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The importance of specializing in complex manufacturing industries: Evidence from Mexican regions, 2004-2019

Manuel Gómez Zaldívar, Fernando Gómez Zaldívar***

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Abstract:

Economic complexity literature highlights the role of productive capabilities and industrial sophistication as central drivers of long-term development, yet most empirical evidence remains concentrated in a limited set of countries. This paper extends the debate by examining Mexico, a middle-income economy deeply integrated into global markets and characterized by stark regional disparities. Using data from the 2004 and 2019 Economic Censuses, we assess changes in manufacturing specialization and complexity across Mexican regions. The results show that while all regions increased their specialization and diversification, only those able to transition into more complex manufacturing industries expanded their share of national output—patterns consistent with findings for China, Italy, and Brazil. These findings underscore the importance of the *quality* of diversification, not just its extent, as a determinant of regional economic performance. More broadly, the Mexican case illustrates how integration into global value chains does not automatically guarantee convergence: sustained development depends on the accumulation of capabilities and upgrading into sophisticated activities. The study thus contributes to international debates on structural transformation, regional inequality, and the conditions under which emerging economies can leverage industrial complexity for inclusive growth.

Keywords: Industry groups; economic complexity; Mexico's municipalities.
JEL Classification: L60; R11; R12.

La importancia de especializarse en industrias manufactureras complejas: evidencia de las regiones mexicanas, 2004-2019

Resumen:

La literatura sobre complejidad económica destaca el papel de las capacidades productivas y la sofisticación industrial como motores centrales del desarrollo de largo plazo; sin embargo, la mayor parte de la evidencia empírica se concentra en un conjunto limitado de países. Este artículo amplía el debate al examinar el caso de México, una economía de ingreso medio profundamente integrada a los mercados globales y caracterizada por marcadas disparidades regionales. Utilizando datos de los Censos Económicos de 2004 y 2019, analizamos los cambios en la especialización y la complejidad manufacturera a lo largo de las regiones mexicanas. Los resultados muestran que, si bien todas las regiones incrementaron su especialización y diversificación, solo aquellas que lograron transitar hacia industrias manufactureras más complejas ampliaron su participación en la producción nacional, un patrón consistente con la evidencia encontrada para China, Italia y Brasil. Estos hallazgos subrayan la importancia de la *calidad* de la diversificación, y no

* Departamento de Economía y Finanzas, Universidad de Guanajuato. México. mgomez@ugto.org
** Escuela de Gobierno y Transformación Pública, Tecnológico de Monterrey. México. fergo7@tec.mx
Corresponding author: fergo7@tec.mx

solo de su magnitud, como determinante del desempeño económico regional. De manera más amplia, el caso mexicano ilustra que la integración a las cadenas globales de valor no garantiza automáticamente la convergencia: el desarrollo sostenido depende de la acumulación de capacidades y del escalamiento hacia actividades más sofisticadas. En este sentido, el estudio contribuye a los debates internacionales sobre transformación estructural, desigualdad regional y las condiciones bajo las cuales las economías emergentes pueden aprovechar la complejidad industrial para un crecimiento inclusivo.

Palabras clave: Grupos industriales, complejidad económica, municipios de México.
Clasificación JEL: L60; R11; R12.

1. Introduction

Hidalgo and Hausmann's (2009) methodology on economic complexity offers a foundational framework for understanding the significance of an economy's productive structure as a manifestation of the collective knowledge embedded within society's capabilities. This knowledge is articulated through the coordinated interaction of firms, institutions, infrastructure, and social networks, which together enable the production of increasingly sophisticated goods. Their approach emphasizes that economic development is driven less by natural resource endowments or individual skills than by the broader system of capabilities that support innovation, specialization, and diversification. Importantly, this perspective reconceptualizes structural transformation as a process of accumulating and recombining productive know-how, thereby explaining why some regions are able to transition into complex industries while others remain confined to low-value economic activities. A growing body of empirical research at both the international and national levels consistently demonstrates that higher levels of economic complexity are strongly associated with superior economic outcomes. Felipe *et al.* (2012) show that a country's ability to produce complex products is positively related to its income level and development trajectory. At the regional level, Gao and Zhou (2018) find that more complex regions in China grow faster, while Antonietti and Burlina (2019) demonstrate that Italian regions upgrading into complex industries strengthen their economic performance. Similarly, Herrera *et al.* (2021) analyze the diversity and sophistication of Brazilian states' productive structures and argue that, over time, the gap between more and less complex states has persisted, reinforcing regional inequalities.[1]

One insight derived from this framework is the recognition of the profound heterogeneity in productive complexity, both across countries and within national economies. Internationally, advanced economies tend to concentrate in highly complex industries—such as precision manufacturing, chemicals, or electronics—while many developing countries remain specialized in resource-based or low-complexity activities, limiting their potential for sustained growth. This heterogeneity is not confined to the global scale; within nations, significant disparities also emerge across regions, as some territories accumulate the capabilities needed to enter complex industries while others remain locked in traditional or less sophisticated sectors. Understanding these uneven patterns is essential, since they shape not only national competitiveness but also the prospects for inclusive development and regional convergence.

The aim of this study is to analyze the Mexican economy and evaluate whether the evolution of its regions aligns with international evidence suggesting that the ability to transition into more complex industries is a decisive factor in regional development. The findings indicate that, over the period examined, all Mexican regions increased their manufacturing specialization. However, only those that specialized in relatively more complex industries were able to expand their share of national manufacturing output. In contrast, regions for which there is insufficient evidence of such specialization experienced only moderate growth—or even a decline—in their share of national manufacturing output. These patterns are consistent with international evidence, mirroring findings from countries such as China and Italy, where regions that

[1] Moreover, a distinct strand of the economic complexity literature provides robust evidence that the sophistication of productive structures is systematically associated with fundamental macroeconomic outcomes—including national income levels, long-term growth trajectories, inequality dynamics, and patterns of foreign direct investment—thereby consolidating economic complexity as a central analytical framework for the study of economic development.

successfully transitioned into more complex industries achieved sustained growth, while those specializing in less complex activities experienced relative decline.

