MEXICO SOUTHERN STATES STUDY

ECONOMIC STRUCTURE AND SECTORS SELECTED FOR DEEP DIVES

WORLD BANK GROUP
THE WORLD BANK IBRD • IDA
IFC International Finance Corporation

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Abbreviations

Banxico	*Banco de México* (Central Bank of Mexico)
ECI	Economic Complexity Index
ENOE	*Encuesta Nacional de Ocupación y Empleo* (National Survey of Occupation and Employment)
FDI	foreign direct investment
GCF	gross capital formation
GDP	gross domestic product
INEGI	*Instituto Nacional de Estadistica y Geografia* (National Institute of Statistics and Geography)
NAFTA	North American Free Trade Agreement
NDP	National Development Plan

Introduction

Mexico, a large upper-middle-income federal republic, is marked by deep regional disparities in socioeconomic development. In the country's industrialized northern[1] and Bajío regions,[2] the per capita gross domestic product (GDP) averaged approximately US$13,000 and US$10,000, respectively in 2021, compared to approximately US$4,100 in the less developed southern region. Mexico City, the country's wealthiest jurisdiction, has a per capita GDP of more than US$20,000, over six times that of Chiapas, the poorest, at US$3,200. Moreover, the per capita GDP of Nuevo León, one of Mexico's richest states, is closer to that of Poland, a high-income country, while Chiapas' is below the average of the in Northern Triangle countries (El Salvador, Guatemala, and Honduras). In terms of poverty and other socioeconomic indicators, a similar pattern is observed: as of 2022, more than two-thirds of Mexicans living in extreme poverty are concentrated in just six out of the 32 states, namely Chiapas (17.7 percent), Veracruz (11.8 percent), State of México (11.3 percent), Oaxaca (9.4 percent), Guerrero (8.8 percent), and Puebla (8.4 percent).

Since the inception of the North American Free Trade Agreement (NAFTA) in 1994, the process of regional economic convergence has been stagnant. Despite the overall benefits of free trade for Mexico, the more developed northern and northern-central regions were better positioned to leverage the opportunities provided by NAFTA, which was succeeded by the United States–Mexico–Canada Agreement in 2020. These opportunities were primarily in sectors such as automotive manufacturing, machinery and electronics, and export-oriented agriculture. On the other hand, most of the southern states have continued to struggle with challenges such as sluggish productivity growth and limited structural transformation. Contrary to converging, some of Mexico's richest and

poorest states have seen their economic gaps widen: for example, the per capita GDP of Queretaro, located in the Bajío region and among the fastest-growing and richest states, experienced an average annual growth rate of 1.4 percent between 1995 and 2021. Meanwhile, Chiapas saw its per capita GDP decrease by 1.1 percent per year during the same period. The recent nearshoring trend could further increase regional gaps between the northern and central regions and the southern states if the latter cannot integrate into the global and regional value chains.[3]

Regional economic disparities in Mexico can also be traced back to differences in factor endowments, sectoral output compositions, and economic efficiency across states. The states experiencing the fastest overall GDP growth rates in recent decades have also experienced the largest improvements in labor productivity. For example, labor productivity in the Bajío region rose at an average annual rate above 1 percent between 2003 and 2018, while in Chiapas, Guerrero, and Oaxaca it declined close to 1 percent annually. The labor productivity in Mexico City is around 3.5 times that of Chiapas.[4]

Even within industries that are highly successful elsewhere in Mexico, low productivity prevails across the economies of the south. Low human capital levels and high informality rates reduce labor productivity and inhibit the emergence of new, more productive industries. Deficient economic and social infrastructure further reduces total factor productivity and discourages investment in the southern states, while limited access to large consumer markets and weaker integration into the global economy undermine their competitiveness. Furthermore, a market structure dominated by a large number of small firms and few large ones contributes to the prevalence of firm-level performance issues such as limited management capabilities, absence of standardized corporate practices, low-skilled labor force, inadequate access to finance, slow adoption of new technologies, minimal innovation, and low survival rate. The lack of a critical mass of companies in highly productive sectors inhibits the formation of clusters where economies of scale and scope as well as cutting-edge support services could emerge. Insufficient business-support and logistics services exacerbate these challenges.

Economies in southern Mexico tend to focus on industries and sectors in which they have relatively lower productivity. The productivity gap between the northern and southern states primarily reflects differences in firm-level performance and industries performing below the national average. Moreover, the economic output composition of these states further exacerbates the disparity. Their inability to redirect labor and capital towards more productive activities suggests potential distortions that might be undermining their allocation efficiency. These economies are marked by low levels of sophistication and diversity, with productive factors concentrated in less productive sectors and limited capacity for evolving into more complex sectors.

On the policy front, the weak rule of law and insecurity pose major obstacles to private-sector development across much of the region. Except for Yucatán, the majority of southern states suffer from serious security issues, social conflicts, and/or weak regulatory and law enforcement capabilities. Issues such as land fragmentation and untenured communal land create uncertainty about property rights, further limiting economies of scale. Restrictive business reg-

ulations complicate investment planning and create uncertainty about potential returns. Finally, regulatory barriers to competition or weak enforcement of pro-competition laws in markets for key goods and services undermine the growth potential of strategic sectors.

Reducing regional disparities has been a core objective of several National Development Plans (NDP), as well as federal government's regional initiatives and various state-level programs. The federal and state governments have designed and implemented development programs aimed at fostering socioeconomic convergence among lagging regions. In 2017–18, the federal government established seven special economic zones (SEZ) in less developed states to encourage domestic and foreign investment, though this initiative was subsequently cancelled by the current federal administration.[5] The 2019–24 NDP includes among its flagship programs the *Corredor Interoceánico del Istmo de Tehuantepec* (Interoceanic Corridor of the Isthmus of Tehuantepec),[6] which aims to modernize the railway, roads, and ports along the corridor between Coatzacoalcos in Veracruz and Salina Cruz in Oaxaca. It also seeks to consolidate up to ten industrial parks in the region.[7] The NDP also includes the so-called Mayan Train. This infrastructure project will span approximately 1,500 kilometers and pass through the states of Campeche, Chiapas, Tabasco, Quintana Roo, and Yucatán.

This study aims to contribute to the ongoing efforts in Mexico to reduce regional disparities by identifying opportunities for private sector development in selected states within the South-Southeast region. This region of Mexico covers nine states: Campeche, Chiapas, Guerrero, Oaxaca, Puebla, Quintana Roo, Tabasco, Veracruz, and Yucatán. However, given the differences in economic structure, social development, and institutional capacities among these states, adopting a "one-size-fits-all" approach may not be optimal. Therefore, this analysis focuses on the three poorest states in Mexico—Chiapas, Guerrero, and Oaxaca—located in the southern region, as well as Yucatán, a relatively more dynamic and developed state in the region located in the southeastern region ("the selected states" from here on). These states represent two different stages of development and capacities, and these two subregions.

This study highlights opportunities for private sector–led growth in agroindustry, forestry, automotive manufacturing, and the information, communications, and technology (ICT) sectors. These industries offer substantial potential for accelerating and diversifying sources of economic growth in the selected states. The choice of these industries was based on a comprehensive review of the economic literature on these states, an assessment of the development strategies adopted by the federal and state governments, and an analysis of GDP and employment sectoral composition, recent growth patterns, and export profiles of the four states.

The study finds that enhancing value addition in the large yet low-productivity agricultural sector could play a pivotal role in transforming the economic landscape of Mexico's southern states. By raising the quality of agricultural outputs to meet the import standards of major markets in North America, Asia, and Europe, it is possible to not only diversify the economy but also accelerate income growth among the country's poorest households.

Developing a sustainable forestry industry is another avenue for change. This industry can support economic diversification by embracing the use of recycled

materials to supply some subsectors and fostering a reforestation and conservation strategy for the sustainable production of virgin raw materials. Moreover, introducing higher value-added manufacturing products could uplift local communities by raising the income levels of the population.

Furthermore, the emerging auto-parts industry in the southern states holds substantial potential. Supporting its development and promoting deeper integration of the south into the domestic value chains in the north and center-north regions could be a catalyst for job creation. This would foster a globally competitive manufacturing sector that is dynamic and robust.

Finally, consolidating Yucatán as a regional ICT hub stands as a promising strategy. It is expected to contribute to the enhancement of the overall productivity of the southern economies, marking a significant stride in economic development.

***

A forthcoming Country Private Sector Diagnostic (CPSD) will provide a broader view on the main challenges and opportunities for private sector development in Mexico, complementing the findings of these Deep Dives at the regional level. The CPSD and the Deep Dives will be mutually reinforcing, as the national coverage of the former will offer a more comprehensive view of the economic structure, constraints and opportunities for private sector investment in the country while the latter offers more granular analytics on the state of the economy and the private sector in Mexico's poorest region.

1

The Economic Structure of the Southern States in Mexico[8]

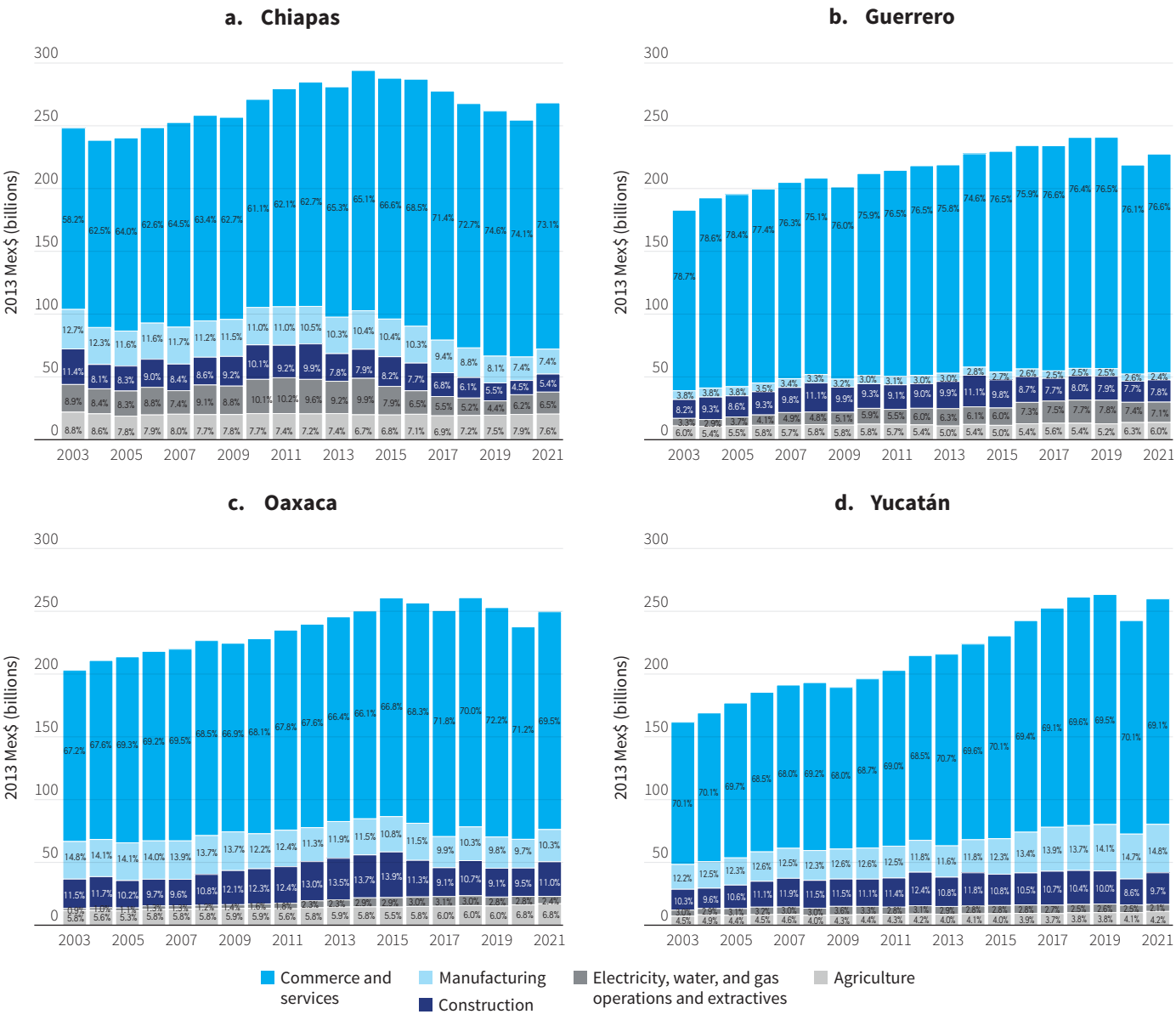
This chapter provides a brief review of the economic structure and growth performance of the selected states—Chiapas, Guerrero, Oaxaca and Yucatán. The purpose of this examination is to understand the constraints, challenges, and unique characteristics driving their economic development.

GDP COMPOSITION AND GROWTH TRENDS

Chiapas, Guerrero, Oaxaca, and Yucatán are relatively small economies, each contributing between 1.3 and 1.6 percent of Mexico's gross domestic product (GDP). The economies of these four states are primarily driven by the services sector, which represented an average of 72.1 percent of their economic output in 2021, compared to 66.7 percent at the national level. As figure 1.1 shows, the contribution of the services sector to the economies of Chiapas and Oaxaca has increased, while in Yucatán and Guerrero, it has seen a slight decrease over recent decades. In Chiapas, the agriculture sector's share of the state GDP de-

FIGURE 1.1

Composition and Evolution of State-Level GDP



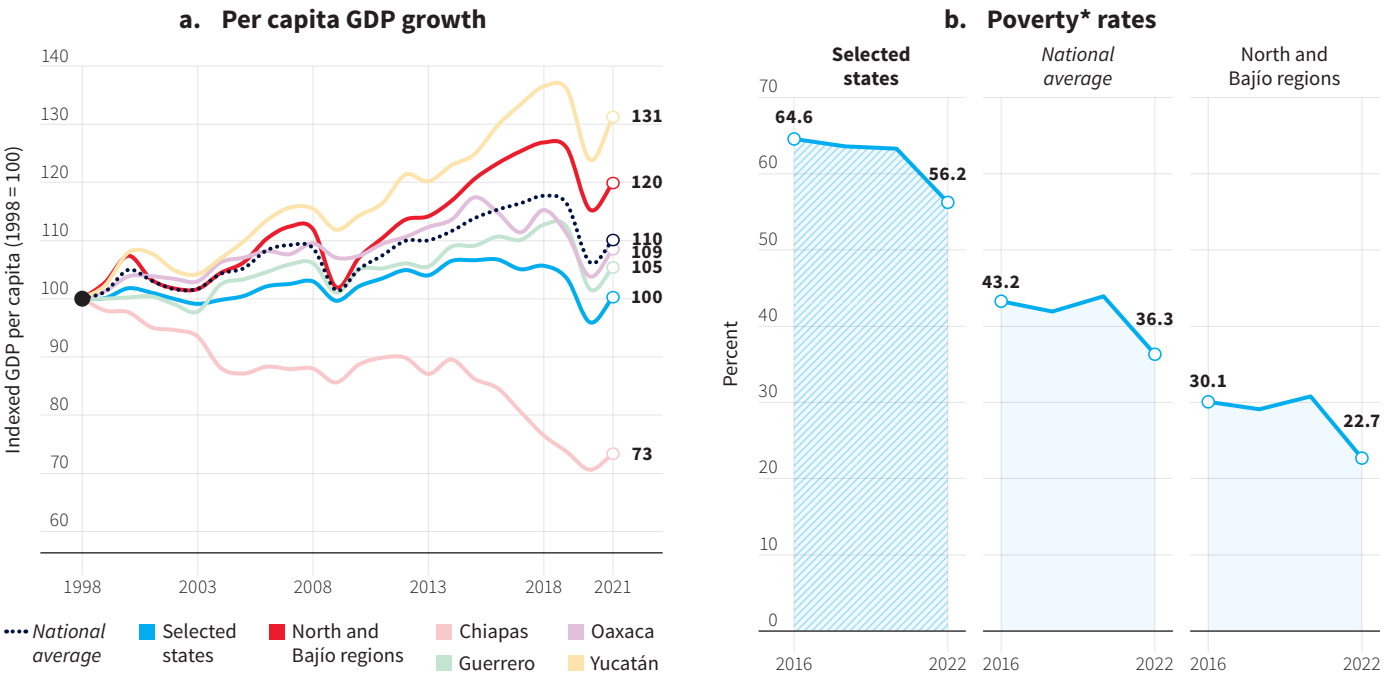
Source: Based on data from INEGI's National Accounts (various years).
Note: GDP = gross domestic product. The starting year for the data, 2003, is the earliest year for which sector-level GDP data is available from INEGI National Accounts. The data for 2021 is preliminary.

clined from 8.8 percent in 2003 to 7.6 percent in 2021, yet this remained the largest share among the four states. There was also a decline in the contribution of the manufacturing sector to the total output in Chiapas, falling from 12.7 to 7.4 percent over this period. Similarly, the extractives and utilities (electricity, water, and gas) sector shrunk from 8.9 to 6.5 percent, and construction from 11.4 to 5.4 percent.[9] In Guerrero, the contribution of manufacturing contracted from 3.8 percent in 2003 to 2.4 percent in 2021, the smallest share among the four states. The extractives and utilities sector was the only one that significantly increased its share in the state GDP, expanding from 3.3 to 7.1 percent, over the same period. In Oaxaca, the agriculture sector contributed an average 5.9 percent to the state GDP between 2003 and 2021, with notable spikes in 2020 and 2021. Conversely, the contribution of the manufacturing sector decreased from 14.8 to 10.3 percent. Yucatán, having the largest manufacturing sector among the selected states, was the only state where the share of manufacturing activities grew over this period, from 12.2 percent of the state GDP in 2003 to 14.8 percent in 2021—albeit still well below the national average of 17 percent. However, the contribution of the agricultural sector to the state GDP slightly decreased from 4.5 to 4.2 percent.

Between 1998 and 2021, the cumulative growth of per capita GDP in Chiapas, Guerrero, and Oaxaca fell short of both the national growth rate of 10 percent and the average growth of 20 percent in the more economically dynamic Bajío[10] and northern[11] regions (figure 1.2, panel a). Yucatán was the only exception among the selected states, registering a robust 31 percent cumulative

FIGURE 1.2

Per Capita GDP Growth and Headcount Poverty Rates



Source: Per capita GDP growth is based on data from INEGI's National Accounts (various years) and poverty rates are based on data from the *Consejo Nacional de Evaluacion de la Politica de Desarrollo Social*.
Note: GDP = gross domestic product. Per capita GDP growth is the GDP of each state or region divided by the population of each state or region. The data for 2021 is preliminary.
*Refers to multidimensional poverty.

increase in GDP per capita over the period. The growth rates of Guerrero and Oaxaca were just 5 and 9 percent, respectively. Chiapas even experienced a contraction in its per capita GDP of 27 percent. Despite Yucatán's rapid growth, its per capita income remains below the national average. Furthermore, the region's overall poor economic performance has led to adverse social consequences, as evidenced by its persistently high poverty rates. However, between 2016 and 2022, the poverty rate in the selected states fell by 8.3 percentage points, moving from 64.6 to 56.2 percent (figure 1.2, panel b). Similarly, the northern region and the Bajío saw a decrease of 7.4 percentage points, moving from 30.1 to 22.7 percent.

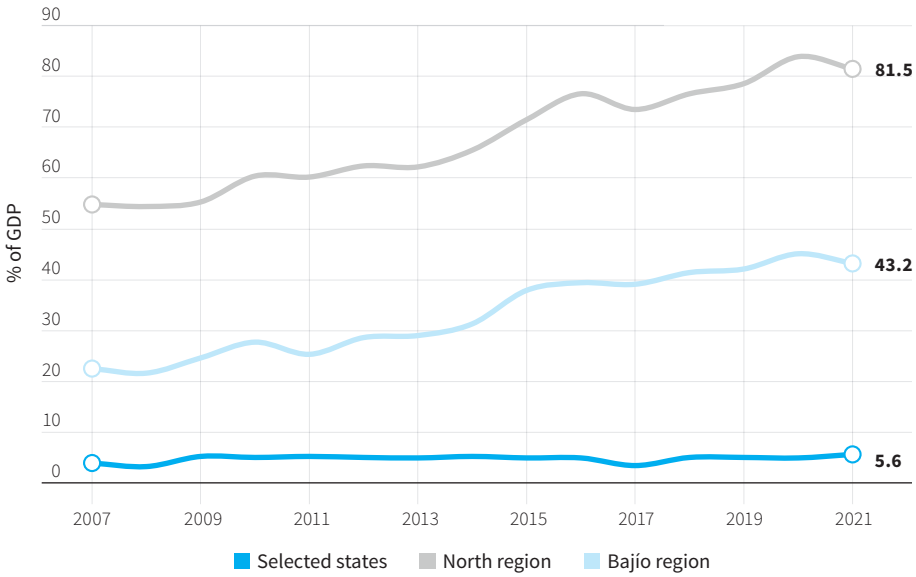
EXPORTS AND FOREIGN DIRECT INVESTMENT

The southern region of Mexico shows a much lower integration into the global economy than other states of the country, especially those in the Bajío and northern regions (figure 1.3). In 2021, the average exports from Chiapas, Guerrero, Oaxaca, and Yucatán represented close to only 6 percent of their GDP. By contrast, the exports of the Bajío and North regions were equivalent to 43.2 and 81.5 percent of their GDP, respectively. Moreover, the export-to-GDP ratio in the selected states has struggled to surpass 5 percent, while that of the Bajío and North regions has increased significantly during the last decades.

