

## Structural transformation, poverty, and inequality in emerging countries

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**Abstract.** *This study makes a valuable contribution to the existing literature by examining the impact of structural transformation on poverty reduction in 13 emerging economies during the period 2008-2018. The research utilizes a generalized method of moments (GMM) dynamic panel regression technique to identify the key drivers of poverty and inequality reduction. The findings reveal that structural change significantly contributes to poverty and income inequality reduction in the emerging economies under consideration. Specifically, the service sector and industry sector play pivotal roles in eradicating poverty and income inequality in these countries. However, the results suggest also that the agricultural sector may not be the most efficient means of reducing poverty and inequality in emerging economies. To increase its impact on poverty reduction, it is crucial to modernize and transform the agricultural sector into an agribusiness.*

**Keywords:** emerging countries, GMM, inequality, poverty, structural transformation.

**JEL Classification:** E24, F16, I32, J31.

## 1. Introduction

Over the past two decades, emerging economies have witnessed impressive economic expansion, outpacing that of developed countries (IMF, 2023). This economic growth has significantly reduced poverty in many developing regions. Since the seminal work of Bourguignon (2004), a multitude of theoretical and empirical studies have emerged examining the relationship between poverty, inequality, and economic growth. A consensus has emerged that achieving sustained inclusive growth is crucial to alleviate both poverty and inequality (Mlachila et al., 2017).

Poverty can be explored as one of the basic features of unsustainable socio-economic development and as a persistent phenomenon that can disturb people's lives (Bossert et al., 2022). As highlighted in the latest United Nations Report (2021) in the 2030 Agenda for Sustainable Development, the first goal aims to eradicate poverty in all its forms everywhere. Inequality may take many different forms and refers to the unequal distribution of resources, opportunities, and rewards within a community or between various groups of people. Undoubtedly, one of the biggest dangers to societal stability is wealth disparity (Kharlamova et al. 2018).

Indeed, achieving poverty reduction, reducing inequalities, and promoting inclusive growth necessitate coupling gross domestic product growth with dynamic and substantial structural transformation across various economic sectors (African Development Bank, 2019). Addressing this challenge is essential for better socioeconomic and human development (Khan, 2019). However, social economists are currently focusing on the concept of poverty as a key facet of sustainable development. For example, according to McMillan and Rodrik (2011), countries that have experienced structural changes in their economic activity have successfully lifted themselves out of poverty and achieved higher levels of prosperity. For Barbier and Hochard (2014), in developing countries, the simple impact of growth on poverty reduction is clarified by the fact that a larger share of the population lives on agricultural land, which is less advantageous to production.

Over the last decade, emerging countries have made great strides toward reducing poverty. In certain instances, the economic transformation process has sparked wage and productivity growth, assisting in the eradication of poverty. Also, in emerging countries, agriculture is still undeveloped and characterized by poor production. As a result, it appears that this country's agriculture sector is not going to be able to eradicate poverty. To escape the middle-income trap, these nations need to go through a transition. The government is worried about the shift from an agriculture-based nation to one that places a priority on added value from the manufacturing sector. The structural change will boost added value in addition to boosting productivity since it will employ more employees in the manufacturing sector and provide commodities from upstream to downstream, promoting more inclusive economic growth (Kim et al., 2018). Structural change reflected the redistribution of economic activity from low-productivity sectors to high-productivity sectors. As such, it helps ensure strong, sustainable, and inclusive growth (UNCTAD,

2016). It is usually marked by at least two stylized facts: either the strengthening of the share of the manufacturing sector and high-value-added services in GDP and a rapid reduction in the share of agriculture, or the decrease in the share of agricultural employment and the movement of workers to other more productive sectors of the economy.

Structural transformation is one of the main components of economic development, as the resource effect should lead to higher overall productivity and therefore higher incomes. It is broadly defined as the reallocation of resources from low-productivity activities (traditionally identified with agriculture) to high-productivity activities (industries and services). Support for industrial policy has become a necessary condition for structural transformation in most industrial economies today. This means that industrial policy support has become a prerequisite for structural change. Industrial policy refers to a specific type of policy aimed at reshaping the production structure of a sector to enhance the potential for economic growth (Pack and Saggi, 2006). Structural change consists of shifting economic activity among the three main sectors of the economy: agriculture, manufacturing, and services, to ensure future growth.

