life. According to Sakyi et al. (2018), more regulation, decision-making transparency, reduced bribery, and increased public trust have a major influence on social welfare in African countries.

Numerous literature study showed that TF plays a major role in economic growth (Pham et al., 2013; Sakyi et al., 2017), increased trade flows (Jordaan, 2014; Yu & Luu, 2020), reduced tariff barriers (Hartono & Patunru, 2020; Portugal-Perez & Wilson, 2009; Wilson et al., 2003, 2005), and non-tariff barriers (Hoekman & Nicita, 2018; Sakyi & Afesorgbor, 2019). However, researchers have given less attention to and evaluated it in terms of the social welfare benefits it provides. Institutional and business environment improvements not only assist the economy, but also help to modernize society (UNCTAD, 2016). As a result, effective capacity building through TF enforcement will help to improve people's quality of life. This is a critical strategy for advancing social welfares.

As previously stated, there are few studies on the effects of facilitation on social welfare, although the study methodologies used are different. For example, Nguyen (2015) employed a Generalized Method of Moments (GMM)-type instrumental variable technique to investigate the influence of TF on poverty and inequality from 2005 to 2012. To express the TF index, he used the number of procedures and time required for products export and import. This study demonstrates that when this set of countries applies TF, poverty and inequality can be reduced. Sakyi et al. (2018) then applied the System-GMM approach to look at social wellbeing in African countries from 2010 to 2015. Improvements in TF indices have all had a significant impact on these countries' social wellbeing. Hartono and Patunru (2020) studied the effects of TF on economic activity, poverty, and income inequality in Indonesia using a Computable General Equilibrium model. The authors argued that lowering import tariffs and transaction costs can help Indonesia reduce poverty, boost economic efficiency, and narrow income disparities. For this analysis, we used the System-GMM estimator since it has been adopted and utilized more widely by many studies, and because the heterogeneity of GMM-type instrumental approaches is often contentious (Sakyi et al., 2018).



III. METHODOLOGY AND DATA

A. Estimation Strategy

These countries can concentrate on exporting operations that take advantage of their many relative abundance characteristics by joining trade blocs and agreements. The Heckscher-Ohlin model predicts that employees will gain more from free trade than they would otherwise. The great majority of ASEAN's members are developing nations. These countries' youthful workforce, in particular, expands at a rapid rate (ILO & ADB, 2015). The successful implementation of trade strategies by countries can benefit not only the economy, but also the social welfare of the people (Sakyi et al., 2018). It is widely known that the scope of TF is unclear. It addresses customs clearance, government management, and transport infrastructure challenges. The restrictions of these factors can all have a negative impact on job creation and social welfare (Sakyi et al., 2017, 2018; Yu & Luu, 2020, 2022). Improvements in transport infrastructure, according to research, increase connection and employment (Yu & Luu, 2022). It also makes it easier for people to obtain a better educational and healthcare environment (Jouanjean et al., 2016; Sakyi et al., 2018). The ASEAN countries' social welfare estimation model is expressed as follows, based on the following considerations:

$$SW_{it} = \beta_0 + \gamma SW_{it-1} + \beta_1 TFE_{it} + \beta_2 POP_{it} + \beta_3 Inf_{it} + \beta_4 Trade_{it} + \delta_i + \delta_t + \varepsilon_{it} \quad (1)$$