The export profiles of Chiapas and Yucatán show more diversification than that of Oaxaca, which has slightly greater export diversity than Guerrero. Key export-oriented sectors that contribute significantly to exports include transportation equipment manufacturing and processed foods in Chiapas; processed

FIGURE 1.3

Total Exports as a Percentage of GDP



Source: Based on data from INEGI's Exports by State database.
Note: GDP = gross domestic product. The figure reflects the time period for which exports data is available. Excludes oil-related activities (oil mining and manufacturing of oil- and carbon-based products). The nominal U.S. dollar value of exports was converted to nominal Mexican pesos using Banxico's foreign exchange market portal (average for each year). The GDP data for 2021 is preliminary.

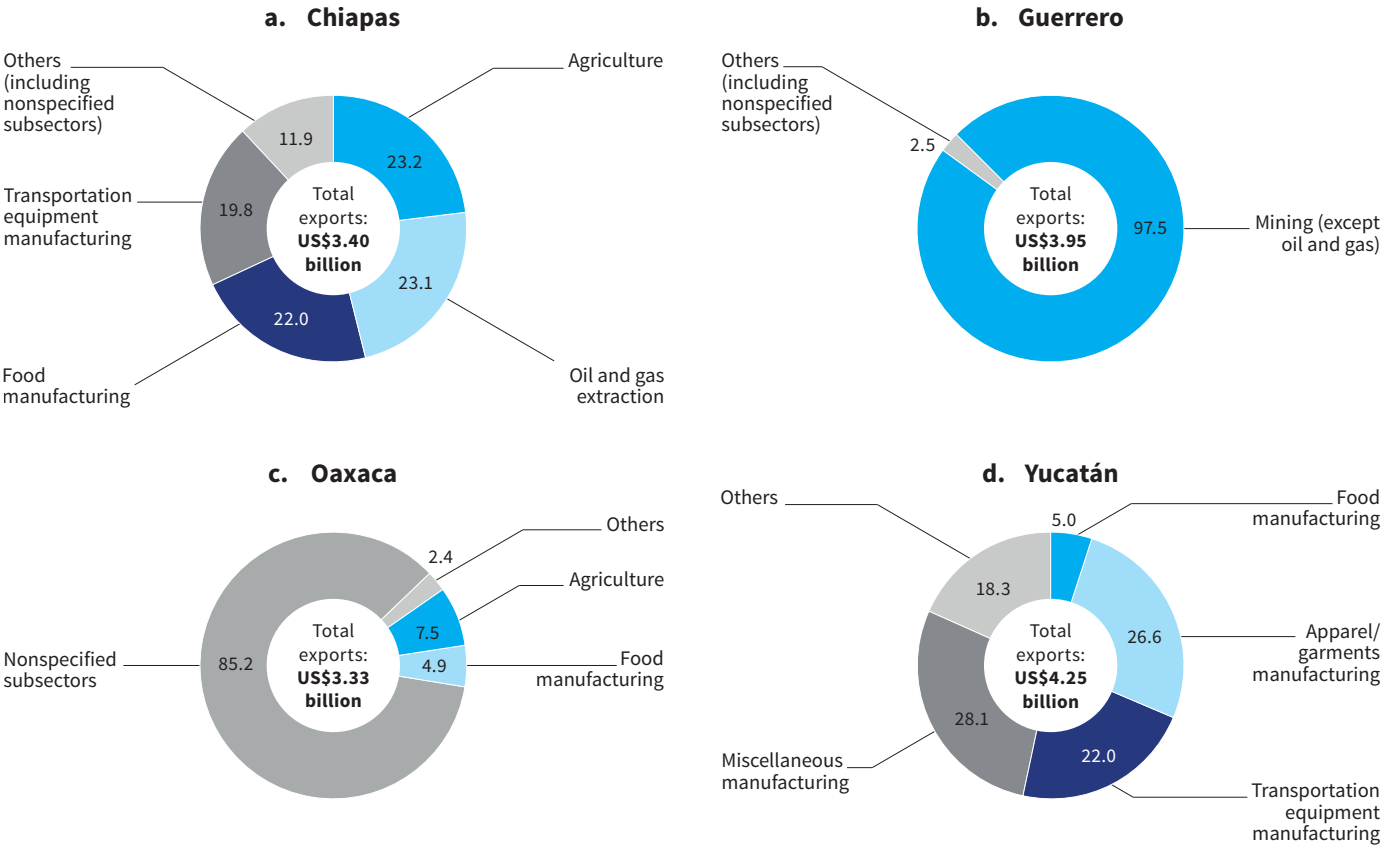
foods in Oaxaca;[12] and garments, transportation equipment, and other miscellaneous products manufacturing in Yucatán (figure 1.4). Agricultural goods also contribute to the exports of these states. In Chiapas, bananas, coffee, and natural honey; in Guerrero, copra, guava, and mango; in Oaxaca, coffee, lemon, papaya, and mango; and in Yucatán, fish, shellfish, cucumber, and animal or vegetable fats and oils.

Foreign direct investment (FDI) inflows generally represent a modest share of GDP across Mexico, but in the selected states, it makes up an even smaller share (figure 1.5). Since 2003, FDI inflows in Chiapas, Guerrero, Oaxaca, and Yucatán have averaged just 1.4 percent of their combined GDP. Notably, there was a spike in 2013, primarily because of increased investment in the nonoil mining and beverage production sectors in Guerrero, as well as in the utilities and beverage production sectors in Oaxaca. By contrast, the average FDI inflows in the Bajío and North regions represent 3.0 and 3.5 percent of GDP, respectively.

Since 2003, the beverages industry has attracted the largest share of FDI in the selected states, followed by the banking sector (figure 1.6). In particular, the beverages industry accounted for 18.6 percent of FDI in Chiapas, 15 percent in Guerrero, 36.5 percent in Oaxaca, and 23.2 percent in Yucatán. The bank-

FIGURE 1.4

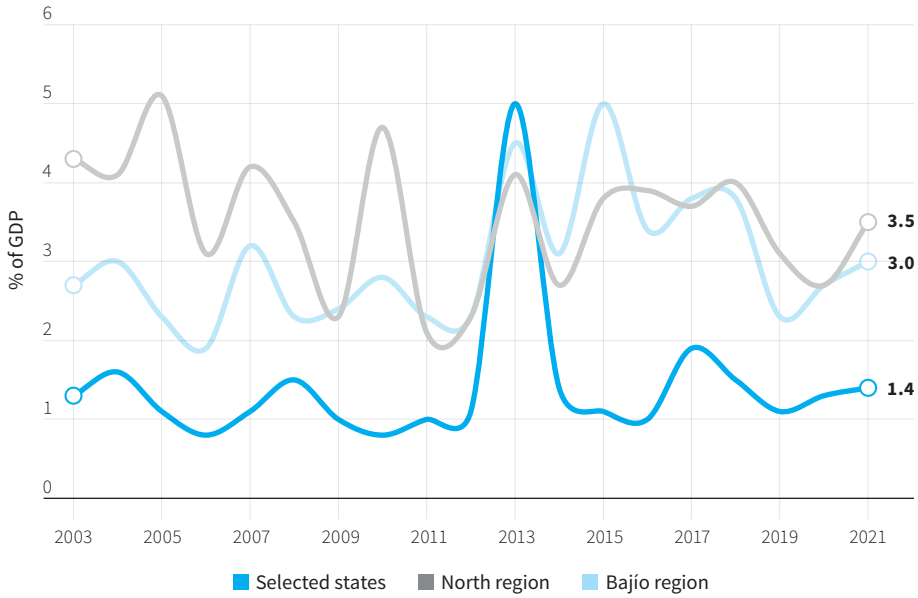
Decomposition of Exports in the Selected States, 2018–21 (%)



Source: Based on data from INEGI's Exports by State database.
Note: Exports is broken down by economic activities categorized according to the North American Industry Classification System (NAICS) at the three-digit level. Data availability for the primary sector, which includes agriculture (NAICS 111), animal production (NAICS 112), and fishing, hunting and trapping (NAICS 114), is limited and only available starting from the year 2018. The corresponding NAICS codes for the rest of the sectors are as follows: apparel/garments manufacturing (NAICS 315), food manufacturing (NAICS 311), mining (except oil and gas; NAICS 212), miscellaneous manufacturing (NAICS 339), oil and gas extraction (NAICS 211), and transportation equipment manufacturing (NAICS 336).

FIGURE 1.5

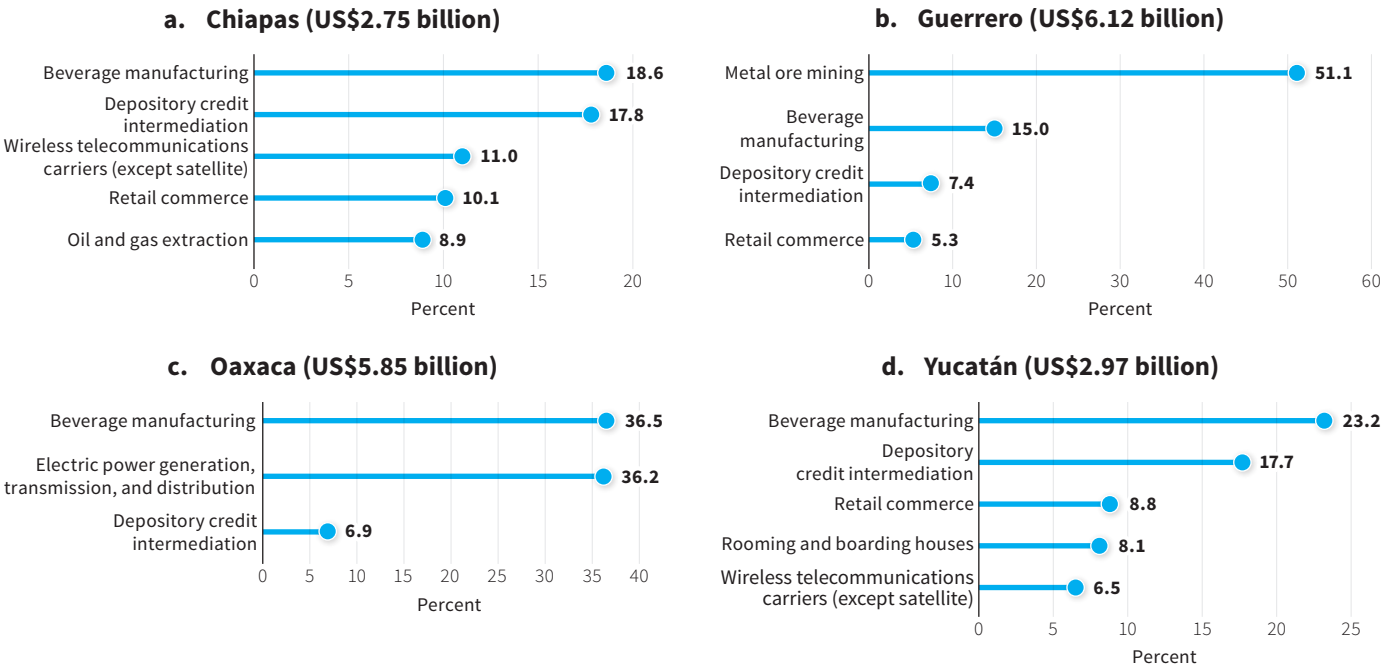
FDI Inflows as Percentage of GDP, 2003–21



Source: Based on data from Mexico *Secretaría de Economía's Información estadística de la Inversión Extranjera Directa*.
Note: FDI = foreign direct investment; GDP = gross domestic product. To convert the nominal value of FDI from U.S. dollars to Mexican pesos, the exchange rate was obtained from Banxico's foreign exchange market portal, using the average exchange rate for each year. The GDP data for 2021 is preliminary.

FIGURE 1.6

Decomposition of FDI Inflows in the Selected States, 2003–21



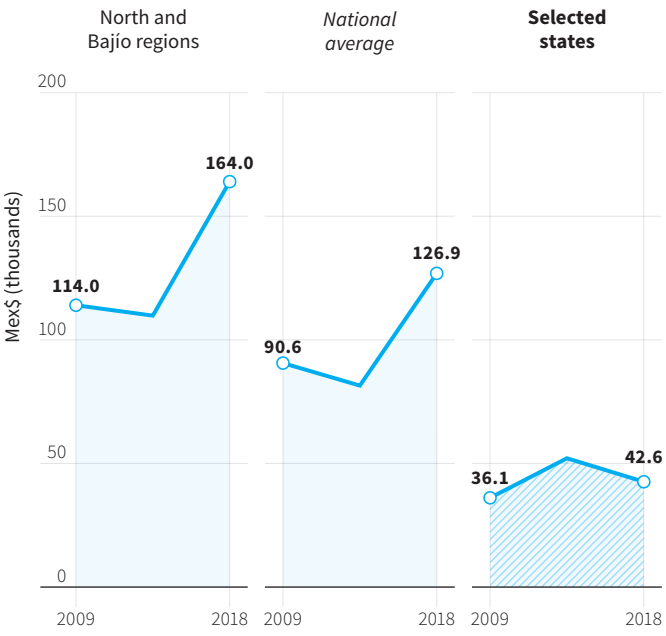
Source: Based on data from Mexico Secretaría de Economía, https://datos.gob.mx/busca/dataset/informacion-estadistica-de-la-inversion-extranjera-directa/resource/ea8190a2-93ef-4404-b2b1-735038d51954.
Note: FDI = foreign direct investment. The figure shows sectors categorized according to the North American Industry Classification System at the four-digit level. These sectors either, collectively, represent 80 percent of total investment during the 2003–21 period or, individually, represent at least 5 percent of total investment during the same period. Data for the primary sector is reported as confidential by the source. The corresponding NAICS codes for these are as follows: beverage manufacturing (NAICS 3121); depository credit intermediation (NAICS 5221); electric power generation, transmission, and distribution (NAICS 2211); metal ore mining (NAICS 2122); oil and gas extraction (NAICS 2111); retail commerce (NAICS 4621); rooming and boarding houses (NAICS 7213); and wireless telecommunications carriers (except satellite; NAICS 5172).

ing sector, on the other hand, accounted for 17.8 percent of FDI in Chiapas, 7.4 percent in Guerrero, 6.9 percent in Oaxaca, and 17.7 percent in Yucatán. There are also other sectors that have received significant shares of FDI in the selected states. For instance, in Chiapas, wireless telecommunications captured 11 percent of FDI inflows. In Guerrero, metallic mineral mining represented over 50 percent of total FDI. In Oaxaca, which has considerable potential for renewable energy, 36.2 percent of FDI was devoted to electricity generation, transmission, and distribution. Yucatán's FDI inflows were more broadly distributed, with retail commerce, accommodations, and wireless telecommunications each receiving over 5 percent of the state's FDI inflows.

TRENDS IN GROSS CAPITAL FORMATION AND STOCK OF FIXED ASSETS

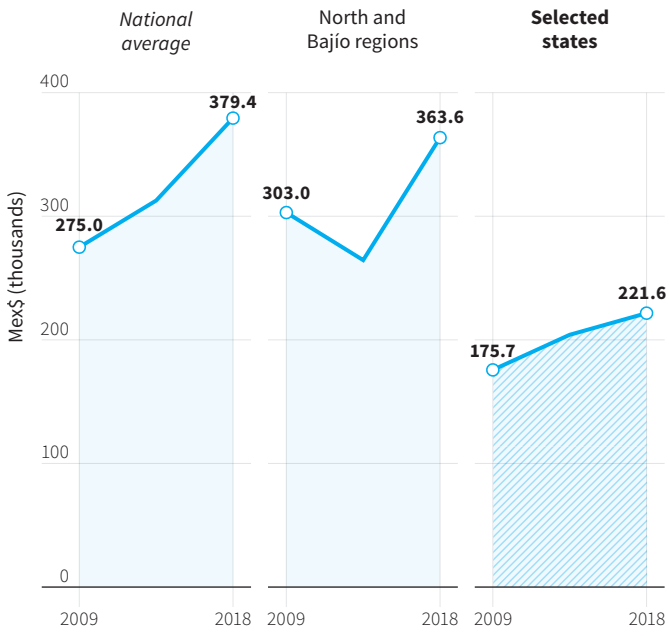
When compared to other regions, gross capital formation (GCF) and fixed-asset accumulation in the selected states have been modest.[13] In 2018, the rate of GCF in the northern region and the Bajío was nearly four times higher than in the selected states. Moreover, between 2014 and 2018, the rate of GCF per economic unit increased significantly at the national level and in the northern region and the Bajío (figure 1.7). Conversely, in the selected states, this rate increased by only 6.5 percentage points over the same period. The ratio of fixed assets per worker is 1.71 times higher at the national level and 1.64 times higher in the North and Bajío regions than the aggregate for the selected states (figure 1.8). These lower levels of fixed assets per worker persist even when considering the capital or labor intensity of the sectors, with the exception of mining (figure 1.9).

FIGURE 1.7
Gross Capital Formation Per Economic Unit



Source: Based on INEGI 2010; 2015; 2019.

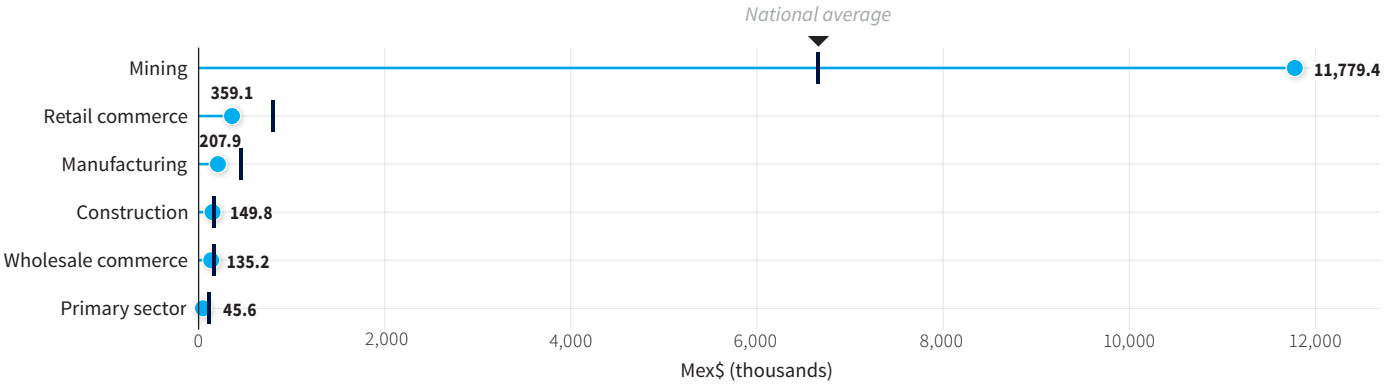
FIGURE 1.8
Fixed Assets Per Worker



Source: Based on INEGI 2010; 2015; 2019.

FIGURE 1.9

Fixed Assets Per Worker in Selected Sectors, 2018



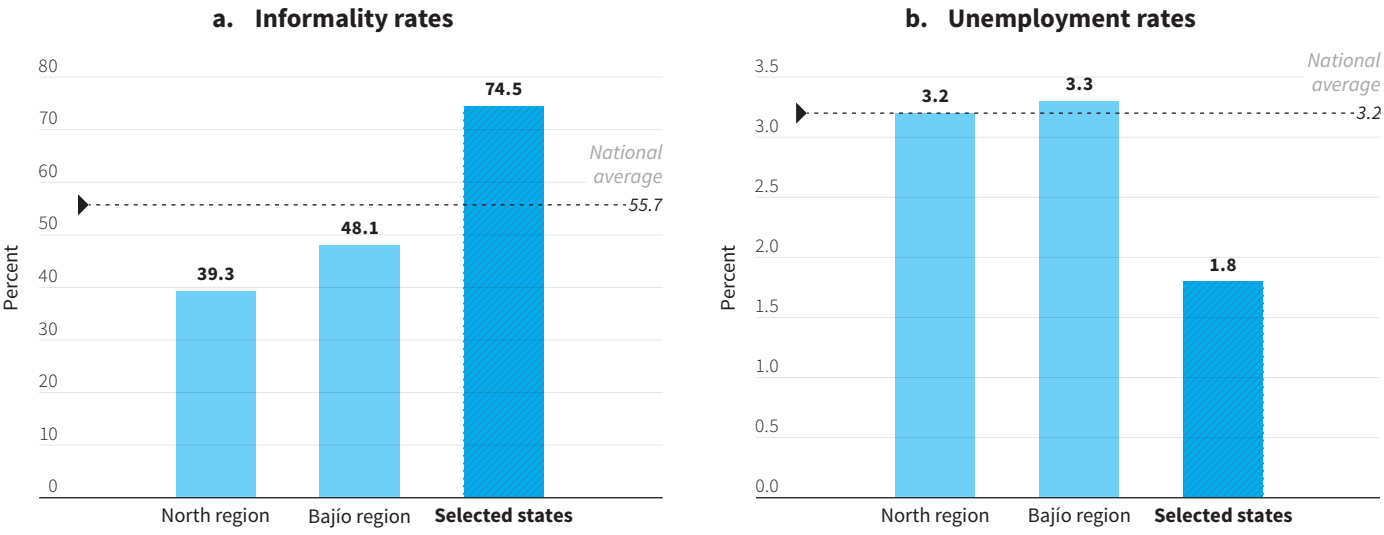
Source: Based on INEGI 2019.

