ISSN No. 2631-2743

KAIRÓS

Revista de ciencias económicas, jurídicas y administrativas

KAIRÓS, Vol. (5) No. 8, pp. 144-165, enero - junio 2022

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ECONOMIC STRUCTURE AND POVERTY IN MEXICO, 2008-2018

ESTRUCTURA ECONÓMICA Y POBREZA EN MÉXICO, 2008-2018

DOI:
https://doi.org/10.37135/kai.03.08.08

Recibido: 30/08/21
Aceptado: 13/12/21

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UNIVERSIDAD NACIONAL DE CHIMBORAZO
FACULTAD DE CIENCIAS POLÍTICAS Y ADMINISTRATIVAS

ISSN No. 2631-2743

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Resumen

This study analyzes the economic structure and whether the changes it experiences are linked to and affect poverty in Mexico and the states that comprise it. Therefore, the GDP and employment sectoral participation, the intersectoral effect (EI), and the reassignment effect (ER) of employment towards high productivity sectors in the States that make up the country are estimated, and Coneval poverty indices are also used in the analysis. The evidence confirms that the sectoral participation with respect to GDP and employment tends to increase in the services sector and that in the country, the increase in productivity is mainly attributed to RE; however, the activities to which employment is relocated in the states are primarily non-industrial activities. Finally, it was found that the poverty reduction is explained by economic growth, the participation of the secondary and tertiary sectors of the economy, but not by the reallocation effect, which denotes the non-existence of a structural change in the Mexican economy.

Palabras clave: economic structure, structural change, productivity, poverty.

Abstract

Este estudio analiza la estructura económica y si los cambios que ésta experimenta están vinculados y afectan la pobreza de México y los estados que lo integran. Por ello, se estima la participación sectorial del PIB y el empleo, el efecto intrasectorial (EI) y el efecto reasignación (ER) del empleo hacia sectores de alta productividad en los Estados que conforman el país, también se utilizan los índices de pobreza del Coneval en el análisis. La evidencia constata que la participación sectorial respecto al PIB y el empleo tiende a aumentar en el sector servicios y que en el país el aumento en la productividad se atribuye principalmente al ER; sin embargo, las actividades a las que se reubica el empleo en los estados son en su mayoría actividades no industriales. Por último, se encontró que la reducción de la pobreza se explica por el crecimiento económico, la participación de los sectores secundario y terciario, pero no por el ER lo cual denota la inexistencia de un cambio estructural en la economía mexicana.

Key words: estructura económica, cambio estructural, productividad, pobreza.

1. Introduction

At present, poverty is one of the main problems to achieve development on a global scale, its reduction by half was the first of the eight Millennium Development Goals (MDGs) that the UN (2014) agreed to achieve by 2015. It is the first in the 2030 Agenda for Sustainable Development, which includes 17 objectives in the effort to eradicate poverty, fight inequality, injustice and confront climate change in the framework of globalization (ECLAC, 2016).

The World Bank (2018) indicates that in the last two decades, there have been important advances in reducing poverty since the proportion registered worldwide in 2010 was reduced by half and extreme poverty (people living with less than USD1.90) went from being almost 36% in 1990 to represent 10% of the world population in 2015; however, far from ceasing to be worrisome, the phenomenon of poverty is still valid, and currently millions of people continue to suffer from it on the different continents.

Thus, some countries stand out in reducing poverty, such as China and India in Asia and Brazil in Latin America (WB, 2018). In these nations, there has been a change in the economic structure, although before they were countries characterized by specialization in raw materials, industrial activity currently holds more significant weight. This process is linked to poverty reduction in recent research (UNIDO, 2012; Haraguchi and Fang Chin Cheng, 2016).

However, within the framework of neoliberalism, as a theory that maintains that promoting welfare consists of not restricting the free development of the individual's entrepreneurial capacities and freedoms, the recommendations of supranational organizations such as the World Bank or the International Monetary Fund suggest reducing the government participation in the economy, which implies denying the possibility of countries developing an industrial policy (Harvey, 2005; Storm, 2015).

Joseph Stiglitz (2009) points out that industrial policies are necessary and intrinsically fundamental for all development processes and testimony of this is all successful industrialization for almost two centuries in Germany and the United States until the recent cases of Korea, Taiwan, Brazil, China, and India (cited in Cimoli et al., 2009). The secondary sector is considered the one with the highest productivity and has characteristics that link it with reducing poverty, such as productive chains, higher wages, more excellent distribution of benefits (Kaldor, 1979; Dasgupta and Singh, 2006).

Recent studies show that greater participation in the industry leads to a considerable reduction in poverty conditions in Brazil (UNIDO, 2012; Levinas and Somoes, 2016), South Korea (Lanzarote, 1991), China (UNIDO, 2012), Africa (Berthélemy, 2018) and Kazakhstan (Verme, 2010). However, in cases such as India (Aggarwal, 2012) or Peru (Tello, 2015) when employment is directed from

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the agricultural sector to service activities, it has a positive impact on poverty reduction, which is attributed to the productivity of the jobs that the labor force goes to and the wages they offer, hence the interest of this study in investigating this relationship for Mexico.

In Latin America, studies on the economic structure find that, for the Chilean case, Correa (2016) finds that there are "virtuous" and "regressive" manufacturing sectors to reduce inequality. On the other hand, Argentina (Longhi and Osatinsky, 2015) warns that the structural fragmentation of the economy has generated employment problems and poverty that are more pronounced in the north than in the Pampas provinces.