Studying Mexico offers a valuable opportunity to contribute to international debates on structural transformation, since its regions display dynamics that resemble those documented across countries. Deep integration into global markets, a long process of trade liberalization, and strong regional contrasts in industrial capacity make Mexico a natural laboratory for examining how complexity and capabilities shape development. Our study builds on research such as Gao and Zhou (2018), Antonietti and Burlina (2019), and Herrera et al. (2021), which provide regional-level evidence linking economic complexity to growth in specific countries. Unlike these studies, there is limited evidence for Mexico. Our paper fills this gap by analyzing how regional productive structures in Mexico influence manufacturing specialization and national output, offering new insights into regional development dynamics in a middle-income country.

This study contributes to two interrelated strands of literature. The first of which focuses on Mexico's manufacturing sector, with particular emphasis on research that examines specific historical periods and identifies the structural factors underlying uneven patterns of regional and industrial development. The second pertains to the measurement and evaluation of economic complexity at the subnational level. While previous studies have computed this for states and municipalities,[2] our research underscores the challenge the nation faces in achieving uniform development across all regions. Since complex or sophisticated economic activities take time to develop due to the necessary gradual accumulation of productive capabilities, it is likely that the disparities currently seen across regions and municipalities will persist due to the lack of any clear industrial policy in those regions that lag behind.

The remainder of the study is structured as follows. Section 2 reviews the relevant literature. Section 3 outlines the recent evolution of Mexico's manufacturing sector at the national level and by region and MIG. Section 4 describes the data and the methodology for assessing municipal specialization and for calculating the economic complexity measures, by municipality and MIG. Section 5 presents the results. Section 6 presents the concluding remarks and offers a number of suggestions for future research.

2. Literature review

Due to the manufacturing sector's importance to the country, a substantial amount of literature has been dedicated to analyzing it. Focusing on the case of Mexico in the wake of the implementation of NAFTA, Hanson (1998) explores how regions adjust differently to trade liberalization. Overall, the paper shows that while trade liberalization can lead to national economic gains, the benefits are unevenly distributed, with some regions gaining significantly while others face stagnation or even decline. Regions closer to the country's northern border with the U.S. were already more industrially developed and benefited more from trade liberalization than those in the south, which remained more rural and agricultural. Ibarra-Olivo and Rodríguez-Pose (2022) examine how Foreign Direct Investment (FDI) contributes to increasing wage disparities across regions in Mexico. Overall, the study concludes that while FDI can drive economic growth and improve wages in certain areas, it also contributes to increasing wage inequality. FDI tends to be concentrated in more developed regions, particularly in northern and central Mexico, where infrastructure and labor skills are more aligned with the needs of foreign investors. Often closer to the U.S. border or major urban centers, these areas experienced a significant rise in wages due to FDI-driven growth in manufacturing and other high-skill sectors. Jordaan and Garduño-Rivera (2024) examine the spatial distribution of manufacturing industries in Mexico between 1950 and 2019, focusing on how this distribution changed in response to different economic policies: import substitution industrialization (ISI) and trade liberalization. Their findings indicate that during the initial phase of ISI, Mexico City and Mexico State comprised the main manufacturing hub, while there was a small industrial presence in Monterrey, Jalisco, and León in the Bajío region. The importance of Mexico City and its share (together with that of the surrounding area) of the manufacturing sector declined continuously over the

[2] See Gómez-Zaldívar and Gómez-Zaldívar (2023) and Gómez-Zaldívar et al. (2024). These studies analyze economic complexity at both the state and municipal levels, employing various indicators—including employment, gross product per worker, value added per worker, and economic units—for its estimation. Their results reveal a strong correlation across these measures, regardless of the specific variable used.

period analyzed. By 2019, the northern region solidified its role with major manufacturing hubs in Tijuana, Ciudad Juárez, and Monterrey; Jalisco and the Bajío region also consolidated their position. While there is still manufacturing activity in Mexico City, its significance continues to decline. Studies on the effects of Chinese competition since the latter's entry into the WTO, including Iranzo and Ma (2006), Utar and Torres-Ruiz (2013), Mendez (2015) and Chiquiar *et al.* (2017) have documented the negative impact on manufacturing development in Mexico of the substantial rise in Chinese exports to the U.S. Their results suggest that Chinese competition has transitioned from low-tech, labor-intensive manufacturing to more sophisticated, high-value-added production. This may explain why some regions in Mexico have yet to fully undergo the structural economic transformation necessary to produce complex manufactured goods, leaving them unable to compete effectively against both other Mexican regions and China.

The results of previous studies emphasize the need for policies aimed at mitigating the growing inequalities driven by national economic strategies, trade liberalization, foreign direct investment (FDI), and/or competition from China. These policies include upgrading infrastructure, strengthening education, and implementing training initiatives to provide workers in less developed regions with the necessary skills and so on. Such measures would help less dynamic regions to adapt, promoting more equitable economic growth across regions.