LABOR MARKET TRENDS

Labor markets in Chiapas, Guerrero, Oaxaca, and Yucatán have higher rates of informality, contributing to lower wages and obscuring the actual incidence of unemployment. Aggregate informality rate in these states stood at 74.5 percent in 2022, which is higher than the national average of 55.7 percent and surpasses the rates for the northern region and the Bajío at 39.3 and 48.1 percent, respectively (figure 1.10, panel a). Moreover, the average monthly wage for formal workers in the selected states has been historically lower than in other regions, trailing by about 12 percent below the average for the northern region and the Bajío over the last decade. As the informal sector employs a large share of the labor force that is not absorbed by the formal sector, the unemployment rate in the selected states is just 1.8 percent, much lower than the levels of most other states (figure 1.11, panel b).

FIGURE 1.10

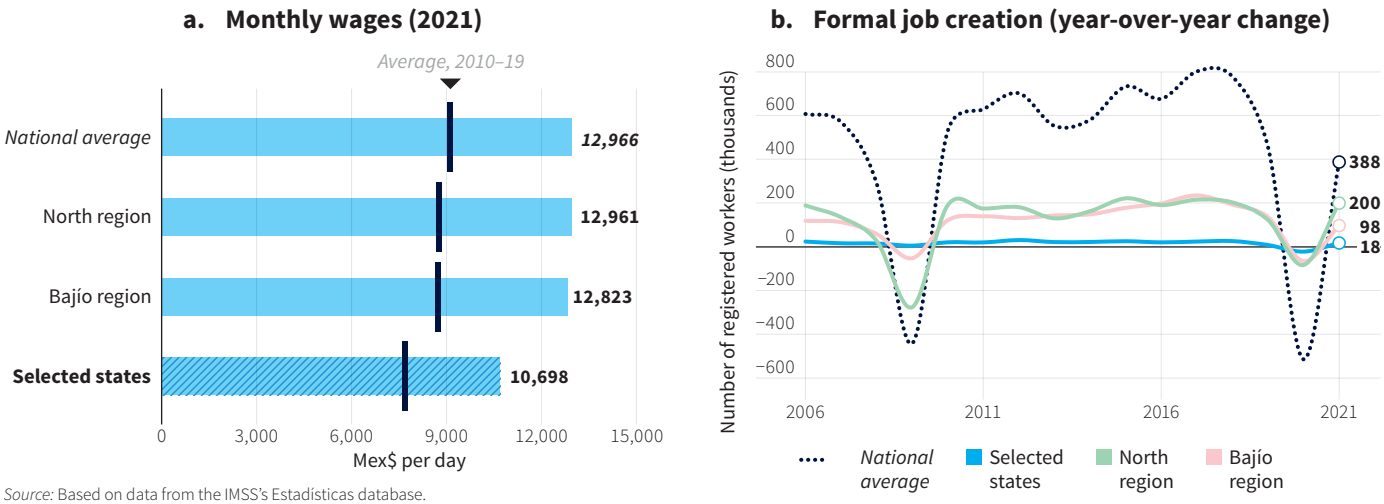
Informality and Unemployment, 2022



Source: Based on data from INEGI's ENOE database.
Note: Data are for the second quarter of 2022.

FIGURE 1.11

Trends in Wages and Job Creation

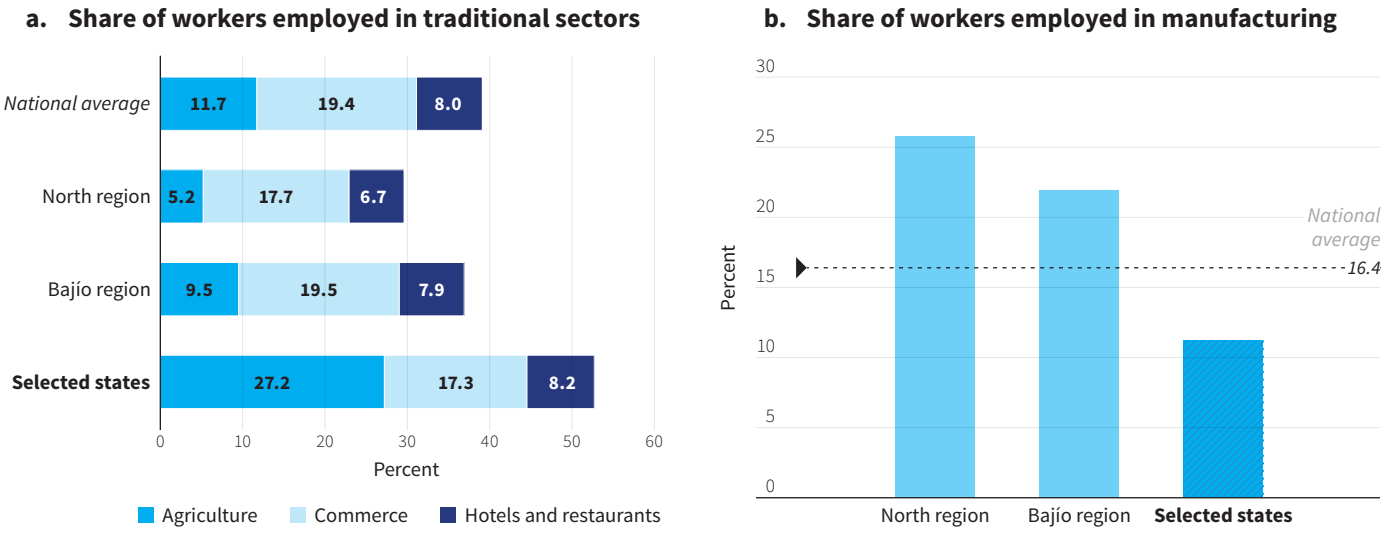


Source: Based on data from the IMSS's Estadísticas database.
Note: The figure for formal job creation (panel b) covers all workers registered in the *Instituto Mexicano del Seguro Social* (Mexican Institute of Social Security).

Lower wages in the southern region are also related to the concentration of workers in less sophisticated and less productive economic activities. The share of workers in Chiapas, Guerrero, Oaxaca, and Yucatán employed in traditional sectors such as agriculture, hotel and restaurant services, and commerce is over 50 percent (figure 1.12, panel a). This contrasts significantly with the northern region and the Bajío, where these sectors employ 30 and 36 percent of the workforce, respectively. Moreover, in the selected states, only 11.2 percent of workers are employed in manufacturing and related activities, far below the levels observed in the northern region (25.8 percent) and the Bajío (21.9 percent) (figure 1.12, panel b).

FIGURE 1.12

Employment in Traditional Sectors and Manufacturing, 2022



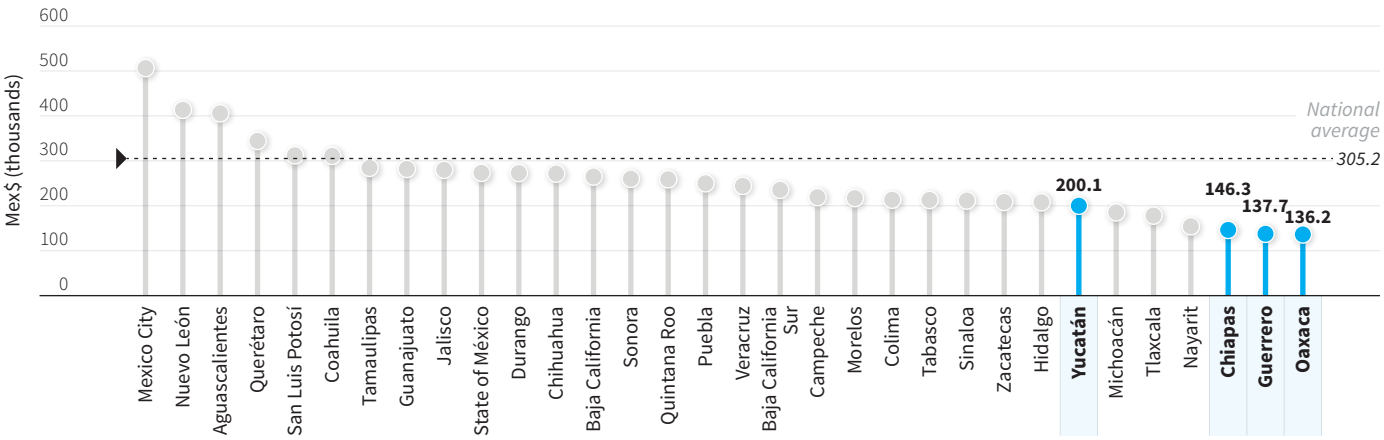
Source: Based on data from INEGI's ENOE database.
Note: Data are for the second quarter of 2022.

PRODUCTIVITY DECOMPOSITION ANALYSIS

Over the last 15 years, labor productivity in the northern and Bajío regions have increased relative to the national average, while the productivity gap has widened in the selected states, with the exception of Yucatán. Given data limitations at the subnational level, this analysis focuses on labor productivity, measured as value added per worker. Levels of labor productivity in the selected Southern states are all far below the national average of Mex$305,200 per worker per year. Labor productivity in Chiapas, Guerrero, Oaxaca, and Yucatán is 52.1, 54.9, 55.4, and 34.4 percent below the national average, respectively. Notably, Chiapas, Guerrero, and Oaxaca have the lowest productivity levels among all 32 states of Mexico (figures 1.13 and 1.14).[14]

FIGURE 1.13

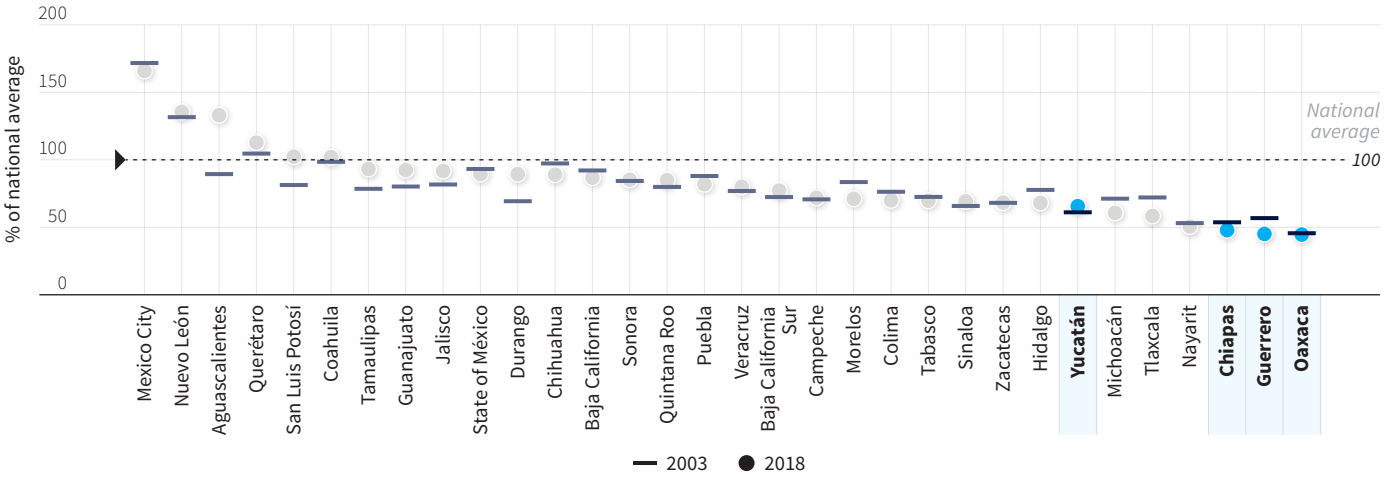
Labor Productivity by State, 2018



Source: Based on INEGI 2019.
Note: Economic activities related to oil and gas, banking and finance, and other centralized activities, as well as those with negative value added, are excluded to avoid distortions in the estimation of labor productivity.

FIGURE 1.14

Labor Productivity by State, 2003 and 2018



Source: Based on INEGI 2004; 2019.
Note: Economic activities related to oil and gas, banking and finance, and other centralized activities, as well as those with negative value added, are excluded to avoid distortions in the estimation of labor productivity.

The low productivity in the selected states could be attributed to two potential causes. The first is structural factors, which might inhibit productivity growth across all sectors and industries, and the second potential cause could be that economic activity tends to concentrate in sectors and industries with inherently low productivity levels. These hypotheses are not mutually exclusive, both can coexist and contribute to the observed low productivity. However, they must be evaluated separately to analyze their individual impacts. To assess these hypotheses, a version of the Oaxaca-Blinder decomposition, a popular method in labor economics, is used to calculate the difference in labor productivity between the state level and the national average. This difference is defined as the "productivity gap" for each state (figure 1.15).[15]

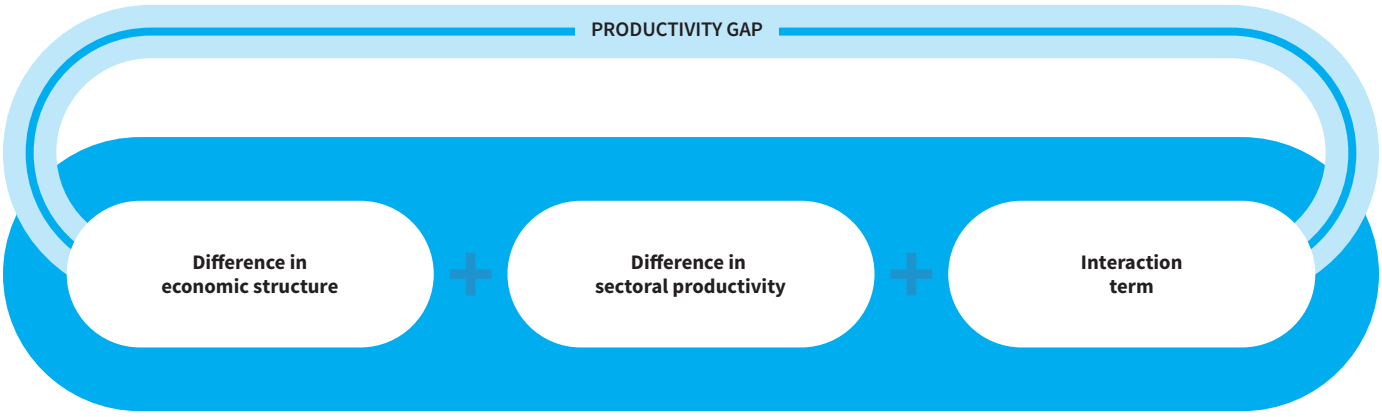
The Oaxaca-Blinder decomposition allows for the isolation of three different components of the productivity gap.

1. **Difference in economic structure.** This component captures the variances in the concentration of employment among industries in the individual states compared to the national structure, while holding the states' sectoral productivity levels constant. Essentially, it shows whether the state economy tends to focus on higher or lower productivity sectors.

2. **Difference in sectoral productivity.** This component reveals how sectoral productivity levels by industry vary at the state and national levels, while holding the state's economic structure constant. It exposes the differences in productivity that exist within the same industry, across different states.

3. **Interaction term.** This component accounts for how state-level differences in economic structure and sectoral productivity combine to further narrow (or widen) the productivity gap. It can also indicate how well or how poorly the labor force has been allocated across industries in which the state is more productive than the national average.

FIGURE 1.15
Productivity Gap Decomposition



Source: Authors' own elaboration

The selected states exhibit relatively low levels of productivity across all industries. Most of the productivity gap in the selected states is explained by their industries underperforming against the national average, while differences in economic structure are comparatively modest (table 1.1). Chiapas is the only state in which its economic structure is found to narrow the productivity gap, albeit slightly. In addition, the presence of a large interaction term suggests that not only do these states have lower productivity levels than the national average, but they tend to produce relatively more goods and services in which their economies are less productive and fewer goods and services in which their economies are more productive (figure 1.16).

TABLE 1.1

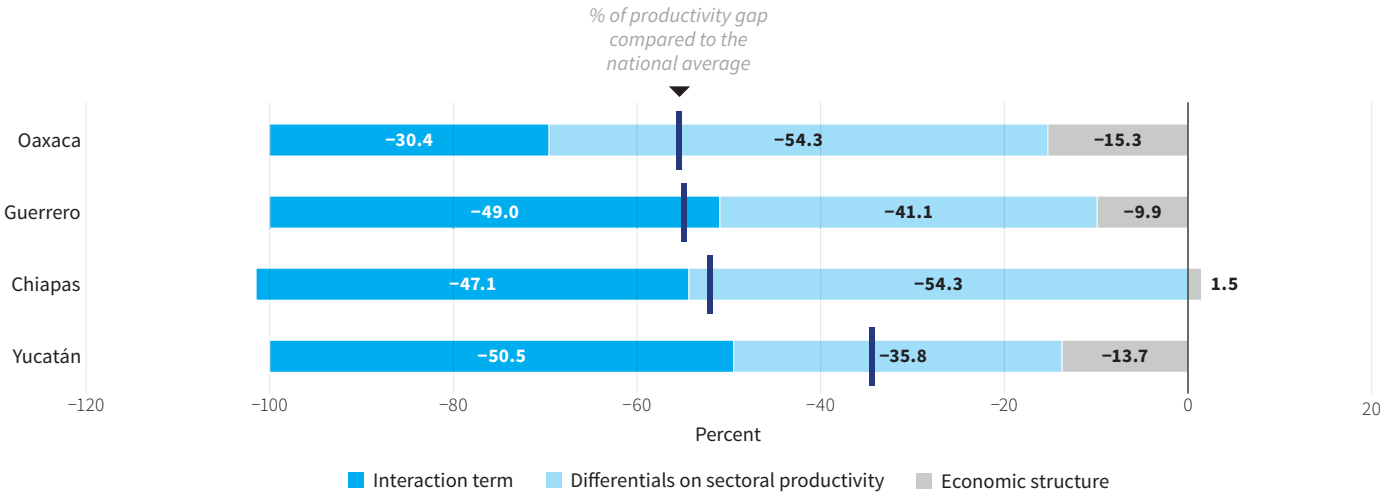
Productivity Gap Decomposition for the Selected States, 2018

	Productivity (Mex$, thousands)*	Productivity gap		Productivity decomposition							
				Mex$, thousands				% of national average			
		Mex$, thousands	% of national average	Differentials on economic structure	Differentials on sectoral productivity	Interaction term	Total	Differentials on economic structure	Differentials on sectoral productivity	Interaction term	Total
Yucatán	200.1	−105.1	−34.4	−14.4	−37.6	−53.1	−105.1	−4.7	−12.3	−17.4	−34.4
Chiapas	146.3	−158.9	−52.1	2.4	−86.4	−74.9	−158.9	0.8	−28.3	−24.5	−52.1
Guerrero	137.7	−167.5	−54.9	−16.6	−68.8	−82.1	−167.5	−5.4	−22.6	−26.9	−54.9
Oaxaca	136.2	−169.0	−55.4	−25.8	−91.8	−51.4	−169.0	−8.5	−30.1	−16.8	−55.4

Source: Calculations based on data from INEGI 2019.
Note: For details of the productivity decomposition for all the states, see appendix A. Absolute and relative differentials in productivity compared to the average national productivity level of Mex$305,200 per worker per year. Economic activities related to oil and gas, banking and finance, and other centralized activities, as well as those with negative value added, are excluded to avoid distortions in the estimation of labor productivity

FIGURE 1.16

Productivity Gap in the Selected States by Component, 2018



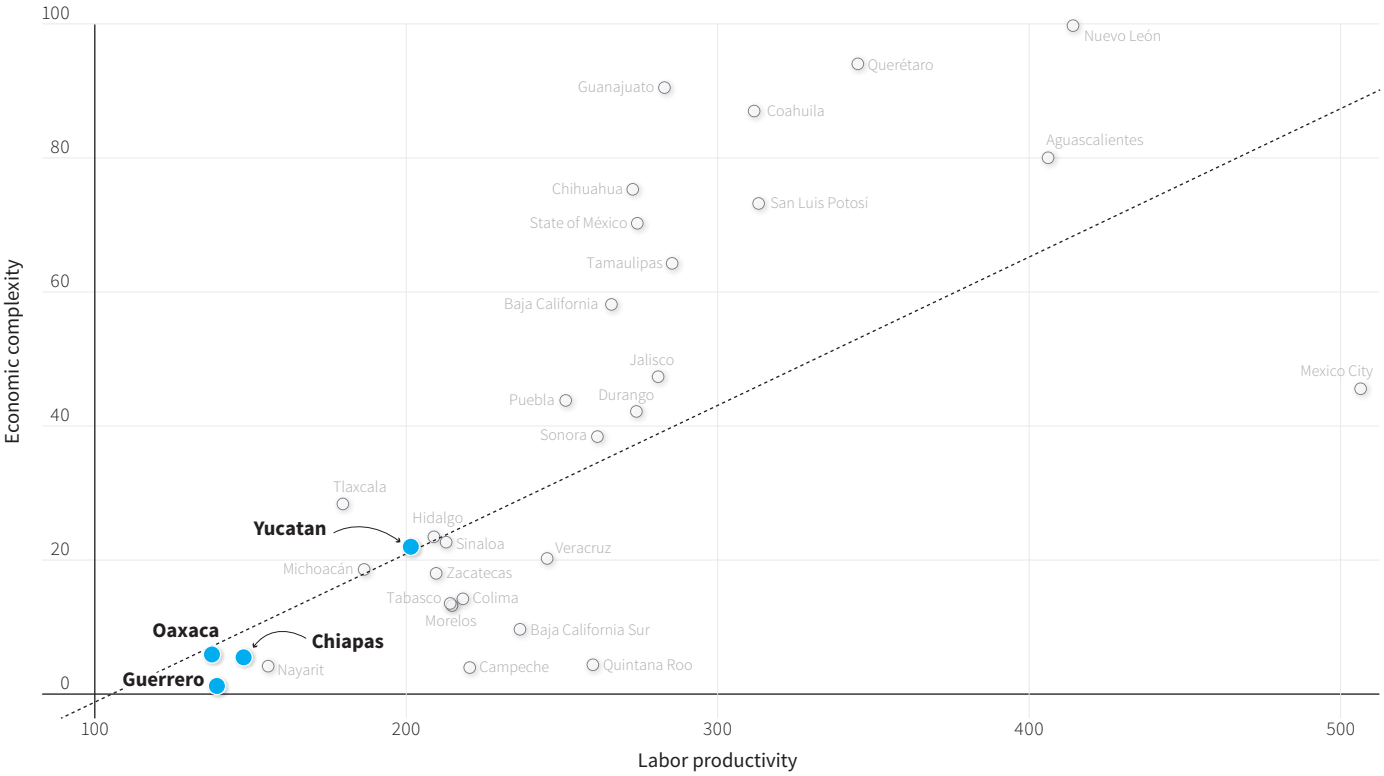
Source: Calculations based on data from INEGI 2019.
Note: Economic activities related to oil and gas, banking and finance, and other centralized activities, as well as those with negative value added, are excluded to avoid distortions in the estimation of labor productivity.

