FUTURITY
Economics & Law

DOI: https://doi.org/10.57125/FEL.2024.09.25.11

How to cite: Halim, H., Syafitri, W., & Fazaalloh, A. M. (2024). The Role of Trade Liberalisation and FDI in the Structural Transformation of Indonesia's Industrial Sector**.** *Futurity Economics&Law, 4*(3). 177-193. https://doi.org/10.57125/FEL.2024.09.25.11

The Role of Trade Liberalisation and FDI in the Structural Transformation of Indonesia's Industrial Sector

Hafis Halim*

Master's in economics, Officer at The Ministry Of Finance, Postgraduate student, Brawijaya University, Malang, East Java, Indonesia, https://orcid.org/0009-0008-0152-2106

Wildan Syafitri

Phd in Economics, Professor of The Department of Economics, Brawijaya University, Malang, East Java, Indonesia, https://orcid.org/0000-0002-0067-1010

Al Muizzuddin Fazaalloh

Phd in Economics, Professor of The Department of Economics, Brawijaya University, Malang, East Java, Indonesia, https://orcid.org/0000-0002-0526-9717

***Corresponding Author**: *hafishalim@student.ub.ac.id*

Received: February 27, 2024 **| Accepted:** July 15, 2024 **| Available online:** July 31, 2024

Abstract: The Indonesian government is formulating policies aimed at promoting trade openness and attracting foreign direct investment (FDI). This study investigated the relationship between trade openness and foreign direct investment (FDI) and their effects on the structural transformation of the industrial sector over the period from 1991 to 2021. The analysis was grounded in empirical data sourced from reputable databases, including the World Development Indicators (WDI), the World Integrated Trade Solutions (WITS), and the National Single Window for Investment (NSWi) administered by the Indonesian Investment Coordinating Board (BKPM). Through this examination, the aim was to elucidate the mechanisms by which these economic variables contributed to changes within the industrial structure, thereby providing insights into the broader implications for economic growth

and development. The study employed the Autoregressive Distributed Lag (ARDL) Bounds testing approach to cointegration in order to investigate the long-run and short-run effects of trade openness and FDI on the industrial sector in Indonesia. The measurement of the trade openness encompasses exports, imports, and trade barriers like tariffs. Factors such as per capita income, labour productivity, and information and communication technology (ICT) also drove structural transformation. The findings of this research indicated that exports had a positive and significant impact on structural transformation in the Indonesian industry due to the access to foreign markets and expanding market share. In contrast, the effect of imports could have been more significant, meaning that the presence of imported goods could erode domestic industries because they were less competitive regarding technology and productivity. Meanwhile, the tariff reductions had a significantly negative impact on the value-added of the industry, meaning that the tariff reduction policies hindered domestic industries and caused the Indonesian market to be flooded with imported products. Furthermore, FDI positively impacted the proportion of labour but was not significant for value-added, indicating that the high-productivity foreign capital was needed to increase the value-added of the industrial sector. Moreover, the per capita income was significantly and positively associated with structural transformation, while labour productivity and ICT are significantly and negatively associated. This model could help the Indonesian government formulate practical trade openness and FDI policies to promote industrialization

Keywords: structural transformation, industrial sector, trade openness, FDI.

Introduction

The Indonesian government has implemented various policy measures such as participating in Regional Trade Agreements (RTAs), streamlining licensing processes, providing tax incentives such as bonded zones and the Export Destination Import Facility (KITE), as well as establishing special economic zones, to promote trade openness and attract foreign investment. These policy measures have shown success, as evidenced by the increasing trend in Indonesia's international trade volume in import and export transactions. The subsequent inquiry pertains to the potential of trade liberalisation to instigate structural transformations within the Indonesian industrial sector, particularly with regard to its impact on employment composition and labour productivity.

Indonesia has designed a National Long-Term Development Plan (RPJPN) 2025–2045 with the aim of transforming its economy from a low-value-added commodity-based to a high-value-added industrial sector by leveraging technological advancements and innovation. This transformation is considered vital to enhancing productivity and achieving an average economic growth of 6–7% per year, which would enable Indonesia to overcome the middle-income trap.

The successful experiences of the eight leading economies in Asia showed that structural transformations could be achieved through the industrialisation and trade policies. These countries have increased their share in the global trade market and improved the quality of their exports. Between 1965 and 1990, their world export market share rose from 7.9% to 18.2% (Kaba et al., 2022). Indonesia can learn from these experiences to inspire its economic transformation.

The impact of the trade liberalisation on the economy remains a compelling topic of discussion. International trade significantly influences structural transformations through two mechanisms: the reduction of trade barriers and changes in policies or economic disruptions, which can affect specialisation patterns, ultimately impacting the composition of the employment or value-added concluded by (Alessandria et al., 2021). The study by Kacou et al. (2022) suggests that the trade liberalisation in developing countries with high openness is crucial in enhancing labour productivity. The trade openness is critical in improving the low productivity through competition in the international market and adopting the latest technology, as argued by Samargandi (2018). However,

Kaba et al. (2022) found different results, stating that for African countries, the trade openness may not support industrialisation despite having comparative advantages due to non-endowment factors such as logistics costs and an unsupportive business environment.

The importance of Foreign Direct Investment (FDI) in driving structural transformation is still debatable. FDI can stimulate structural transformation by adding value to the manufacturing sector and creating value-added jobs in the service sector (Emako et al., 2022). FDI can drive structural transformation by reallocating resources to more productive sectors, although its effects may have a time lag, especially for the industrial sector, as concluded by Mühlen and Escobar (2020). FDI would facilitate the knowledge and technology transfer, contributing to increased productivity, as suggested by (Alessandria et al., 2021). The impact of Foreign Direct Investment (FDI) on the manufacturing sector's share of GDP in Africa is found to be insignificant, possibly due to the sectoral distribution of FDI in Africa. Most FDI inflows are concentrated in the mining, oil, and gas (MOG) sector (Mijiyawa, 2017).

Given Indonesia's extensive government policies to promote international trade and attract foreign investment, the evaluation of their effectiveness becomes relevant. Table 1 shows the performance of Indonesia's international trade and FDI.

Table 1

Performance of Indonesia's Trade and FDI From 1991 to 2022

Tahun	TO (%GDP)	TO ($mil)	FDI (%GDP)	FDI ($mill)	Import	Export
1991-1995	53.73	418,142.04	1.45	11,718.00	203,920.16	214,221.88
1996-2000	67.77	537,453.99	1.74	16,430.00	233,145.95	239,875.27
2001-2005	61.25	689,863.54	1.90	19,330.00	259,125.23	261,179.58
2006-2010	52.45	1,340,546.34	1.60	17,085.20	262,819.01	269,460.91
2010-2015	47.52	2,488,992.13	1.09	13,110.58	256,351.19	272,284.54
2016-2020	38.09	1,967,659.91	0.11	4,214.22	250,733.60	286,720.40
2021-2022	42.80	826,141.93	-0.81	-4,957.17	239,971.81	290,629.07

Source: World Bank (n.d.).