While additional studies on the Mexican economy exist, those mentioned above capture the key contributions of our research and serve as central references for understanding the issues we address. First, Mexico has experienced disparities within its manufacturing sector, with the share of manufacturing output of the five regions analyzed evolving unevenly between 2004 and 2019. Second, the northern and central regions, particularly the Bajío, are the primary beneficiaries of the dismantling of the manufacturing conglomerate in and around the capital, just as our findings corroborate. Third, the disparities in development may arise from several factors, such as changes in the economic model, economic liberalization, FDI inflows, Chinese competition or, as we argue here, the types of MIGs in which regions specialize.

3. The recent evolution of Mexico's manufacturing sector

The evolution of the Mexican manufacturing sector—at the national level, by region and by MIGs—has shown significant variation in recent years. Figure 1 shows the manufacturing sector's contribution to Mexico's GDP based on quarterly GDP data from Mexico's National Institute of Statistics and Geography (INEGI). The sector's share has averaged around 20.84%, peaking at 23.03% in the third quarter of 2000 and hitting its lowest values during global crises: 19.17% in the first quarter of 2009 and 19.02% in the second quarter of 2020.

Figure 2 shows the contribution of five regions to Mexico's overall manufacturing output.[3] The timeframes in Figures 1 and 2 differ due to variations in data availability nationally and by state.

The Center region has continued to lose prominence in this sector, a trend identified by previous studies: its contribution to the national total declined from 27.8 to 21.7, a decrease of 21.8%. The South region also saw a reduction in its share, from 9.8 to 6.9, a decrease of 29.7% in its share of the national manufacturing sector.

The remaining three regions show varying degrees of increasing involvement in the manufacturing sector. The Center-North's share rose from 11.2 to 12.1, an increase of 8.5%. Meanwhile, the North region, which had the largest share in 2003 at 39.2%, increased its share to 42.7 by 2022, marking an 8.9% rise.

[3] Generally speaking, the regions are as per those defined by Banco de Mexico, with one addition, the *Bajío* region, which emerged as a significant manufacturing hub during the period analyzed. **North**: Baja California, Chihuahua, Coahuila, Nuevo León, Sonora, and Tamaulipas; **Center-North**: Baja California Sur, Colima, Durango, Jalisco, Michoacán, Nayarit, Sinaloa, and Zacatecas; **Center**: Mexico City, Mexico State, Hidalgo, Morelos, Puebla, and Tlaxcala; **South**: Campeche, Chiapas, Guerrero, Oaxaca, Quintara Roo, Tabasco, Veracruz, and Yucatán; **Bajío**: Aguascalientes, Guanajuato, Querétaro, and San Luis Potosí.

Finally, Bajío recorded the most significant growth in terms of its share of the manufacturing sector, from 11.9 to 16.5%, which translates to a 38.7% increase.