Therefore, this paper aims to seal the empirical gaps in the current literature and contribute to the debate on sustainable development goals in emerging countries. To our best knowledge, no research has referred to the case of emerging countries by examining the influence of structural transformation on poverty and inequality. The main motivation for this research, compared to other associated studies, is to investigate the role of structural transformation on income distribution, inequality, and poverty reduction in emerging countries that are experiencing radical changes in their economic structures, by providing support based on a solid theoretical and empirical background.

The current study aims to fill the theoretical and empirical lacunas in the existing literature and contribute to the debate in various ways. We verify the extent to which structural transformation affects the probability of escaping from poverty and inequality in emerging countries and identify that if agricultural incomes increase, it will help reduce the inequality arising from rapidly increasing income from other sources for a panel of 13 emerging countries<sup>(1)</sup> over the period 2008-2018. To test this hypothesis, we use the generalized method of moments (GMM). Our study focuses only on emerging countries. This is particularly important for two main reasons. Emerging countries, which heavily rely on industrial and manufacturing as these countries have been transforming their economic profiles from agriculture into the manufacturing and service industries (Naudé et al. 2013). Furthermore, agriculture remains underdeveloped and is characterized by low productivity in emerging countries.

The rest of the paper is organized as follows. Section two is about the descriptive analysis of data on structural transformation and poverty. Section three presents the empirical review and section four presents the method of analysis and the data used. Section five discusses the empirical results, while section six concludes the paper.

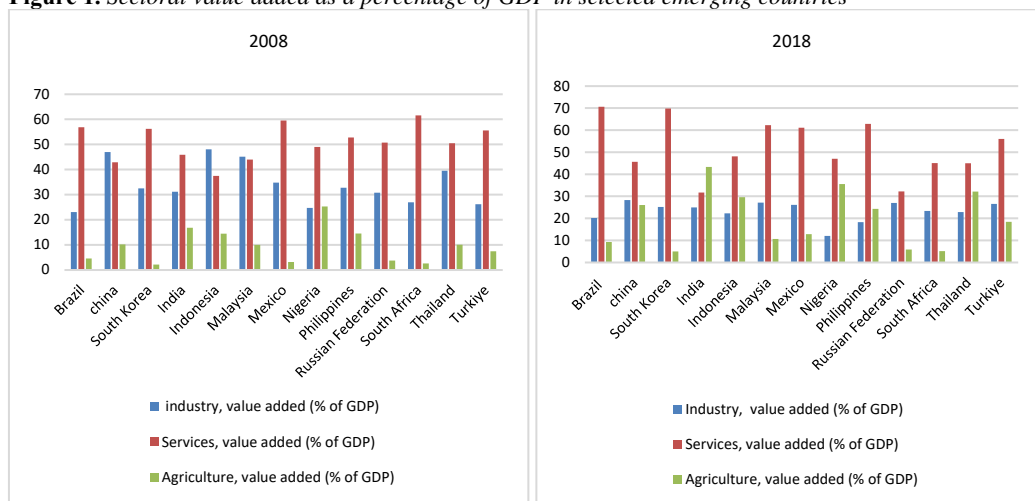
## 2. Evolution of structural transformation and poverty in emerging countries

### 2.1. Structural Transformation in Emerging Countries

In recent years, many emerging economies have experienced substantial industrialization, which has greatly aided their economic development. Manufacturing, mining, building, and energy production are examples of industries. Another vital part of the GDP in emerging economies is the services sector. A vast range of activities, such as finance, tourism, transportation, education, healthcare, and more, are included in the services sector.