ECONOMIC COMPLEXITY ANALYSIS

The Economic Complexity Index (ECI) offers another method to measure the economic structure, performance, and potential of the selected states.[16] This approach assumes that the output of an economy is indicative of its embedded stock of productive capabilities, and, thus, economies with comparable productive capabilities are likely to produce similar types of goods and services.[17] Producing more complex goods and services increases a location's productive capacities, enabling it to produce a wider range of increasingly complex goods and services—a phenomenon known as "opportunity gain."[18] However, the possibilities created by opportunity gain hinge on the "distance" between the existing productive structure and the structure required for newer, more complex goods and services. There is a high correlation between economic complexity and the average labor productivity of the Mexican states (figure 1.17). Chiapas, Guerrero and Oaxaca are among the less productive states and their economies are also among the least sophisticated. Yucatán performs better in both metrics, but it is still in the bottom half in terms of economic complexity, and it has the seventh lowest labor productivity. This situation has remained relatively constant in the last decades, with slight improvements in the economic complexity of Chiapas and Oaxaca, and deterioration in Guerrero (figure 1.18).

FIGURE 1.17

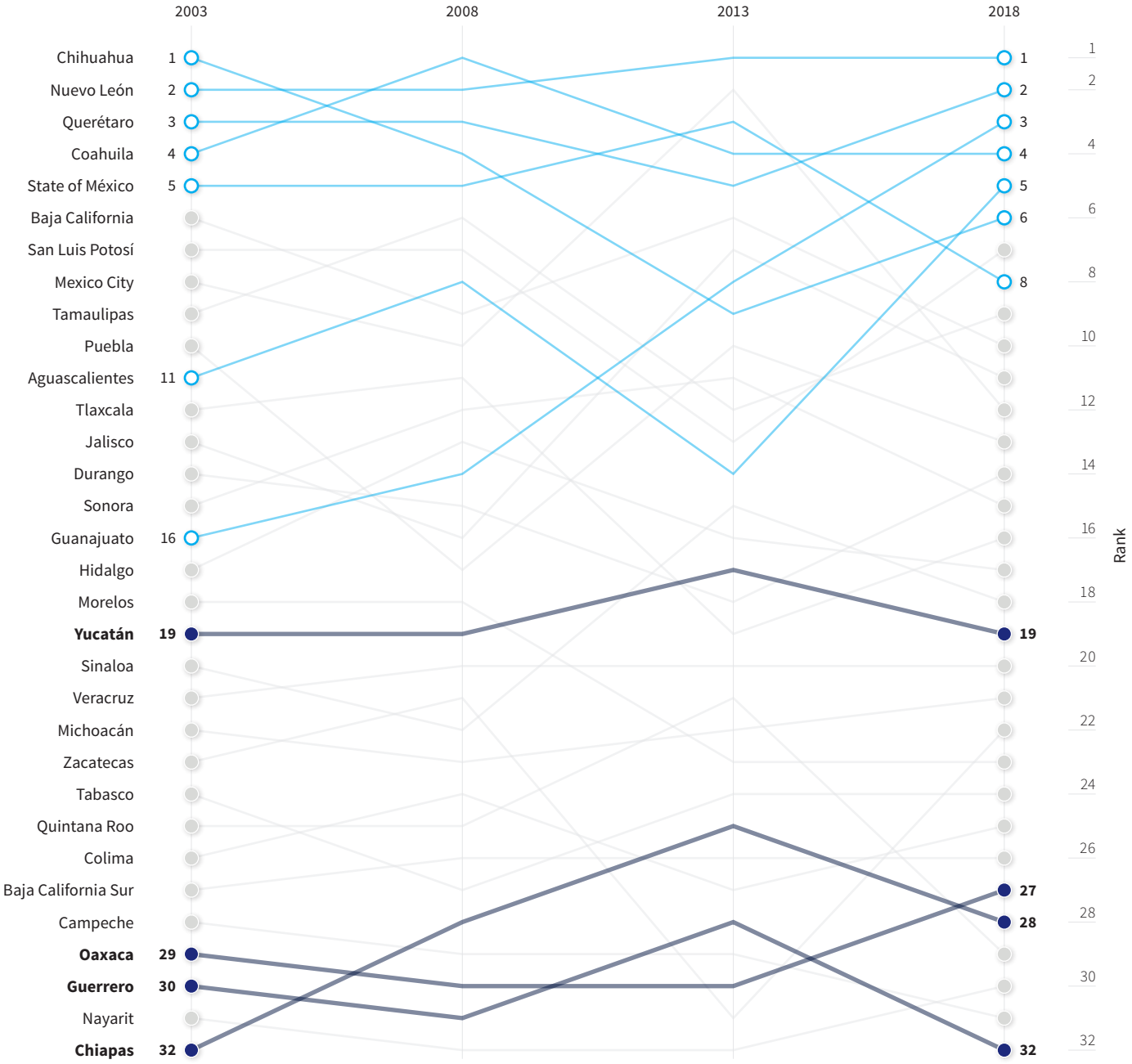
Economic Complexity and Labor Productivity by State, 2018



Source: Calculations based on data from INEGI 2019.
Note: Economic complexity is calculated based on Hausmann and Hidalgo (2009) and the methodology of Harvard's Growth Lab, using value added of sectors. Results were normalized to range from 0 to 100. Labor productivity is calculated as the value added per worker, expressed in thousands of Mexican pesos. Economic activities related to oil and gas, banking and finance, and other centralized activities, as well as those with negative value added, are excluded to avoid distortions in the estimation of labor productivity.

FIGURE 1.18

Economic Complexity Rank by State, 2003–18

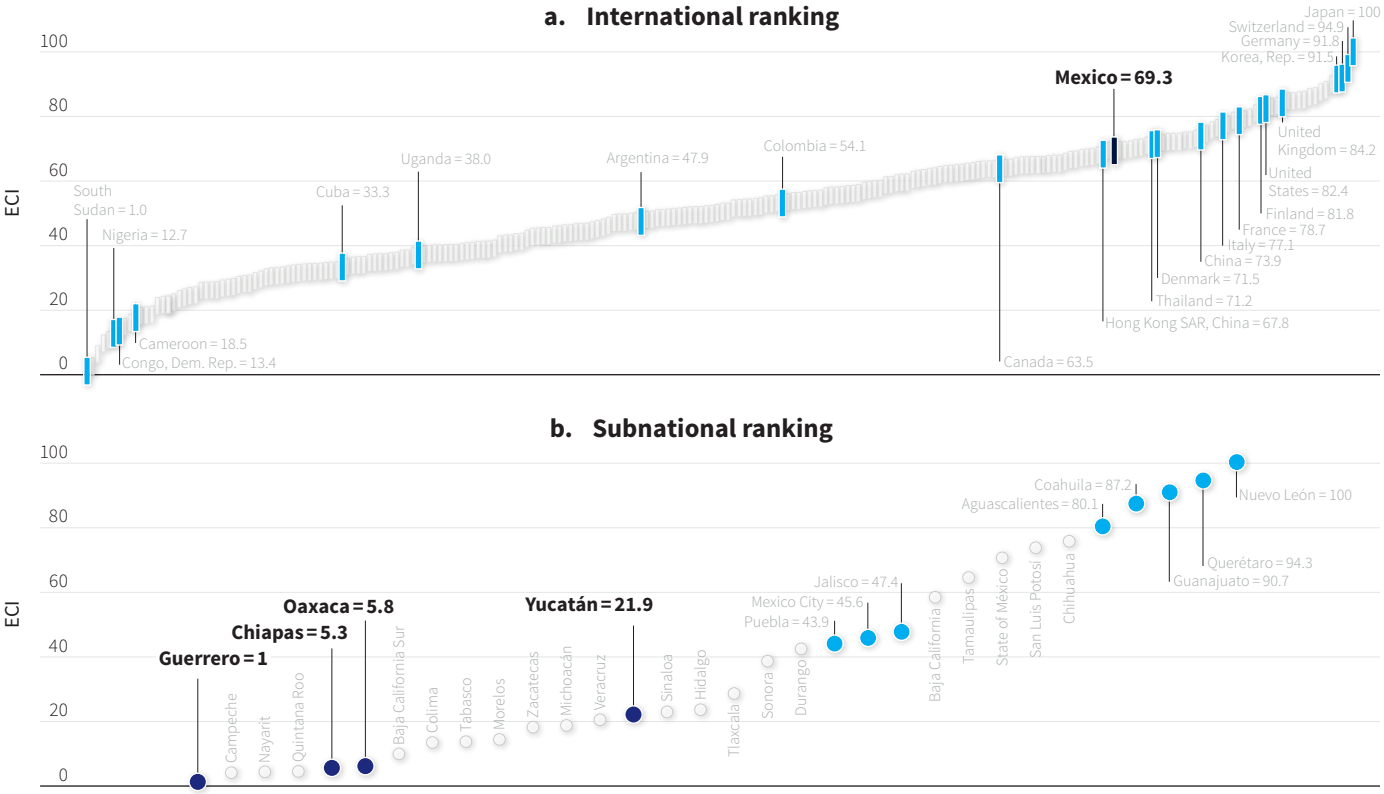


Source: Calculations based on data from INEGI 2004; 2009; 2014; 2019.
Note: Economic complexity is calculated based on Hausmann and Hidalgo (2009) and the methodology of Harvard's Growth Lab, using value added of sectors. Results were normalized to range from 1 to 100. Oil-related and centralized activities, as well as those with negative value added, are excluded to prevent distortions.

The ECIs of Chiapas, Guerrero, Oaxaca, and Yucatán are lower than those of wealthier states and comparable with the ECIs observed in countries with much lower income levels (figure 1.19). According to the Atlas of Economic Complexity, Mexico ranks as the 22nd most complex country in terms of exports in 2021, improving seven places above its position in 1995 (29th). However, there is wide variation in economic complexity across different states. The most recent subnational ECI for exports from 2014, found that the economy of

FIGURE 1.19

Economic Complexity Index, International and Subnational Rankings, 2018



Source: The Atlas of Economic Complexity, Mexico Atlas of Economic Complexity, and calculations based on data from INEGI 2019.
Note: The Economic Complexity Index (ECI) for the Mexican states and the international ECI are not directly comparable. The international ECI is based on exports, which are presumably more sophisticated activities. On the other hand, the ECI for the Mexican states is calculated based on value added of all economic activities (excluding oil-related and centralized activities). The ECI is calculated based on Hausmann and Hidalgo (2009) and the methodology of Harvard's Growth Lab.

Chiapas was roughly on par in terms of sophistication with Côte d'Ivoire and Uganda; Guerrero's economy was close to Cameroon and Trinidad and Tobago; Oaxaca's economy was close to Cuba and Morocco; and Yucatán's economy was close to Argentina and Colombia.[19] By contrast, the states with the highest ECIs—Chihuahua, Nuevo León, and Tamaulipas—have economic complexity levels comparable to those of France; Finland; Hong Kong SAR, China; Italy; and the United Kingdom. Moreover, the ECIs of the selected states, based on global trade flows, may have deteriorated over recent years given that their share of Mexico's nonoil exports dropped from 1.3 percent in 2014 to 1.0 percent in 2021.

Chiapas, Guerrero, Oaxaca, and Yucatán reflect low opportunity value[20] and low adjusted economic complexity. These states exhibit lower levels of productivity, income, economic sophistication, and potential for output growth. Their low opportunity value indicates that they possess little scope to improve their economic sophistication by developing more complex and productive industries. Given this context, public policies should aim for "strategic bets" that focus on fostering new more sophisticated industries, which could catalyze a process of structural transformation, while also addressing cross-cutting constraints on growth and diversification. The positioning of Mexico's 32 states in

FIGURE 1.20

A Policy Map for Structural Transformation

Source: Calculations based on data from INEGI's Economic Census (2019) and National Accounts.
Note: The matrix is based on the approach and methodology of Hausmann and Klinger (2009). Higher opportunity values suggest that a state has more opportunities and can easily "jump" to the production of more complex products. A higher adjusted economic complexity level indicates that a state's economic complexity exceeds what would be expected given its income and growth level, which means it is likely to grow faster in the next years and it has room to upgrade the quality of its existing products and expand its product range.

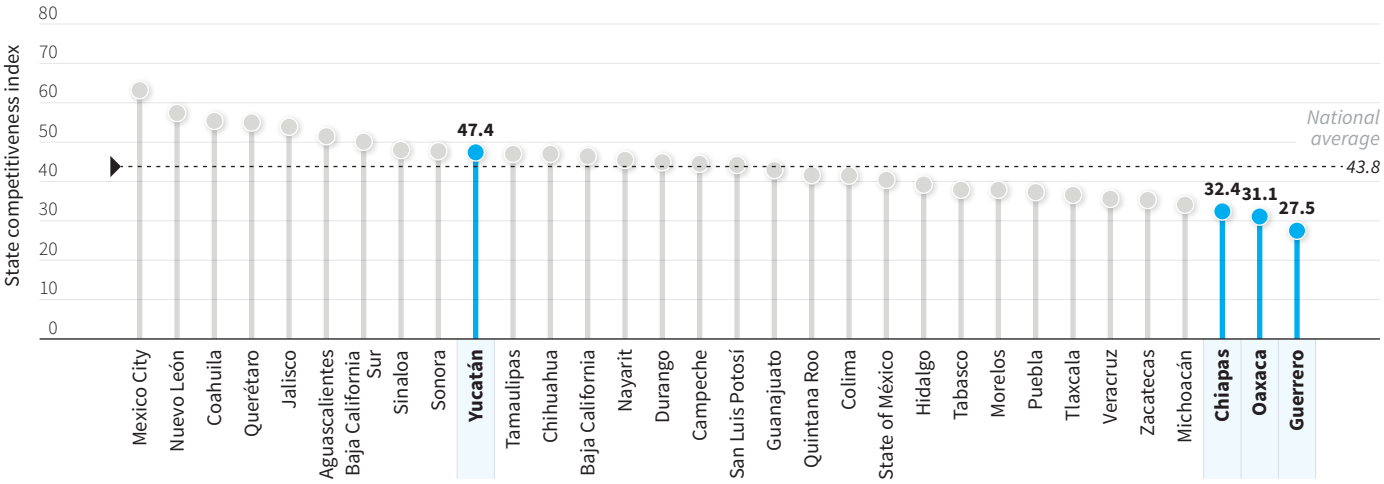
the strategic matrix developed by Hausmann and Klinger (2009) confirms the importance of such strategic bets in the selected states (figure 1.20).

COMPETITIVENESS INDICATORS

The investment climate in Chiapas, Guerrero, and Oaxaca is generally poor, while Yucatán ranks above the national average. According to a 2022 report by the Instituto Mexicano para la Competitividad (Mexican Competitiveness Institute; IMCO) Chiapas, Oaxaca, and Guerrero are the weakest performers in terms of overall competitiveness, whereas Yucatán ranks 10th out of 32 states in Mexico (figure 1.21). Based on a 0–100 scale, Chiapas, Oaxaca, and Guerrero have an average overall score of 30.3, which is almost half the average score of 57.0 for the most competitive states (Mexico City, Nuevo León, Coahuila, Querétaro and Jalisco). The IMCO's evaluation found that Guerrero and Oaxaca scored below 50 in nine out of 10 areas (except for legal system), while Chiapas scored below

FIGURE 1.21

State Competitiveness Index



Source: IMCO 2022.

TABLE 1.2

State-Level Indicators of Competitiveness

	Chiapas	Guerrero	Oaxaca	Yucatán
Legal system	High	Medium-low	Medium-high	High
Environmental sustainability	Medium-low	Medium-high	Medium-high	Medium-low
Social wellbeing	Very low	Low	Low	Medium-low
Political system	High	Low	Medium-low	Very high
Government efficiency	Medium-low	Very low	Low	High
Factor markets	Very low	Low	Low	Medium-low
Economic stability	Medium-low	Low	Medium-low	Medium-high
Pioneering sectors	Low	Medium-low	Low	Medium-low
International relations	Low	Medium-low	Low	Low
Innovation	Low	Low	Low	Medium-low
Overall	Low	Low	Low	Medium-high

Source: IMCO 2022.
Note: A state-level indicator categorized as "very high" indicates that the score in that area is two or more standard deviations above the average; "high" indicates that the score is between one and two standard deviations above the average; "medium-high" indicates that the score is one standard deviation above the average; "medium-low" indicates that the score is one standard deviation below the average; "low" indicates that the score is between one and two standard deviations below the average; and "very low" indicates that the score is two or more standard deviations below the average.

50 in eight areas (except for legal and political systems) (table 1.2).[21] Yucatán's performance contrasts sharply from the other selected states as it achieved an overall score of 47.4, with five areas above 50: legal system, social wellbeing, political system, government efficiency, and economic stability.

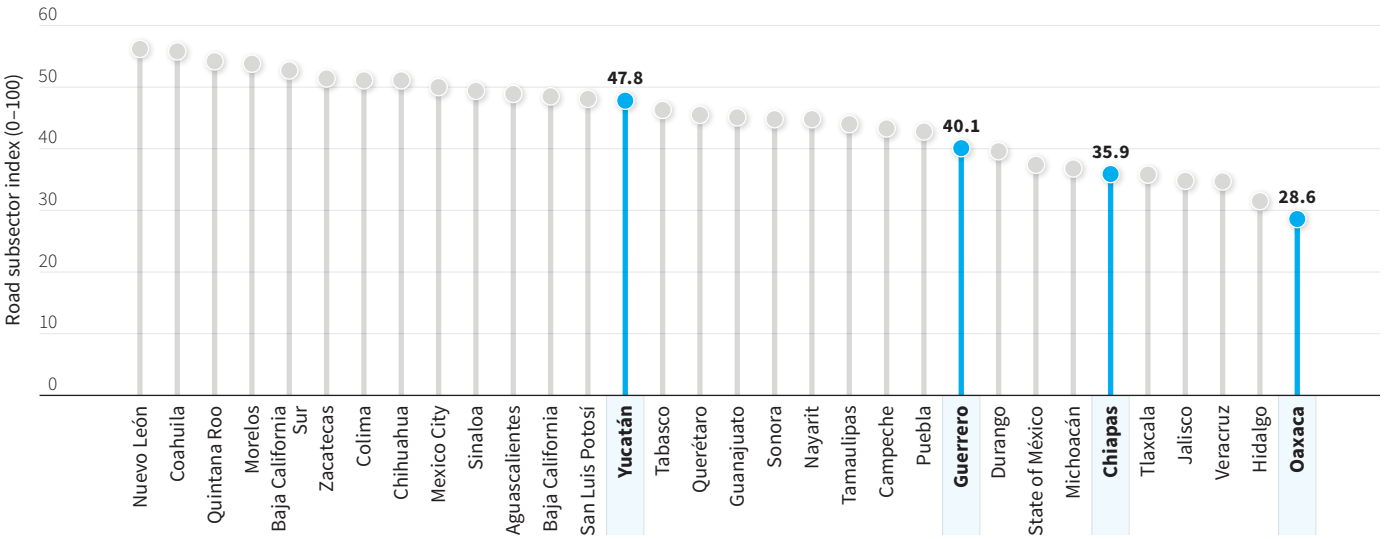
INFRASTRUCTURE INDICATORS

The selected states face significant infrastructure gaps in transportation, communications, water and wastewater management, and electricity and fuel supplies. To assess infrastructure conditions across all states, 11 normalized indices were calculated for evaluation.[22]

Within the transportation sector, four subsectors were analyzed. The road subsector index was employed to measure road coverage and quality in each state (figure 1.22). Oaxaca ranked the lowest on this index, placing 32nd out

FIGURE 1.22

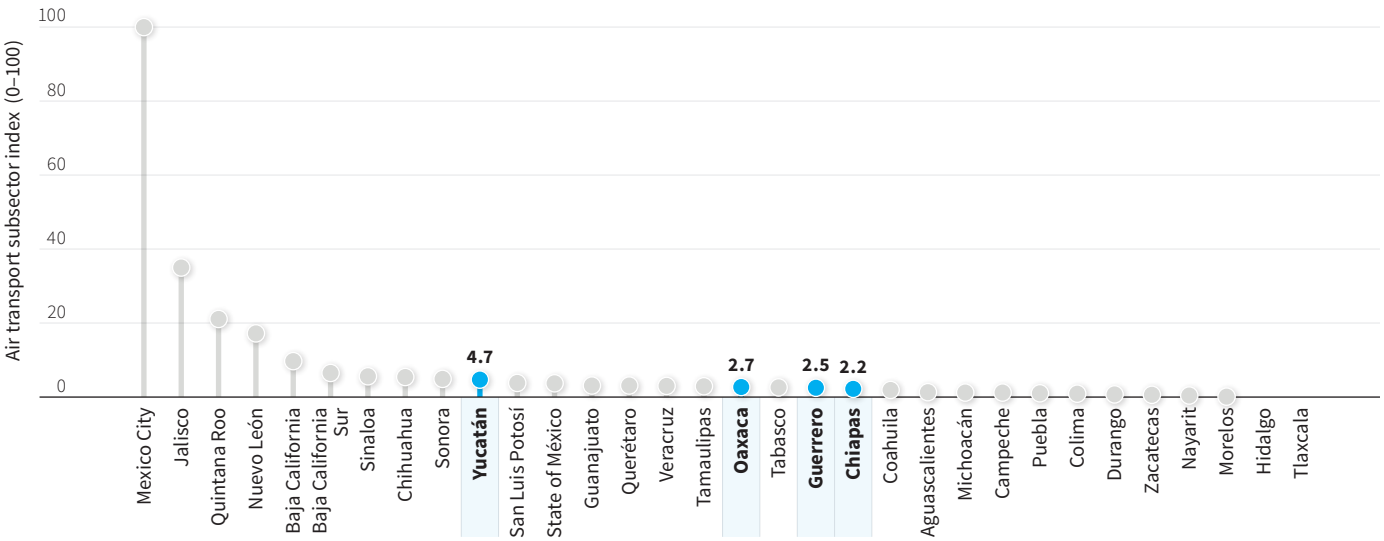
Road Subsector Index by State



Source: Based on data from SCT (2015).