Research Problem

Industrialisation is considered one of the critical drivers of economic growth, particularly in the early stages of development. It serves as a pathway to escape the middle-income trap, which is also occurring in Indonesia. Research on the impact of trade openness on the structural transformation of the economy in Indonesia, considering both labour and value-added aspects simultaneously, is still rare, making this study address a significant research gap. This research is pivotal for discerning effective policy frameworks that the Indonesian government can adopt to foster industrialisation and enhance existing industries, thereby mitigating the risks associated with the middle-income trap. A critical question addressed in this study pertains to the optimal orientation of trade openness: should it prioritize imports, exports, or adopt a hybrid approach integrating both strategies? Furthermore, this inquiry will rigorously analyse the implications of tariff reductions on the acceleration of industrialisation processes.

In addition, the Indonesian government's commitment to attracting foreign direct investment (FDI) through a range of incentives and facilitation measures necessitates an evaluation of the strategic importance of FDI in catalysing the industrial sector's growth. This study will assess the urgency and potential impact of FDI in stimulating industrial development in Indonesia, thereby providing empirical

evidence for policymakers to design targeted interventions that enhance the country's industrial landscape.

Research Focus

This study analysed the role of trade openness and FDI in the structural transformation of Indonesia's industrial sector. The proportion of imports and exports measured the trade openness, and a tariff barrier variable was added to assess the efficiency of Indonesia's extensive tariff reduction policy. Furthermore, to obtain more comprehensive results, structural transformation was measured by the proportion of labour and value-added in the industrial sector.

Research Aim and Research Questions

The research questions formulations in this study were as follows:

- What is the role of imports and exports in the structural transformation of the industrial sector in Indonesia?
- What is the role of lowering tariffs in the structural transformation of the industrial sector in Indonesia?
- What is the role of FDI in the structural transformation of the industrial sector in Indonesia?

Thus, with these research questions, the roles of imports, exports, tariff reduction, and FDI in the structural transformation of the industrial sector can be determined. This will enable the Indonesian government to formulate appropriate policies for industrial upgrading rather than implementing policies that may lead to premature deindustrialisation.

Literature Review

Research investigating the impact of trade openness and foreign direct investment (FDI) on industrialization has produced mixed findings in the literature. Furthermore, the empirical assessment of trade openness predominantly relies on standard metrics such as export and import volumes. In contrast, measures that incorporate trade barriers are infrequently employed, which may limit the comprehensiveness of the analysis regarding the true nature of trade openness and its effects on industrialization processes.

As an introduction to the literature review of this research, the main positions concerning the theory related to structural transformation were briefly discussed, as well as a brief explanation of openness and FDI and their relationship to structural transformation was accomplished. Based on the studies by Emako et al. (2022), Syrquin (2010), and Vu (2017), the initial theory of structural transformation is illustrated by Lewis's dual-sector model, which explains the labour migration. This model categorises the economy into two sectors: a traditional, rural-based sector with low productivity and a modern, urban-based industry with high productivity. Lewis argued that the agricultural sector has a surplus of labour, leading to urbanisation. Additionally, they discuss Rostow's (1959) theory, which views structural transformation as a shift in capital accumulation levels. Furthermore, Rostow's theory, as elaborated by Todaro and Smith (2015), outlines that the transition from underdevelopment is a process that involves a series of stages that all countries must pass through.

Additionally, New Structural Economics (NSE), as introduced by Justin Yifu Lin in his articles, are grounded on the analysis of the nature of modern economic growth to develop a new framework for economic development and industrial policy (Lin, 2011; 2014; 2017). NSE highlights that the critical features of contemporary economic development include on-going technological innovation, industrial upgrading, and economic diversification. These elements facilitate a consistent rise in labour productivity, which in turn affects a country's per capita income.

A possible explanation for structural transformation is globalization, discussed in Wood (2019) and Grabowski and Self (2023) based on the Heckscher-Ohlin theory of comparative advantage. According to this theory, comparative advantage arises from differences in the availability of factors of production and the reduction of trade barriers. Globalization and comparative advantage can lead to an increase in labour demand, which ultimately changes the labor market structure suggested by Uy et al. (2013).

Two mechanisms lead to comparative advantage in international trade explained by (Alessandria et al., 2021). The first mechanism involves reducing trade barriers, which can be accomplished through technological advancements, such as advanced container mechanisms that lower shipping costs, lowering tariff barriers, or adjusting quotas. The second mechanism can occur through policy changes, such as adjustments in tax tariffs, improvements in productivity, and the restructuring of the economic input-output.

Import and export activities also significantly contribute to structural transformations. The import of goods from other countries can reduce production costs, while the export can expand market share and provide opportunities to learn from international buyers (Alessandria et al., 2021).

Factors like non-homothetic preference and productivity can impact structural transformation (Matsuyama, 2019). Non-homothetic preference relates to the demand side, and when a country has a higher real per capita income, it tends to demand more from sectors with higher income elasticity. Non-homothetic preference, in turn, can lead to increased labour allocation in those sectors. On the other hand, the productivity channel suggests that countries with higher productivity in sectors with higher income elasticity are likely to become exporters. Foreign Direct Investment (FDI) can also drive structural transformation by bringing in fresh capital, knowledge, and technology, increasing industry productivity. The relationship between Foreign Direct Investment (FDI) and structural change has not been explored much in the literature. However, it will likely be very important for many economies, especially developing countries. Multinational Enterprises (MNEs) that enter an economy and operate in a productive sector can help shift economic activity from less productive sectors, leading to effective structural transformation. In this way, MNEs can also help to reallocate labour between sectors (Mühlen & Escobar, 2020).

How do analysts measure structural transformation? They explore structural transformation by examining how different sectors contribute to overall economic activity. This evaluation often involves tracking changes in the shares of sectors over time. Employment and value-added are commonly used indicators to gauge activity from the production side, while consumption is also considered (van Neuss, 2019). In this study, the used measure of structural transformation was from the production side, which included the employment and value-added.