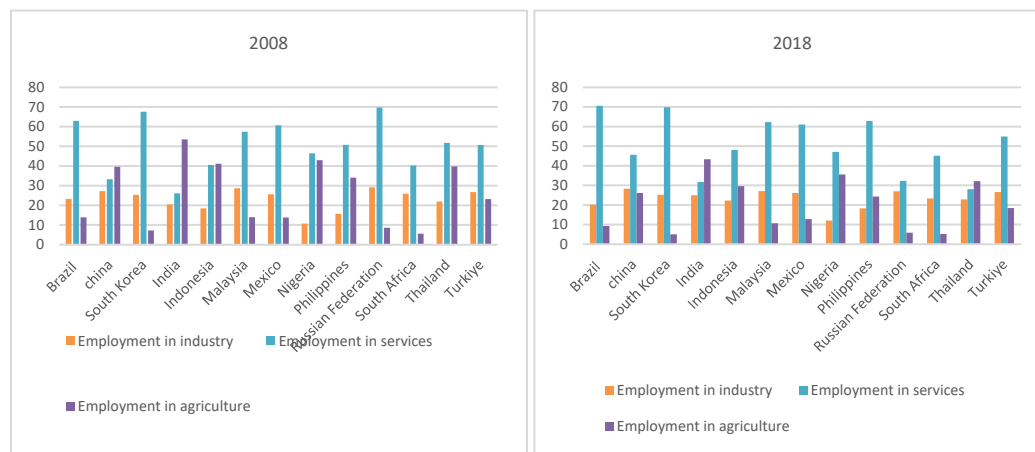
Figure 1 shows that industrial activities and services in emerging countries have the largest percentage of GDP in 2018, while the agricultural sector had only a very low added value in GDP. Therefore, sectoral added value comes mainly from the industrial sector and the service sector. Structural change implies a movement of labor from traditional to modern activities. This subsequently leads to a reorientation of productivity to diversify and modernize it by embracing labor from the agricultural sector, which is the primary employer sector in certain developing nations.

**Figure 1.** Sectoral value added as a percentage of GDP in selected emerging countries



**Source:** World Bank (WDI).

Figure 2 shows that structural transformation in emerging countries seems to be moving in the right direction. The shift in employment patterns transfers the focus from the less productive sectors, such as agriculture, to the more productive ones, such as industry and services between 2008 and 2018.

**Figure 2.** Distribution of employment (% total employment by sector)

Source: World Bank (WDI).

## 2.2. Poverty and inequality situation in emerging economies

Poverty refers to the condition where a person or community lacks the basic material, social, and economic resources needed to lead a decent and satisfying life. This can include a lack of access to food, housing, healthcare, education, decent employment, and other basic needs. Poverty reduction is a key objective for many governments and international organizations to create a more equitable society and improve the living conditions of vulnerable populations. According to the United Nations (2021), approximately 10% of the world's population lives in horrendous poverty and struggles to meet its basic needs, such as health, education, sanitation, and access to water, among others.

In this study, we will use three indices of poverty which are the most popular. The first index is the poverty rate (PR), which is the percentage of the population living below the poverty line (\$1.90 per day). The poverty gap index (PGI) of \$1.90 per day is a measure of the average lack of income or consumption compared to the poverty line of \$1.90 per day. It measures the average shortfall in income or consumption of people living below the poverty line from the line itself. It examines not only who is poor but also how far below the poverty line they are. The Gini index (GINI) reflects the extent to which the distribution of income between individuals is equal. The Gini Index is the value that shows the level of income or wealth inequality in the population being studied. A lower Gini Index indicates a more equal distribution, while a higher index implies greater inequality.

Figure 3 shows that the poverty rate has been significantly reduced in emerging countries in recent years except in South Africa, but it remains high, especially in Nigeria and India. The poverty gap has decreased, particularly in China, but it has increased in South Africa. In Mexico and South Africa, people who live below the poverty line are very far from the \$ 1.90-a-day line. Income inequality in certain emerging countries slightly increased but the levels are still higher, where a significant portion of the population lives on very low incomes while a smaller segment enjoys higher levels of wealth.

**Figure 3.** Share of poor population in emerging countries

Source: World Bank (WDI).

### 3. Review of Empirical Literature

#### 3.1. Structural transformation and poverty

The empirical literature that contributes to the subject continues in a premature stage. These studies vary depending on the measure of poverty used, the countries included in the data set, and the determinants of poverty. However, the impact of structural poverty transformation processes in all emerging economies has received little attention and needs to be demonstrated. Among previous investigations related to the impact of structural transformation on poverty reduction, UNIDO (2012) has emphasized that the process of structural change has been accompanied by a decrease in the poverty rate in Brazil, Russia, India, China, and the country of South Africa (BRICS) over the period 1984–2004. This process has had the greatest effect in China, where the poverty rate has fallen from 15% to 3% over this period. This reduction is explained by the migration of poor inhabitants from rural areas to urban areas and their jobs in the manufacturing sector. In other countries,

poverty reduction is sorted by economic growth, industrialization, and policy distribution. Similar results are obtained by Kahya (2012) who shows, for a sample of ASEAN countries (Malaysia, Indonesia, Thailand, and the Philippines) using the OLS method, that the impact of structural changes on poverty has been meaningful and positive in all countries. More recently, Lee (2018) uses the GMM system method and a panel comprising 30 countries over the period 1990–2014. He indicates that poverty reduction can be alleviated through structural reforms.