FIGURE 1.23

Air Transport Subsector Index by State



Source: Based on data from SCT (2015).

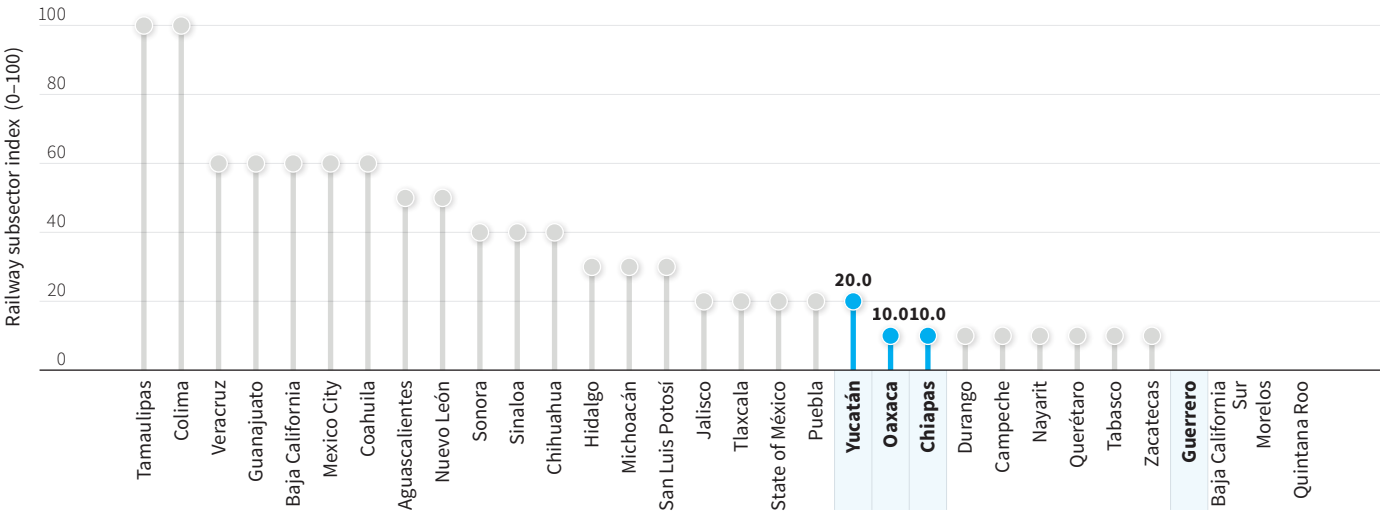
of 32 states. Chiapas and Guerrero fared slightly better but still ranked in the bottom ten, ranking 27th and 23rd, respectively. In contrast, Yucatán performed comparatively well, ranking in the middle of the range at 14th place and even exceeding some states in the Bajío and North regions.

The subsector index for air transportation measured the volume of freight and passengers per airport (figure 1.23). Chiapas, Guerrero, and Oaxaca ranked in the middle of the distribution, securing the 20th, 19th, and 17th positions, respectively). Yucatán, on the other hand, performed better and ranked 10th.

For railways, the subsector index measured the volume of freight transported

FIGURE 1.24

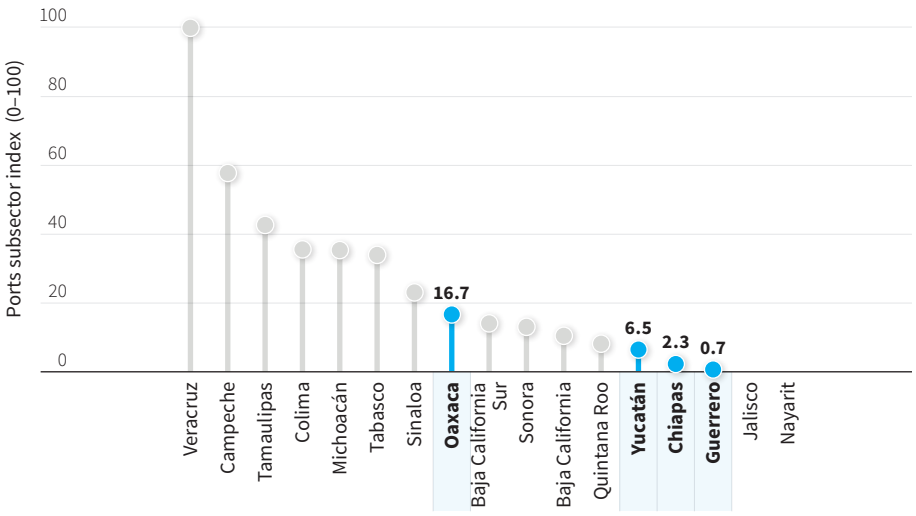
Railway Subsector Index by State



Source: Based on data from ARTF (2018).
Note: An index score of 0 indicates no functioning railways.

FIGURE 1.25

Port Subsector Index by State



Source: Based on data from ARTF (2018).
Note: An index score of 0 indicates no functioning railways.

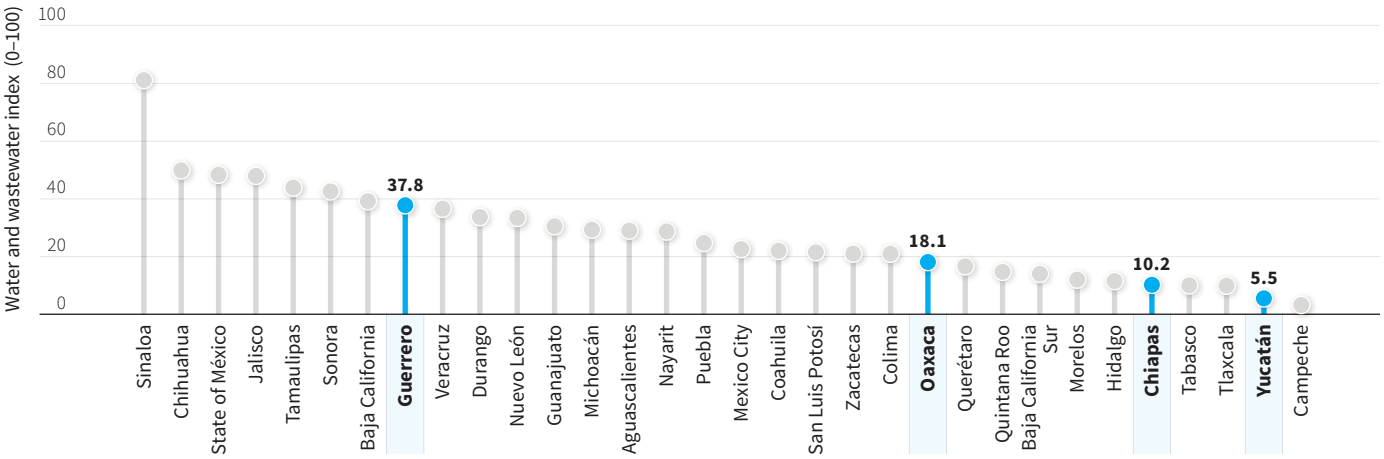
relative to the length of the rail network (figure 1.24). Yucatán ranked the highest among the selected states, securing the 17th position. In contrast, Oaxaca and Chiapas ranked in the bottom third of the distribution, ranking 22nd and 24th, respectively). Notably, Guerrero ranked the lowest (32nd), as it lacks any rail infrastructure.[23]

Finally, the subindex for seaports measured the integral capacity of ports in Mexico's 17 coastal states (figure 1.25). Among the selected states, Oaxaca performed the best, ranking eighth out of 17. Yucatán, Chiapas, and Guerrero, however, ranked low, securing the 13th, 14th, and 15th positions, respectively. Notably, Guerrero has no federal or state port infrastructure and only one port located in Acapulco city, which until 2021 was operated by a private concessionaire.[24]

Scores for water, wastewater, electricity, and fuel infrastructure display different patterns. The index for the water and wastewater sector measures the

FIGURE 1.26

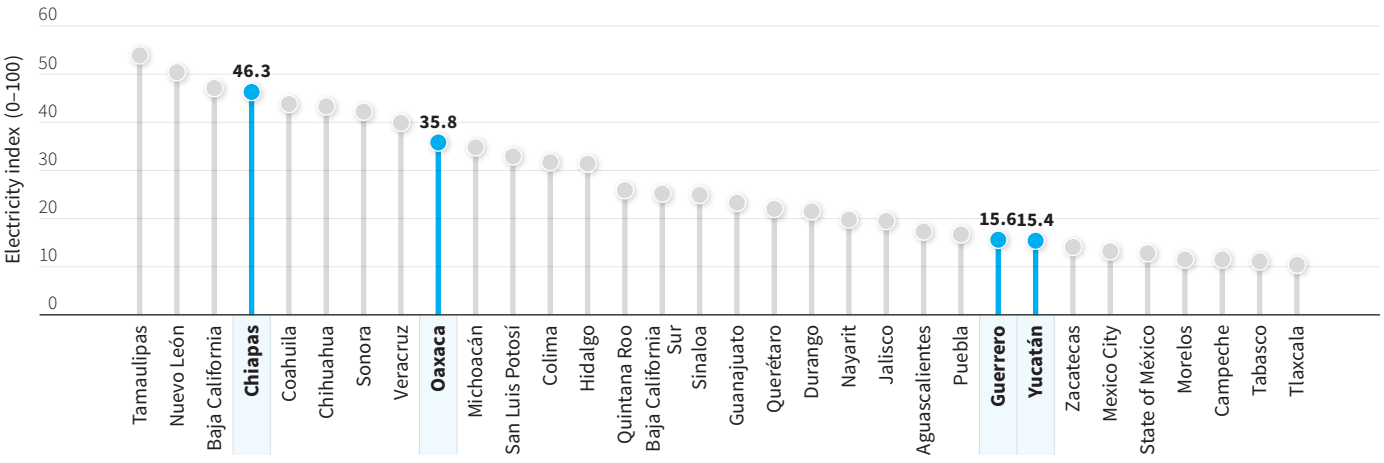
Water and Wastewater Index by State



Source: Elaborated with information from CONAGUA (2019).
Note: Index scores range from 0 (state with lowest coverage) to 100 (state with the highest coverage).

FIGURE 1.27

Electricity Index by State



Source: Based on data from SENER (2016a).
Note: Index scores range from 0 (state with the worst performance in electricity) to 100 (state with the best performance in electricity).

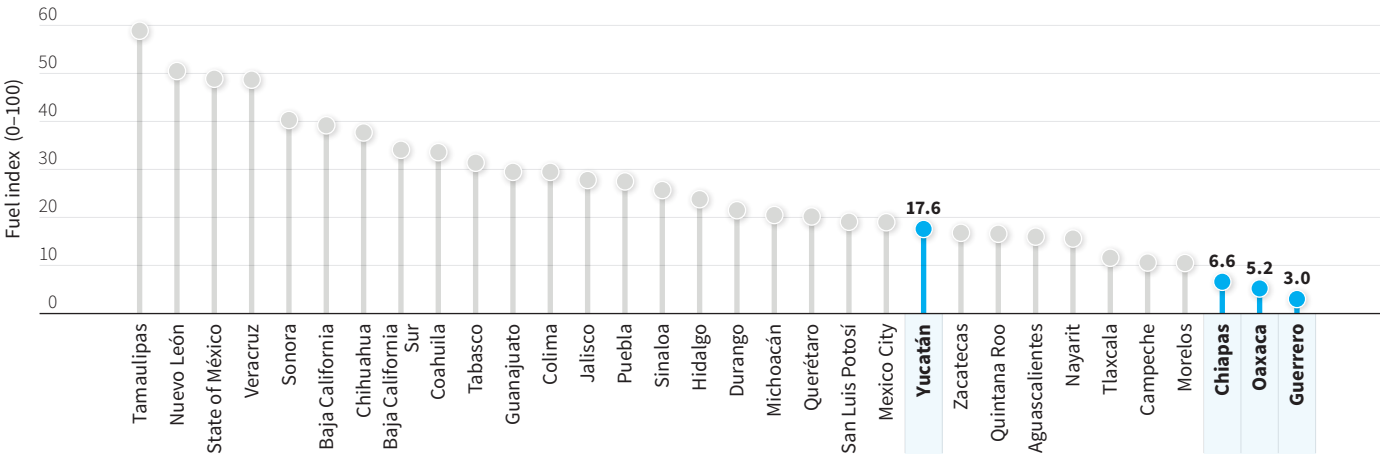
coverage of drinking water and wastewater treatment systems, as well as coverage of irrigation districts (figure 1.26). Chiapas and Yucatán ranked very low, placing 30th and 31st, respectively. Oaxaca performed relatively better, ranking in the lower third of the distribution at 22nd, while Guerrero ranked in the top ten, securing the ninth position.

The electricity index measures the ability of local energy production to satisfy local demand (figure 1.27). Guerrero and Yucatán both ranked in the bottom half of the distribution at 24th and 25th, respectively. Conversely, Chiapas and Oaxaca achieved top ten rankings, placing fourth and ninth, respectively.[25]

For the fuel index, which measures the local availability of gasoline, diesel, natural gas, and liquefied petroleum gas, Guerrero, Oaxaca, and Chiapas ranked the lowest nationwide, placing 32nd, 31st, and 30th, respectively (figure 1.28).

FIGURE 1.28

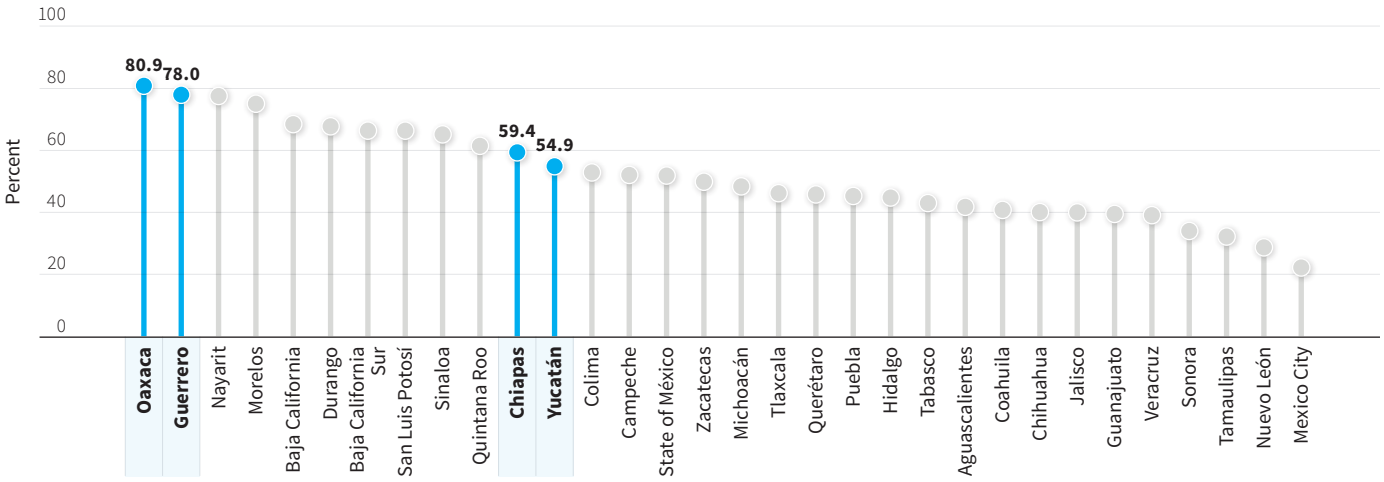
Fuel Index by State



Source: Elaborated with information from SENER (2016b).
Note: Index scores range from 0 (state with the worst performance in electricity) to 100 (state with the best performance in electricity).

FIGURE 1.29

Share of Common Land by State



Source: Based on data from RAN (2019).

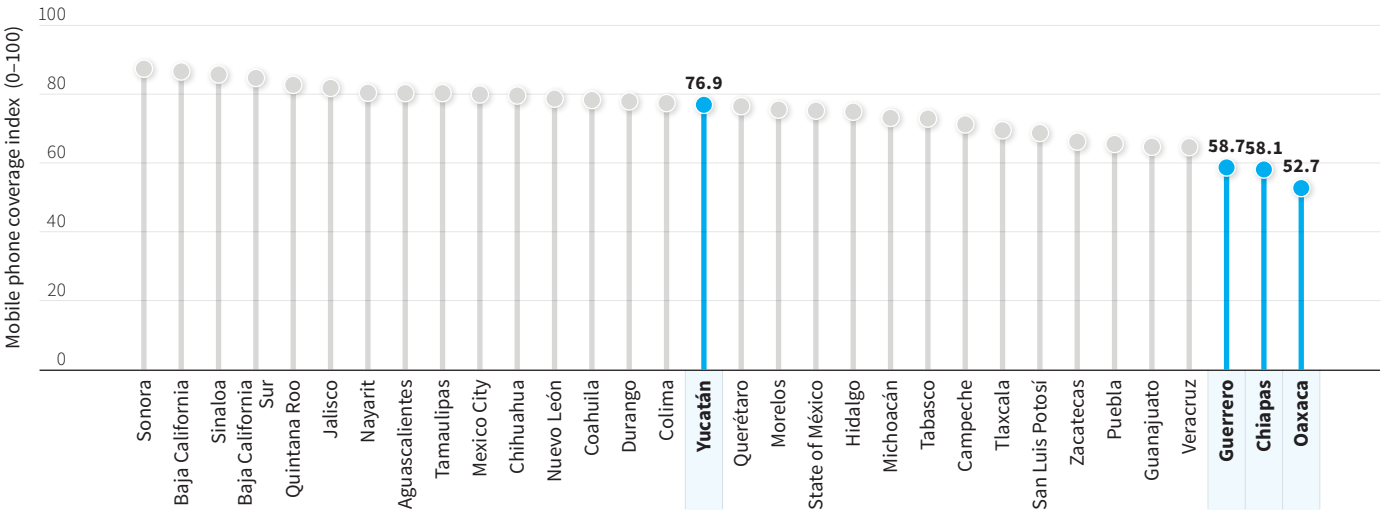
Yucatán performed relatively better but still ranked in the lower third of the distribution, placing 22nd.[26]

The development of infrastructure networks in the selected states also face challenges related to land ownership and access rights (figure 1.29). Oaxaca and Guerrero have the largest shares of common land in the country at 81 and 78 percent of all land, respectively. Chiapas and Yucatán, although having lower shares of common land, are still high at 59 and 55 percent, respectively.

In terms of communications, two indices were calculated. The mobile phone index measures the coverage of cellular service within each state (figure 1.30).