FIGURE 1.
Contribution of manufacturing sector to GDP

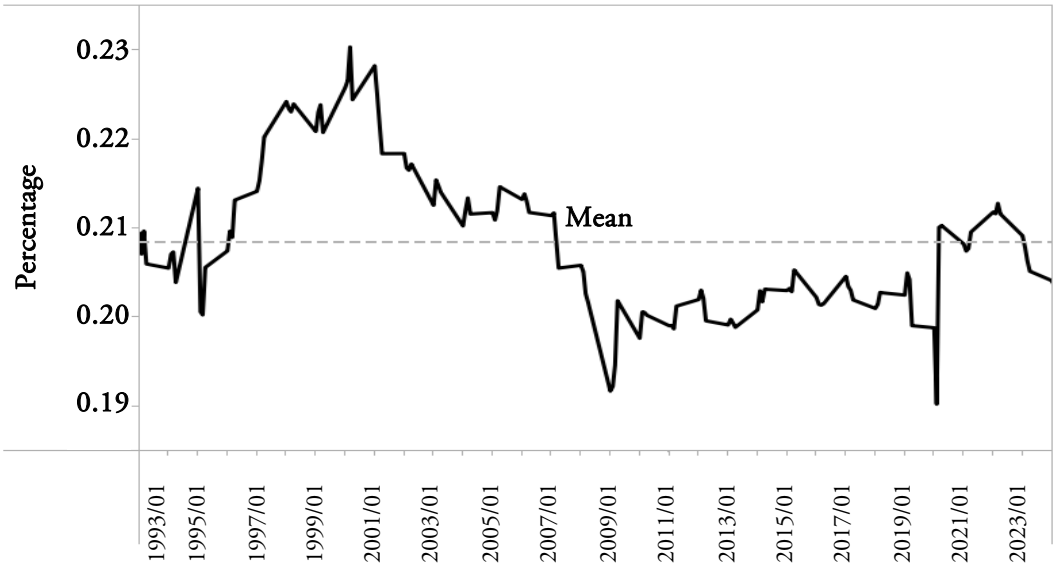


FIGURE 2.
Regional contribution to national manufacturing output

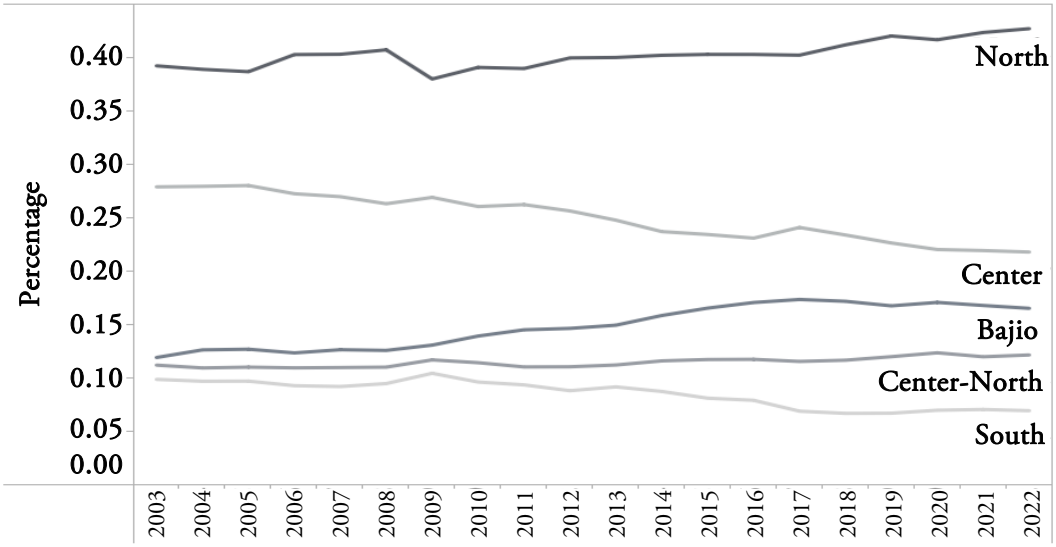
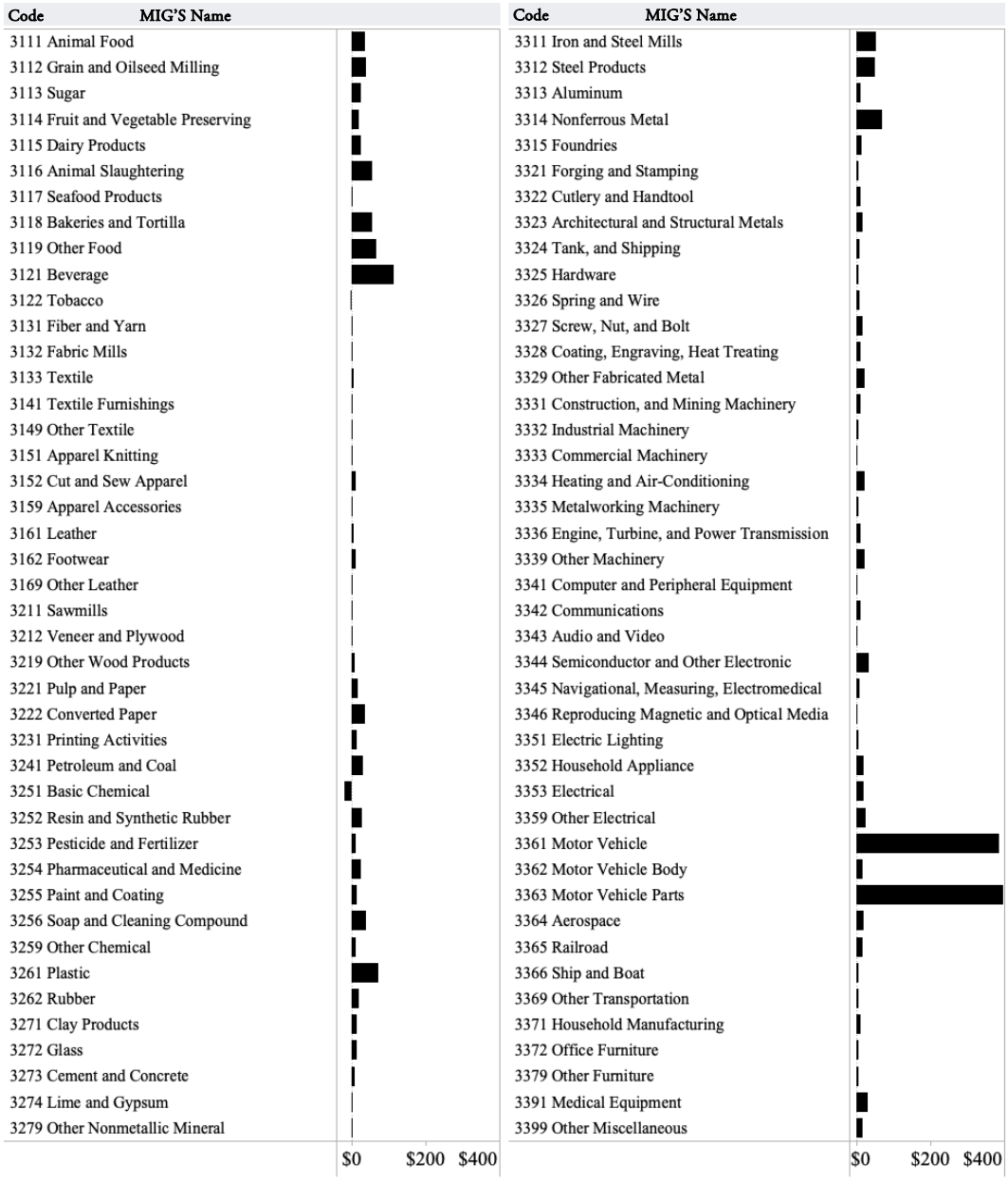


Figure 3 shows the absolute change in Value Added (VA) per MIG.[4] It is very clear that some MIGs perform much better than others. The average increase in VA of the 86 MIGs was 26 million pesos; 68 MIGs recorded an increase below this mean (only three had relatively small negative values) and 18 above it, while two showed an increase that was 15 times the average.[5]

[4] A similar pattern emerges when the absolute change in the Total Gross Production of MIGs is calculated.
[5] The 18 MIGs are: 3111, 3112, 3116, 3118, 3119, 3121, 3231, 3241, 3252, 3256, 3261, 3311, 3312, 3314, 3344, and 3391; the two that outperform the rest are 3361 and 3363, which are associated with subsector 336 (Transportation equipment manufacturing).

FIGURE 3.
Absolute change in the Value Added (VA) of Manufacturing Industry Groups (MIGs), 2004–2019*



* The vertical axis displays the 4-digit code and names of the 86 MIGs as classified by the North American Industry Classification System (NAICS).