Several studies explicitly discussing the impact of trade openness and structural transformation in the industrial sector have yielded different results. For instance, research by Betts et al. (2017) and Teignier (2018), which discusses the remarkable structural transformation in South Korea, found a hump-shaped pattern in the industrial sector. Furthermore, research by Tahir et al. (2016) for the period 1980–2013 in the SAARC region found that trade openness influences the structural transformation of the industrial sector. Araujo et al. (2021), for the period 1970–2017, a group of countries found that trade openness had a positive impact on developed countries and a negative impact on developing countries. Khobai and Moyo (2021) on SADC Countries for the period 1990–2017 concluded that trade drives the manufacturing sector's performance. Osakede and Adenikinju (2022), for the period 1975–2019 in the West African States, found that trade openness, exports, and import tariffs all had a positive impact. Mignamissi and Nguekeng (2022) for the period 1990–2019 in Africa, found that trade openness has a non-linear relationship with industrialization and is highly dependent on a country's industry level. Gandjon Fankem and Feyom (2023), for the period 1985–2015 in Sub-

Saharan Africa, found that trade openness negatively impacts the industrial sector. Busse et al. (2024) researched 131 developing countries from 1991–2020 and found varying results on the impact of trade liberalization for each region. Cengiz and Manga (2024) researched the Western Balkan Countries and found that globalisation promotes labour growth in the industrial sector.

Furthermore, several studies discussing the impact of FDI on the industrial sector also yielded varied results. Research by Pineli et al. (2020) concluded that the impact of FDI highly depends on the targeted sector and the growth level of a country. Mamba et al. (2020), who conducted research in WAEMU Countries from 1990–2017, found that FDI is insignificant for industrialization. Mühlen and Escobar (2020) conducted research in Mexico and found that FDI affects structural transformation. Müller (2021) conducted research focused on Sub-Saharan countries from 1996 to 2017, while Oduola et al. (2022) extended the analysis to cover 1996-2018, both reporting consistent findings that foreign direct investment (FDI) has a negative impact on industrial development. In contrast, Amoah and Jehu-Appiah (2022) explored the effects of FDI on industrialization across Africa from 1990 to 2018, concluding that FDI positively influences industrial growth.

Based on these literature studies, research on the impact of trade openness and FDI in the ASEAN region, particularly in Indonesia, is still rarely found. Additionally, tariffs are rarely used as a measure of trade openness.

Materials and Methods

This research analysed the impact of trade liberalisation on the industrial sector's structural transformation in Indonesia between 1991 and 2021. The study gathered data from various sources, such as World Bank (n.d.), WITS (n.d.) and NSWI (n.d.).

Model Specification

The relationship between trade liberalisation, Foreign Direct Investment (FDI), and structural transformation in the industrial sector with the measurement of transformation using employment can be represented in the model as follows:

$$ST_t = \beta_0 + \beta_1 Exp_t + \beta_2 Imp_t + \beta_3 FDI_t + \beta_4 GDP_t + \beta_5 LP_t + \beta_6 Trf_t + \beta_7 ICT_t + \varepsilon_t \quad (1)$$

Similarly, when measured by value added, the equation is as follows:

$$ST_t = \beta_0 + \beta_1 Exp_t + \beta_2 Imp_t + \beta_3 FDI_t + \beta_4 GDP_t + \beta_5 Emp_t + \beta_6 Trf_t + \beta_7 ICT_t + \varepsilon_t \quad (2)$$

The structural transformation (ST) as the dependent variable will be measured by the industrial sector's labour force and the industrial sectors value-added. Furthermore, trade liberalisation will be measured by exports (Exp) and imports (Imp) as well as tariff barriers (Trf), and FDI represents FDI inflow. Additionally, there are control variables such as GDP measured by GDP per capita, labour productivity (LP) measured by the value-added divided by the employment (for the first equation) and labour force (for the second equation), and the ICT index represented by Average of Internet users per 100 inhabitants (internet use), broadband subscriptions per 100 inhabitants, and mobile phones per 100 inhabitants (infrastructure) (Comunale & Felice, 2022).

Research Method

The study used the Autoregressive Distributed Lag (ARDL) method, introduced by Pesaran and Smith (1998) and Pesaran et al. (2001), to investigate the impact of trade liberalisation, FDI, GDP per capita, tariff barriers, and labour on the structural transformation of Indonesia's industrial sector. The ARDL method is chosen for its ability to handle a combination of I (0) and I (1) time series data, as proposed by Pesaran et al. (2001). It is also reliable in avoiding endogeneity issues due to small sample sizes (Rauf et al., 2018).

ADF Unit Root Test

Stationarity tests for each variable are conducted as an initial step in this research. The level of stationarity serves as a guide for selecting further methodologies in the suggested estimation process for policy implications in the future. This study employed the leading unit root test, the Augmented Dickey-Fuller (ADF) test introduced by Dickey and Fuller in 1979.

$$\Delta Y_t = \alpha_0 + \beta_0 T_{t-1} + \beta_1 Y_{t-1} + \sum_{i=1}^{m} \alpha_1 \Delta Y_{t-i} + \mu_t \quad (3)$$

The root test in ARDL assumes that its variables have integration levels of I (0) or I (1). It is crucial to perform the test to ensure that the variables are not I (2) to avoid obtaining misleading results. If a variable is integrated at level two, we cannot interpret the given F-statistic values.

The ARDL Model Specification

This study utilised the ARDL approach, as described by [15], to conduct a cointegration bound test and assess the existence of a long-term relationship. The results of the bound test indicate that if the calculated F-statistic is higher than the critical upper limit value for I(1) for the number of explanatory variables (k), the null hypothesis will be rejected. The null hypothesis cannot be rejected if the F-statistic is lower than the critical lower limit value for I (0). Furthermore, if the F-statistic falls between I (0) and I (1), it indicates uncertainty about cointegration (Rauf et al., 2018). If cointegration is present, the next step in the ARDL process involves the inclusion of the long-term ARDL equation as follows.