where *i* denotes the country and *t* denotes the time span 2000 – 2021. Because this economic bloc already had the full involvement of 10 member countries at this time, this study uses the prescribed time period to estimate. The data that will be acquired throughout this time is also rather complete. This lets this study avoid having to deal with missing data. The variable *SW*, which stands for social welfare, is the first variable on the left side of the calculated model. Employment, secondary school enrollment, traffic collisions, and life expectancy are used as social welfare indicators in this study. The trade facilitation effect *TFE* is a variable. It will take into account the effects of transport infrastructure, institutional influences, and market efficiency. The quality of road infrastructure, train infrastructure, port infrastructure, air transport infrastructure, and overall infrastructure are all affected by transport infrastructure. The institutional effect is a measure of how effective government management is. Corruption control, government efficacy, political stability, regulatory quality, and the rule of law are all factors in this variable. This variable will contain the burden of customs processes, the burden of government regulation, and the customs service index in terms of market efficiency. *POP*, *Inf*, and *Trade* variables are among the model's control variables. The variable *POP* stands for total population, the variable *Inf* stands for consumer inflation, and the variable *Trade* stands for market openness. The fixed effects of time and nation are δ_i and δ_t respectively, and the model error is ε_{it} . In this approach, control factors are supposed to be exogenous and independent of TF variables (Abbott et al., 2017; Sakyi et al., 2018). Increased population density encourages competition for jobs and money. All of these causes contribute to poverty and a drop in social well being. Inflationary pressures reduce the population's ability to consume. Especially when workers' wages have not yet kept pace with rising consumer goods prices. When it comes to recruiting foreign direct investments and promoting import and export activity, trade openness is critical. Poor trade openness has a negative impact on the economy and makes it difficult for labor to find a secure job.

Table 1. Variables details and data sources

Variable	Details	Source
<i>Social welfare indicators</i>		
Employment	employment, total (% of total labor force)	WB WDI
Life expectancy	Life expectancy at birth, total (years)	WB WDI
Traffic collisions	Mortality caused by road traffic injury (per 100,000 population)	WB WDI
Education	School enrollment, secondary (% net)	WB WDI
<i>Trade facilitation indicators</i>		
Institutional	Institutional effect (the aggregate of control of corruption, government effectiveness, political stability, regulatory quality, and the rule of law)	WB WGI



Infrastructure	Transport infrastructure effect (the aggregate of quality of roads infrastructure, railroad infrastructure, port infrastructure, air transport infrastructure, and overall infrastructure)	WEF GCI
Market efficiency	Market efficiency (the aggregate of the burden of customs procedures, the burden of government regulatory, and the customs service index)	GETR
<i>Control variables</i>		
POP	The number of people per square kilometer of land area	WB WDI
Inf	Inflation, consumer prices (annual %)	WB WDI
Trade	Market openness: (export + import)/GDP	WB WDI

Note: WB WDI stands for World Bank World Development Indicators; WB WGI stands for World Bank Global Governance Indicator; WEF GCI stands for World Economic Forum's Global Competitiveness Index; GETR stands for Global Enabling Trade Report.

The definitions of the variables, as well as the data sources, are listed in Table 1. The study's hypothesis is that changes in institutions, transport infrastructure, and a healthy business environment can boost people's well being. Furthermore, the effectiveness of legislative openness and corruption control improves the investment environment's soundness. This improves the appeal of investment opportunities or expands the size of a corporation. As a result, there are more job prospects for workers. Furthermore, improved transport infrastructure allows people to have access to work possibilities, as well as education and health care. People can also avoid numerous unnecessary traffic collisions thanks to advanced traffic infrastructure.

B. Data Collection and Analysis

The World Bank (WB) provides data on employment, education, traffic incidents, and life expectancy. Multiple data sources are used to extract indicators linked to TF. To begin with, the infrastructure index is a composite of the quality of roads, railroads, ports, air transport facilities, and general infrastructure. These figures are taken from the Global Competitiveness Index of the World Economic Forum. They are gathered on a scale of 1 to 7, with 7 being the highest quality grade. Control of corruption, government efficacy, political stability, regulatory quality, and the rule of law are all part of the institutional effect. The impression of the extent to which public power is used for private gain, encompassing both minor and significant kinds of corruption, is referred to as corruption control. The perceived quality of public services, the quality of policy formulation and implementation, and the consistency with which the government sticks to its policies are all factors in determining government effectiveness. A country's view of the likelihood of political instability is measured by political stability. The ability of a government to design and implement policies and regulations is measured by regulatory quality. The rule of law is a metric that measures how much people believe in, follow, and enforce social standards. These measures are taken from the World Bank's Worldwide Governance Indicators, which were created and developed by the World Bank. These indicators' values are the country's aggregate indices scores in units of a standard normal distribution ranging from -2.5 to 2.5. This variable will contain the burden of Customs processes, the burden of government regulation, and the Customs service index in terms of market efficiency. The cost of Customs procedures is a measure of how effective Customs procedures in a certain country are perceived by business operators. On a scale of 1 to 7, the burden of Customs procedures is rated, with higher scores indicating more efficient Customs operations. The burden of government regulation is a metric that measures how businesses see government administrative obligations. The scale of government regulatory burden spans from 1 to 7, with a lower number indicating a larger regulatory load. The World Economic Forum conducted a survey, and the above two metrics are based on the results. The Customs services index assesses the quality of Customs and related agencies' services. The Customs service index is graded on a scale of one to twelve, with higher ratings denoting better service. The Global Enabling Trade Report provided the data for this statistic. Before being incorporated in the model, the TF-related metrics described above are standardized. The World Bank database is used to extract data on population, consumer inflation, and trade openness. The factors utilized in this analysis are described in Tables 2 and 3.