Since the beginning of the 1980s, the Mexican economy entered a slow growth phase (Loria, 2009). Regarding the decrease in poverty explained by the economic growth of 2000-2014, Campos and Monroy (2016) find that a systematic relationship between growth and variations in poverty is not observed. For their part, Ceballos and de Anda (2021) find that in the south of the country, branches such as transportation, communication services, education, health, government, and tourism are associated with less poverty. In the center and north, the reduction decreases with occupations such as machinery and equipment production, insurance, corporate services, professional, recreational, and government activities.

On the other hand, Padilla-Pérez and Villarreal (2017) study the relationship between the change in the economic structure and the increase in productivity from 1990 to 2015 in the Mexican economy; for this, they decompose the increase in productivity. They find the relocation of hours worked in the industry significantly, but its impact is hampered by workflows from sectors with high productivity to those with low productivity.

Therefore, this research is aimed at investigating how the economic structure impacts poverty levels, that is, how the participation of the secondary and tertiary sectors influences the low incidence of poverty, knowing that the general trend of the economies is towards a decrease in the participation of the primary sector and an increase in industry and services. The questions in this research are: What have been the transformations in the economic structure of Mexico and its states during the study period 2008-2018? In addition to determining if there is a link between the economic structure and poverty in Mexico and its states?

The working hypothesis argues that those entities that are characterized by having higher levels of productivity eventually have a lower incidence of poverty, particularly those entities identified by their manufacturing vocation because industrial development favors better wages due to productivity levels, as well as the higher proportion of jobs that contribute to the production of consumer goods with higher added value.

Article is made up of the introduction and five other parts. The second part briefly reviews the

structuralist approach and its relationship with poverty, then the methodology and data used are explained. The fourth part analyzes the economic structure, the intersectoral effect (EI), the reallocation effect (ER), and the situation of poverty in the states and the country; In contrast, the fifth part analyzes the determinants of poverty and, finally, the conclusions of the study are added.

2. The structuralist approach, Neo-structuralist and poverty

In the structuralist approach, the economic structure is strongly linked to the population's living conditions since the structural differences between developed and undeveloped countries underlie the socioeconomic contrasts of one type of country concerning the other (Dutt, 2019). The concept of economic structure refers to the classification proposed by Fischer (1935 and 1939), which suggests the division of production factors into three sectors: on the one hand, the primary sector concentrated in agricultural activities, on the other hand, the sector secondary integrated by industrial and mining activities. Finally, tertiary activities, dedicated to services (Moncayo, 2008).

In this logic, the economic structure is integrated, on the one hand, by the productive structure that refers to the participation of each sector (primary, secondary, and tertiary) and its branches in the Gross Domestic Product (GDP) registered in the national accounts. On the other hand, the relative labor occupation in each sector or branch of the economy is also called the employment structure. The composition of both refers to the economic structure of a country (Yoguel and Barletta, 2017; Cimoli et al. 2005, and Lanzarotti, 1991).

The pioneers of structuralism point out that the primary-export structure, of services and little industrialized, as well as the exchange of these products for machinery and technological products, explains to some extent the conditions of backwardness in terms of consumption capacities and the levels of poverty in Latin America and in the rest of the undeveloped countries. This, due to the historical loss of the purchasing power of raw materials concerning industrialized products in the international market (Prebisch, 1949, 1967; Furtado, 1961; Pinto, 1970; Cardoso and Faletto, 1979).

According to Moncayo (2008), the process that leads to economic growth is accompanied by the change in the economic structure, which is perceptible from the relocation of the workforce, altering the relative occupation of a sector or branch towards others, or starting from the change in the proportion represented by primary, secondary or tertiary GDP (and their branches) in total production; however, not every change in the economic structure implies a structural change.

The Latin American structuralist tradition defines structural change as one that induces socioeconomic

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improvement from the development of industrial and technological activities that promote greater productivity and sustained growth, improving the conditions with which it participates in the international market and, this being a change of By increasing general productivity, a virtuous nature leads to a substantial improvement in the population's living conditions, mitigating socioeconomic problems in undeveloped countries (ECLAC, 2012; Cimoli et al. 2015; Yoguel and Barletta, 2017).

It is important to note that the structuralist approach arises in a context where productive structures were mainly dual -in Lewis's sense- and production was vertically and nationally integrated; while, at present, multiple productive structures predominate with a high degree of production fragmentation, due to the emergence of new knowledge-intensive services and the multiple dependencies and interconnections between the different components of the global economic system. This makes the debate on the type of specialization desirable to achieve socio-economic development more complex (Yoguel and Barletta, 2017).

In this context, during the last decades and within ECLAC, the neo-structuralist approach has emerged, for which not all sectors have the same potential to induce productivity increases, generate productive chains, high-paying jobs, or attend to the socio-economic problems, so it is relevant to study the effects on these variables of the changes in the participation of the different economic sectors in each country (Cimoli et al., 2005; Cimoli et al. 2015).

Neo-structuralism criticizes that classical structuralism has not considered the weight of the State and institutions as elements to achieve well-being via the use of other mechanisms such as income transfers or progressive taxes, as well as their redistributive effect to reduce inequality and poverty (Dutt, 2019); Therefore, this approach assumes that the State is a relevant economic actor in promoting development and promoting change in the structure (production and employment) to reduce the gaps in productivity and living standards between nations (Storm, 2015; Dutt, 2019).

Furthermore, for the renewed structuralist perspective, structural change does not simply suggest the relocation of production towards the industrial sector and manufacturing activities, but towards knowledge-intensive-diffusing activities with high-income elasticity of export demand, in particular contrast with those that are natural resources or work (Cimoli et al. 2005; Cimoli et al. 2010; ECLAC, 2012).