FIGURE 1.30

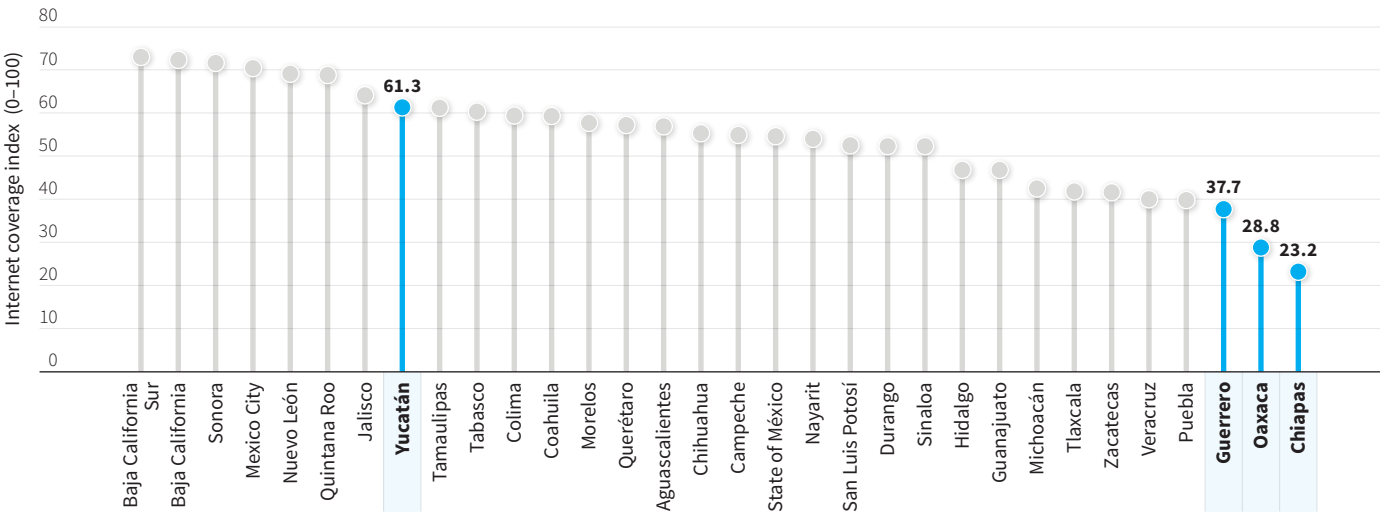
Mobile Phone Coverage Index by State



Source: Based on data from INEGI (2015).
Note: Index score range from 0 (state with lowest coverage) to 100 (state with the highest coverage).

FIGURE 1.31

Internet Coverage Index by State



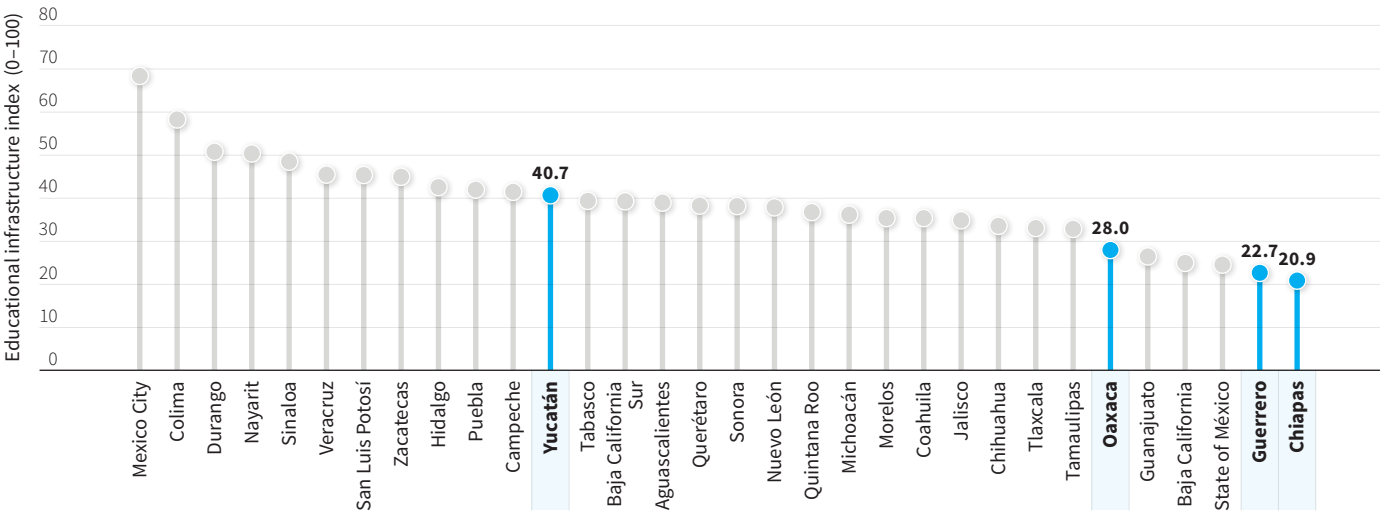
Source: Elaborated with information from INEGI (2015).
Note: Index scores range from 0 (state with lowest coverage) to 100 (state with the highest coverage).

Guerrero, Chiapas, and Oaxaca again ranked at the bottom of the distribution, placing 30th, 31st, and 32nd, respectively. In contrast, Yucatán ranked in the middle, securing the 16th position. For the internet coverage index, which measures access to mobile data services and home internet connections, Guerrero, Oaxaca, and Chiapas ranked in the bottom of the distribution at 30th, 31st, and 32nd, respectively (figure 1.31). Yucatán, however, ranked among the top ten, placing eighth.

The coverage of social infrastructure varies across states. On the educational infrastructure index, which measures the physical coverage of schools in all

FIGURE 1.32

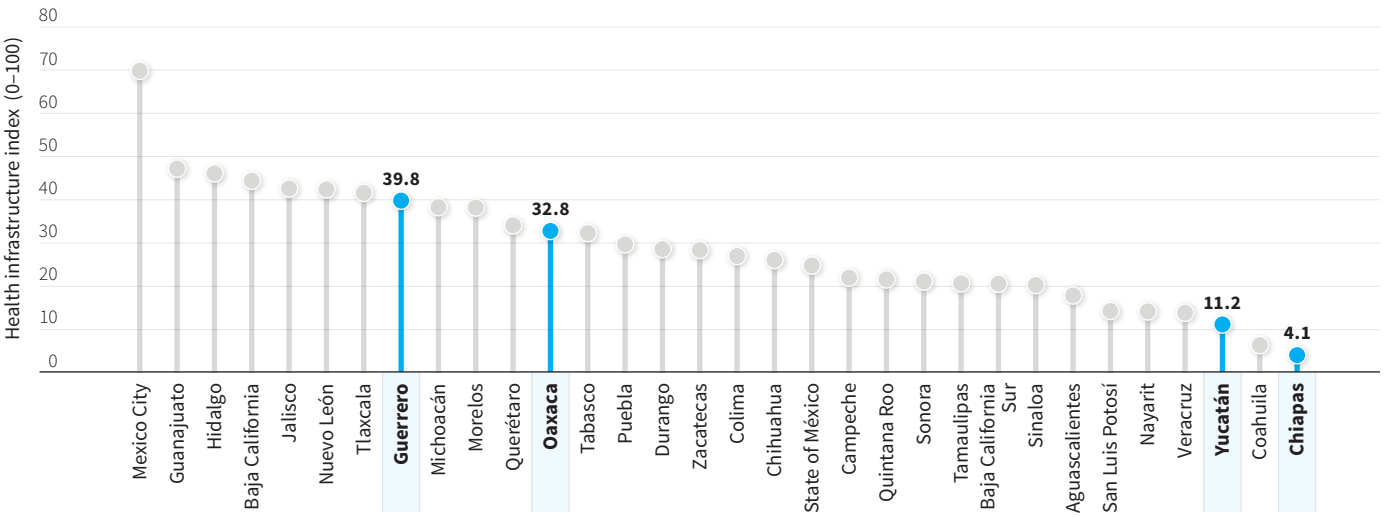
Educational Infrastructure Index by State



Source: Based on data from SEP (2016).
Note: Index scores range from 0 (state with the lowest coverage) to 100 (state with the highest coverage).

FIGURE 1.33

Health Infrastructure Index by State



Source: Based on data from SALUD (2016).
Note: Index scores range from 0 (state with the lowest coverage) to 100 (state with the highest coverage).

levels, Guerrero and Chiapas ranked in the bottom of the distribution at 31st and 32nd, respectively (figure 1.32). Oaxaca also performed poorly, placing 27th. In contrast, Yucatán ranked in the middle of the distribution, securing the 15th position. In terms of the health infrastructure index, which measures the availability of clinics, hospitals, and other health facilities, Guerrero ranked the highest among the selected states at eighth, followed by Oaxaca at 12th, Yucatán at 30th, and Chiapas at 32nd (figure 1.33).

The review of economic structure, sectoral productivity, and infrastructure coverage in the selected states highlights several policy challenges that hinder their convergence with the more prosperous northern and Bajío regions. Weaknesses in governance and rule of law exacerbate insecurity, as limited regulatory and law-enforcement capabilities in these states contribute to social conflicts and uncertainty. However, Yucatán stands out as an exception, benefitting from relatively strong governance that has fostered one of the most robust and diverse economies in southern Mexico. Across the selected states, but particularly in Oaxaca and Guerrero, the large share of land held as common land acts as a barrier to investment in productive facilities and infrastructure. Even when land is privately owned, its highly fragmented ownership structure constrains the formation of economies of scale. In addition, restrictive and unclear business regulations further discourage investment, create uncertainties regarding future returns, and raise the costs associated with formalizing businesses.

Human capital and infrastructure weaknesses hinder productivity and growth of the southern economies. The region faces low levels of human capital and high rates of informality, resulting in reduced overall labor productivity and inhibiting the emergence of more productive activities and industries. Moreover, deficient economic and social infrastructure further reduces total factor productivity and discourages private investment and business operations in the selected states. Insufficient commercial transportation infrastructure limits access to larger markets and competitive inputs, preventing the southern states from capitalizing on the opportunities offered by global value chains and, more recently, nearshoring investments related to their reconfiguration.

The combination of policy weaknesses and chronic underinvestment from the public and private sectors contribute to the low productivity and competitiveness of the southern states, even in sectors that are highly successful elsewhere in Mexico. These economies are characterized by low levels of sophistication and diversity, with a disproportionate focus on low-productivity sectors and limited opportunities for the development of more complex industries. The lack of competition in some key goods and services undermines the potential of strategic sectors. The prevalence of numerous small informal firms contributes to poor management quality, a lack of standardized corporate practices, limited opportunities for worker training, pervasive constraints on access to finance, limited innovation and technological upgrading, and low survival rate. Furthermore, the absence of a critical mass of large formal companies in highly productive sectors inhibits the development of economies of scale and scope, while insufficient availability of business-support services further narrows the range of viable economic activities. The impact of these constraints varies in each state and sector. In the following chapter, a description of the criteria for selecting strategic sectors for the deep dive assessments is provided.

2
The Selected Sectors for Deep Dives

This study identifies opportunities for private sector–led growth in the following sectors: agro-industry, forestry, automotive manufacturing, and information and communication technologies (ICT). These sectors demonstrate substantial potential for export diversification, integration into regional and global value chains, productivity enhancements, and employment generation in the selected states.

The selection of these sectors was based on a combination of three main criteria:

1. **Literature review.** A comprehensive review of existing studies and assessments of sectors in the southern region.
2. **Qualitative analysis.** Reflecting the policy priorities of the federal and state governments, regulatory and business climate barriers affecting the development of sectors in the selected states, and other considerations such as environmental impacts and the impact of COVID-19 were also included in these qualitative criteria.
3. **Quantitative analysis.** Evaluating the economic relevance of the sectors in the selected states and the potential impact of their development in terms of gross domestic product, exports, employment generation, and investment attractiveness.

Figure 2.1 illustrates the criteria used for sector selection, and appendix C provides a detailed description of the variables, metrics, and methodology for weighting the selection criteria, as well as the results that guided the sector selection.

FIGURE 2.1

Sectors Scanning Methodology

1

LITERATURE REVIEW

Analysis of **10 different** studies to identify potential sectors in each state

1. *Economic Complexity Reports for Guerrero, Oaxaca, and Yucatan*, *Centro de Investigación y Docencia Económicas* (2017).
2. *Smart Diversification and Regional Integration Opportunities in Mexico*, Pinheiro (2020).
3. *Cost Competitiveness of Mexican SEZ Cities*, World Bank and MMK Consulting (2016).
4. *Strategic Plan for the Development of the Isthmus of Tehuantepec Corridor*, McKinsey and Secretaría de Economía (2015).
5. *Implementation of Special Economic Zones 2016*, Grupo Prodensa (2016).
6. Ricardo Hausmann, Timothy Cheston, and Miguel Angel Santos, *La Complejidad Económica de Chiapas: Análisis de Capacidades y Posibilidades de Diversificación Productiva*, CID Working Paper 302 (2015).
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2

QUALITATIVE ANALYSIS

Analysis of **seven elements** at the sector level

1. World Bank Group's doing business indicators: Mexico (2007–16)
2. Regulatory framework
3. Alignment with the National Development Plan 2019–24 and related programs
4. Alignment with state development plans
5. Infrastructure requirements
6. Environmental impact
7. Impact of COVID-19

3

QUANTITATIVE ANALYSIS

Statistical analysis of 14 indicators at the sector level grouped in **seven categories**

1. Performance in the national economy (% of GDP and CAGR, income/economic unit, and remuneration)
2. Integration in global markets (exports value and share and CAGR; 2007–19)
3. Labor intensity (PO/FA)
4. Investment attractiveness (% of Mexico's FDI and total; 2015–19)
5. Potential links (sales, purchases, and relation to other sectors)
6. Import substitution (value of sector imports)
7. World positioning (growth in global market; 1995–2017)

Source: Authors' own elaboration.
Note: CAGR = compound annual growth rate; CONACYT = *Consejo Nacional de Ciencia y Tecnología* (National Council of Science and Technology); FA = fixed assets; FDI = foreign direct investment; GDP = gross domestic product; SEZ = special economic zone; PO = people employed in sector.

Based on the literature review, the study identified 38 economic activities at the North American Industry Classification System three-digit level with varying frequencies in each of the selected states (table 2.1). These economic activities were then grouped into 16 sectors based on similarities in the required productive capabilities and potential for integration into value chains.

The qualitative analysis was based on the states' scores in seven indicators (table 2.2):

1. **Ease of doing business.** It assesses different dimensions of the subnational report of Doing Business in Mexico 2016 that could affect a "typical firm" of each sector, such as ease of firm establishment, construction permits, contract compliance, and copyright registration for each selected state.

2. **Regulatory framework.** It analyzes the laws and codes that rule over each of the large sectors (NOMs and sector-specific laws), along with general business regulations, for example, the Foreign Direct Investment Law and Industrial Property Law. Reports that provide insights into sector-specific regulations are also analyzed to identify any constraints.

TABLE 2.1

Economic Activities and "Large Sectors" at the NAICS Three-Digit Level Identified During the Literature Review

Clasif.	Sector	% repetitions in Literature			
		Chs.	Gro.	Oax.	Yuc.
1	Crop Production	38%	25%	22%	25%
1	Agroindustry	75%	100%	67%	75%
1	Food Manufacturing	38%	50%	44%	25%
1	Beverage and Tobacco Product Manufacturing	13%		22%	
1	Fishing, Hunting and Trapping			11%	
2	Leather and Allied Product Manufacturing	25%		11%	
2	Textile Mills	13%	50%	11%	50%
2	Apparel Manufacturing	13%		22%	
2	Textile Product Mills	25%	25%	22%	50%
3	Furniture and Related Product Manufacturing	13%		33%	
3	Wood Product Manufacturing	13%	50%	22%	25%
3	Paper Manufacturing	25%		22%	25%
4	Petroleum and Coal Products Manufacturing			0%	
4	Plastics and Rubber Products Manufacturing	25%	50%	33%	50%
5	Nonmetallic Mineral Product Manufacturing				25%
5	Fabricated Metal Product Manufacturing	25%	50%	33%	50%
5	Primary Metal Manufacturing	13%	75%	11%	75%
5	Mining (except Oil and Gas)	13%	25%	22%	25%
6	Electrical Equipment, Appliance, and Component Manufacturing	38%		11%	50%
6	Computer and Electronic Product Manufacturing	38%	25%	56%	50%
7	Transportation Equipment Manufacturing	38%	50%	22%	25%
7	Machinery Manufacturing	13%	25%	56%	50%
7	Support Activities for Transportation	13%			
8	Touristic Activities	25%	25%	11%	25%
8	Data Processing, Hosting, and Related Services				25%
9	Utilities	13%		33%	
10	Construction of Buildings	13%			
11	Miscellaneous Manufacturing	13%			25%
12	Chemical Manufacturing	25%	50%	33%	25%
13	Publishing Industries (except Internet)				25%
13	Motion Picture and Sound Recording Industries				25%
13	Other Information Services			11%	50%
14	Ambulatory Health Care Services		25%		
14	Professional, Scientific, and Technical Services				25%
15	Telecommunications				50%
16	Management of Companies and Enterprises				25%
16	Credit Intermediation and Related Activities				25%
16	Administrative and Support Services				25%

	Large Sector	% Normalized	States
1	Agroindustry	100%	All
5	Mining and Metal Industries	68%	All
2	Textiles, Garments and Leather	47%	All
7	Transportation Equipment	43%	All
6	Electronics	39%	All
3	Forestry (paper and wood)	32%	All
4	Plastic, rubber, oil derivatives	20%	All
12	Chemical Industry	16%	All
8	Tourism	12%	All
13	Information Services	12%	Oax. and Yuc.
16	Support Services	6%	Yuc.
14	Professional Services	2%	Gro. and Yuc.
15	Telecommunications	2%	Yuc.
9	Energy Generation	1%	Chs. and Oax.
11	Other Manufacturing Activities	0%	Chs.and Yuc.
10	Construction	0%	Chs.

Source: Based on the literature review.

3 **Alignment with federal government policy.** It identifies whether each sector is directly or indirectly aligned with any of the strategies included in the National Development Plan 2019–24.

4 **Alignment with states policies.** It identifies whether each sector is directly or indirectly aligned with each State Development Plan.

5 **Availability of required infrastructure.** Based on reports from government sources, it evaluates the availability of services such as water, energy, transportation, and other sector infrastructure in each selected state, considering the intensiveness of each sector.

6 **Environmental impact.** It evaluates the potential impact of each sector on water, air, and soil, including greenhouse gas emissions and other pollutants. It also considers existing environmental constraints that could undermine the development of certain sectors in some states.

7 **Impact of COVID-19.** It evaluates the impact of the pandemic on the sectors, drawing from various international reports (from organizations such as the Boston Consulting Group, KPMG, McKinsey, and the World Bank), as well as specific information for the country (reports from Banco de México and guidelines from the health authorities that affected economic activity).

TABLE 2.2

Sectors' Ranking Based on the Qualitative Analysis

Large Sectors	Doing Business	Regulatory Framework	Alignment with PND and related programs	Alignment with state development programs	Infrastructure requirements	Environmental impact	Impact of COVID-19	Total Score (Min= 0, Max.=32)	Normalized
Agroindustry	3	3	3	4	3	2	4	22	100%
Textiles, Garments and Leather	3	4	3	2	3	2	2	18	67%
Forest industry (wood and paper)	3	3	3	3	3	2	1	18	67%
Other manufacturing activities	3	4	2	2	2	2	3	16	50%
Transportation Equipment	2	4	2	2	2	2	3	15	42%
Telecommunications	1	4	2	2	2	3	4	15	42%
Energy Generation	1	1	2	2	2	2	4	14	33%
Electronics	2	4	2	2	2	2	2	14	33%
Chemical industry	2	3	2	2	2	1	3	13	25%
Plastic, rubber, oil derivatives	2	3	2	2	1	1	2	11	8%
Mining and Metal industries	1	3	2	2	1	1	1	10	0%
Construction	1	3	2	0	3	0	1	10	0%

0 1 2 3 4

Source: Based on the qualitative analysis.
Note: Tourism, other services not related to information and communication technology, and other manufacturing activities are excluded from the analysis.

The quantitative analysis was employed to estimate the market potential and development impact of the sectors. It involved constructing seven categories with a total of 14 indicators to quantify the relevance of the sectors to economic development at the national and regional levels (tables 2.3). These categories included:

1. **Performance at the national economy.** This category focuses on the sector's relative size, growth, employment, and income contributions to the Mexican economy. It helps evaluate the overall significance and performance of the sector within the national context.

2. **Integration to global markets.** This category identifies the sectors that have successfully exported products from Mexico. It evaluates the sector's capability to engage in global trade and participate in international markets.

3. **Labor intensity.** This category recognizes the importance and growth of labor-intensive sectors and their potential for generating significant employment impacts. Sectors with higher labor intensity are expected to have a significant effect on job creation.

4. **Investment attractiveness.** This category measures the sector's appeal to private sector development, particularly through foreign direct investment. It identifies sectors that have been successful in attracting international investment.

5. **Potential links to other sectors.** Using the input-output matrix, this category analyzes the sector's interconnections with other sectors, both upstream and downstream. Sectors that are highly linked to other sectors and have the potential to develop clusters are identified.

6. **Import substitution.** This category considers the level of imports in the sector, which suggests the national market potential for products that the sector requires but are not being produced competitively within the country. It identifies opportunities for domestic production and import substitution.

7. **World positioning.** This category measures how Mexico is positioned in global markets in terms of exports shares. It evaluates the competitiveness and market reach of Mexican sectors in the international arena.