Table 2. TF indicators description

Category	Indicators	Obs	Mean	Std. Dev.	Min	Max
Institutions	Control of Corruption	220	0.3523	0.2509	0	1
	Government Effectiveness	220	0.4269	0.2484	0	1
	Political Stability	220	0.5196	0.2524	0	1
	Regulatory Quality	220	0.5009	0.2215	0	1
	Rule of Law	220	0.4221	0.2462	0	1
Infrastructure	Quality of overall infrastructure	220	0.5050	0.2523	0	1
	Quality of roads	220	0.2861	0.1904	0	1
	Quality of railroad infrastructure	220	0.3477	0.3108	0	1
	Quality of port infrastructure	220	0.4162	0.2732	0	1
	Quality of air transport infrastructure	220	0.5765	0.2257	0	1
Market efficiency	Burden of customs procedures	220	0.3839	0.2454	0	1
	Burden of government regulation	220	0.5197	0.2070	0	1
	customs service index	220	0.3209	0.1155	0	1

Table 3. Variables description

Variable	Obs	Mean	Std. Dev.	Min	Max
Employment	220	5.3357	0.8975	2.6391	6.8373
Life expectancy	220	4.2611	0.0816	4.0679	4.4278
Traffic collisions	220	5.5181	0.7931	4.0642	6.8096
Education	220	5.4573	0.6454	4.2618	6.5040
Institutional	220	2.2218	1.1399	0.2927	4.8790
Infrastructure	220	2.1315	1.1013	0.3683	4.6043
Market efficiency	220	1.2246	0.5021	0.5332	2.8940
Trade facilitation effects	220	5.5778	2.6552	1.2172	12.3772
POP	220	5.0799	1.4317	3.1384	8.9927
Inf	220	4.4402	2.6077	-2.3150	10.4532
Trade	220	1.3099	0.8998	0.0576	4.3733

IV. RESULTS AND DISCUSSIONS

The findings of the estimation will be presented and discussed in this section. The results are presented in Tables 4 to 9, with Tables 4 to 7 displaying the baseline regression results and Tables 8 and 9 displaying the System-GMM estimation results. To examine the TF's impact on ASEAN social welfare, this study looks at its institutional, infrastructure, market, and overall implications. Results are shown in 8 columns in each table, including institutional impacts in columns (1) and (5), transport infrastructure effects in columns (2) and (6), market efficiency in columns (3) and (7), and overall benefits of TF on social welfare in ASEAN countries in columns (4) and (8).

Tables 4 and 5 show the findings of Ordinary Least Squares (OLS) regression in this investigation. The effects of TF on employment and life expectancy are seen in Table 4. The impacts of TF on traffic collisions and people's access to education are reported in Table 5. While the impact coefficients for traffic collisions are negative, they are positive and statistically significant at the 1% level for education, life expectancy, and employment.