The ARDL bound testing model for the structural model measured by the employment is as follows:

$$\Delta ST_t = \alpha_0 + \sum_{i=1}^{m} \beta_{1i} \Delta ST_{t-i} \sum_{i=0}^{m} \beta_{2i} \Delta Exp_{t-i} + \sum_{i=0}^{m} \beta_{3i} \Delta Imp_{t-i} + \sum_{i=0}^{m} \beta_{4i} \Delta FDI_{t-i} + \sum_{i=0}^{m} \beta_{5i} \Delta GDP_{t-i} + \sum_{i=0}^{m} \beta_{6i} \Delta LP_{t-i} + \sum_{i=0}^{m} \beta_{7i} \Delta Trf_{t-i} + \sum_{i=0}^{m} \beta_{8i} \Delta ICT_{t-i} + \beta_8 ST_{t-1} + \beta_9 EXP_{t-1} + \beta_{10} Imp_{t-1} + \beta_{11} FDI_{t-1} + \beta_{12} GDP_{t-1} + \beta_{13} LP_{t-1} + \beta_{14} TRF_{t-1} + \beta_{15} ICT_{t-1} + \varepsilon_t \quad (4)$$

The ARDL bound testing model for structural model measured by the value-added is as follows:

$$\Delta ST_t = \alpha_0 + \sum_{i=1}^{m} \beta_{1i} \Delta ST_{t-i} \sum_{i=0}^{m} \beta_{2i} \Delta Exp_{t-i} + \sum_{i=0}^{m} \beta_{3i} \Delta Imp_{t-i} + \sum_{i=0}^{m} \beta_{4i} \Delta FDI_{t-i} + \sum_{i=0}^{m} \beta_{5i} \Delta GDP_{t-i} + \sum_{i=0}^{m} \beta_{6i} \Delta Emp_{t-i} + \sum_{i=0}^{m} \beta_{7i} \Delta Trf_{t-i} \sum_{i=0}^{m} \beta_{8i} \Delta ICT_{t-i} + \beta_8 ST_{t-1} + \beta_9 EXP_{t-1} + \beta_{10} Imp_{t-1} + \beta_{11} FDI_{t-1} + \beta_{12} GDP_{t-1} + \beta_{13} Emp_{t-1} + \beta_{14} TRF_{t-1} + \beta_{15} ICT_{t-1} + \varepsilon_t \quad (5)$$

The equation for the long-term model if structural transformation measured by employment:

$$ST_t = \alpha_0 + \sum_{i=1}^{m} \beta_{1i} + \sum_{i=0}^{m} \beta_{2i} Exp_{t-i} + \sum_{i=0}^{m} \beta_{3i} Imp_{t-i} + \sum_{i=0}^{m} \beta_{4i} FDI_{t-i} + \sum_{i=0}^{m} \beta_{5i} GDP_{t-i} + \sum_{i=0}^{m} \beta_{6i} LP_{t-i} + \sum_{i=0}^{m} \beta_{7i} Trf_{t-i} + \sum_{i=0}^{m} \beta_{8i} ICT_{t-i} + \varepsilon_t \quad (6)$$

Structural transformation measured by value added:

$$ST_t = \alpha_0 + \sum_{i=1}^{m} \beta_{1i} + \sum_{i=0}^{m} \beta_{2i} Exp_{t-i} + \sum_{i=0}^{m} \beta_{3i} Imp_{t-i} + \sum_{i=0}^{m} \beta_{4i} FDI_{t-i} + \sum_{i=0}^{m} \beta_{5i} GDP_{t-i} + \sum_{i=0}^{m} \beta_{6i} Exp_{t-i} + \sum_{i=0}^{m} \beta_{7i} Trf_{t-i} + \sum_{i=0}^{m} \beta_{8i} ICT_{t-i} + \varepsilon_t \quad (7)$$

The equation for the short-term model if structural transformation measured by employment is as follows:

$$ST_t = \alpha_0 + \sum_{i=1}^{m} \beta_{1i} \Delta ST_{t-i} + \sum_{i=0}^{m} \beta_{2i} \Delta Exp_{t-i} + \sum_{i=0}^{m} \beta_{3i} \Delta Imp_{t-i} + \sum_{i=0}^{m} \beta_{4i} \Delta FDI_{t-i} + \sum_{i=0}^{m} \beta_{5i} \Delta GDP_{t-i} + \sum_{i=0}^{m} \beta_{6i} \Delta LP_{t-i} + \sum_{i=0}^{m} \beta_{7i} \Delta Trf_{t-i} + \sum_{i=0}^{m} \beta_{8i} \Delta ICT_{t-i} + \alpha ECM_{t-1} + \varepsilon_t \quad (8)$$

Structural transformation measured by value added:

$$ST_t = \alpha_0 + \sum_{i=1}^{m} \beta_{1i}\, \Delta ST_{t-i} + \sum_{i=0}^{m} \beta_{2i}\, \Delta Exp_{t-i} + \sum_{i=0}^{m} \beta_{3i}\, \Delta Imp_{t-i} + \sum_{i=0}^{m} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{m} \beta_{5i}\, \Delta GDP_{t-i} + \sum_{i=0}^{m} \beta_{6i}\, \Delta Exp_{t-i} + \sum_{i=0}^{m} \beta_{7i}\, \Delta Trf_{t-i} + \sum_{i=0}^{m} \beta_{8i}\, \Delta ICT_{t-i} + \alpha ECM_{t-1} + \varepsilon_t \quad (9)$$

Results

ADF Unit Root Test Result

The ADF unit root test results indicate that all variables have a significant trend and intercept at first differences. Therefore, the ARDL method can be used for this test**.** Table 2 and Table 3 present the unit root test results.

Table 2

ADF Unit Test Result, Structural Transformation Measured by Employment

Variable		ADF No Trend		ADF With Trend		Order of Integration
		t-stat	Sigg.	t. stat	Sigg.	
ST	Level	-2.512116	0.1231	-1.593872	0.7651	I (1)
	1st Diff.	-4.29466***	0.0024	-4.704496***	0.0046	
Import	Level	-0.72676	0.8249	-1.905434	0.6268	I (1)
	1st Diff.	-5.210245***	0.0002	-5.100988***	0.0015	
Export	Level	-1.128656	0.6911	-1.955755	0.6009	I (1)
	1st Diff.	-4.69097***	0.0008	-4.540488***	0.0058	
FDI	Level	-1.848779	0.3504	-2.374847	0.3836	I (1)
	1st Diff.	-4.43840***	0.0017	-4.352221***	0.0097	
GDP	Level	-0.775732	0.8116	-2.000681	0.5774	I (1)
	1st Diff.	-5.53197***	0.0001	-5.427986***	0.0007	
LP	Level	-0.601648	0.8558	-1.731660	0.7119	I (1)
	1st Diff.	-4.95654***	0.0004	-4.863506	0.0027	
Tarif	Level	-1.202966	0.6599	-2.441819	0.3524	I (1)
	1st Diff.	-5.38229***	0.0001	-5.308597***	0.0009	
ICT	Level	0.673949	0.9894	-2.040623	0.5564	I (1)
	1st Diff.	-5.3307***	0.0001	-5.571897***	0.0005	

Source: Stata Output.

