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Economic Complexity and Regional Manufacturing Performance in Mexico, 2004–2019

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Abstract

The development of Mexico's manufacturing sector has progressed unevenly across regions and industry groups, with the underlying causes varying over time. Using data from 2004 to 2019, we find that all Mexican regions experienced increased specialization and diversification. However, only those regions that shifted toward more complex manufacturing activities were able to expand their share of national manufacturing output. These findings underscore the critical role of industrial sophistication in shaping regional economic relevance. Consistent with prior research, our results highlight the importance of a clear and strategic industrial policy to support less dynamic regions. Such policy is essential for enabling structural transformation, fostering more balanced and inclusive economic growth, and overcoming persistent institutional and productive constraints that continue to hinder regional development.

Keywords: Industry Groups, Economic Complexity, Mexico's Municipalities.
JEL Classification: L60, R11, R12

I. Introduction

The Mexican manufacturing sector underwent significant transformation beginning in the mid-1980s, coinciding with a gradual process of economic liberalization that accelerated following the implementation of the North American Free Trade Agreement (NAFTA) in 1994. Despite these reforms, the sector has struggled to regain the peak contribution to GDP it achieved in 2000. Several external shocks—including China's accession to the World Trade Organization (WTO), the global financial crisis triggered by the subprime mortgage collapse, and the COVID-19 pandemic—have all constrained the sector's ability to sustain its momentum. Although periods of growth have occurred, persistent regional disparities remain. These disparities tend to intensify during national slowdowns, as gains in one region or subsector often coincide with stagnation or decline in others.

As numerous studies have shown, Mexico's manufacturing sector has consistently exhibited pronounced regional and sectoral inequalities. Fluctuations in growth and decline across different regions and industries can be traced to a complex interplay of national policy decisions, global economic dynamics, and the unique economic and socio-demographic attributes of each region or industrial branch at a given time.

This study aims to explore and account for the disparities in the development of Mexico's manufacturing sector by analyzing the types of Manufacturing Industry Groups (MIGs)[1] in which each region of the country was able to specialize in the period 2004 to 2019.

We begin by measuring municipal specialization across Manufacturing Industry Groups (MIGs) in both the initial and final years of the study period. We then analyze changes in specialization by focusing on two dimensions: (i) shifts in the diversity of municipalities' industrial profiles and (ii) changes in the number of municipalities specializing in each MIG. Our findings reveal that municipalities—and, by extension, the regions they comprise—tended to increase the number of MIGs in which they specialized, reflecting a general trend toward greater diversification. Importantly, this diversification did not imply simply retaining initial specializations while adding new ones; rather, it involved a reallocation of focus, with municipalities becoming less specialized in certain MIGs and more specialized across a wider set of them. However, this increase in diversity did not uniformly translate into a higher

[1] A 4-digit code according to the North American Industry Classification System (NAICS). Appendix 1 lists the 86 MIGs.

regional share of national manufacturing output. Given the stagnation of the national manufacturing sector and the continued expansion of manufacturing activities across regions, not all areas benefited equally. To understand these divergent outcomes, we examine the economic complexity of the MIGs in which each region has specialized.

Next, following the methodology proposed by Hidalgo and Hausmann (2009) and Hausmann *et al.* (2011), we compute economic complexity indicators to examine the relationship between regional shifts in manufacturing share and the sophistication of the Manufacturing Industry Groups (MIGs) in which each region specializes. Our analysis demonstrates that the nature of regional specialization is a key determinant of whether a region increases its contribution to national manufacturing output. Specifically, regions that concentrated their specialization in MIGs with higher levels of economic complexity were more likely to expand their share of domestic manufacturing, while those that focused on less complex MIGs generally experienced a decline. These findings suggest that industrial sophistication is a critical factor shaping regional manufacturing performance.

This study engages with and contributes to two main strands of literature. The first centers on analyses of Mexico's manufacturing sector, particularly those that examine specific time periods to identify the structural factors and conditions underlying its uneven development across regions and industries. The second focus is on assessing economic complexity at the subnational level in Mexico. 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

[2] See Gómez-Zaldívar and Gómez-Zaldivar (2023) and Gómez-Zaldivar *et al*. (2024). These studies conducted their analysis at both the state and municipal levels, using various indicators, such as people employed, gross product per worker, value added per worker, and economic units. Their findings show a strong correlation between these measures regardless of the variables used for the estimation.

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

Given the strategic importance of the manufacturing sector in Mexico, a substantial body of research has been devoted to its analysis. Much of this literature has focused on the period following the implementation of the North American Free Trade Agreement (NAFTA). Hanson (1998), for example, examines how different regions adjusted to trade liberalization, finding that while such reforms can generate aggregate economic gains, these benefits are unevenly distributed. Regions in northern Mexico, which were already more industrially developed, captured a larger share of the gains, whereas southern regions—characterized by a more rural and agricultural economy—experienced stagnation or decline.

Ibarra-Olivo and Rodríguez-Pose (2022) analyze the effects of Foreign Direct Investment (FDI) on regional wage disparities. Their findings suggest that although FDI can promote economic growth and raise wages, it also exacerbates inequality, as investment tends to concentrate in more developed areas—especially in northern and central Mexico—where infrastructure and workforce capabilities align more closely with investor demands. These regions, often located near the U.S. border or major urban centers, experienced significant wage increases driven by FDI-led growth in manufacturing and other high-skilled sectors.