Table 4. The impact of trade facilitation on employment and life expectancy (OLS)

Variable	Employment				Life expectancy			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Institutional	0.778*** (0.0774)				0.0629*** (0.00417)			
Infrastructure		0.399*** (0.0547)				0.0462*** (0.00533)		
Market efficiency			0.734*** (0.114)				0.0616*** (0.0137)	
Trade facilitation effects				0.247*** (0.0269)				0.0228*** (0.00220)
POP	0.167*** (0.0430)	0.329*** (0.0447)	0.265*** (0.0507)	0.260*** (0.0446)	0.0169*** (0.00212)	0.0306*** (0.00275)	0.0247*** (0.00332)	0.0239*** (0.00251)
infla	0.0815*** (0.0247)	-0.00731 (0.0249)	-0.0181 (0.0240)	0.0274 (0.0237)	0.00108 (0.00157)	- 0.00480*** (0.00154)	- 0.00689*** (0.00173)	-0.00246 (0.00152)
Trade	-0.728*** (0.0858)	-0.607*** (0.0919)	-0.458*** (0.0922)	-0.698*** (0.0881)	- 0.0225*** (0.00411)	-0.0259*** (0.00689)	-0.00136 (0.00661)	- 0.0255*** (0.00572)
Constant	3.352*** (0.227)	3.643*** (0.269)	3.770*** (0.276)	3.429*** (0.247)	4.060*** (0.0145)	4.063*** (0.0186)	4.093*** (0.0211)	4.057*** (0.0166)
No of observations	220	220	220	220	220	220	220	220
R-square	0.445	0.233	0.214	0.319	0.808	0.717	0.630	0.752

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 5. The impact of trade facilitation on traffic collisions and education (OLS)

Variable	Traffic collisions				Education			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Institutional	0.0645 (0.0736)				0.589*** (0.0376)			
Infrastructure		-0.0219 (0.0691)				0.518*** (0.0380)		
Market efficiency			-0.309** (0.146)				0.929*** (0.100)	
Trade facilitation effects				-0.00750 (0.0308)				0.247*** (0.0161)



POP	0.0844 (0.0594)	0.0956* (0.0555)	0.116** (0.0551)	0.0981* (0.0571)	0.262*** (0.0264)	0.393*** (0.0232)	0.312*** (0.0304)	0.320*** (0.0233)
infla	0.0682*** (0.0237)	0.0557*** (0.0200)	0.0466** (0.0186)	0.0555** (0.0214)	0.0546*** (0.0104)	0.00752 (0.0102)	-0.00739 (0.0107)	0.0311*** (0.00887)
Trade	0.128 (0.0928)	0.190* (0.103)	0.265*** (0.102)	0.183* (0.1000)	-0.709*** (0.0513)	-0.822*** (0.0605)	-0.621*** (0.0598)	-0.800*** (0.0557)
Constant	4.476*** (0.231)	4.584*** (0.240)	4.751*** (0.236)	4.575*** (0.239)	3.505*** (0.105)	3.397*** (0.116)	3.579*** (0.132)	3.364*** (0.102)
No of observations	220	220	220	220	220	220	220	220
R-square	0.146	0.144	0.160	0.144	0.662	0.625	0.550	0.669

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 6. The impact of trade facilitation on employment and life expectancy (Fixed effect)

Variable	Employment				Life expectancy			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Institutional	-0.670* (0.342)				0.0719*** (0.0171)			
Infrastructure		-0.926** (0.341)				0.0551** (0.0173)		
Market efficiency			-1.672** (0.623)				0.107** (0.0444)	
Trade facilitation effects				-0.466** (0.172)				0.0358*** (0.00882)
POP	-2.065* (1.095)	-1.256 (0.692)	-0.868 (0.841)	-0.713 (0.993)	0.162* (0.0880)	0.175* (0.0807)	0.140* (0.0741)	0.0967 (0.0826)
infla	0.0125 (0.0117)	0.00874 (0.00944)	0.0254 (0.0175)	0.0104 (0.00903)	0.000849 (0.000932)	0.000692 (0.00117)	-0.000319 (0.00130)	0.000769 (0.000979)
Trade	-0.331** (0.109)	-0.165 (0.0968)	-0.285** (0.113)	-0.246** (0.0789)	0.000384 (0.00876)	-0.0106 (0.0106)	-0.00356 (0.0114)	-0.00685 (0.00902)
Constant	17.69*** (5.010)	13.87*** (3.161)	12.05** (3.804)	11.83** (4.386)	3.276*** (0.426)	3.267*** (0.396)	3.423*** (0.357)	3.576*** (0.398)
No of observations	220	220	220	220	220	220	220	220
R-square	0.639	0.708	0.635	0.705	0.773	0.733	0.704	0.775