Table 3

ADF Unit Test Result, Structural Transformation Measured by Value Added

		ADF No Trend		ADF With Trend		Order of Integration
		t-stat	Sigg.	t. stat	Sigg.	
ST	Level	-0.887223	0.7783	-1.901136	0.6290	I (1)
	1st Diff.	-5.28750***	0.0002	-5.209447***	0.0012	
Import	Level	-0.72676	0.8249	-1.905434	0.6268	I (1)
	1st Diff.	-5.210245***	0.0002	-5.100988***	0.0015	
Export	Level	-1.128656	0.6911	-1.955755	0.6009	I (1)
	1st Diff.	-4.690971***	0.0008	-4.540488***	0.0058	
FDI	Level	-1.848779	0.3504	-2.374847	0.3836	I (1)
	1st Diff.	-4.438403***	0.0017	-4.352221***	0.0097	

GDP	Level	-0.775732	0.8116	-2.000681	0.5774	I (1)
	1st Diff.	-5.531970***	0.0001	-5.427986***	0.0007	
Employ	Level	-2.512116	0.1231	-1.593872	0.7651	I (1)
	1st Diff.	-4.29466***	0.0024	-4.704496***	0.0046	
Tarif	Level	-1.202966	0.6599	-2.441819	0.3524	I (1)
	1st Diff.	-5.382292***	0.0001	-5.308597***	0.0009	
ICT	Level	0.673949	0.9894	-2.040623	0.5564	I (1)
	1st Diff.	-5.330696***	0.0001	-5.571897***	0.0005	

Source: Stata Output.

Cointegration Test

The bound test result indicates that the calculated F-statistic value is higher than the upper critical value. Table 4 and Table 5 present the significance levels for I (0) and I (1) for 1%, 2.5%, 5%, and 10%. Based on the test results, it can be concluded that there is cointegration.

Table 4

Bound Test Result (Employment)

Test Statistic	Value	K
F-statistic	25.13818	7
Critical Value Bounds:		
Significance	I (0) Bound	I (1) Bound
10%	1.92	2.89
5%	2.17	3.21
2.5%	2.43	3.51
1%	2.73	3.9

Source: Stata Output.

Table 5

Bound Test Result (Value-added)

Test Statistic	Value	K
F-statistic	14.00500	7
Critical Value Bounds:		
Significance	I (0) Bound	I (1) Bound
10%	1.92	2.89
5%	2.17	3.21
2.5%	2.43	3.51
1%	2.73	3.9

Source: Stata Output.

Diagnostic Test

The diagnostic test results show that the data has passed the serial correlation test (Breusch-Godfrey test), the ARCH test, and the heteroskedasticity test (Breusch-Pagan-Godfrey). Moreover, the

RESET Ramsey test indicates that the model specification is appropriate and normally distributed (Jarque-Bera test). The detailed results of the diagnostic tests are in Table 6 and Table 7.

Table 6

Diagnostic Test, Structural Transformation Measured by Employment

Diagnostic Test	X2	Probability
Breusch-Godfrey Serial Correlation LM test	1.863281	0.3939
Breusch-Pagan-Godfrey Heteroskedasticity test	16.19386	0.7045
ARCH test	0.088913	0.7656
Ramsey RESET	0.003600	0.9538
Jarque-Bera test	2.304491	0.3045

Source: Stata Output.

Table 7

Diagnostic Test, Structural Transformation Measured by Value Added

Diagnostic Test	X2	Probability
Breusch-Godfrey Serial Correlation LM test	5.587879	0.0612
Breusch-Pagan-Godfrey Heteroskedasticity test	15.84280	0.7784
ARCH test	1.313246	0.2518
Ramsey RESET	4.671766	0.0739
Jarque-Bera test	0.470360	0.7904

Source: Stata Output.

Long-run and Short-run Analysis Result

Long-run Analysis. The findings from the long-term analysis, as shown in Table 8 and Table 9, indicate that both measurements of structural transformation reveal a significant positive correlation between exports and FDI. The coefficients for the employment measurement are 0.187328 and 0.085080, while for the value-added measurement, they are 0.153980 and 0.075403. However, the imports did not significantly impact either of the measurements.

For the GDP variable, the estimation results show a significant positive outcome for both approaches to measuring structural transformation. In the employment approach, the coefficient is 1.199177, while in the value-added approach, the coefficient is 1.192872. The correlation between a country's GDP and its structural transformation can be attributed to non-homothetic preferences. The results from the labour productivity side in table 6 (employment measurement) showed a significant negative influence of -0.834925. Meanwhile, as indicated in Table 7, the amount of labour does not show significant results in the increase of value added from the industrial sector in Indonesia.

Tariff barriers yield different outcomes regarding the measure of structural transformation. Tariff barriers show insignificant results on industrial sector employment but positively affect increasing value added from the industrial sector. The last variable, ICT, shows a significant negative relationship with structural transformation in the industrial sector in Indonesia by coefficient -0.005878 for employment and -0.007404 for value-added.

Short-run Analysis. The short-run equations yield results like those of the long-run equations. This indicates that imports have a non-significant negative effect on structural transformation in Indonesia's industrial sector, while the FDI variable shows a positive relationship. Additionally, the GDP variable has a significant positive effect, while the labour productivity variable

and ICT variable have significant negative effects. These results align with those of the long-run equations. In the short run, tariffs have a significant positive impact, but in the long run, they are not significant.

Overall, the short-term outcomes align closely with the long-term results. The error correction term shows a significant negative value, with a coefficient of 0.427657. This indicates that the adjustment process from the short-term to the long-term equilibrium occurs fairly quickly. Specifically, if a disturbance occurs in the short term, the system is expected to return to equilibrium within less than two years in the long term.

Table 8

Long Run and Short Run Analysis, Structural Transformation Measured by Employment

Long Run

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Export	0.187328	0.043354	4.320860	0.0025
Import	-0.253196	0.159765	-1.584797	0.1517
FDI	0.085080	0.030061	2.830195	0.0221
GDP	1.199177	0.190771	6.285962	0.0002
LP	-0.834925	0.225480	-3.702879	0.0060
Tarif	0.017228	0.008933	1.928613	0.0899
ICT	-0.005878	0.002047	-2.870892	0.0208
C	15.76105	1.983915	7.944417	0.0000
Short Run				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(IMPORT)	0.004703	0.009484	0.495877	0.6333
D(FDI)	0.003754	0.002040	1.840865	0.1029
D(GDP)	0.743767	0.019992	37.20410	0.0000
D(LP)	-0.683054	0.025255	-27.04620	0.0000
D(TRF)	0.020289	0.001402	14.46967	0.0000
D(ICT)	-0.000740	0.000294	-2.513664	0.0362
CointEq (-1)*	-0.434660	0.020434	-21.27175	0.0000
R-squared		0.993731		
Adjusted R-squared		0.989029		
F-statistic		532.7495		
Prob(F-statistic)		0.000000		

Source: Stata Output.