In sum, Mexico's manufacturing sector share has shown no consistent upward or downward trend over the last 30 years but rather fluctuations over time around a constant mean. The five regions have developed unevenly, with some increasing in prominence while others lose ground. A similar pattern can be observed in the evolution of output across different MIGs, with even greater disparities.

To understand the factors driving the success or failure of different regions (in terms of increasing or decreasing their share of manufacturing output), we examine not only the number of MIGs in which the municipalities across regions specialize but also the quality or sophistication of these, measured by their level of economic complexity.

4. Data and methodology for measuring specialization and economic complexity

To estimate the specialization of municipalities and compute economic complexity, we employ data from the 2004 and 2019 Economic Censuses conducted by the National Institute of Statistics and Geography (INEGI).

The specific variable we use is *number of Economic Units (EU) per municipality*, which is organized into matrices labeled $M_{m,i}$, comprised of rows containing the country's municipalities (n_m) and columns corresponding to MIGs (n_i).[6] Cell $m_{m,i}$ indicates the number of EU in municipality *m* carrying out an economic activity from MIG *i*.

Using the definition of Location Quotient commonly employed in regional science literature, matrix $M_{m,i}$ is converted into a binary (i.e., composed of zeros and ones) matrix $M^B_{m,i}$ in which a value of one in an any given cell ($m^B_{m,i}$= 1) implies that municipality *m* is specialized in MIG *i*.[7]

This binary matrix is then used to compute two key vectors. The diversity vector—the initial measure of municipal economic complexity—is calculated by summing the values in each *row* of the binary matrix.

$$Diversity: \qquad k_{m,0} = \sum_{i=1}^{n_i} m^B_{m,i} \tag{1}$$

Each of the entries in this vector corresponds to the diversity of each municipality (the number of MIGs in which each municipality is specialized).

The second vector, the ubiquity vector, is derived by summing the values in each *column* of the binary matrix.

$$Ubiquity: \qquad k_{i,0} = \sum_{m=1}^{n_m} m^B_{m,i} \tag{2}$$

Each entry indicates the number of municipalities specializing in each MIG. Diversity and ubiquity are essential for computing the economic complexity metrics, as explained below.[8]

Method of reflections (MR)

The MR iteratively computes successive values of diversity and ubiquity using the previous measurements, beginning with the initial values (1) and (2). This iterative procedure is outlined in Equations (3) and (4):

$$k_{m,N} = \frac{1}{k_{m,0}} \sum_{c=1}^{n_c} m^b_{m,i} \cdot k_{i,N-1} \tag{3}$$

$$k_{i,N} = \frac{1}{k_{i,0}} \sum_{m=1}^{n_m} m^b_{m,i} \cdot k_{m,N-1} \tag{4}$$

The subscript N denotes the number of iterations required to achieve a fixed point; $k_{m,N}$ is the municipalities' economic complexity vector and $k_{i,N}$ that of the MIGs.

Municipalities possessing a wider array of productive knowledge or capabilities are able to manufacture a greater variety of goods; these economies tend to be more diverse or to have a higher degree

[6] With the EU and MIGs together, we have a 2,459*86 matrix.
[7] Municipality m is specialized in MIG i if the proportion of EU engaged in it with respect to the total EU in the municipality is equal to or greater than the equivalent proportion nationwide; otherwise, it takes a value of zero.
[8] Vectors 1 and 2 are denoted by subscript zero because they are the initial values of the diversity and ubiquity.

of economic complexity. In contrast, more sophisticated MIGs—those that manufacture more sophisticated goods or ones with greater value-added—tend to be produced by a select group of municipalities that have superior productive knowledge.

5. Results

5.1. The evolution of diversity across regions

Table 1 summarizes the change in the diversity of manufacturing in the municipalities of each region. It shows that in 2004, the municipalities in the North region were specialized in 2,324 MIGs, a figure that grew to 2,698 by 2019; this 16.1% increase in diversity is the lowest of all five regions. The municipalities in the South region were the least diverse on average, each of them being specialized in 4.6 MIGs in 2004, which increased to 7.0 by 2019. Nevertheless, during this period, this region had the largest percentage increase in diversity, with the number of MIGs in which its municipalities specialized increasing by 54%. The percentage changes of the remaining three regions, which have similar rates, lie between these extremes.[9]

Table 1.
Evolution of the diversity of manufacturing in municipalities by region

Region	Diversity of manufacturing		Percentage change	Average number of MIGs in which municipalities are specialized	
	2004	2019		2004	2019
North	2,324	2,698	16.1 %	8.4	9.7
Bajío	1,282	1,622	26.5 %	9.6	12.2
Center-North	3,359	4,210	25.3 %	8.5	10.6
Center	4,654	5,694	22.3 %	8.7	10.6
South	5,106	7,864	54.0 %	4.6	7.0
	16,725	22,088			

The numbers in this table might be interpreted as a national boom period for manufacturing, since the municipalities' average diversity improved in all regions, albeit to different degrees. Yet as shown in Figure 2, some regions experienced a reduction in their contribution to the national manufacturing sector. How can these facts be reconciled?