Although these activities are located in the secondary sector of the economy, they are the activities that make the most effective use of technology, as opposed to those that are labor-intensive or those that are intensive in natural resources such as mining (ECLAC, 2012). For this reason, structural change is suggested as the change in the pattern of specialization, in consideration of how the composition of the sectors is related to technological change (Katz, 2000; Ocampo, 2005).

In this sense, to understand the link between economic structure, structural change, and well-being, it is essential to point out that the economic dynamism that transforms the productive structure is complementary to social equality, in such a way that structural change is understood as to how to achieve synergy between both within an integrated vision of development that achieves economic growth and increases in productivity, considering social inclusion and environmental sustainability (Cimoli et al., 2005; ECLAC, 2012; Cimoli et al., 2015).

Consequently, a change in the economic structure towards industrial sectors and knowledge-intensive activities would propitiate a structural change and, with it, the reduction of poverty (Cimoli et al., 2005; Capdeville, 2005; ECLAC, 2012: however, if The economic structure tends to specialize in activities that are intensive in natural resources and/or labor (with a lower income elasticity of demand) would favor the opposite, although the sensitivity to this change will depend on the institutional conditions of each country.

Regarding the relationship between the economic structure and the conditions of poverty, the empirical evidence shows that the countries that are going through industrialization processes and that direct the workforce in activities of this nature are those that historically register the highest productivity and have seen a decrease in their poverty levels finding a high degree of causality. This process is known as structural change (Cimoli et al. 2005; Lavopa, 2012; UNIDO 2012; Haraguchi and Fang Chin Cheng, 2016; Berthélemy, 2018; Diao, McMillan and Rodrik, 2019).

3. Methodology applied, and data used

Recent studies on the change in the economic structure and industrialization processes in developing countries highlight the measurement through the sectoral reallocation effect or simply the reallocation effect (ER), which is defined as the contribution to the variation in the labor productivity of the mobilization of workers between the different sectors of one period to another, following the work of McMilllan and Rodrik (2011), widely cited and which is exposed below:

$$\Delta Yt = \sum \theta i,t-k \cdot \Delta yi,t + \sum yi,t \cdot \Delta \theta i,t \qquad (1)$$

$$i=1, \ldots 11 \quad t=1,2$$

Where:

"Δ" refers to the increase in percentage terms of the variable in the period.
"Y" represents productivity, understood as the division of the GDP of each type of activity in a year by the number of people employed in it.
"Θ" represents the participation of the employed population in the sector "i" in year "t" of total employment.

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"I" represents economic activity, while "t" refers to the year within the period.
"$\sum \theta i,t-k\Delta Y\ i,t$" would represent the natural increase in productivity within that activity, also called the intersectoral effect.

The second component, "$\sum yi,t \cdot \Delta \theta i,t$" is called the reallocation effect (RE), it would represent that increase caused by the movement of employees from sectors of lower productivity If RE> 0 means that employment has been relocated from activities with lower productivity towards those with higher productivity.

For equation 1, labor productivity is understood as the increase in GDP at constant prices of each activity or sector per person employed in it in each state or region in a year concerning the previous one (ILO, 2015). Both data are provided by the National Institute of Geography and Statistics (INEGI), GDP in the section of national accounts at 2013 prices, while for the employed population, the Employed Population in the fourth quarter of the National Survey is considered of Occupation and Employment for the period from 2006 to 2018.

To measure poverty, the poverty index by income and extreme poverty by income are taken, estimated respectively by the National Council for the Evaluation of Social Policy (CONEVAL) for the country and each state. These are presented for every two years, which are calculated based on the National Household Income and Expenditure Survey (ENIGH) carried out biennially by the INEGI.

CONEVAL uses the National Consumer Price Index (INPC) price indices to measure the Income Poverty Lines (PL). These lines are constructed by measuring the minimum monthly income to satisfy basic national needs (in urban or rural areas) from a food basket for extreme poverty lines (EPL) and a non-food basket that, when added to the previous one, constitutes the PL. In such a way, income poverty is calculated by determining the number of people who receive a monthly income below the PL and the EPL, dividing each household by the number of people who inhabit it according to the ENIGH (CONEVAL, 2020).

Subsequently, to explain the levels of moderate and extreme poverty from the economic structure following the proposal of Aggarwal and Kumar (2012) as shown in equations 2 and 3, where both poverty indices are explained by the participation in GDP of the secondary and tertiary sectors, economic growth, and the reallocation effect. Investment in social programs is also used as a control variable (because this variable is correlated with the levels of poverty in the states due to their operating rules), since its contribution in reducing poverty is theoretically and empirically recognized (Aggarwal and Kumar, 2012; Lavopa and Szirmai 2012; Tello, 2015):

$$PM = \beta 0 + \beta 1EGi, t + \beta 2GDP2i, t + \beta 3GDP3i, t + \beta 4REi, t + \beta 5SPi, t + \varepsilon i \quad (2)$$

$$PE = \beta 0 + \beta 1EGi, t + \beta 2GDP2i, t + \beta 3GDP3i, t + \beta 4REi, t + \beta 5SPi, t + \varepsilon i \quad (3)$$

$$i = 1, \ldots 32 \quad t = 1, \ldots 6$$

Where:

MP: represents the moderate-income poverty index presented by CONEVAL

EP: means the extreme income poverty index presented by CONEVAL.

β0: represents the constant.

EG: represents the economic growth registered in the year "t" with respect to the previous year in the state "i".