Table 9

Long Run and Short Run Analysis, Structural Transformation Measured by Value Added

Long Run

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Export	0.153980	0.064096	2.402352	0.0473
Import	-0.084142	0.165990	-0.506907	0.6278
FDI	0.075403	0.034758	2.169382	0.0667
GDP	1.192872	0.197978	6.025264	0.0005

LP	0.146013	0.199954	0.730234	0.4890
Tarif	0.024245	0.007447	3.255590	0.0139
ICT	-0.007404	0.001713	-4.322760	0.0035
C	11.57489	4.114642	2.813097	0.0260
Short Run				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(IMPORT)	0.036034	0.011436	3.150888	0.0161
D(FDI)	0.005064	0.002536	1.997416	0.0859
D(GDP)	1.041397	0.015894	65.52105	0.0000
D(LP)	-0.271828	0.038957	-6.977707	0.0002
D(TRF)	0.031155	0.002004	15.54399	0.0000
D(ICT)	-0.001158	0.000356	-3.250651	0.0140
CointEq (-1)*	-0.623842	0.037959	-16.43461	0.0000
R-squared		0.999228		
Adjusted R-squared		0.998558		
F-statistic		6796.621		
Prob(F-statistic)		0.000000		

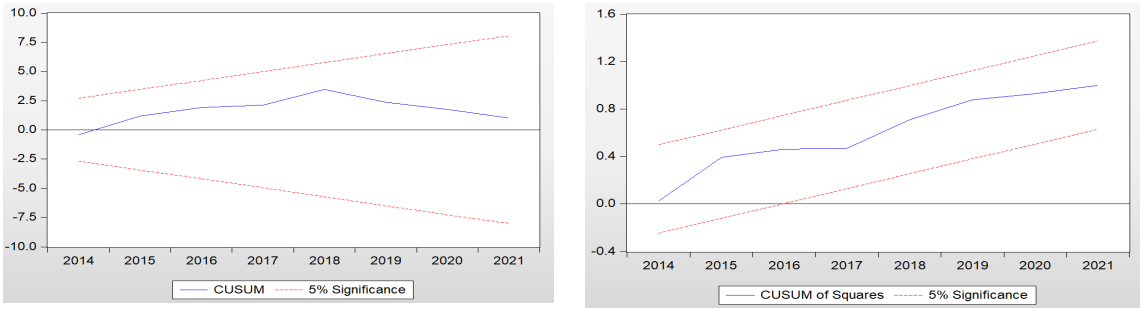
Source: Stata Output.

Structural Stability Test

Structural stability test using cumulative sum (CUSUM) and cumulative sum of squares (CUSUM square) has been conducted to normalize the limits of long-run and short-run analysis on electricity consumption and production. The CUSUM and CUSUM square test graphs are presented in Figures 1 and 2, which indicate that all values are within the critical bounds at a significance level of 5 percent. The results of this stability test strengthen both the long-run and short-run structures.

Figure 1

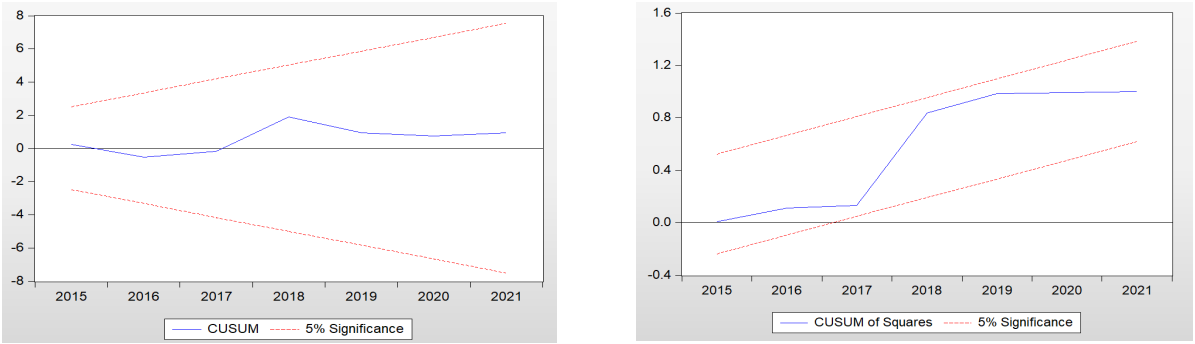
CUSUM Test and CUSUM of Squares Test. Structural Transformation Measured by Employment



Source: Stata Output.

Figure 2

CUSUM Test and CUSUM of Squares Test. Structural Transformation Measured by Value Added



Source: Stata Output.

Discussion

The test results showed that exports positively influence the increase in employment and value-added in Indonesia's industrial sector. Access to international markets enhances a country's market share through its comparative advantage via export mechanisms. Foreign demand also boosts the proportion of labour and value-added in the industrial sector. The study by Alessandria et al. (2021) found that exports enhance labour productivity. Conversely, imports do not significantly negatively impact Indonesia's industrial sector. This is because Indonesia's industrial sector is still less competitive compared to developed countries in terms of technology and productivity, leading to domestic industries being outcompeted. Khobai and Moyo (2021) suggest that when a domestic sector lacks competitiveness, it can experience negative impacts on growth, affecting both output and employment, due to competition from more competitive imported products. Middle-income countries face challenges in accessing advanced technologies within the global value chain (GVC), leading to stagnating productivity and increasing labor costs. Consequently, this situation triggers premature deindustrialization (Andreoni & Tregenna, 2018).

The Foreign Direct Investment (FDI) shows a significant positive impact on increasing employment in Indonesia but does not significantly affect value-added. The influx of FDI into Indonesia can create new job opportunities, thereby increasing the proportion of labour force participation. However, it is crucial to highlight the types of foreign investment entering Indonesia, as investments in sectors with low productivity and technology may not contribute to increasing industrial industry value-added. FDI entering middle-income countries tends to exploit resources and labour without transferring technology and knowledge, and profits from FDI are often repatriated to the home country without reinvestment. This aligns with Pineli et al. (2020) research, which concludes that the effects of FDI heavily depend on a country's growth level and the type of FDI entering the country. Saba and Ngepah (2023) argue that the Foreign Direct Investment (FDI) plays a pivotal role in driving industrialisation, particularly when it is accompanied by substantial financial support and the dissemination of knowledge across sectors.

Tariff barriers show a significant positive relationship with Indonesia's industrial sector's value added. This finding is noteworthy because it indicates that higher tariffs contribute to the development of domestic industries in terms of value-added. This phenomenon occurs because lower tariffs would make imported goods cheaper, leading to increased competition that domestic sectors may be unable to match. Consequently, policies focused on lowering tariffs and promoting free trade agreements could undermine the competitiveness of domestic industries. Research by Petreski et al. (2017) indicates that tariff reductions tend to enhance value-added in countries with established sectors. Conversely, the effect on value-added in nations with emerging industries is minimal.