TABLE 2.3

Breakdown of the Quantitative Analysis Into Seven Categories

Categories	Weights assigned to each category/indicator
1.Performance in national economy	**30%**
Sector GDP (% of national)	3%
CAGR GDP sector 2003-2019	7%
Income per economic unit (thousand pesos)	10%
Remuneration per working population (thousand pesos)	10%
2. Integration to global markets	**10%**
Value of exports (Mexico, % total)	3%
Value of exports (Mexico, CAGR 2007-2019)	7%
3. Labor intensity	
PO/FA (thousand pesos)	10%
4.Investment attractiveness	**20%**
FDI (% Mexico)	5%
FDI (total 2015-2019, MDD) (% Mexico)	15%
5. Potential links	**20%**
Value of sales to other sectors	5%
Value of purchases from other sectors	5%
Total incidence on other sectors	10%
6. Import substitution	**5%**
Sector imports	5%
7. World positioning	**5%**
Growth in global market share 1995-2017, PP	5%
TOTAL	100%

Large Sector Normalization

Large Sector*	% Normalized
Transportation Equipment	60%
Agroindustry	45%
ICT – Manufacturing**	44%
Electronics	37%
ICT – Services**	37%
Energy Generation	29%
Plastic, Rubber, oil derivatives	28%
Textiles, Garments and Leather	28%
Fabrication of machinery and equipment***	27%
Telecommunications**	25%
Chemical industry	24%
Mining and metal industries	23%
Forest industry (Wood and paper)	12%

Source: Authors' own elaboration.
Note: CAGR = compound annual growth rate; FA=fixed assets ; FDI = foreign direct investment; GDP = gross domestic product; PO = people employed in sector; ICT = information communication technology.
*Construction, other manufacturing activities, tourism, and other services sectors not related to ICT are excluded.
**Considered as telecommunications sector in the literature review and qualitative analysis.
***Considered as transportation equipment in the literature review and qualitative analysis.

The combination of the three criteria resulted in the selection of the following sectors:

1. **Agro-industry.** The broader southern region in Mexico, which includes the four selected states, has high potential to develop this industry, given its natural resources and suitable weather conditions for primary production. Industrializing agricultural products to expand the value chain towards the production of final consumption goods is the next natural step. The complexity analyses conducted for the selected states reveal that this sector aligns well with their existing productive capabilities, suggesting its potential for short-term development. With the right policies, the sector could uplift small farmers and producers out of poverty.

2. **Transportation equipment, with a focus on the automotive industry.** This sector represents Mexico's highest performing, tightly integrated into global value chains and with strong links to other industries. The relevance of the sector is expected to grow even further given the higher regional content requirements for the automotive industry established by the United States–Mexico–Canada Agreement, and nearshoring investments related to the relocation of production from Asia (particularly China) to get closer to the end markets in North America. Among the selected states, Chiapas stands out with the greatest number of firms within the auto parts segment, a labor-intensive subsector that could generate jobs and productive opportunities. Further developing this sector in Chiapas

would enable the state to benefit from Mexico's modern, integrated, and successful industries, with potential spillovers not only for the state but also for the Northern Triangle countries (El Salvador, Guatemala, and Honduras).

3 **Forest industry.** The sector was selected because of its strong presence in the selected states, government support at the federal and state levels, and its alignment with the selected states' current productive capabilities. Moreover, sustainable development of the sector has the potential to reverse the damage caused by illegal logging, forest fires for agricultural purposes, and other issues that have led to annual losses of thousands of forest hectares in the country.

4 **ICT industry.** This sector was selected given its promising prospects and strong government support in Yucatán. The state government has played an active role in the development of this sector and intends to continue doing so until it is fully consolidated. Yucatán has one of Mexico's most enabling ICT ecosystems, characterized by close coordination between public, private, and academic actors. Similar to the transportation equipment sector, the ICT industry represents an opportunity to develop a modern and globally integrated sector in the region, which serves as the foundation of the so-called "Fourth Industrial Revolution."[27] This revolution is characterized by the increasing use of advanced digital technologies such as artificial intelligence, the Internet of Things, robotic automation, virtual or augmented reality, quantum computing, big data analytics, blockchain, genetic engineering, among others.

Appendixes

APPENDIX A

Productivity Gap Decomposition

The methodology used to determine the productivity gap for each state builds upon the Blinder-Oaxaca decomposition. It allows for the calculation of the difference in labor productivity between the national average n and state level s and by isolating three distinct components of the productivity gap, $\sum ((Ci_s)(Pi_s)) - \sum ((Ci_n)(Pi_n))$. The first component is the differentials on economic structure, $\sum (Ci_s - Ci_n)(Pi_s)$, which captures the contribution of differences in industry concentration C between the state and national levels, multiplied by the state-level productivity Pi_s. The second component is the differentials on sectoral productivity, $\sum (Pi_s - Pi_n)(Ci_s)$, which accounts for the disparities in productivity P between the state and national levels, multiplied by the state-level industry concentration (Ci_s). The third component is the interaction term, $(Ci_s - Ci_n)(Pi_s - Pi_n)$, which captures the combined effect of changes in industry structure $(Ci_s - Ci_n)$ and productivity differentials $(Pi_s - Pi_n)$ on the productivity gap. The productivity gap is then represented by the equation:

$$\sum ((Ci_s)(Pi_s)) - \sum ((Ci_n)(Pi_n)) = \sum ((Ci_s - Ci_n)(Pi_s)) + \sum ((Pi_s - Pi_n)(Ci_s)) + (Ci_s - Ci_n)(Pi_s - Pi_n).$$

In this equation, the degree of concentration C in industry I, is calculated as the employment share in that industry. The productivity P is calculated as the value added per worker or as the weighted average (by industry concentration) of the labor productivity of all industries. The national average is used as the benchmark for productivity per industry Pi and concentration Ci.

The data utilized is sourced from the 2019 Economic Census (INEGI). Economic activities related to oil and gas; central, commercial, and development banks;

brokerage houses; and other centralized activities, as well as those with negative value added, are excluded to avoid distortions in the estimation (table A.1).

Economic sectors were then grouped using the "subsector" three-digit classification from the North American Industry Classification System (NAICS).

TABLE A.1

Economic Activities Excluded From the Analysis

NAICS code	Name of activity
211111	Extracción de petróleo y gas natural asociado
213111	Perforación de pozos petroleros y de gas
237121	Construcción de sistemas de distribución de petróleo y gas
237122	Construcción de plantas de refinería y petroquímica
237123	Supervisión de construcción de obras para petróleo y gas
324110	Refinación de petróleo
325110	Fabricación de petroquímicos básicos del gas natural y del petróleo refinado
483113	Transporte marítimo de petróleo y gas natural
486110	Transporte de petróleo crudo por ductos
486210	Transporte de gas natural por ductos
486910	Transporte por ductos de productos refinados del petróleo
521110	Banca central
522210	Banca de desarrollo
522451	Montepíos
523210	Bolsa de valores
813110	Asociaciones, organizaciones y cámaras de productores, comerciantes y prestadores de servicios
813120	Asociaciones y organizaciones laborales y sindicales
813130	Asociaciones y organizaciones de profesionistas
813140	Asociaciones regulatorias de actividades recreativas
813210	Asociaciones y organizaciones religiosas
813220	Asociaciones y organizaciones políticas
813230	Asociaciones y organizaciones civiles
932110	Organismos internacionales
932120	Sedes diplomáticas y otras unidades extraterritoriales

Source: Authors' own elaboration.
Note: NAICS = North American Industry Classification System.

RESULTS

Table A.2 presents the results of the productivity gap decomposition analysis.

TABLE A.2

Absolute and Relative Differentials Compared to Average National Productivity

State	Productivity (Mex$, thousands)*	Productivity gap		Productivity decomposition							
				Value (Mex$, thousands)				% of national average			
		Value (Mex$, thousands)	% of national average	Differentials on economic structure	Differentials on sectoral productivity	Interaction term	Total	Differentials on economic structure	Differentials on sectoral productivity	Interaction term	Total
Mexico City	506.4	201.2	65.9	148.4	63.7	−10.8	201.2	48.6	20.9	−3.5	65.9
Nuevo León	413.6	108.4	35.5	−12.7	80.7	40.4	108.4	−4.2	26.4	13.2	35.5
Aguascalientes	405.8	100.6	33.0	130.1	110.3	−139.8	100.6	42.6	36.1	−45.8	33.0
Querétaro	344.3	39.1	12.8	9.8	36.7	−7.4	39.1	3.2	12.0	−2.4	12.8
San Luis Potosí	312.3	7.0	2.3	20.6	2.7	−16.3	7.0	6.8	0.9	−5.3	2.3
Coahuila	311.0	5.7	1.9	45.2	−32.7	−6.8	5.7	14.8	−10.7	−2.2	1.9
Tamaulipas	284.5	−20.7	−6.8	−6.1	−25.8	11.2	−20.7	−2.0	−8.5	3.7	−6.8
Guanajuato	282.0	−23.2	−7.6	24.8	−5.1	−42.9	−23.2	8.1	−1.7	−14.1	−7.6
Jalisco	280.0	−25.3	−8.3	−65.3	−3.7	43.8	−25.3	−21.4	−1.2	14.4	−8.3
State of México	273.3	−31.9	−10.5	−13.8	−4.1	−14.1	−31.9	−4.5	−1.3	−4.6	−10.5
Durango	272.8	−32.4	−10.6	30.8	−15.3	−47.9	−32.4	10.1	−5.0	−15.7	−10.6
Chihuahua	271.6	−33.7	−11.0	8.8	−61.8	19.3	−33.7	2.9	−20.2	6.3	−11.0
Baja California	265.0	−40.2	−13.2	−0.3	−7.3	−32.7	−40.2	−0.1	−2.4	−10.7	−13.2
Sonora	260.2	−45.1	−14.8	13.9	−25.2	−33.7	−45.1	4.5	−8.2	−11.1	−14.8
Quintana Roo	259.0	−46.2	−15.1	39.3	35.7	−121.2	−46.2	12.9	11.7	−39.7	−15.1
Puebla	250.1	−55.1	−18.1	−10.3	−7.4	−37.4	−55.1	−3.4	−2.4	−12.3	−18.1
Veracruz	244.3	−60.9	−20.0	5.7	−9.1	−57.5	−60.9	1.9	−3.0	−18.8	−20.0
Baja California Sur	235.5	−69.7	−22.8	29.0	−7.0	−91.7	−69.7	9.5	−2.3	−30.0	−22.8
Campeche	219.2	−86.0	−28.2	38.5	1.0	−125.5	−86.0	12.6	0.3	−41.1	−28.2
Morelos	217.1	−88.1	−28.9	−66.1	−30.1	8.0	−88.1	−21.7	−9.8	2.6	−28.9
Colima	213.5	−91.7	−30.0	19.4	−40.8	−70.3	−91.7	6.3	−13.4	−23.0	−30.0
Tabasco	212.9	−92.4	−30.3	2.5	−25.2	−69.7	−92.4	0.8	−8.2	−22.8	−30.3
Sinaloa	211.5	−93.7	−30.7	4.6	−56.0	−42.3	−93.7	1.5	−18.4	−13.9	−30.7
Zacatecas	208.4	−96.8	−31.7	33.1	−64.7	−65.2	−96.8	10.8	−21.2	−21.4	−31.7
Hidalgo	207.8	−97.4	−31.9	−15.0	−46.1	−36.3	−97.4	−4.9	−15.1	−11.9	−31.9
Yucatán	200.1	−105.1	−34.4	−14.4	−37.6	−53.1	−105.1	−4.7	−12.3	−17.4	−34.4
Michoacán	185.3	−120.0	−39.3	−21.8	−57.2	−40.9	−120.0	−7.1	−18.7	−13.4	−39.3
Tlaxcala	178.1	−127.1	−41.6	−4.0	−68.3	−54.8	−127.1	−1.3	−22.4	−18.0	−41.6
Nayarit	154.3	−150.9	−49.4	−2.8	−60.6	−87.5	−150.9	−0.9	−19.9	−28.7	−49.4
Chiapas	146.3	−158.9	−52.1	2.4	−86.4	−74.9	−158.9	0.8	−28.3	−24.5	−52.1
Guerrero	137.7	−167.5	−54.9	−16.6	−68.8	−82.1	−167.5	−5.4	−22.6	−26.9	−54.9
Oaxaca	136.2	−169.0	−55.4	−25.8	−91.8	−51.4	−169.0	−8.5	−30.1	−16.8	−55.4
Total general	305.2										

Source: Calculations based on data from INEGI 2019.
Note: Absolute and relative differentials in productivity compared to the average national productivity level of Mex$305,200 per worker per year.

APPENDIX B

Components of the Infrastructure Indicators

To make the components comparable, a normalization process was conducted. This process involved giving all components equal weights according to the number of components per index. Table B.1 summarizes the components of the infrastructure indicators.

TABLE B.1

Components of the Infrastructure Indicators

Name	Component	Unit
Road subsector index	Share of highways with four or more lanes	%
	Share of federal roads in good and acceptable conditions	%
Port subsector index	Integral capacity of main ports	Tons
Air transport subsector index	Quantity of freight transported by air transport companies in regular national and international services	Kilograms
	Air traffic	Number of flights
Railway subsector index	Density of freight per km of rail	%
Mobile telephony coverage index	Share of mobile telephony users	%
Internet coverage index	Share of homes with wireline	%
	Share of internet users	%
Water and wastewater sector index	Water consumption	km^3
	Installed capacity for wastewater treatment	Number of wastewater treatment plants
	Coverage of wastewater treatment	%
	Coverage of irrigation districts	Hectares
	Franchised volume of water	%
Electricity index	Power produced	GWh
	Power produced with renewables	GWh per year
	Energy consumption per capital	Megawatts per capita
Combustibles index	Gasoline and diesel stations	Number of stations per 100,000 inhabitants
	Liquefied petroleum gas consumption	Thousands of barrels per day
	Natural gas consumption	Million standard cubic feet per day
Educational infrastructure index	Physical capacity of basic education	Number of schools per 100,000 inhabitants
	Physical capacity of intermediate education	Number of schools per 100,000 inhabitants
	Average grade of scholarship	Scholarship years
	Absorption capacity in secondary education	%
	Absorption capacity in intermediate education	%
	Higher education coverage	%
Health infrastructure index	Physical coverage for medical attention	Number of hospitals per 100,000 inhabitants
	Hospital capacity	Number of hospital beds
	Medical personnel	Number of hospitals per 100,000 inhabitants

Source: Author's own elaboration.
Note: GWh = gigawatt hours; km = kilometers.

APPENDIX C
Methodology for the Selection of Sectors

The sector selection was based on a combination of three main criteria (figure C.1): (1) a comprehensive review of existing literature at the regional and sectoral levels; (2) a qualitative analysis to identify sectors that have the potential to open new markets and create investment opportunities for private sector, and specific sectors prioritized or favored by federal and states development plans; and (3) a quantitative analysis to measure the importance of the sectors for the national and states economies in terms of gross domestic product, exports, employment generation and investment attractiveness.

LITERATURE REVIEW

The first criteria for the selection of sectors is based on an exhaustive review of several studies that identified economic sectors and activities in the selected states that could be developed to diversify and upgrade their productivity. These studies encompass academic reports, consulting projects, and government initiatives. In total, 25 reports using different methodologies were examined: eight reports for Chiapas, four for Guerrero, nine for Oaxaca, and four for Yucatán.

Based on the literature review, a total of 38 economic activities at the North American Industry Classification System three-digit level were identified, with varying frequencies in each of the selected states (table C.1). These economic activities were then grouped into 16 "large sectors" based on similarities in the required productive capabilities and potential for integrated value chains development.

FIGURE C.1

Sectors Scanning Methodology

1

LITERATURE REVIEW

Analysis of **10 different** studies to identify potential sectors in each state

1. *Economic Complexity Reports for Guerrero, Oaxaca, and Yucatan*, *Centro de Investigación y Docencia Económicas* (2017).
2. *Smart Diversification and Regional Integration Opportunities in Mexico*, Pinheiro (2020).
3. *Cost Competitiveness of Mexican SEZ Cities*, World Bank and MMK Consulting (2016).
4. *Strategic Plan for the Development of the Isthmus of Tehuantepec Corridor*, McKinsey and Secretaría de Economía (2015).
5. *Implementation of Special Economic Zones 2016*, Grupo Prodensa (2016).
6. Ricardo Hausmann, Timothy Cheston, and Miguel Angel Santos, *La Complejidad Económica de Chiapas: Análisis de Capacidades y Posibilidades de Diversificación Productiva*, CID Working Paper 302 (2015).
7. *State Innovation Agendas*, CONACYT (2015).
8. *Report on Sector Identification and Demand Projections*, World Bank Group (2016).
9. *Feasibility Studies SEZ of Salina Cruz, Progreso, Lazaro Cárdenas-La Unión, Puerto Chiapas, and Progreso*, *Secretaría de Hacienda y Crédito Público* (2016).
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2

QUALITATIVE ANALYSIS

Analysis of **seven elements** at the sector level

1. World Bank Group's doing business indicators: Mexico (2007–16)
2. Regulatory framework
3. Alignment with the National Development Plan 2019–24 and related programs
4. Alignment with state development plans
5. Infrastructure requirements
6. Environmental impact
7. Impact of COVID-19

3

QUANTITATIVE ANALYSIS

Statistical analysis of 14 indicators at the sector level grouped in **seven categories**

1. Performance in the national economy (% of GDP and CAGR, income/economic unit, and remuneration)
2. Integration in global markets (exports value and share and CAGR; 2007–19)
3. Labor intensity (PO/FA)
4. Investment attractiveness (% of Mexico's FDI and total; 2015–19)
5. Potential links (sales, purchases, and relation to other sectors)
6. Import substitution (value of sector imports)
7. World positioning (growth in global market; 1995–2017)

Source: Authors' own elaboration.
Note: CAGR = compound annual growth rate; CONACYT = *Consejo Nacional de Ciencia y Tecnología* (National Council of Science and Technology); FA = fixed assets; FDI = foreign direct investment; GDP = gross domestic product; SEZ = special economic zone; PO = people employed in sector.

QUALITATIVE ANALYSIS

Qualitative analysis was conducted for each of the "large sectors" to identify potential regulatory, political, and business climate barriers to their development in the selected states. The analysis also considered the support provided by national and subnational governments, environmental considerations, and the impact of COVID-19. A summary of the criteria used in the analysis is shown in table C.2.

The analysis was condensed into seven indicators, which were assigned weights ranging from 0 to 4 based on the attractiveness in each evaluated factor.[28] The weighting was based on the following criteria:

1. **Ease of doing business.** This indicator assesses various variables from the subnational report of Doing Business in Mexico 2016 that could affect a "typical firm" in each sector. Factors include ease of firm establishment, construction permits, contract compliance, copyright registration, among others, for each selected state.

2 **Regulatory framework.** This indicator analyzes the laws and codes that rule over each of the large sectors (Normas Oficiales Mexicanas [Official Mexican Norms] and sector-specific laws), along with general business regulations, for example, the Foreign Direct Investment Law and Industrial Property Law. In addition, reports providing insights into sector-specific regulations are analyzed to identify any constraints affecting the sectors.

3 **Alignment with federal government policy.** This indicator identifies whether each sector is directly or indirectly aligned to any of the strategies outlined in the National Development Plan 2019–24.

4 **Alignment with states' policies.** This indicator determines whether each sector is directly or indirectly aligned to each of the selected state's development plans (Chiapas 2019–24, Guerrero 2016–21, Oaxaca 2016–22, Yucatán 2018–24).

5 **Availability of required infrastructure.** This indicator evaluates the availability of essential services, such as water, energy, transportation, and other sector-specific infrastructure, in each selected state. It relies on reports from government sources (for example, the Secretaría de Comunicaciones y Transportes, the Secretaría de Energía, the Comisión Nacional del Agua, and state governments) to assess the intensity of infrastructure services required by each sector.

TABLE C.1

Economic Activities and "Large Sectors" at the NAICS Three-Digit Level Identified During the Literature Review

Clasif.	Sector	% repetitions in Literature			
		Chs.	Gro.	Oax.	Yuc.
1	Crop Production	38%	25%	22%	25%
1	Agroindustry	75%	100%	67%	75%
1	Food Manufacturing	38%	50%	44%	25%
1	Beverage and Tobacco Product Manufacturing	13%		22%	
1	Fishing, Hunting and Trapping			11%	
2	Leather and Allied Product Manufacturing	25%		11%	
2	Textile Mills	13%	50%	11%	50%
2	Apparel Manufacturing	13%		22%	
2	Textile Product Mills	25%	25%	22%	50%
3	Furniture and Related Product Manufacturing	13%		33%	
3	Wood Product Manufacturing	13%	50%	22%	25%
3	Paper Manufacturing	25%		22%	25%
4	Petroleum and Coal Products Manufacturing			0%	
4	Plastics and Rubber Products Manufacturing	25%	50%	33%	50%
5	Nonmetallic Mineral Product Manufacturing				25%
5	Fabricated Metal Product Manufacturing	25%	50%	33%	50%
5	Primary Metal Manufacturing	13%	75%	11%	75%
5	Mining (except Oil and Gas)	13%	25%	22%	25%
6	Electrical Equipment, Appliance, and Component Manufacturing	38%		11%	50%
6	Computer and Electronic Product Manufacturing	38%	25%	56%	50%
7	Transportation Equipment Manufacturing	38%	50%	22%	25%
7	Machinery Manufacturing	13%	25%	56%	50%
7	Support Activities for Transportation	13%			
8	Touristic Activities	25%	25%	11%	25%
8	Data Processing, Hosting, and Related Services				25%
9	Utilities	13%		33%	
10	Construction of Buildings	13%			
11	Miscellaneous Manufacturing	13%			25%
12	Chemical Manufacturing	25%	50%	33%	25%
13	Publishing Industries (except Internet)				25%
13	Motion Picture and Sound Recording Industries				25%
13	Other Information Services			11%	50%
14	Ambulatory Health Care Services		25%		
14	Professional, Scientific, and Technical Services				25%
15	Telecommunications				50%
16	Management of Companies and Enterprises				25%
16	Credit Intermediation and Related Activities				25%
16	Administrative and Support Services				25%

	Large Sector	% Normalized	States
1	Agroindustry	100%	All
5	Mining and Metal Industries	68%	All
2	Textiles, Garments and Leather	47%	All
7	Transportation Equipment	43%	All
6	Electronics	39%	All
3	Forestry (paper and wood)	32%	All
4	Plastic, rubber, oil derivatives	20%	All
12	Chemical Industry	16%	All
8	Tourism	12%	All
13	Information Services	12%	Oax. and Yuc.
16	Support Services	6%	Yuc.
14	Professional Services	2%	Gro. and Yuc.
15	Telecommunications	2%	Yuc.
9	Energy Generation	1%	Chs. and Oax.
11	Other Manufacturing Activities	0%	Chs.and Yuc.
10	Construction	0%	Chs.