Lin J. (2019) demonstrates how structural changes impact individuals' income in both rural and urban areas before introducing a new structural economics approach to eradicating poverty. The findings indicate that boosting personal income is the initial step in reducing and ultimately eliminating poverty. New technology and job prospects will frequently coexist with structural changes in both rural and urban regions, helping individuals increase their wages. In a similar vein, Lugo et al. (2022) reveal that structural transformation have been the main driver of poverty reduction in China by creating better-paying employment and raising worker productivity.

Several works have highlighted the role of the industrial sector in poverty reduction (Cadot et al., 2016; Erumban and Vries, 2021 and Lin C. et al., 2022). The study by Cadot et al. (2016) of 35 sub-Saharan African countries concludes that the industrial sector has a better track record of eradicating poverty than the agriculture and service sectors. Similarly, Erumban and Vries (2021), using data from 42 developing nations collected over 28 years, show that structural change and expansion in the manufacturing sector are positively and significantly associated with poverty reduction. In a related study, Lin et al (2022) found a positive relationship between regional economic growth and China's local industrial reduction of poverty.

Interestingly, few studies focus on the link between the service sector and the reduction of poverty like Rifa and Listiono (2021) and Kamaludin A. (2023). Rifa and Listiono (2021) demonstrate that the service sector has a significant and positive effect on poverty reduction for 38 East Java cities during the period 2012–2015, whereas they assumed that the role of the industrial sector was not significant. Therefore, this study suggests that the service sector is more effective in reducing poverty. According to Kamaludin A. (2023), when communities with an agricultural dominating basis have enough or have changed to other sectors in addition to the service sector, there is a clear association between the fall in the number of rural poor people and the shift to the third sector.

### 3.2. Structural transformation and inequality

The relationship between structural change and inequality in the development process was well articulated in early works by Lewis A. (1954) and Kuznets S. (1955). These authors formulated a working hypothesis that, at the initial level of development, economic growth accelerates in the modern sector while wage rates in the traditional sector remain relatively lower due to unlimited labor supply, thereby increasing the degree of income inequality at the national level. The premise here is that inequality in the traditional sector is substantially smaller (owing to unequal production levels), but inequality in the modern

sector is considerable. So, the existing literature presents conflicting positions regarding the impact of structural change on reducing inequality.

Nangarumba (2015) outlined the common issue that developing countries face, which is their propensity to leave the agricultural sector in favor of advancement in the industrial sector. Many employees in the agricultural sector are uneducated. A large percentage of the agriculture industry's workforce lives in poverty. In contrast, the growth of the industrial and service sectors can help to lessen inequality in developed nations. This is because people in industrialized countries tend to have higher levels of education and utilize technology very quickly, which can motivate them to work in the industrial sector.

The study by Morsy et al. (2023) highlighted that the flow of workers from low to high-productivity sectors might increase by one standard deviation, which would reduce overall inequality by 0.5 percent and opportunity inequality by 1.1 percent. They suggest that swift structural change might result in a long-term decline in inequality in Africa. Wang et al. (2023) and Chen (2016) are examples of this line of research. These studies investigate the impact of industrialization and urbanization on reducing inequality.

However, Roy and Roy (2017) provide further evidence of the negative effect of structural transformation on reducing inequality in 217 countries from 1991 to 2014. The authors found that the process of structural transformation enhances income inequality, while trade liberalization and FDI inflows assist in alleviating it. Income distribution is more equitable in infrastructure development. Capello and Cerisola (2023) show that reallocation towards higher value-added sectors in Central and Eastern European countries (CEECs) could lead to higher regional inequalities. Sectoral transition is a tough process since it is dependent on the long-term sectoral composition of countries and regions as well as the fact that job-specific skills are not simply transferrable from one industry to another.

Given the foregoing discussion, it is worth noting that most empirical studies have been limited to evaluating the impact of the industrial and service sectors on reducing poverty and inequality in emerging countries. Consequently, our research is inspired to clarify this effect.

#### 4. Methodology and Data

This section outlines the research methods used to examine the relationship between structural change and poverty.