The limitations of the discussion arise because this research needs to divide the industrial sectors into more specific sub-sectors. By dividing it into sub-sectors, more accurate results can be estimated. Export and import dynamics, along with import tariffs, can affect each industrial sub-sector in distinct ways. Consequently, government policy implications should be tailored to address the unique needs of each sub-sector. This specificity applies to policies concerning imports, exports, tariffs, and foreign investment.

Conclusions

This research aimed to examine the role of trade openness and FDI inflows in the structural transformation of Indonesia's industrial sector using time series data from 1991 to 2021, employing the ARDL bound testing approach. The structural transformation was assessed regarding the number of workers and value-added as proxies for the industrial sector. The study confirms that exports expand the domestic industrial market share, thereby supporting an increase in the number of workers and value-added in the industrial sector. Conversely, imports do not pose a significant threat, suggesting that local industries may be susceptible to competition from imported goods featuring advanced technology and higher productivity. While foreign direct investment (FDI) positively impacts employment levels, it does not have a substantial effect on value-added. This implies that various forms of foreign investment may not all equally benefit the economy. Tariff reduction also negatively impacts the value-added industrial sector in Indonesia, indicating that tariff reductions may flood the Indonesian market with foreign products, leading to reduced competitiveness of domestic industries. Control variables show the following influences: GDP positively affects the proportion of workers and value-added in Indonesia's industrial sector, while labour productivity negatively impacts employment and positively affects value-added. The ICT variable yields unique results, indicating that increased ICT leads to a decline in the labour force and value-added in the industrial sector. This is because Indonesia's industrial sector is still dominated by low-productivity industries, which are susceptible to displacement by technological advancements.

Implications

Based on the research findings, several recommendations can be suggested as policy considerations for the transformation of Indonesia's industrial sector:

1. The government should identify latent comparative advantages oriented towards export, and incentives and facilitations for international trade should be aligned with these comparative advantages. Identifying comparative advantages is crucial to avoid misallocation that could lead to deindustrialisation.
2. Industrial development should focus on high-technology industrial clusters to enhance the value-added of the industrial sector. Countries like Taiwan and South Korea have successfully moved away from middle-income status by mastering technology and fostering innovation.
3. To enhance the capacity and skills of the workforce relevant to high-technology industries.
4. To strengthen infrastructure and logistics to reduce logistics costs, improving industrial cost efficiency.
5. Foreign Direct Investment (FDI) entering the country should target sectors based on comparative advantages. Misdirected FDI may contribute less effectively to a country's development. Foreign investments should prioritise strategic industries that bring new technology, knowledge, and managerial expertise.
6. Information and Communication Technology (ICT) can enhance productivity but may also challenge sectors that cannot keep pace with ICT advancements. Therefore, the government must ensure workforce readiness and protect sectors vulnerable to ICT developments.

Suggestions for Future Research

This research has several limitations that can be addressed as recommendations for future studies, including:

1. `The study did not differentiate industries into sub-sectors; these sub-sectors exhibit diverse productivity levels and value-added outcomes. Examining specific sub-sectors within the industry is essential for gaining insights into the dynamics of the broader industrial sector and determining which sub-sectors are most impacted by trade openness policies.
2. There is a need for more comprehensive measurements regarding trade openness, such as incorporating Indonesia's trade openness policies, like the extent of export subsidies or trade agreements.

Acknowledgements

We would like to World Development Indicators (WDI), World Integrated Trade Solutions (WITS), World Trade Organization (WTO) and National Single Window for Investment (NSWi) BKPM Indonesia for providing the secondary data for this data analysis.

Conflict of Interest

None.

Funding

The Authors received no funding for this research.

References

Alessandria, G., Johnson, R. C., & Yi, K. M. (2023). Perspectives on trade and structural transformation. *Oxford Development Studies, 51*(4), 455–475. https://doi.org/10.1080/13600818.2023.2279665

Amoah, C., & Jehu-Appiah, J. (2022). Factors driving industrialization in Africa: A panel two-stage least square approach. *Modern Economy, 13*(2), 144–158. https://doi.org/10.4236/me.2022.132010

Andreoni, A., & Tregenna, F. (2018). *Stuck in the middle: premature deindustrialisation and industrial policy* (CCRED working paper No. 11/2018). http://dx.doi.org/10.2139/ssrn.3269739

Araujo, E., Araújo, E., Peres, S. C., & Punzo, L. F. (2021). An investigation into shapes and determinants of deindustrialization processes: Theory and evidence for developed and developing countries (1970–2017). *EconomiA, 22*(2), 129–143. https://doi.org/10.1016/j.econ.2021.03.001

Betts, C., Giri, R., & Verma, R. (2017). Trade, reform, and structural transformation in South Korea. *IMF Economic Review, 65*(4), 745–791. https://doi.org/10.1057/s41308-017-0031-7

Busse, M., Dary, S. K., & Wüstenfeld, J. (2024). Trade liberalisation and manufacturing employment in developing countries. *Structural Change and Economic Dynamics, 70*, 410–421. https://doi.org/10.1016/j.strueco.2024.05.003

Cengiz, O., & Manga, M. (2024). Does economic globalization trigger de-industrialization in Western Balkan countries? Empirical evidence based on augmented mean group estimator. *Regional Science Policy and Practice, 16*(4), Article 12709. https://doi.org/10.1111/rsp3.12709

Comunale, M., & Felice, G. (2022). Trade and structural change: An empirical investigation. *International Economics, 171*, 58–79. https://doi.org/10.1016/j.inteco.2022.04.007

Emako, E., Nuru, S., & Menza, M. (2022). The role of foreign direct investment in structural change in Ethiopia. *Cogent Business and Management, 9*(1), Article 2154106. https://doi.org/10.1080/23311975.2022.2154106

Gandjon Fankem, G. S., & Feyom, C. (2023). Is trade openness a barrier to industrialization? Evidence from Sub-Saharan Africa. *Review of World Economics, 160*(2), 713–759. https://doi.org/10.1007/s10290-023-00497-2

Grabowski, R., & Self, S. (2023). Are the drivers of structural change different in Asia and Africa?. *Applied Economics*. https://doi.org/10.1080/00036846.2023.2257930

Kaba, K., Lin, J. Y., & Renard, M. F. (2022). Structural change and trade openness in sub-Saharan African countries. *The World Economy, 45*(7), 2101–2134. https://doi.org/10.1111/twec.13261