5.2. Change in number of municipalities specialized in each MIG and complexity of the latter

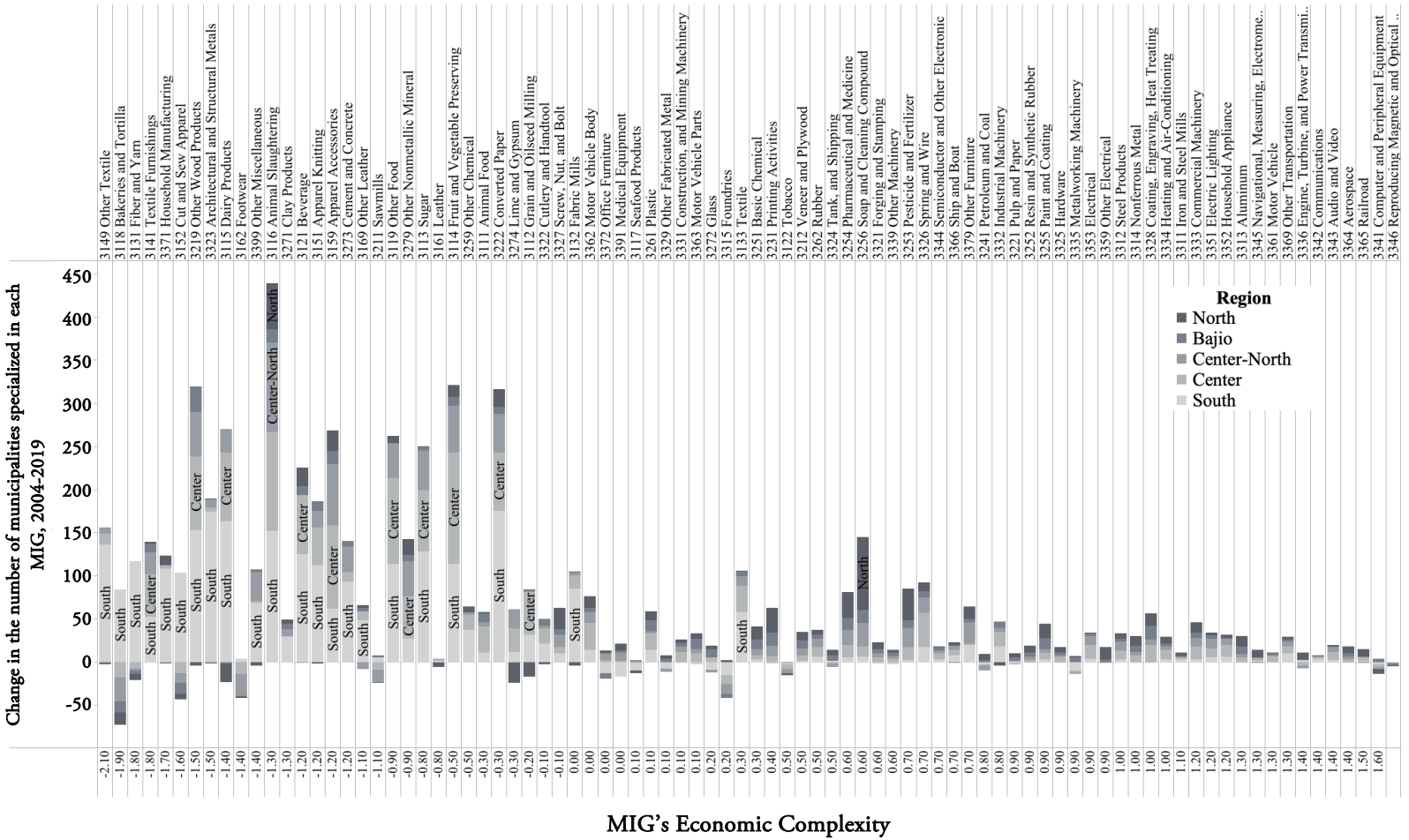
To understand why a growing regional diversity does not lead to increases in the share of manufacturing output in all regions, we need information on the quantity and quality (the level of sophistication or level of complexity) of the MIGs in which each region specializes during the period.

Figure 4 illustrates the change in municipal specialization across the 86 Manufacturing Industry Groups (MIGs) between 2004 and 2019, disaggregated by region. The vertical axis indicates the change in the number of municipalities specialized in each MIG, while the horizontal axis lists the MIGs in order of their economic complexity.

[9] Appendix 1 shows that these results are robust when calculated using a different level of economic aggregation, a 6-digit NAICS code, or another variable, Total People Employed (TPE).

The first bar, corresponding to MIG 3149 (the least complex MIG, with an index of –2.1), shows that by 2019 municipalities in all regions—North, Bajío, Center-North, Center, and South—had gained specialization in this industry, as reflected by positive values on the vertical axis. In contrast, the second bar, which represents MIG 3118, shows a mixed pattern: municipalities in the South gained specialization, while those in the North, Bajío, Center-North, and Center lost specialization, as indicated by the negative values for these regions.

FIGURE 4.
Change in the number of municipalities specialized in each MIG between 2004 and 2019, by region*



The calculation of MIGs' economic complexity is based on the methodology detailed in the two studies on the Mexican economy cited in footnote 2.

The interpretation of the remaining MIGs follows the same logic, where positive values denote municipalities that gained specialization between 2004 and 2019, and negative values denote those that lost it, differentiated by region.

In general, Figure 4 highlights three main patterns. First, municipalities tend to specialize more easily in less complex industries than in more complex ones, as evidenced by the taller bars on the left side of the figure compared with those on the right. Second, the regions that lost share in the national manufacturing sector -particularly the South and the Center- gained greater specialization in less complex industries. Finally, the North and Bajío regions, which expanded their share of the manufacturing sector, achieved this by shifting toward greater specialization in more complex industries -a transition that was central to their growth- while simultaneously losing specialization in some less complex activities.