GDP2: represents the percentage share of the secondary sector in all GDP.

GDP3: means the share of the tertiary sector in GDP.

RE: represents the reallocation effect calculated for each state in each year calculated with equation 1.

PS: Represents investment in social programs as a percentage of GDP in each state and year.

Ɛ: represents the statistical error.

For the explanatory variables, the years that coincide with the poverty index (2008, 2010, 2012, 2014, and 2016) are considered, with respect to the variations, the biennial changes are considered for the same reason between the same years.

Economic growth is considered as the relative increase in GDP registered in the year "i" with respect to that registered two years before; the participation of the sectors in the economy refers to the percentage that each GDP occupies (primary, secondary and tertiary) in each year and state; As a proxy for the variable, the investment of social programs (PS) is taken, the amount allocated to "transfers and support" as a percentage of GDP in each year is considered. The data are provided by the National Institute of Geography and Statistics (INEGI). Excel software is used for data management, and STATA 15.1 software for the application of statistical models.

4. Economic structure and poverty in the Country and States

Table 1 shows that in 2008 of the total economy, the primary sector only represented 3.38% of GDP. For its part, the secondary sector makes up 35.27% of the generation of wealth, being the manufacturing industry the one that participates to a greater extent (16.99%), followed by the

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extractive industry and electricity (9.74%); and construction (8.53%). The tertiary sector is the one with the highest participation in GDP this year (61.35%), where the highest representation is held by professional, financial, and corporate services; followed by trade (16.95%); while the least represented are various services (2.21%) and restaurants and accommodation services (2.43%).

In 2018 the primary sector represented 3.34% of the production of that year. For its part, the secondary sector has the participation of 30.55% in GDP; the highest participation is held by the manufacturing industry (16.58%), followed by construction (7.28%), and the mining and quarrying industry and electricity respectively (6.67%). The tertiary sector is the one with the highest participation in this year, representing 66.11%, with commerce and professional financial and corporate services being the activities with the highest contribution (22.91% and 18.33% respectively); at the other extreme, those with the lowest participation, as in 2008, are various services (2.06%); and restaurants and accommodation services (2.37%).

Table 1. GDP by sectors and activities in Mexico from 2008 to 2018.

Economic sector or branch	PIB 08	%*	PIB 18	%*	Δ**
Total	14,402,757	100%	17,739,437	100%	
Primary sector.	486,465	3.38%	592,952	3.34%	-0.04%
Secondary sector.	5,079,734	35.27%	5,418,536	30.55%	-4.72%
Extractive and electricity industry.	1,403,235	9.74%	1,182,842	6.67%	-3.07%
Manufacturing industry.	2,447,227	16.99%	2,941,823	16.58%	-0.41%
Construction.	1,229,272	8.53%	1,293,871	7.29%	-1.24%
Third sector.	8,836,558	61.35%	11,727,948	66.11%	4.76%
Comercio.	2,440,638	16.95%	3,251,896	18.33%	1.39%
Restaurants and accommodation services.	349,725	2.43%	419,787	2.37%	-0.06%
Transportation, communications, mail and storage.	1,160,475	8.06%	1,742,447	9.82%	1.77%
Professional, financial, and corporate services.	2,914,367	20.23%	4,063,909	22.91%	2.67%
Social services.	1,047,866	7.28%	1,158,280	6.53%	-0.75%
Various services.	317,745	2.21%	365,793	2.06%	-0.14%
Government and international organizations.	605,743	4.21%	725,836	4.09%	-0.11%

*Percentage of participation in total GDP. ** Growth in percentage points in the participation of the activity or sector in the period.
Source: Own elaboration based on the National Accounts System of the INEGI in 2013 pesos.

Regarding the participation of the sectors in the economy, there is no substantial change in the primary sector (-.04%). In contrast, the secondary sector registers a decrease in the total participation of all sectors (-4.72% in the entire sector) that comprise it: -3.07% in the extractive industry, -0.41% in manufacturing, and -1.24% in construction. Tertiary activities increase their participation substantially (4.76%) Being in commerce (1.39%); transportation and communications (1.77%); and professional, financial, and corporate services (2.67%), which have registered the most significant increase in their participation in these ten years, which denotes a transparent process of outsourcing of the Mexican economy.

Table 2. Working population by sectors and activities in Mexico from 2008 to 2018.

Economic sector or branch	PO* 08	%*	PO* 18	%*	Δ***
Total	44,798,686	100%	54,194,608	100%	
Primary sector.	6,244,756	13.94%	6,874,691	12.69%	-1.25%
Secondary sector.	11,046,708	24.66%	13,864,904	25.58%	0.92%
Extractive and electricity industry.	413,184	0.92%	398,788	0.74%	-0.19%
Manufacturing industry.	6,997,919	15.62%	9,090,533	16.77%	1.15%
Construction.	3,635,605	8.12%	4,375,583	8.07%	-0.04%
Third sector.	27,163,979	60.64%	33,170,241	61.21%	0.57%
Comercio.	8,735,487	19.50%	10,082,351	18.60%	-0.90%
Restaurants and accommodation services.	2,843,647	6.35%	4,249,632	7.84%	1.49%
Transportation, communications, mail, and storage.	2,283,579	5.10%	2,832,600	5.23%	0.13%
Professional, financial, and corporate services.	2,685,791	6.00%	3,955,199	7.30%	1.30%
Social services.	3,777,383	8.43%	4,321,009	7.97%	-0.46%
Various services.	4,588,924	10.24%	5,449,702	10.06%	-0.19%
Government and international organizations.	2,249,168	5.02%	2,279,748	4.21%	-0.81%

* People working in the activity or sector. ** Percentage of participation of the total employed workers. Δ *** Growth in percentage points of the participation of the activity or sector in the period.
Source: Own elaboration based on the ENOE.