##### 4.1. Model

The model for the analysis of "structural transformation and poverty" was extended to the model used by Rifa and Listiono (2021).

$$Poverty_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 ST_{it} + V_t + U_i + \varepsilon_{it}$$

Where poverty is the poverty index,  $i$  and  $t$  represent a country and time, respectively. In addition,  $X_{it}$  is a vector of explanatory variables;  $ST_{it}$  represents the variables related to structural transformation;  $U_i$  is a country-specific effect;  $V_t$  is a time-specific effect and  $\varepsilon_{it}$  is an error term.



## 4.2. Variables and Data Sources

We use panel data from 13 emerging countries from 2008 to 2018. The data for targeted variables has been collected from World Development Indicators (WDI) and other databases.

The explanatory variables chosen are those that are often used in empirical research on structural change and poverty. Table 1 provides a description and definition of the explanatory variables. We use the poverty gap at \$1.90 per day (PPP 2011) (PGI), the poverty rate (% of the population) (PR), and the Gini index (I. Gini) as the dependent variables.

**Table 1.** Presentation of explanatory variables

	Variable	Definition
Indicator of structural transformation	VAJ-IND	Industry, value added (% of GDP)
	VAJ-SER	Service, value added (% of GDP)
	VAJ-AGR	Agriculture, value added (% of GDP)
	EMP-IND	Employment in industry (% of total employment)
	EMP-SER	Employment in services (% of total employment)
	EMP-AGR	Employment in agriculture (% of total employment)
Control variables	FDI	Foreign Direct Investment (% GDP)
	OPE	Trade opening (X+M) (% GDP)
	RD	Research and development expenditure (% of GDP)
	EDU	Public expenditure on education (% of GDP)
	INT	Internet users (% of the population)

The estimation model with the three poverty indicators is expressed as follows:

In the first model, we use the poverty rate as a poverty proxy.

$$PGI_{it} = \beta_0 + \beta_1 PGI_{it-1} + \beta_2 X_{it} + \beta_3 ST_{it} + V_t + U_i + \varepsilon_{it} \quad (1)$$

In the second model, the PGI is a poverty proxy.

$$PR_{it} = \beta_0 + \beta_1 PR_{it-1} + \beta_2 X_{it} + \beta_3 ST_{it} + V_t + U_i + \varepsilon_{it} \quad (2)$$

In the third model, we use the GINI index as a measure of the equality of income distribution between individuals.

$$Gini_{it} = \beta_0 + \beta_1 Gini_{it-1} + \beta_2 X_{it} + \beta_3 ST_{it} + V_t + U_i + \varepsilon_{it} \quad (3)$$

## 5. Result and discussion

The outcomes of the estimation between structural transformation and poverty in emerging nations are presented in Tables (2), (3), and (4).

### 5.1. Structural Transformation and Poverty

The dependent variables are, respectively, the poverty rate (PR) and the poverty gap index (PGI). In the first regression, structural transformation is measured by sectoral value added (Table 2), while in the second regression, it is measured by sectoral employment (Table 3). The coefficient associated with lagged poverty (L.) has a positive and statistically

significant impact on poverty. The population was already experiencing high levels of poverty in the previous year, it is probable that this poverty will persist partially due to structural and systemic barriers that don't resolve rapidly. This result is consistent with the study of Nessa et Imai (2023) who show that once one falls into the working-poor trap, it is challenging to escape without external shocks.

A potentially fundamental element of poverty elimination is the industrial sector, whose results show that the coefficients of (VAJ.IND) and (EMP.IND) are negative and significantly reduce poverty. These findings are in line with those of Amadou et Aronda (2020), Cadot et al. (2016), and Unido (2012). The emerging countries have experienced, over the last 30 years, one of the most remarkable economic transformations in history. It's moving from a centrally planned economy to a market-oriented economy, which has led to rapid industrialization, urbanization, and export-led growth (ILO, 2020). As a result, the industrial sector significantly contributed to the growth of workers, both directly via the production and manufacturing processes and indirectly through the supply chain and related services.

Our empirical outcome of the service sector (VAJ-SER) and (EMP-SER) indicates a negative and significant effect on poverty. This estimation means that the higher the structural changes in the service sector, the lower the ordinary expenditure gap of each poor person to the poverty line. The service sector outcome is equally in concordance with Rifa and Listiono (2021). The service sector has been a major source of employment in emerging countries, providing jobs for a significant portion of the population. Services trade is essential to economic growth, job creation, and value chain participation.