5.3. Relationship between economic complexity and the specialization of municipalities

Figure 5 presents scatterplots illustrating the relationship between the level of sophistication (economic complexity) of the MIGs in which municipalities specialize during the period 2004-2019 and the percentage change in the number of municipalities specializing in each MIG, disaggregated by region.[10]

Although both linear and nonlinear specifications were examined, the evidence suggests that nonlinear patterns are identified more reliably. The analysis relies on Spearman's rho (ρ), a nonparametric measure of rank correlation that captures monotonic relationships and is less sensitive to outliers. This figure presents the nonlinear estimations that include all observations, whereas Appendix 2 reports the results after removing the atypical observations located in the upper-right corner, which slightly affect the p-values.

A positive correlation ($\rho > 0$) between these two variables would suggest that, during this period, a relatively large number of municipalities in the region acquired new productive capabilities, enabling them to engage and specialize in more complex or sophisticated MIGs, while simultaneously a substantial number reduced their specialization in MIGs with low levels of economic complexity.

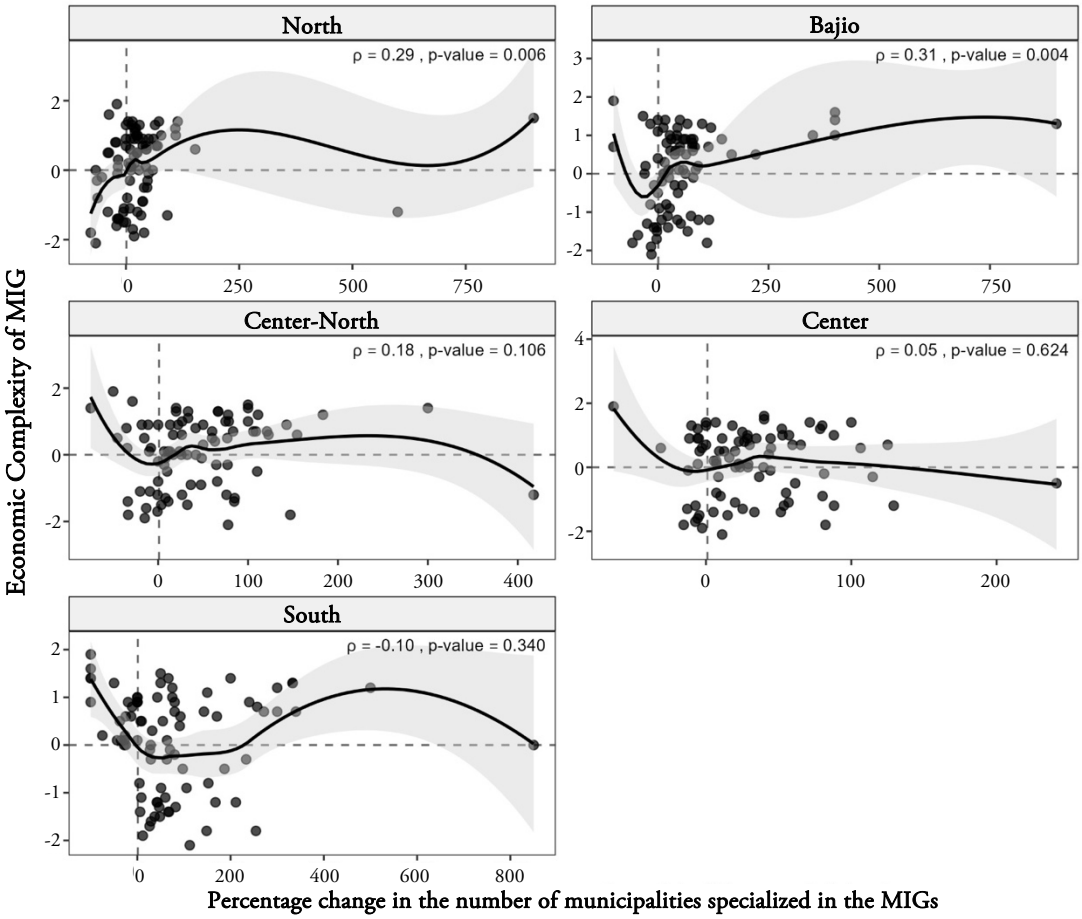
North and Bajío regions exhibit a positive nonlinear relationship, with ρ values around 0.3, both highly significant (p-values ≤ 0.006). The estimated value for the Center-North region indicates a weaker and statistical insignificant association. The ρ estimates for the Center and South regions are very close to zero and negative, respectively, and both are statistically insignificant.

These results validate the central argument of our study: to understand the factors driving the contribution of regions to national manufacturing output, it is essential to identify the common characteristic of the MIGs in which each region specializes. The evidence leads us to conclude that the North and Bajío regions increased their share of manufacturing output during this period due to their clear specialization in more complex and higher value-added economic activities. In contrast, the Center and South regions saw a decline in their share as there is no evidence of such specialization.

The evidence that all regions experienced an increase in the diversity of their municipalities -with the South region showing the most significant rise- highlights the fact that what truly matters is the quality or economic complexity of the MIGs they specialize in, rather than the sheer quantity.

[10] The percentage change is the change in the number of municipalities specializing in each MIG (as shown in Figure 4) divided by the number of municipalities specialized in that particular MIG in 2004, multiplied by 100. We consider the relative percentage change to be more appropriate than the absolute change because our aim is to understand the shift in each region's relative contribution over a specific period. Thus, the level of specialization of each region in a given MIG prior to 2004 should be irrelevant.

FIGURE 5.
Quantity and sophistication of MIGs in which municipalities specialize, by region



Source: Own calculations using R code provided by González-Leonardo (personal communication, 2025).