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1



Table 7. The impact of trade facilitation on traffic collisions and education (Fixed effect)

Variable	Traffic collisions				Education			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Institutional	-1.112*** (0.214)				0.213 (0.147)			
Infrastructure		-0.759** (0.240)				0.150 (0.204)		
Market efficiency			-1.338 (0.839)				-0.292 (0.527)	
Trade facilitation effects				-0.518*** (0.142)				0.0800 (0.0744)
POP	-4.593*** (0.538)	-5.004*** (0.669)	-4.734*** (0.925)	-3.789*** (0.753)	3.138*** (0.648)	3.207*** (0.385)	3.978*** (0.694)	3.093*** (0.527)
infla	0.0430** (0.0135)	0.0466*** (0.0135)	0.0601*** (0.0155)	0.0450*** (0.0129)	0.00303 (0.00895)	0.00239 (0.00887)	0.00135 (0.0105)	0.00222 (0.00877)
Trade	-0.0693 (0.209)	0.0860 (0.211)	-0.0126 (0.209)	0.0378 (0.189)	-0.144 (0.143)	-0.174 (0.144)	-0.148 (0.167)	-0.162 (0.147)
Constant	31.22*** (2.862)	32.24*** (3.259)	30.96*** (3.848)	27.41*** (3.364)	-10.78*** (3.210)	-10.94*** (2.018)	-14.21*** (3.203)	-10.50*** (2.671)
No of observations	220	220	220	220	220	220	220	220
R-square	0.765	0.741	0.727	0.760	0.628	0.625	0.624	0.625

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The findings of the fixed effects model are then evaluated. The Hausman test was used to determine whether random or fixed effects should be used. Because the p-value was less than 0.05, it was decided to employ the fixed effect rather than the random effect. Tables 6 and 7 present the findings of the fixed effects. TF impacts are statistically significant, but they also have a negative influence on employment (see Table 6, columns (1) to (4)), contrary to the conclusions provided in the preceding two tables. Institutions, infrastructure, and market efficiency all have an impact on schooling (see Table 7, columns (5) to (8)).

The System-GMM estimator is used to analyze these impacts more thoroughly. Effective government management can have a positive impact on social welfare by fulfilling its commitment to establish a healthy economic environment. The institutional coefficients, in particular, are both positive and statistically significant (see Tables 8 and 9 columns (1) and (5)). The institutional coefficient impact on these two dimensions is positive and highly statistically significant when we utilize employment and education as a connection with social well being. The institutional effect is a 3.63% rise in total employment and a 17.2% increase in secondary school enrolment at the 1% level, according to the above statistics. At the 5% level, institutional impacts reduced traffic collisions by 9.74%. At the 10% level, there is also a 0.121% improvement in life expectancy. The institution of a country is a key component in explaining the wealth disparity between countries. The foregoing findings imply that as a country's institutional factors (corruption control, government effectiveness, political stability, regulatory quality, and rule of law) improve, the country's welfare (employment, education, traffic collisions, and life expectancy) improves. This finding is entirely consistent with past research (Acemoglu & Robinson, 2008; Sakyi et al., 2018).

In terms of the influence of transport infrastructure, the findings support the initial anticipation that improved transport infrastructure would result in numerous social welfare benefits (see Tables 8 and 9 column (2) and column (6)). All of the coefficients are statistically significant and positive. The impact of transport infrastructure upgrades boosts secondary school



attendance by 8.58% and reduces traffic collisions by 9.74% at the 1% level, according to our findings. At the same time, this effect reveals a 2.55% gain in employment at the 5% level, as well as a 0.0842% increase in life expectancy in countries at the 10% level. This means that the impact of transport infrastructure boosts economic activity and strengthens regional ties. As a result, access and income are increased. The findings are consistent with earlier research (Abbott et al., 2017; Sakyi et al., 2018; Yu & Luu, 2022). Numerous studies have proven that improving infrastructure benefits people from all walks of life. They can be more adaptable and proactive in their career and business search. Stable occupations can provide a consistent source of revenue for workers. They will be able to spend more for medical services and provide a better educational environment for their children (Jouanjean et al., 2016; Sakyi et al., 2018). People with stable work and sources of income are less likely to be unemployed, which lessens traffic congestion (Yakubu & Muhammed, 2021). Overall, the data imply that enhanced transport infrastructure might result in social benefits for people across the globe. As a result, we support the realization that infrastructure development is a critical component of a country's economic and social progress.