The contribution of the agriculture sector has an insignificant relationship with poverty. Our findings tie in with the findings of Ferreira et al. (2010) but contradict studies like Obiakor et al. (2021) and Enongene (2023). This means that increasing the contribution of the agricultural sector to GDP will increase poverty levels. The agriculture sector suffers from difficulties in emerging countries. A significant portion of agriculture is subsistence farming, where farmers primarily produce for their consumption. This can limit their ability to generate surplus income to escape poverty. Also, outdated farming practices, a lack of access to modern technology, and inadequate infrastructure can lead to low agricultural productivity. Insufficient yields can prevent farmers from generating sufficient income.

The control variables introduced into the structural transformation equation also have the coefficients indicated in the theoretical predictions. The coefficient of (FDI) is negative and statistically significant. These results are similar to those of the study by Ahmed et al. (2019), they show that FDI has a highly significant impact on reducing poverty in ASEAN and SAARC countries. Emerging countries in the region that draws the most FDI in research and development (R&D), which is influenced by factors like Industry 4.0 initiatives in countries, which include the digital economy and industries related to infrastructure, like electricity or information and communications technology, OCDE (2022). To preserve their technical power, emerging nations have a long history of

scientific research and continue to spend on R&D. Thus, a high level of research and development serves to reduce poverty. The variable measuring trade openness appears with a negative and significant sign. Indeed, openness significantly reduces poverty. This result is consistent with the study of Nissa et Imai (2023). Many emerging countries implement supportive policies to boost ICT development, such as mobile Internet. So, for the quality of infrastructure, measured by the number of internet users (INT), the coefficient of this indicator is also found to be statistically significant, negatively indicating that access to the internet reduces poverty. These results corroborate the findings of Yang et al. (2021).

The education systems of emerging countries have achieved in quality. Some universities made it to the top degree of universities in the world, but these countries are preferably hardly represented in the top 1000 universities in the world, given the demographic strength, and the size of their education effort (in terms of enrolments) (Wolhuter, 2023). Our results confirm that and indicate that public spending on education (EDU) reduces poverty in emerging countries. This outcome is consistent with the research of Ngepah et al. (2022), which demonstrates that a person with a primary school education will have a 1% lower sensitivity to poverty.

**Table 2.** The relationship between structural transformation (sectoral value added) and poverty

Variables	Dependent variable: PR			Dependent variable: PGI		
	(1)	(2)	(3)	(1)	(2)	(3)
L.	0.837*** (0.022)	0.779*** (0.046)	0.729*** (0.030)	0.492*** (0.164)	0.511** (0.259)	0.562* (0.319)
FDI	-0.368** (0.183)	-0.312* (0.184)	-0.105 (0.192)	0.1495* (-0.089)	-0.070 (0.412)	-0.414** (0.184)
OPE	0.005 (0.007)	-0.014** (0.007)	-0.016** (0.007)	-0.007 (0.009)	-0.076** (0.037)	-0.027* (0.015)
R&D	0.176 (0.278)	-0.069 (0.395)	0.568 (0.499)	-0.933*** (0.313)	-2.150* (1.160)	-4.040* (2.270)
EDU	0.241 (0.168)	-0.434** (0.216)	-0.917*** (0.236)	-1.692*** (0.581)	0.14311 (0.443)	-1.242 (0.833)
INT	-0.026*** (0.008)	-0.017 (0.016)	-0.020** (0.009)	-0.033** (0.016)	0.028 (0.022)	-0.0178 (0.015)
VAJ. IND	-0.874*** (0.030)			-0.280** (0.126)		
VAJ. SER		-0.732* (0.042)			-0.503** (0.242)	
VAJ. AGR			0.302*** (0.059)			0.085** (0.427)
Constant	3.790** (1.933)	5.453* (2.989)	-3.265 (2.553)	1.058*** (9.519)	5.548** (2.511)	3.313*** (0.998)
Observations	145	145	145	144	137	144
Ar1p	0.258	0.270	0.264	0.0668	0.0652	0.0255
Ar2p	0.945	0.843	0.833	0.982	0.921	0.963
Sarganp	0.961	0.988	0.962	0.944	0.744	0.739
Hansenp	0.923	0.971	0.903	0.941	0.738	0.752
Number of instruments	13	11	14	12	11	12
Heterogeneity test	0.0	0.25	0.23	0.81	0.12	0.28