The results obtained for Mexico reveal a pattern consistent with the international evidence mentioned. In particular, as in China, where regions with a greater capacity to transition into complex industries achieved higher growth rates, or in Italy, where territories that diversified into more sophisticated sectors consolidated their economic performance. In Mexico only those regions that moved into more complex manufacturing activities were able to expand their share of national output. Similarly, the findings align with the case of Brazil, where persistent differences in the productive complexity of states have reinforced regional inequalities. These parallels confirm the point emphasized in the theoretical framework: it is not mere diversification that drives regional development, but rather the quality of such diversification, understood as the capacity to accumulate and recombine productive knowledge to enter higher value-added sectors.

6. FINAL COMMENTS

This study illustrates that the sophistication of manufacturing specialization is a key determinant of regional economic performance in Mexico, aligning closely with international evidence. As shown in China (Gao and Zhou, 2018), Italy (Antonietti and Burlina, 2019), and Brazil (Herrera *et al.*, 2021), regions that successfully shift into more complex industries consolidate and expand their share of national output, while those locked into less sophisticated activities experience relative decline. Mexico thus offers an additional case that reinforces the broader argument that economic complexity is a robust and generalizable driver of regional development across diverse institutional and geographic contexts.

At the global scale, our findings contribute to the debate on the uneven geography of industrial upgrading and the persistence of structural asymmetries between advanced and emerging economies. The Mexican experience illustrates that integration into global markets alone does not ensure convergence; rather, sustained growth depends on the ability to build capabilities and specialize in complex industries. This insight has broader implications for middle-income economies participating in global value chains, suggesting that long-term success hinges less on export orientation itself and more on the sophistication and complexity of the goods produced and traded.

At the national scale, the findings highlight the need for industrial policies that move beyond simply attracting investment and instead prioritize building the productive capabilities of lagging regions. Without targeted interventions -such as improving infrastructure, strengthening education and training systems, fostering technological ecosystems, and enhancing institutional capacity- the structural divide between northern and central regions and the south is likely to persist or even widen. In this sense, our results echo earlier studies showing how trade liberalization and FDI have deepened territorial inequalities (Hanson, 1998; Ibarra-Olivo and Rodríguez-Pose, 2022), while pointing to the potential of complexity-oriented strategies to reduce these disparities.

At the subnational scale, the results show that regional development trajectories depend heavily on industrial composition. The North and Bajío have advanced by moving into more complex industries, whereas the Center and South remain concentrated in less sophisticated activities. This underscores the importance of differentiated regional strategies: rather than applying a uniform policy framework, it is necessary to identify each region's latent capabilities and target industries with the greatest potential for upgrading. The current wave of nearshoring makes this approach even more urgent, as the restructuring of global production networks could either mitigate or intensify Mexico's regional inequalities, depending on how policy responds.

In sum, the Mexican case demonstrates that long-term development depends not only on the extent of industrial diversification but, more importantly, on its quality. For Mexico -and for other emerging economies- the central policy challenge lies in transforming existing productive bases into platforms for upgrading into more complex activities. Meeting this challenge demands coordinated action across multiple scales, with the dual objective of enhancing national competitiveness in global markets while ensuring that the gains from upgrading are more evenly shared across regions.

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ORCID

Manuel Gómez Zaldívar https://orcid.org/0000-0002-6526-8994

Fernando Gómez Zaldívar https://orcid.org/0000-0001-8103-8614

Appendix 1. Regional diversity robustness check

Table A1.1 shows the change in regional diversity when calculated using the same variable (EU) as in Table 1 but, in this case, with different economic aggregation levels, by national industry (i.e., 6-digit NAICS code).

Table A1.1
Evolution of the diversity of municipalities, EU and national industries*

Region	Diversity		Percentage change	Average number of national industries in which municipalities are specialized	
	2014	2019		2004	2019
North	4,637	5,568	20.1 %	23.2	27.8
Bajío	2,558	3,373	31.8 %	19.5	25.7
Center-North	5,882	7,796	32.5 %	15.9	21.1
Center	8,493	10,782	26.9 %	17.0	21.5
South	6,979	10,737	53.8 %	9.6	14.8
	28,729	38,256			

* When using the EU variable, by municipalities and national industry, we have a 1,928*288 matrix.

Table A1.2 shows the results when regional diversity is calculated using a different variable, Total People Employed (TPE), and the same level of aggregation as in Table 1 (i.e., 4-digit NAICS code).

Table A1.2
Evolution of the diversity of municipalities, TPE and MIG*

Region	Diversity		Percentage change	Average number of MIGs in which municipalities are specialized	
	2014	2019		2004	2019
North	814	1,032	26.8 %	3.5	4.4
Bajío	523	758	44.9 %	4.0	5.8
Center-North	1,399	1,877	34.2 %	3.7	5.0
Center	1,905	2,618	37.4 %	3.6	5.0
South	1,838	3,372	83.5 %	1.9	3.5
	6,479	9,657			

* When using the TPE variable, by municipalities and industry groups, we have a 2,229*84 matrix.

The evidence shows that the finding of increasing diversity across all regions remains consistent when calculated using different variables and levels of economic aggregation. The regional rankings based on the percentage change in diversity are identical across all three scenarios, with the South region having the highest percentage change and the North the lowest. The percentage changes in the remaining three regions are similar and their position in the ranking depends on the variable and level of aggregation employed.

Appendix 2. Quantity and sophistication of MIGs in which municipalities specialize, by region, excluding extreme values

The figure below presents the results of Spearman's ρ calculated after excluding extreme values for each region. The most notable changes occur in the Bajío and South regions. For the Bajío, the evidence of a positive correlation weakens, as does its statistical significance. In contrast, the evidence of a negative correlation for the South region strengthens, along with its statistical significance. Overall, while the first change slightly undermines our main argument, the second one reinforces it.