The findings reveal that these coefficients are statistically significant when it comes to the effect of market efficiency on social welfare. According to our data, for every 1% increase in market efficiency, employment rises 3.79%, life expectancy rises 0.138%, and secondary school enrollment rises 20.7%. Furthermore, the study's findings suggest that at a 10% level, the impact of market efficiency reduces traffic collisions by 8.89%. These findings suggest that enhancing market efficiency is critical for improving social wellbeing. That is, as cross-border trade grows as a result of improving business conditions, so does ASEAN countries' social well being. Improved customs and legal burdens indicate improvements in the business environment. The movement of commodities between countries has become easier as a result of advancements in this sector. Furthermore, the cost of importing and exporting has dropped, resulting in greater trade flows (Jordaan, 2014; Sakyi et al., 2018; Yu & Luu, 2020). Business activity also promotes technological and labor size spillovers (Agrawal, 2015). An improvement in the business climate, as well as an increase in foreign direct investment and trade flows. This will enable governments to generate the additional revenue required to raise people's living standards.

Table 8. The impact of trade facilitation on employment and life expectancy (GMM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Employment (-1)	1.003*** (0.0103)	1.017*** (0.0127)	1.022*** (0.00725)	0.999*** (0.0156)				
Life expectancy (-1)					0.946*** (0.0114)	0.958*** (0.0123)	0.960*** (0.00891)	0.936*** (0.0165)
Institutional	0.0363*** (0.00874)				0.00121* (0.000681)			
Infrastructure		0.0255** (0.0118)				0.000842* (0.000489)		
Market efficiency			0.0379** *				0.00138*** (0.000494)	
Trade facilitation effects				0.0131*** (0.00472)				0.000816** * (0.000201)
POP	0.00393 (0.00356)	0.0117* (0.00670)	0.00887* (0.00520)	0.00684* (0.00391)	0.000154 (0.000473)	0.000310 (0.000454)	0.000136 (0.000405)	0.000546 (0.000778)



Infla	0.00628** * (0.00105)	0.00349* * (0.00153)	0.00285* * (0.00125)	0.00451** * (0.00170)	-7.11e-05 (9.60e-05)	- 0.000191** * (5.17e-05)	- 0.000180** * (6.21e-05)	-0.000122** (5.80e-05)
Trade	-0.0354*** (0.00850)	-0.0365** (0.0157)	- 0.0261** * (0.00962)	-0.0334*** (0.00947)	0.00138* (0.000723)	0.000679 (0.000521)	0.000993** (0.000488)	0.000614 (0.000870)
Constant	-0.150*** (0.0453)	-0.224*** (0.0726)	-0.240*** (0.0539)	-0.125* (0.0705)	0.230*** (0.0457)	0.179*** (0.0502)	0.171*** (0.0364)	0.268*** (0.0675)
Number of country	10	10	10	10	10	10	10	10
AR(2)	-1.16	1.24	-1.24	1.20	-0.76	-1.07	-0.94	-1.07
AR(2) p-value	0.245	0.214	0.215	0.230	0.447	0.284	0.348	0.283
Hansen Stat	3.93	2.99	2.50	3.85	3.78	5.29	5.28	5.01
Hansen p-value	0.951	0.982	0.991	0.954	0.957	0.871	0.872	0.891