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3.** *The relationship between structural transformation (sectoral employment) and poverty*

Variables	Dependent variable: PR			Dependent variable: PGI		
	(1)	(2)	(3)	(1)	(2)	(3)
L.	0.342* (0.185)	0.737*** (0.029)	0.714*** (0.027)	0.397** (0.156)	0.410** (0.165)	0.479*** (0.146)
FDI	-0.287 (0.195)	-0.141 (0.167)	-0.520*** (0.081)	-0.271 (0.209)	-0.312 (0.228)	-0.223 (0.217)
OPE	-0.033*** (0.012)	-0.015** (0.007)	-0.028*** (0.007)	-0.027*** (0.009)	-0.023*** (0.008)	-0.015** (0.007)
R&D	5.209** (2.081)	0.401 (0.380)	0.314 (0.265)	-1.353*** (0.428)	-0.669** (0.333)	-0.595* (0.324)
EDU	-0.743 (0.513)	0.238 (0.148)	-0.693*** (0.224)	-0.877*** (0.257)	-0.843*** (0.268)	-0.549** (0.256)
INT	-0.160*** (0.050)	-0.012** (0.006)	-0.0198** (0.008)	-0.030** (0.012)	-0.048*** (0.017)	-0.047*** (0.017)
EMP.IND	-1.558*** (0.529)			-0.340*** (0.106)		
EMP.SER		-0.114*** (0.018)			-0.0621*** (0.023)	
EMP.AGR			0.134*** (0.038)			0.077** (0.031)
Constant	5.622*** (1.167)	-0.111 (0.209)	-0.504 (1.431)	-4.526*** (1.744)	0.612 (1.250)	5.481** (2.325)
Observations	145	138	145	144	137	144
Ar1p	0.506	0.250	0.259	0.066	0.065	0.025
Ar2p	0.435	0.791	0.921	0.982	0.921	0.963
Sarganp	0.814	0.550	0.493	0.944	0.744	0.739
Hansenp	0.805	.513	0.459	0.944	0.744	0.739
Number of instruments	12	12	14	12	11	12
Heterogeneity test	0.28	0.07	0.12	0.81	0.12	0.28

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 5.2. Structural transformation and inequality

Table 4 below presents the results of the econometric estimations of the interrelationship between structural transformation and the inequality model.

The result demonstrates path dependence, as the lagged dependent variable is determined to be positive and significant. As a result, if inequality exists now, it will likely persist in the future if it is not controlled. These findings are corroborated by the work of Roy and Roy (2017).

The estimation results show that structural changes to the industrial sector due to the negative coefficients of the variables (VAJ.IND) and (EMP.IND) tend to make income distribution more equal. In countries where the proportion of employment in industry has constantly increased, inequality tends to be lower. The results are consistent with the previous conclusion of Baymul and Sen (2020). Our empirical outcome of the service sector (VAJ-SER) indicates a negative and significant effect on income distribution. On the other hand, the service sector reduces income inequality. This is in line with the findings of Morsy et al. (2021). Uniquely, the coefficient of SER-EMP is, as expected, negative but not statistically significant. According to the findings, nations that have consistently increased their share of employment and value-added in industry, followed by services, have a lower rate of inequality.

The VAJ-AGR and EMP-AGR coefficients are significant and positive, indicating that where agriculture has stalled and its employment share has increased, there appears to be high inequality. Our findings tie in with the findings of Kahya (2012) but contradict the studies of Romli (2016) who shows that agriculture was a sharing industry that was successful in reducing income disparities. However, it was shown that the sharing sectors of industry and service increased income disparities.

Concerning the control variables introduced into the structural transformation, we found that the coefficients for foreign direct investment (FDI) are positive and statistically significant. A positive correlation between FDI and the Gini index suggests that demographic groups may disproportionately benefit from foreign investment. This may result in a concentration of income and wealth among a small group, thereby escalating income inequality. Huang et al. (2020) found the same results and suggested that FDI may increase income inequality as a country initially develops.

The coefficient of Trade Openness (TO) is significant and negative but low; this could indicate that openness to international trade has had a relatively limited impact on the reduction of economic inequality in emerging countries. These results are comparable to those of Dorn et al. (2020).