According to table 2, in 2008, the employed population in Mexico was 44,798,686. Of these, 13.94% of the total national work is in the primary sector. On the other hand, the secondary sector represents 24.66% of employment, manufacturing being where most of it is found (15.62%); followed by construction (8.07%), and the extractive and electricity industry (0.92%), respectively. The tertiary sector occupies most of the employment this year (60.64%), the largest participation is found in commerce (19.50%) and various services (10.24%), while the minor occupation is represented by the government and international organizations (5.02%).

In 2018, workers in Mexico reached 54,194,608, of which 12.69% were employed in the primary sector. The secondary sector occupies 25.58% of national employment, being 16.77% in manufacturing activities, 8.12% in construction, and 0.74% in the extractive industry and electricity. Tertiary activities are those that occupy most of the workers this year, representing 61.21% of the workers, most of which are in commerce (18.60%) and various services (10.06%). In contrast, the activity with the lowest occupational occupation is the government and international organizations (4.21%).

In the decade, the total employed population in Mexico has an increase of 20.97%, slightly less than the growth of GDP production as indicated above (23.17%), which suggests an increase in productivity. In this period, the participation of economic sectors is altered in the following way in the employment structure: The primary sector is reduced (-1.25%). Since the share of these activities in GDP remains the same, it is suggested that (in relative terms) workers have migrated to higher productivity activities (because agricultural activities have the lowest productivity in the entire economy).

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Table 3. Productivity in Mexico by sectors and activities in 2008 and 2018.

Economic sector or branch	Prt*2008	Prt* 2018	Δ**	%***
Total	321,500	327,328	5,829	1.81%
Primary sector.	77,900	86,251	8,352	10.72%
Secondary sector.	459,841	390,810	- 69,032	-15.01%
Extractive and electricity industry.	3,396,150	2,966,093	- 430,057	-12.66%
Manufacturing industry.	349,708	323,614	- 26,094	-7.46%
Construction.	338,120	295,702	- 42,418	-12.55%
Third sector.	325,304	353,568	28,264	8.69%
Comercio.	279,393	322,534	43,140	15.44%
Restaurants and accommodation services.	122,985	98,782	- 24,203	-19.68%
Transportation, communications, mail and storage.	508,183	615,141	106,958	21.05%
.Professional, financial and corporate services.	1,085,106	1,027,485	- 57,620	-5.31%
Social services.	277,405	268,058	- 9,348	-3.37%
Various services.	69,242	67,122	- 2,120	-3.06%
Government and international organizations.	269,319	318,384	49,066	18.22%

* Productivity per working person. ** Absolute increase in productivity. ***
Source: Own elaboration based on the ENOE and the national accounts provided by INEGI. Percentage increase in productivity.

Table 3 shows that most stands out when analyzing productivity in the period is the low increase of MXN 5,829. (1.81%) in the decade, which is in turn made up of disparate growth dynamics between sectors and activities.

The primary and tertiary sectors show an increase higher than the national total, being 10.72% and 8.69% respectively, for its part, the secondary sector shows a decrease in the period in the three activities that comprise it, the strongest fall occurs in the industry extractive and electricity, where the decrease is 12.66% (- $ 430,057 MXN.) this is remarkable since this activity is the one with the highest productivity in all the years of the period.

Although this decrease is explained by the fall in the prices of oil and other products derived from mining, the fall in this activity does not fully explain that of the sector, since, at the same time, productivity in manufacturing activities decreases considerably, thus as in construction; and both represent a more significant share in the national GDP than the other. Nor do they explain the fall in national productivity since they do not represent more than 7% of national production.

On the other hand, in general, the activities of the tertiary sector increase their productivity; this is due to the increase in trade, transportation, communications, mail and storage, and government activities to a lesser extent. However, there is a decrease in the productivity of professional, financial, and corporate services; activity where this indicator is highest in the sector.

The fact that in the Mexican economy from 2008 to 2018, the secondary sector decreased in terms of participation in GDP and productivity results in the low increase in productivity during the

period, even though the participation of the secondary sector in the structure of employment, which is explained by ceasing to produce technology-intensive goods and specializing in labor-intensive goods as mentioned in the studies mentioned above (Cimoli, 2005; CEPAL, 2012) as a result of the outsourcing process (Carrillo and Cadena, 2019) and deindustrialization (Calderón-Villareal and Hernández-Bielma, 2016) that the nation has experienced in the decade.

Table 4. Economic Structure in Mexico by State in 2008 and 2018.