Kacou, K. Y. T., Kassouri, Y., Evrard, T. H., & Altuntaş, M. (2022). Trade openness, export structure, and labor productivity in developing countries: Evidence from panel VAR approach. *Structural Change and Economic Dynamics, 60*, 194–205. https://doi.org/10.1016/j.strueco.2021.11.015

Khobai, H., & Moyo, C. (2021). Trade openness and industry performance in SADC countries: is the manufacturing sector different?. *International Economics and Economic Policy, 18*(1), 105–126. https://doi.org/10.1007/s10368-020-00476-0

Lin, J. Y. (2011). New structural economics: A framework for rethinking development. *World Bank Research Observer, 26*(2), 193–221. https://doi.org/10.1093/wbro/lkr007

Lin, J. Y. (2014). Industrial policy revisited: A new structural economics perspective. *China Economic Journal, 7*(3), 382–396. https://doi.org/10.1080/17538963.2014.949025

Lin, J. Y. (2017). Industrial policies for avoiding the middle-income trap: A new structural economics perspective. *Journal of Chinese Economic and Business Studies, 15*(1), 5–18. https://doi.org/10.1080/14765284.2017.1287539

Mamba, E., Gniniguè, M., & Ali, E. (2020). Effect of foreign direct investment on structural transformation in West African Economic and Monetary Union (WAEMU) countries. *Cogent Economics & Finance, 8*(1), Article 1783910. https://doi.org/10.1080/23322039.2020.1783910

Matsuyama, K. (2019). Engel's law in the global economy: Demand-induced patterns of structural change, innovation, and trade. *Econometrica, 87*(2), 497–528. https://doi.org/10.3982/ecta13765

Mignamissi, D., & Nguekeng, B. (2022). Trade openness-industrialization nexus revisited in Africa. *Economic Change and Restructuring, 55*(4), 2547–2575. https://doi.org/10.1007/s10644-022-09401-8

Mijiyawa, A. G. (2017). Drivers of structural transformation: The case of the manufacturing sector in Africa. *World Development, 99*, 141–159. https://doi.org/10.1016/j.worlddev.2017.07.007

Mühlen, H., & Escobar, O. (2020). The role of FDI in structural change: Evidence from Mexico. *World Economy, 43*(3), 557–585. https://doi.org/10.1111/twec.12879

Müller, P. (2021). Impacts of inward FDIs and ICT penetration on the industrialisation of Sub-Saharan African countries. *Structural Change and Economic Dynamics, 56*, 265–279. https://doi.org/10.1016/j.strueco.2020.12.004

NSWI. (n.d.). *Perkembangan investasi Indonesia [Development of Indonesian investment]*. https://nswi.bkpm.go.id/data_statistik

Oduola, M., Bello, M. O., & Popoola, R. (2022). Foreign direct investment, institution and industrialisation in Sub-Saharan Africa. *Economic Change and Restructuring, 55*(2), 577–606. https://doi.org/10.1007/s10644-021-09322-y

Osakede, U. A., & Adenikinju, O. O. (2022). Trade liberalization and manufacturing sector performance: Evidence from the economic community of West African states. *Nigerian Journal of Economic and Social Studies, 64*(1), 119–146.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289–326. https://doi.org/10.1002/jae.616

Pesaran, M. H., & Smith, R. P. (1998). Structural analysis of cointegrating VARs. *Journal of Economic Surveys, 12*(5), 471–505. https://doi.org/10.1111/1467-6419.00065

Petreski, M., Jovanovic, B., & Velickovski, I. (2017). Tariff-induced (de)industrialization: An empirical analysis. *Comparative Economic Studies, 59*(3), 345–381. https://doi.org/10.1057/s41294-017-0030-8

Pineli, A., Narula, R., & Belderbos, R. (2021). FDI, multinationals and structural change in developing countries. In N. Foster-McGregor, L. Alcorta, A. Szirmai, & B. Verspagen (Eds.), *New Perspectives on Structural Change: Causes and Consequences of Structural Change in the Global Economy* (pp. 494–523). Oxford University Press. https://cris.maastrichtuniversity.nl/en/publications/fdimultinationalsandstructuralchangeindevelopingcountries

Rauf, A., Zhang, J., Li, J., & Amin, W. (2018). Structural changes, energy consumption and carbon emissions in China: Empirical evidence from ARDL bound testing model. *Structural Change and Economic Dynamics, 47*, 194–206. https://doi.org/10.1016/j.strueco.2018.08.010

Rostow, W. W. (1959). The stages of economic growth. *The Economic History Review, 12*(1), 1–16. https://doi.org/10.2307/2591077

Saba, C. S., & Ngepah, N. (2023). Empirics of convergence in industrialisation and their determinants: Global evidence. *Discover Sustainability, 4*(1), Article 25. https://doi.org/10.1007/s43621-023-00136-8

Samargandi, N. (2018). Determinants of labor productivity in MENA countries. *Emerging Markets Finance and Trade, 54*(5), 1063–1081. https://doi.org/10.1080/1540496X.2017.1418658

Syrquin, M. (2010). Kuznets and Pasinetti on the study of structural transformation: Never the Twain shall meet?. *Structural Change and Economic Dynamics, 21*(4), 248–257. https://doi.org/10.1016/j.strueco.2010.08.002

Tahir, M., Ruiz Estrada, M., Khan, I., & Afridi, M. A. (2016). The role of trade openness for industrial sector development: Panel data evidence from SAARC region. *Journal of Asia Business Studies, 10*(1), 93–103. https://doi.org/10.1108/JABS-01-2015-0007

Teignier, M. (2018). The role of trade in structural transformation. *Journal of Development Economics, 130*, 45–65. https://doi.org/10.1016/j.jdeveco.2017.09.002

Todaro, M. P., & Smith, S. C. (2015). *Economic development* (13th ed.). Pearson.

Uy, T., Yi, K. M., & Zhang, J. (2013). Structural change in an open economy. *Journal of Monetary Economics, 60*(6), 667–682. https://doi.org/10.1016/j.jmoneco.2013.06.002

van Neuss, L. (2019). The drivers of structural change. *Journal of Economic Surveys, 33*(1), 309–349. https://doi.org/10.1111/joes.12266

Vu, K. M. (2017). Structural change and economic growth: Empirical evidence and policy insights from Asian economies. *Structural Change and Economic Dynamics, 41*, 64–77. https://doi.org/10.1016/j.strueco.2017.04.002

WITS. (n.d.). *World integrated trade solution*. https://wits.worldbank.org/

Wood, A. (2019). Globalization and structural change around the world, 1985–2015. *World Bank Research Observer, 34*(1), 65–94. https://doi.org/10.1093/wbro/lky009

World Bank. (n.d.). *World development indicator*. https://data.worldbank.org/