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 9. The impact of trade facilitation on traffic collisions and education (GMM)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Traffic collisions (-1)	0.890*** (0.0404)	0.769*** (0.0765)	0.852*** (0.0172)	0.864*** (0.0139)				
Education (-1)					0.775*** (0.0394)	0.837*** (0.0367)	0.846*** (0.0279)	0.787*** (0.0494)
Institutional	-0.0974** (0.0463)				0.172*** (0.0323)			
Infrastructure		-0.711*** (0.240)				0.0858*** (0.0294)		
Market efficiency			-0.0889* (0.0535)				0.207*** (0.0769)	
Trade facilitation effects				-0.0163 (0.0112)				0.0595*** (0.0209)
POP	-0.0575 (0.0852)	0.210 (0.207)	0.0118 (0.0144)	0.0158 (0.0200)	0.0457*** (0.0157)	0.0479* (0.0279)	0.0398** (0.0170)	0.0482* (0.0247)
Infla	- 0.0153*** (0.00547)	-0.0559** (0.0246)	- 0.00425** (0.00184)	-0.00771* (0.00439)	0.0362*** (0.00402)	0.0206** (0.0102)	0.0243*** (0.00447)	0.0244*** (0.00641)
Trade	0.264 (0.229)	0.441* (0.266)	0.0601* (0.0345)	0.0495 (0.0341)	-0.152*** (0.0420)	-0.0812 (0.0529)	-0.0764** (0.0377)	-0.124* (0.0733)
Constant	0.751* (0.452)	1.358* (0.711)	0.749*** (0.140)	0.669*** (0.110)	0.674*** (0.165)	0.491*** (0.142)	0.399*** (0.132)	0.653*** (0.222)
Number of country	10	10	10	10	10	10	10	10



AR(2)	-1.29	-0.27	-1.71	-1.50	-1.47	-1.22	-1.48	-1.40
AR(2) p-value	0.198	0.785	0.086	0.132	0.141	0.221	0.138	0.161
Hansen Stat	5.33	5.08	5.31	6.43	3.92	3.30	1.48	4.96
Hansen p-value	0.868	0.998	0.870	0.998	0.951	0.973	0.999	0.894

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results of the overall effect of TF are provided in Tables 8 and 9 in columns (4) and (8). The aggregate of the institutional effect, the influence of transport infrastructure, and market efficiency is the overall effect variable. The overall effect on employment, secondary enrollment rate, and life expectancy at birth is positive and statistically significant at the 1% level, according to the findings. For traffic incidents, however, the effect is less pronounced. The results are consistent with our initial anticipation that this effect contributes to the improvement of the welfare effect, based on the sign of the coefficients. The findings demonstrate that for every 1% increase in the total effect of TF, employment rises 1.31%, life expectancy rises 0.0816%, and secondary school enrolment rises 5.95%. This implies that TF is linked to social well-being. This finding is in line with the findings of Sakyi et al. (2018). The coefficients of the variables from the preceding period are all positive and statistically significant at the 1 percent level, as shown in Tables 8 and 9. This means that these welfare effects will last throughout time. Overall, this research suggests that altering components of TF has a significant impact on a country's social welfare.

V. CONCLUSION AND RECOMMENDATIONS

From 2000 through 2021, this study looks at the impact of TF on social wellbeing in ASEAN countries. As proxies for TF, institutional, transport infrastructure, and market efficiency indexes are utilized, as well as the combined effects of these three variables. The social welfare measures evaluated in this study are employment (total yearly employment), average life expectancy, traffic collisions (deaths from road traffic collisions), and education (secondary school enrolment rate). This study first employs OLS and fixed effect regression to estimate the impacts of TF, and then uses the System-GMM estimator to analyze the effects of TF. Improved institutions, transport infrastructure, and market efficiency all have a significant impact, according to the findings. Thus, TF reforms may be associated with improved social welfare in ASEAN countries.

ASEAN is one of the world's most dynamic and consistently rising economic areas. Although TF reform is heavily influenced by a country's policies and plans, it nevertheless necessitates a great deal of cooperation among countries. Countries in the union still need to implement more effective policies to lower tariffs, lower trade transaction costs, and expand regional manufacturing networks. All of these concerns are crucial for ASEAN countries to increase their competitiveness and turn the bloc into a frictionless market for goods, services, and investments. Countries must avoid imposing new and unnecessary non-tariff measures in particular.

AUTHOR STATEMENT

The authors have no relevant financial or non-financial interests to disclose. The authors have no conflicts of interest to declare that are relevant to the content of this article.

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