	Sector I				Sector II				Sector III			
	GDP*		WP**		GDP*		WP**		GDP*		WP**	
	2008	2018	2008	2018	2008	2018	2008	2018	2008	2018	2008	2018
Mexico (Country)	3%	3%	14%	13%	35%	31%	25%	26%	61%	66%	61%	61%
Aguascalientes	4%	4%	7%	5%	38%	40%	28%	35%	57%	56%	65%	61%
Baja California	3%	3%	6%	4%	43%	38%	28%	32%	55%	59%	59%	60%
Baja California Sur	3%	3%	9%	7%	32%	37%	21%	18%	65%	60%	69%	75%
Campeche	0%	1%	19%	21%	92%	84%	22%	20%	8%	15%	58%	59%
Coahuila	2%	2%	5%	5%	54%	51%	32%	40%	44%	47%	62%	55%
Colima	6%	5%	12%	12%	26%	23%	20%	18%	67%	73%	68%	69%
Chiapas	8%	7%	39%	41%	29%	19%	13%	13%	63%	74%	47%	45%
Chihuahua	6%	6%	10%	9%	39%	39%	26%	38%	55%	54%	59%	52%
Mexico City	0%	0%	0%	0%	13%	9%	18%	16%	87%	90%	81%	83%
Durango	11%	10%	17%	14%	30%	30%	23%	28%	60%	60%	60%	57%
Guanajuato	4%	4%	14%	9%	34%	35%	33%	39%	61%	61%	53%	51%
Guerrero	6%	5%	30%	33%	19%	18%	17%	16%	75%	76%	53%	51%
Hidalgo	5%	4%	24%	20%	36%	32%	25%	25%	58%	64%	50%	55%
Jalisco	6%	6%	9%	8%	31%	31%	28%	27%	63%	64%	62%	65%
Mexico (State)	2%	1%	6%	5%	29%	26%	28%	27%	69%	73%	66%	67%
Michoacán	12%	13%	21%	24%	22%	16%	21%	18%	67%	71%	57%	58%
Morelos	3%	3%	15%	13%	34%	30%	21%	22%	63%	67%	64%	65%
Nayarit	8%	7%	19%	21%	23%	18%	18%	16%	68%	76%	63%	63%
Nuevo León	1%	0%	2%	1%	38%	35%	32%	32%	61%	64%	66%	66%
Oaxaca	6%	6%	33%	31%	26%	24%	20%	22%	69%	70%	47%	47%
Puebla	5%	4%	26%	19%	35%	35%	26%	27%	61%	61%	47%	53%
Querétaro	2%	2%	8%	4%	37%	40%	32%	34%	61%	58%	60%	62%
Quintana Roo	1%	1%	5%	5%	14%	11%	17%	16%	85%	88%	77%	79%
San Luis Potosí	4%	4%	20%	18%	36%	39%	24%	30%	61%	57%	55%	52%
Sinaloa	13%	12%	20%	16%	23%	20%	20%	20%	64%	68%	60%	63%
Sonora	6%	7%	11%	11%	44%	44%	28%	27%	49%	49%	59%	61%
Tabasco	2%	2%	17%	17%	68%	61%	20%	18%	30%	37%	63%	65%
Tamaulipas	3%	3%	6%	7%	45%	36%	29%	31%	51%	61%	63%	60%
Tlaxcala	4%	4%	18%	12%	35%	33%	32%	36%	61%	63%	50%	52%
Veracruz	6%	5%	22%	23%	36%	31%	20%	19%	58%	63%	57%	58%
Yucatán	4%	4%	11%	9%	27%	27%	27%	26%	69%	69%	62%	64%
Zacatecas	8%	9%	32%	25%	37%	33%	17%	24%	55%	57%	50%	50%

* Percentage of participation of the sector in GDP. ** Percentage of participation of the sector in the Working Population.
Source: Own elaboration with data from the National Accounts System of the INEGI in 2013 pesos and the ENOE.

As appears in table 4, the secondary sector tends to be the second with the highest participation at the national level. In the states in both elements that make up the economic structure, this except for Campeche and Tabasco, where it represents more than 50% of GDP, however, these The same

KAIRÓS, revista de ciencias económicas, jurídicas y administrativas, 5(8), pp. 144-165. Primer semestre de 2022 (Ecuador). ISSN 2631-2743. DOI: https://doi.org/10.37135/kai.03.08.08

activities employ a fifth of the employed population in these two states, which is since in these the oil activities have high participation, and this generates high levels of wealth. However, they do not need a considerable amount of jobs. In this sector, the dynamics in the employment structure tend to increase slightly; on the contrary, its participation in GDP tends to decrease slightly in most entities.

Lastly, the tertiary sector turns out to be the one with the highest participation both in GDP and in the employed population in most of the states apart from Coahuila, Campeche, and Tabasco. In these states, the secondary sector has the largest share of GDP; however, tertiary activities occupy most of the population. In contrast, the only state where the tertiary sector occupies less than 50% of the population is Chiapas. In this sense, the general trend seen in this last sector is towards increasing participation in GDP and employment.

Table 5. Economic Structure and Variations in Poverty from 2008 to 2018.