The results illustrate that R&D reduces inequality in emerging countries. In this context, Chan et al. (2022) find that a higher R&D subsidy rate decreases the ratio of asset income to wage income, so it would have a decreasing or even a U-shaped effect on income inequality.

**Public spending on education (EDU) increases inequality in emerging countries.**

Access to quality education is not equitably distributed in society, which can reinforce pre-existing inequalities. Individuals from higher socio-economic backgrounds often have more resources to access better education, which can perpetuate disparities. According to Yan and Qui (2015), education increases inequality because poor families invest less in their children's early education than wealthy families; as a result, their children attend lower-quality schools, making them less likely to pursue higher education.

For the quality of infrastructure, measured by the number of internet users (INT), the coefficient of this indicator is also found to be statistically significant, negatively indicating that access to the internet reduces inequality.

**Table 4.** *The relationship between structural transformation and income distribution*

	Dependent variable: GINI INDEX					
	(1)	(2)	(3)	(4)	(5)	(6)
L.	0.492*** (0.164)	0.511** (0.259)	0.562* (0.319)	0.955*** (0.100)	0.985*** (0.041)	0.797*** (0.143)
FDI	0.149* (0.089)	-0.070 (0.412)	0.414** (0.184)	0.032 (0.101)	0.029 (0.031)	-0.275 (0.179)
OPE	-0.007 (0.009)	-0.076** (0.037)	-0.027* (0.015)	-0.001 (0.010)	0.005 (0.004)	-0.016* (0.010)
R&D	-0.933*** (0.313)	2.150* (1.160)	-4.040* (2.270)	0.442 (0.739)	-0.482** (0.214)	-2.028 (1.624)
EDU	1.692*** (0.581)	0.143 (0.443)	-1.242 (0.833)	0.212 (0.272)	0.4621*** (0.148)	-0.439 (0.439)
INT	-0.033** (0.016)	0.028 (0.022)	-0.017 (0.015)	-0.011** (0.005)	-0.014*** (0.004)	-0.024 (0.021)
VAJ. IND	-0.280** (0.126)					
VAJ. SER		-0.503** (0.242)				
VAJ. AGR			0.857** (0.427)			
EMP.IND				-0.245* (0.141)		
EMP.SER					-0.005 (0.12)	
EMP.AGR						0.152* (0.085)
Constant	1.264 (0.378)	1.395*** (1.265)	0.967 (0.118)	7.00311* (3.749)	-1.85184 (2.674)	2.627 (0.075)
Observations	144	144	144	144	137	144
Number of ids	12	12	12	12	11	12
Ar1p	0.046	0.341	0.144	0.040	0.055	0.066
Ar2p	0.572	0.696	0.932	0.710	0.404	0.659
Sarganp	0.859	0.448	0.860	0.200	0.969	0.966
Hansenp	0.862	0.496	0.753	0.325	0.932	0.954
Number of instruments	12	11	11	12	11	13
Heterogeneity test	0.45	0.78	0.41	0.49	0.45	0.41

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Conclusion

The driving objective of this study was to emphasize the causal impact of the structural transformation on poverty and inequality reduction in emerging countries over the period 2008–2018. We used the GMM system to analyze these interrelationships.

According to the results, poverty and inequality tend to rise when the share of value-added and employment in agriculture increases. Despite industry and service sectors tending to decrease it. If labor mobility is shifted from traditional to modern sectors, emerging countries can reduce poverty and inequality better. Other indicators, such as research and development expenditure, the internet, and trade openness, have been shown to reduce poverty and inequality in the study. Despite the reduction of poverty, the problem of inequality has worsened due to FDI and public education spending in emerging countries.

The study has a significant impact on the literature by introducing numerous important dimensions for policy analysis. Emerging economies are demanding sound policies to

reduce income distribution and poverty through structural transformation, infrastructure development, and trade liberalization. FDI and education can be chosen as policy instruments to reduce poverty and inequality. As a result, emerging nations have implemented policy reforms to attract FDI. They have improved business conditions by lowering bureaucratic hurdles, simplifying rules, and strengthening investor protection. They must also initiate collaborations in higher education through student and faculty exchange programs, joint research projects, and academic partnerships. This helps in sharing knowledge, expertise, and research capabilities.

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#### Note

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- (1) List of countries: Brazil, China, South Korea, India, Malaysia, Mexico, Nigeria, Philippines, Russia, South Africa, Thailand and Turkey.

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