Source: Based on the literature review.

6 **Environmental impact.** This indicator evaluates the potential impact of each sector on water, air, and soil, including greenhouse gas emissions and other pollutants. It also considers existing environmental constraints that could undermine the development of certain sectors in each state.

7 **Impact of COVID-19.** This indicator evaluates the pandemic's impact on the sectors, drawing from various international reports (from organizations such as the Boston Consulting Group, KPMG, McKinsey, and the World Bank), as well as specific information from Mexico (such as reports from Banco de México and guidelines from health authorities that affected economic activity).

The following are key take-aways from the qualitative analysis.

There is strong political support, notably at the state level, for the Agro-industry, forestry, energy generation, and metal and mining industries. The selected states, particularly Oaxaca, Chiapas and Guerrero, possess abundant natural resources, and their development plans share a common goal of harnessing these resources to upgrade local productive structures and promote greater prosperity for their residents. However, these states face a common challenge of moving into more advanced and industrialized segments within the value chains of these sectors, particularly in agro-industry and forestry. In the case of Yucatán, there is a clear vision for the development of the information and communication technology sector.

The energy sector is facing some barriers to private investment. Despite a high potential for power generation from renewable sources such as solar, wind and hydroelectric, there are uncertainties and potential deterrents caused by the government's stance on private participation in the sector. The current administration aims to restore market dominance to the state-owned energy firms (the Comisión Federal de Electricidad and Pemex). Additionally, in this region there is doc-

TABLE C.2

Qualitative Analysis Indicators

Variable	Definition	Scale (0–4)	Sources
Ease of doing business	Impact of state's business climate on sector	4 = favorable 0 = unfavorable	Doing Business in Mexico, 2016
Regulatory framework	State and local regulations conductive to the sector's development	4 = conducive 0 = not conducive	FDI Law, Industrial Property Law, Sector-specific, National Laws, NOMs
Alignment with federal government policy	Sector is considered in the National Development Plan	4 = considered 0 = not considered	National Development Plan (2019–24) and related programs
Alignment with state policy	Sector is considered in the state's development plan	4 = considered 0 = not considered	Development plans of Chiapas, Guerrero, Oaxaca, and Yucatan
Availability of required infrastructure	Availability of transportation, water, and energy infrastructures relevant to the sector	4 = available 0 = not available	CONAGUA, SCT, SENER
Environmental impact	Sector's impact on air, water, and soil	4 = no impact 0 = high impact	SEMARNAT, SAGARPA, Deloitte, McArthur Foundation
Impact of COVID-19	Speed of recovery based on sector's relevance and reliance on face-to-face interaction, home-based work, and global value chains	4 = speedy recovery 0 = no recovery	WBG, Banxico

Source: Authors' own elaboration.
Note: CONAGUA = Comisión Nacional del Agua; FDI = foreign direct investment; NOMs = Normas Oficiales Mexicanas; SAGARPA = Secretaria de Agricultura, Ganaderia, Desarrollo Rural, Pesca y Alimentacion; SCT = Secretaría de Comunicaciones y Transportes; SEMARNAT = Secretaría de Medio Ambiente y Recursos Naturales; SENER = Secretaría de Energía; WBG = World Bank Group.

umented evidence showing that social conflicts can significantly slow down or prevent the execution of investment projects, as seen in the case of wind farms.

The COVID-19 outbreak had asymmetric impacts on the development opportunities across sectors. The pandemic-induced demand and supply shocks, in many cases, leading to paralysis of entire industries. Sectors deemed "essential" by Mexican authorities during the pandemic (such as food and beverages, telecommunications and energy on a first stage, and transportation equipment, chemical, construction and mining sectors afterwards) experienced relatively less impacts as they were not forced to shut down. On the other hand, contact-intensive industries, such as tourism and construction, which have limited possibilities for remote operations, were deeply affected and recovered slowly until a relevant share of the population was vaccinated. Sectors more integrated into global value chains, such as the automotive industry, faced supply-chain disruptions and input shortages, inducing reshoring, near-shoring, or import substitution. Finally, the pandemic has increased reliance on ICT services, including e-commerce, platforms for virtual work and meetings, digital government services, remote learning, and telemedicine.

The results of the qualitative analysis are summarized in table C.3.

TABLE C.3

Sectors' Ranking Based on the Qualitative Analysis

Large Sectors	Doing Business	Regulatory Framework	Alignment with PND and related programs	Alignment with state development programs	Infrastructure requirements	Environmental impact	Impact of COVID-19	Total Score (Min= 0, Max.=32)	Normalized
Agroindustry	3	3	3	4	3	2	4	22	100%
Textiles, Garments and Leather	3	4	3	2	3	2	2	18	67%
Forest industry (wood and paper)	3	3	3	3	3	2	2	18	67%
Other manufacturing activities	3	4	2	2	2	2	3	16	50%
Transportation Equipment	2	4	2	2	2	2	3	15	42%
Telecommunications	2	4	2	2	2	3	4	15	42%
Energy Generation	2	2	2	2	2	2	4	14	33%
Electronics	2	4	2	2	2	2	2	14	33%
Chemical industry	2	3	2	2	2	2	3	13	25%
Plastic, rubber, oil derivatives	2	3	2	2	2	2	2	11	8%
Mining and Metal industries	2	3	2	2	2	2	2	10	0%
Construction	2	3	2	1	3	1	2	10	0%

0 1 2 3 4

Source: Based on the qualitative analysis.
Note: Tourism, other services not related to information and communication technology, and other manufacturing activities are excluded from the analysis.

QUANTITATIVE ANALYSIS

This diagnostic draws on quantitative analyses to estimate the market potential and development impact of the sectors. A total of 14 indicators were used to categorize the sectors classified at the North American Industry Classification System four-digit level into seven categories, quantifying their size, profitability, growth potential, and desirability. The results of this categorization, in which each sector is graded and ranked, are shown in table C4.

1. **Performance at the national economy.** This category measures the relevance of the sector in terms of its relative size, growth, income, and remuneration. It provides a measurement of the sector's contribution to the Mexican economy, aiming to identify sectors that have positively impacted the country's growth and development.

2. **Integration to global markets.** This category focuses on sectors that have successfully exported products, as developing a sector that is well integrated into global markets will allow the selected states to participate in the global economy from which they are mostly excluded.

3. **Labor intensity.** This category identifies labor-intensive sectors that create greater and relatively more attractive employment opportunities in the selected states. By leveraging the labor endowment of these states, these sectors have a greater potential for development impact.

4. **Investment attractiveness.** This category measures the appeal of the sector for private sector development through foreign direct investment. It identifies sectors that have proven successful in attracting international investment.

5. **Potential links to other sectors.** Developing a sector with strong links to other sectors will have a multiplier effect, creating the demand conditions for the development of related sectors within the state. By using the input-output matrix, sectors that are highly linked to other sectors, both upstream and downstream, and have the potential to develop clusters are identified.

6. **Import substitution.** This category considers sectors that can strengthen Mexico's participation in regional, national, and international value chains by identifying sectors where high imports suggest market potential for products that are not being produced competitively in the country.

7. **World positioning.** This category measures how well Mexico is positioned in the sector's performance at the international level in terms of exports, to anticipate how much additional global demand could be supplied by the country.

TABLE C.4

Breakdown of the Quantitative Analysis Into Seven Categories

Categories	Weights assigned to each category/indicator
1.Performance in national economy	**30%**
Sector GDP (% of national)	3%
CAGR GDP sector 2003-2019	7%
Income per economic unit (thousand pesos)	10%
Remuneration per working population (thousand pesos)	10%
2. Integration to global markets	**10%**
Value of exports (Mexico, % total)	3%
Value of exports (Mexico, CAGR 2007-2019)	7%
3. Labor intensity	
PO/FA (thousand pesos)	10%
4.Investment attractiveness	**20%**
FDI (% Mexico)	5%
FDI (total 2015-2019, MDD) (% Mexico)	15%
5. Potential links	**20%**
Value of sales to other sectors	5%
Value of purchases from other sectors	5%
Total incidence on other sectors	10%
6. Import substitution	**5%**
Sector imports	5%
7. World positioning	**5%**
Growth in global market share 1995-2017, PP	5%
TOTAL	100%

Large Sector Normalization

Large Sector*	% Normalized
Transportation Equipment	60%
Agroindustry	45%
ICT – Manufacturing**	44%
Electronics	37%
ICT – Services**	37%
Energy Generation	29%
Plastic, Rubber, oil derivatives	28%
Textiles, Garments and Leather	28%
Fabrication of machinery and equipment***	27%
Telecommunications**	25%
Chemical industry	24%
Mining and metal industries	23%
Forest industry (Wood and paper)	12%

Source: Authors' own elaboration.
Note: CAGR = compound annual growth rate; FA=fixed assets ; FDI = foreign direct investment; GDP = gross domestic product; PO = people employed in sector; ICT = information communication technology.
*Construction, other manufacturing activities, tourism, and other services sectors not related to ICT are excluded.
**Considered as telecommunications sector in the literature review and qualitative analysis.
***Considered as transportation equipment in the literature review and qualitative analysis.

In table C.5, the three criteria were combined to determine the final selection of sectors for assessment. Each of the criteria was assigned different weights, indicating their relative importance in the selection process.

Table C.6 presents the application of these weights and the ranking for each sector.

Four sectors were chosen for further in-depth analysis from the short-list of seven sectors, based on the performance of the top five across three scenarios.[29] These sectors include: (1) agro-industry in Chiapas, Oaxaca, Guerrero, and Yucatán; (2) forest industry in Chiapas, Oaxaca, Guerrero, and Yucatán; (3) automotive industry in Chiapas; and (4) information and communication technologies (ICTs) in Yucatán. It is important to note that although the selected sectors primarily focus on the manufacturing of tradable goods (except for ICT, which includes services), it does not imply that there is no growth potential or investment opportunities in the services sector. The services sector, par-

TABLE C.5

Sector Selection Weight Distribution by Component (%)

	Scenario 1	Scenario 2	Scenario 3
Literature review	20	25	33.3
Qualitative analysis	20	25	33.3
Quantitative analysis	60	50	33.3

TABLE C.6

Ranking of Sectors Based on Three Scenarios

A. Normalized % for each category

Sector	% Normalized		
	Literature R.	Qualitative A.	Quantitative A.
Transportation Equipment	41%	42%	60%
Agroindustry	100%	100%	45%
ICT – Manufacturing	0%	42%	44%
Electronics	38%	33%	37%
ICT- Services	0%	42%	37%
Energy Generation	5%	33%	29%
Plastics, Rubber, oil derivatives	18%	8%	28%
Textiles, Garments and Leather	44%	67%	28%
Fabrication of Machinery and Equipment	41%	42%	27%
Telecommunications	0%	42%	25%
Chemical Industry	15%	25%	24%
Mining and Metal Industries	54%	0%	23%
Forest Industry (paper and wood)	33%	67%	12%

B. Ranking of sectors for each scenario

#	Scenario 1 (20-20-60)		Scenario 2 (25-25-50)		Scenario 3 (33-33-33)	
	Sector	Factor	Sector	Factor	Sector	Factor
1		67.01%		72.51%		81.67%
2		52.35%		50.51%		47.46%
3		38.57%		41.33%		45.93%
4		36.78%		36.64%		37.40%
5		35.02%		33.99%		36.44%
6		32.52%		32.66%		36.39%
7		30.68%		31.11%		28.72%
8		27.33%		29.04%		26.30%
9		24.90%		25.19%		25.77%
10		24.85%		23.96%		22.38%
11		23.12%		22.74%		22.10%
12		22.75%		22.33%		21.61%
13		21.81%		20.36%		17.96%

Source: Based on the sector selection methodology.
Note: For the weight distribution of each scenario, see table C.7.

ticularly tourism, holds significant potential, especially during its recovery from the COVID outbreak.[30] However, the selected sectors represent opportunities for diversification toward industrial activities, which are barely existent in the region. These sectors have the potential to drive structural change, promote balanced growth, and facilitate integration into the global economy.

The Agro-industry sector is the top performer under the three different scenarios. The broader Southern region in Mexico, which includes the four selected states, has high potential to develop this industry, given its natural resources and suitable weather conditions for primary production. Industrializing agricultural products to expand the value chain towards the production of final consumption goods is the key challenge. The complexity analyses conducted for the selected states reveal that this sector aligns well with their existing productive capabilities, suggesting potential for short-term development. With the right policies, the sector could uplift small farmers and producers out of poverty.

Transportation equipment is the second top performer. This sector is Mexico's highest performing, tightly integrated into global value chains and with strong links to other industries. The relevance of the sector is expected to grow even further given the higher regional content requirements for the automotive industry established by the United States–Mexico–Canada Agreement and nearshoring investments related to the relocation of production from Asia (particularly China) to get closer to the end markets in North America. Among the selected states, although limited, Chiapas has a relevant presence in the transportation

equipment sector. Further developing this sector in Chiapas would enable the state to benefit from Mexico's modern, integrated, and successful industries.

The forest industry was selected for its strong presence in the selected states, government's support at the federal and state levels, and its alignment with the selected states' current productive capabilities. Moreover, sustainable development of the sector has the potential to reverse the damage caused by illegal logging, forest fires for agricultural purposes, and other issues that have led to the annual loss of thousands of forest hectares in the country.

In the case of the ICT industry, Yucatán has a limited, but relevant and growing presence of this industry. The state government has played an active role in the development of this sector and intends to continue doing so until it is fully consolidated. Yucatán has one of Mexico's most enabling ICT ecosystems, characterized by close coordination between public, private, and academic actors. Similar to the transportation equipment sector, the ICT industry represents an opportunity to develop a modern and globally integrated sector in the region, which serves as the foundation of the so-called "Fourth Industrial Revolution."[31] This revolution is characterized by the increasing use of advanced digital technologies such as artificial intelligence, Internet of Things, robotic automation, virtual or augmented reality, quantum computing, big data analytics, blockchain, genetic engineering, among others.

Notes

1. The northern region includes the states of Chihuahua, Coahuila, Baja California Norte, Nuevo León, Sonora, and Tamaulipas.

2. The Bajío includes the states of Aguascalientes, Guanajuato, Jalisco, Querétaro, and San Luis Potosí.

3. Nearshoring is the practice of shifting outsourced manufacturing closer to a product's end market. Currently, Mexico is benefiting from nearshoring investments resulting from the relocation of production from Asia to get closer to the main markets of the United States and Canada. Several factors account for this shift, including (i) supply chain disruptions aggravated by the COVID-19 pandemic and the Russian Federation's invasion of Ukraine, (ii) rising labor costs in offshoring destinations, (iii) higher shipping and other logistics costs with increasing delays, (iv) increasing pressure to reduce transport carbon emissions, (v) geopolitical tensions between the United States and China, (vi) need for closer proximity between design and manufacturing, and (vii) capacity for flexible production, allowing for late-stage adjustments on products for final customers.

4. Based on INEGI's Economic Censuses. The estimation excludes economic activities related to oil and gas, central, commercial and development banks, brokerage houses, and other centralized activities.

5. Given some special agreements and conditions offered by the federal or local governments, some firms that had decided to invest in a special economic zone maintained their investment plans. In Chiapas, the case of a Guatemalan firm stands out. The firm built an industrial complex in Tapachula, near Mexico's border with Guatemala, to produce noncarbonated beverages, flavored milks and oils. The estimated US$100 million investment has generated more than 2,000 jobs, with around 600 direct jobs.

6. The isthmus represents the shortest distance between the Pacific and Atlantic Oceans in Mexico, approximately 300 kilometers at its narrowest point.

7. In June 2019, the Interoceanic Corridor of the Isthmus of Tehuantepec (CIIT) Authority was established to coordinate the program. The CIIT was a decentralized public body with corporate legal status and rights to asset ownership. It absorbed the lands secured by the special economic zone project in the region and, initially, the shares of the state-owned companies administering the ports of Coatzacoalcos and Salina Cruz, as well as the Tehuantepec Isthmus Railway (these infrastructures passed to the control of the Ministry of the Navy in 2022). The CIIT acquired more land along the corridor for industrial parks, carried out consultations with indigenous groups, and promoted public investment projects in ports, oil pipelines, and refineries in the region and local railway. Since 2023, the Ministry of the Navy absorbed the CIIT and it is in charge of the project.

8. The South-Southeast region of Mexico covers nine states: Campeche, Chiapas, Guerrero, Oaxaca, Puebla, Quintana Roo, Tabasco, Veracruz, and Yucatán. This study focuses on the three poorest states, located in the South—Chiapas, Guerrero, and Oaxaca—along with Yucatán, which is one of the less economically disadvantaged states, located in the Southeast region.

9. On the contrary, commerce and services increased their participation in the state, from 58.2 percent in 2003 to 73.1 percent in 2021.

10. Aguascalientes, Guanajuato, Jalisco, Querétaro, and San Luis Potosí.

11. Baja California Norte, Chihuahua, Coahuila, Nuevo León, Sonora, and Tamaulipas.

12. Although not shown in the figure of Oaxaca's exports (figure 1.4, panel c), the state's beverage production (NAICS three-digit code 312) is also a relevant export-oriented sector. The state leads in the production and exports of mezcal in the country.

13. This analysis excludes oil-related activities.

14. Economic activities related to oil and gas, banking and finance, and other centralized activities, as well as those with negative value added, are excluded to avoid distortions in the estimation of labor productivity.

15. Although this method has been used primarily to study discrimination in the labor market, it can also be used to explain differences in any continuous outcome across groups. For further details, see Blinder (1973); Oaxaca (1973). For a discussion of how the Blinder-Oaxaca decomposition was used in the study, see appendix A.

16. Hausmann and others (2013).

17. Capabilities are inferred from the composition of an economy's output using a "method of reflections" based on the diversity and ubiquity of products. An economy with a more diverse and unique output will have higher levels of economic complexity. Estimates of economic complexity may be based on data for exports, production, value added, and even employment (see Hidalgo and Hausmann (2009); Hausmann and others (2013).

18. Opportunity gain depends on the extent to which diversification changes the average complexity of the goods and services not produced by the economy, adjusted according to the distance to each new product.

19. Based on Mexico Atlas of Economic Complexity, which was discontinued after 2014. Exports are imputed to states based on cross-registers of the Mexican customs and social security authorities.

20. Defined as the average complexity of the goods and services not currently produced in a particular location, adjusted by the "distance" of producing a good or service based on the location's current production. The measure reflects the unexploited production prospects that, if pursued, could contribute to increasing the location's economic sophistication or complexity.

21. The report measured capacity of the states to develop, attract, and retain talent and investment through 72 indicators in ten different areas: (a) legal system, (b) environmental sustainability, (c) social wellbeing, (d) political system, (e) government efficiency, (f) factor markets, (g) economic stability, (h) pioneering sectors, (i) international relations, and (j) innovation and sophistication of economic sectors.

22. See appendix B for a list of components used in each index.

23. ARTF (2018).

24. SCT (2017).

25. These two states have the conditions and infrastructure necessary to generate renewable energy: Oaxaca produces a large amount of wind power in the La Ventosa region, and Chiapas has the most hydroelectric dams of any state (SENER 2019).

26. Among the selected states, Chiapas and Guerrero are the only states with no pipelines to transport any kind of fuel. Oaxaca only has one pipeline network, which connects Salina Cruz with Coatzacoalcos, Veracruz. Yucatán benefits from the Mayakan system, a pipeline that connects the state's main cities with fuel production in Campeche and Tabasco (SENER 2015).

27. According to the World Economic Forum (WEF) (2016), the First Industrial Revolution was characterized by the use of water and steam power to mechanize production. The Second Industrial Revolution was characterized by the use of electric power to create mass production. The Third involved the integration of electronics and information technology to automate production. Lastly, the Fourth Industrial Revolution is the digitalization and fusion of technologies that is interrelating the physical, digital, and biological spheres. It is seen as a consequence of the Third Industrial Revolution.

28. The indicators were reviewed at the state level and normalized to a scale ranging from 0 to 4.

29. Agro-industry; transportation equipment; textiles, garments and leather; electronics, forestry; information and communication technology; and fabrication of machinery and equipment.

30. The southern states in Mexico possess natural, cultural, historic, artistic, and gastronomic richness and diversity. This abundance of attractions provides them with an important comparative advantage in the tourism sector. In particular, given the expected changes in the demand composition brought about by the pandemic, more concentrated in open-air, rural- and nature-based tourism activities, with an increase in domestic tourism (vacations close to home and "staycations") and "slow travel" experiences (UNWTO 2021).

31. According to the WEF (2016), the First Industrial Revolution was characterized by the use of water and steam power to mechanize production. The Second Industrial Revolution was characterized by the use of electric power to create mass production. The Third involved the integration of electronics and information technology to automate production. Lastly, the Fourth Industrial Revolution is the digitalization and fusion of technologies that is interrelating the physical, digital, and biological spheres. It is seen as a consequence of the Third Industrial Revolution.

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