	GDP1 *	WP1**	GDP2	WP2	GDP3	WP3	MP***	EP****	ΔYt*****
Aguascalientes	=	-	+	+	+	-	-	-	$ 27,694
Baja California	-	-	+	+	-	+	-	-	-$ 38,590
Baja California Sur	-	-	+	-	-	+	-	-	$ 56,952
Campeche	+	+	-	-	+	=	+	=	-$ 1,799,646
Coahuila	-	-	-	-	+	+	-	-	$ 14,565
Colima	-	-	-	-	+	+	+	+	$ 14,820
Chiapas	-	+	-	-	+	+	+	+	-$ 8,013
Chihuahua	+	-	-	+	+	-	-	-	$ 16,620
Mexico City	-	-	-	-	+	+	+	+	$ 153,988
Durango	-	-	=	+	=	+	-	-	-$ 16,720
Guanajuato	-	-	+	+	+	-	+	+	$ 49,521
Guerrero	-	+	-	-	+	-	-	-	-$ 42,644
Hidalgo	-	-	-	-	+	+	-	-	$ 5,916
Jalisco	=	-	-	-	+	+	-	-	$ 27,694
Mexico (State)	-	-	-	-	+	+	+	+	$ 13,012
Michoacán	+	+	-	-	+	+	-	-	$ 27,404
Morelos	-	+	-	-	+	+	+	+	$ 6,061
Nayarit	-	+	-	-	+	-	-	-	$ 27,694
Nuevo León	-	-	-	-	+	+	-	-	$ 61,655
Oaxaca	=	-	-	+	+	+	+	+	$ 2,157
Puebla	-	-	+	-	+	+	-	-	$ 18,779
Querétaro	-	-	+	+	-	+	-	-	$ 116,155
Quintana Roo	-	-	-	-	+	+	-	-	$ 33,546
San Luis Potosí	=	-	+	+	-	-	-	-	$ 27,694
Sinaloa	-	-	=	+	+	+	+	-	$ 34,079
Sonora	+	+	-	-	+	+	+	+	-$ 15,700
Tabasco	=	-	-	-	+	+	-	-	-$ 69,929
Tamaulipas	-	-	-	+	+	-	+	+	-$ 33,010
Tlaxcala	-	-	-	+	+	+	-	-	-$ 19,664
Veracruz	=	-	-	-	+	+	+	+	$ 15,886
Yucatán	-	-	-	-	+	+	-	-	$ 17,594
Zacatecas	=	+	+	-	-	+	-	-	$ 27,694
States where increased	4	8	8	11	26	24	12	10	23

States where it decreases	21	24	22	21	5	7	20	20	9
States where it stays the same	7	0	2	0	1	1	0	2	0

* Gross domestic product by sector. ** Working Population by sector. *** Moderate poverty. ****Extreme poverty. *****Variation in productivity in Mexican pesos of 2013
Source: Own elaboration with data from INEGI

The extreme poverty index increases in ten states: Colima, Chiapas, CDMX, Guanajuato, Mexico, Morelos, Oaxaca, Sonora, Tamaulipas, and Veracruz. Moreover, it decreases by twenty-one. Remaining the same in Campeche, for its part, the economic structure, both in the productive structure and in employment, increase the participation of the tertiary sector to a greater extent in most of the states. At the same time, primary and secondary activities decrease in their participation, as shown in table 5.

Regarding the relationship between productivity and poverty, it is highlighted that six of the eleven entities that had a considerable decrease in their moderate poverty index present an increase in productivity greater than the national average, while the other six are found with an increment below this. However, the states with the highest levels of productivity are those with the lowest levels of moderate poverty in 2008 and 2018, apart from Campeche and Tabasco (oil states).

It should be noted that, in the three groups indicated above with high productivity (table 5), in the case of tourist states and manufacturing states, all entities have poverty levels lower than the national index. In Hidalgo and Durango, there is a high share of the manufacturing sector, and poverty is below the national average despite not having productivity higher than the national average.

The reallocation effect is understood as one of the two elements that result from the decomposition of the productivity increase of a period of analysis. The first element that makes up the equation is the intersectoral effect (IE), which is understood as the natural increase in productivity. The second element is called the reallocation effect (RE); this represents the increase in productivity attributed to the relocation of employment from lower productivity activities to those with higher productivity levels.

From 2008 to 2018, in five years, the national average productivity increases by one year compared to the previous one, while it decreases in the other five. In such a way that the increase has not been constant since, in most cases, when productivity increases from one year to another, it decreases the next. The highest decrease was in 2009 ($ 26,992 MXN), which was an effect of the economic crisis. In such a way that, although the balance of productivity is positive in these ten years, it is widely held back by negative periods. This results in an increase in productivity in this decade, being $ 5,829 MXN.

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Table 6. Reallocation effect in Mexico from 2008 to 2018.

Period	ΔYt*	IE**	RE***	IE%	RE%
2008-09	- 26,992	- 23,254	- 3,739	86.15%	13.85%
2009-10	18,100	19,763	- 1,663	109.19%	-9.19%
2010-11	- 4,667	- 6,734	2,067	144.29%	-44.29%
2011-12	8,125	4,787	3,338	58.92%	41.08%
2012-13	- 2,871	- 5,812	2,940	202.40%	-102.40%
2013-14	9,155	13,708	- 4,553	149.73%	-49.73%
2014-15	- 1,004	- 5,041	4,037	502.15%	-402.15%
2015-16	5,239	9,350	- 4,111	178.46%	-78.46%
2016-17	1,994	1,093	901	54.83%	45.17%
2017-18	- 1,249	- 5,578	4,329	446.60%	-346.60%
2008-18	5,829	11	5,818	0.19%	99.81%

* Variation in productivity. ** Intrasectorial effect. *** Reallocation effect.
Source: Own elaboration based on the National Accounts System of INEGI and ENOE.

Following table 6, the intersectoral effect (IE) has a negative coefficient in all cases where productivity decreases, which suggests that the decrease in productivity responds to the productivity that is naturally lost in the sectors. The EI perceives that productivity increases naturally to a lesser extent since it only adds up to $ 11.00 MXN in the ten years, representing less than 1%.

On the other hand, the reallocation effect results in a positive coefficient in six of the ten years, of which in three of the decrease in productivity this serves to minimize the participation of the intersectoral effect. However, in three years where there is an increase in productivity, the RE subtracts from the increase by presenting a negative coefficient.

The RE in the entire period of 2008-18 presents a high percentage (99.82%); This is explained by the fact that, although a process of deindustrialization was going through during the period, employment was relocated from agricultural and service activities (of low productivity) to services with higher labor productivity.

On the other hand, the reallocation effect has a positive coefficient in the years where poverty (moderate and extreme) decreases. In contrast, the RE coefficient is negative in those years where it increases, apart from 2018, where the RE is negative while poverty levels decrease compared to 2016.

5. Results of the econometric model

To calculate equations regression 2 and 3 specified in the methodology, the relative levels of each value are considered by state in biennial samples from 2008 to 2018. Robust linear regression is estimated where the 192 observations are considered. In a set of panel data (since they combine a

temporal and transversal dimension), to determine how much the levels of moderate poverty and extreme poverty are explained by economic growth, the participation of the secondary and tertiary sectors in GDP, the reallocation effect and investment in social programs as a percentage of each state's GDP.

Due to working with data that start from GDP, in addition to the presence of atypical data in the calculation of the RE, robust regression is used, in this way, the traditional limitations of the estimation by ordinary least squares are adjusted, anomalous data, lack of normality and symmetry in errors (Andersen, 2008); in such a way that it is not necessary to apply a heteroscedasticity test.

Robust regression has potentialities in panel data empirical applications, does not require a preliminary subjective cleaning of the data, and still produces reasonable parameter estimates even when rough errors occur (Bramati and Croux, 2007).

Table 7. Results of the linear regression of equations 2 and 3

Number of obs=192	MP		EP	
Prob > F=	0		0	
R-squared=	0.3725		0.4513	
	Coef.	P>t	Coef.	P>t
EG	-0.343925	0.197	-0.294333	0.088*
GDP2	-0.712271	0.013**	-0.418239	0.042**
GDP3	-0.941943	0.001***	-0.595668	0.004***
RE	-0.000155	0.158	-0.000107	0.142
SP	2.165849	0***	1.976543	0***
β0	1.195724	0	0.5770818	0.004

MP: Moderate-income poverty index EP: Extreme income poverty index. EG: Represents the economic growth GDP2: The share of the secondary sector in all GDP. GDP3: The share of the tertiary sector in GDP. RE: Reallocation effect SP: Social programs β0: represents the constant.

As table 7 appears concerning moderate poverty, equation 2 denotes the high explanatory power of the model with an R2 of 37%. In comparison, the probability of the "F" statistic is less than 5%, which indicates that together these variables can explain the levels of moderate poverty. Furthermore, the estimated regression shows that all the variables observe a coefficient with the expected sign (except social spending). Secondary and tertiary GDP and social spending were statistically significant (but not the reallocation effect or economic growth) since the probability is shown by the statistic "t" is less than 5%. It is important to note that the sign of the Reallocation Effect is not statistically significant, maybe a reflection that increases in productivity are not necessarily based on a structural change.

On the other hand, in equation 3, when running the model for extreme poverty, the explanatory power increases, since it registers an R2 of 45%; while the probability of the "F" statistic is less than 5%, which indicates that together these variables can explain the levels of extreme poverty and

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economic growth, social programs secondary and tertiary GDP are statistically significant since the probability of the "t" statistic is less than 5%.

In summary, the econometric model indicates that the CE, GDP2, GDP3, and ER reduce poverty. However, the ER is not significant; that is, high levels of relocation do not translate into low levels of poverty because states that have high levels do not increase the natural productivity of their activities, and even though relocation is positive, It does not mean that work is migrating to higher productivity activities in general.

In another sense, social spending, although it is statistically significant, does not have the expected sign. Since the programs tend to be directed to a greater extent at the entities with the highest levels of poverty, consequently, in these, the spending is higher as a share of the GDP compared to the states with the lowest poverty.

The results suggest that high levels of participation in the secondary and tertiary sectors result in poverty levels below the national average, which is explained by the fact that the states that suffer from it to a lesser extent are identified with a manufacturing vocation with high participation of the secondary sector (eleven entities) or with a tourist vocation and a strong weight of the tertiary sector in its economic structure (six entities).

6. Conclusions

In this paper, Mexico's economic structure is studied and if this experience's changes correlate and affect poverty during the 2008-2018 period. This is calculated using the relative sectoral participation in GDP and employment, the intersectoral effect (IE), the reallocation effect (RE), and the poverty indices estimated by Coneval. An econometric model is also estimated to identify the determining factors of poverty.

Although the increase in productivity in the country was not very high in this period, it is suggested that it was induced to a greater extent by labor relocation to higher productivity jobs than by the natural increase in productivity. This is explained by the fact that the share of employment in the industrial sector (the one with the highest productivity) is not reduced while employment decreases in agricultural activities where the lowest productivity is found and increases considerably in tertiary sector activities.

In addition, employment is relocated to higher productivity services. However, employment is not relocated to the sector with the highest productivity (the secondary sector), and the increase

in productivity is feeble; even though the participation of the RE is high, it is not enough to affirm substantial improvements.

According to the econometric model, high levels of participation in the secondary and tertiary sectors explain low poverty levels. On the other hand, the relocation effect and economic growth were insignificant. The empirical analysis presented and the findings of the econometric model led to the acceptance of the research hypothesis since the entities characterized by having a more extraordinary manufacturing vocation and thus high levels of productivity are those that register poverty levels below the national average.

Based on these results, the following recommendations are derived:

First, the State must promote policies aimed at technological development by massifying higher education and protecting strategic parastatal companies. Second, considering the structural heterogeneity in the country's states, it is essential to prioritize development in regions with high levels of poverty; it would be necessary to promote the location of industrial activities and linkage mechanisms with the rest of the country.

Acknowledgements

The work derives from the Master's thesis in Regional Development carried out by the first author with advice from the second. We are grateful to the National Council of Science and Technology (Conacyt) for the financial support to study the postgraduate course at CIAD.

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