Jordaan and Garduño-Rivera (2024) investigate the spatial distribution of manufacturing industries in Mexico from 1950 to 2019, highlighting how it evolved in response to distinct policy regimes—import substitution industrialization (ISI) and trade liberalization. They show that during the ISI period, Mexico City and the surrounding State of Mexico were the primary manufacturing hubs, with only limited industrial activity in Monterrey, Jalisco, and León (Bajío region). Over time, the centrality of Mexico City declined, while the northern region emerged as a dominant manufacturing center, with cities such as Tijuana, Ciudad Juárez, and Monterrey consolidating their positions. Jalisco and the Bajío region also became important manufacturing nodes. Although manufacturing remains present in Mexico City, its relative importance continues to diminish.

A separate line of research has examined the impact of rising Chinese competition following China's accession to the World Trade Organization (WTO). Studies such as Iranzo and Ma

(2006), Utar and Torres-Ruiz (2013), Méndez (2015), and Chiquiar *et al.* (2017) document the adverse effects of increased Chinese exports to the United States on Mexican manufacturing. These studies show that China has moved beyond low-cost, labor-intensive goods toward more sophisticated, higher-value-added products. As a result, some Mexican regions have struggled to complete the structural transformation required to compete both domestically and globally in complex manufacturing sectors.

Collectively, these studies underscore the urgent need for policies to mitigate regional disparities exacerbated by economic liberalization, FDI concentration, and global competition. Recommended measures include improving infrastructure, strengthening education systems, and expanding workforce training programs—particularly in lagging regions—to equip workers with skills aligned to higher-value-added industries. Such strategies are essential for promoting more balanced and inclusive regional development.

While the broader literature on the Mexican economy is extensive, the studies discussed above are particularly relevant to our research and serve as key references. First, they document persistent disparities in manufacturing performance across regions, consistent with our findings for the 2004–2019 period. Second, they highlight the shift in manufacturing activity away from Mexico City toward northern and central regions—especially the Bajío—a trend our results corroborate. Third, they identify several structural drivers of uneven development, including trade liberalization, changes in industrial policy, FDI flows, and external competition. In this paper, we extend this body of work by focusing on a less explored but critical factor: the type of Manufacturing Industry Groups (MIGs) in which regions specialize, and how the complexity of those activities influences regional manufacturing performance.

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 1. Contribution of manufacturing sector to GDP

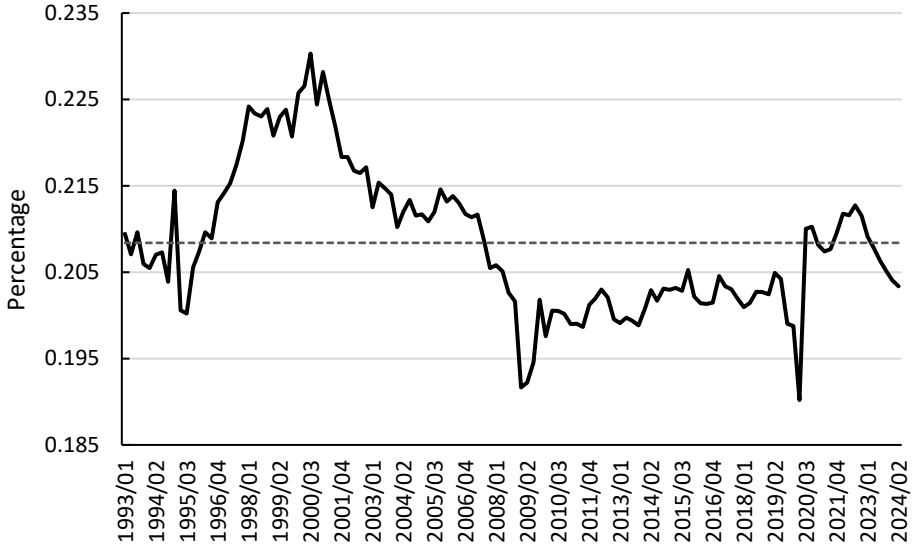


Figure 2 shows the contribution of five regions to Mexico's overall manufacturing output. Generally speaking, the regions are as per those defined by Banco de Mexico, with one addition, the *Bajío* region, which emerged as a significant manufacturing hub during the period analyzed.[3] The timeframes in Figures 1 and 2 differ due to variations in data availability nationally and by state. In Figure 2, all regions except the North are represented on the left-hand axis.

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. 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.

[3] **North (N)**: Baja California, Chihuahua, Coahuila, Nuevo León, Sonora, and Tamaulipas; **Center-North (CN)**: Baja California Sur, Colima, Durango, Jalisco, Michoacán, Nayarit, Sinaloa, and Zacatecas; **Center (C)**: Mexico City, Mexico State, Hidalgo, Morelos, Puebla, and Tlaxcala; **South (S)**: Campeche, Chiapas, Guerrero, Oaxaca, Quintara Roo, Tabasco, Veracruz, and Yucatán; **Bajío (B)**: Aguascalientes, Guanajuato, Querétaro, and San Luis Potosí.

Figure 2. Regional contribution to national manufacturing output

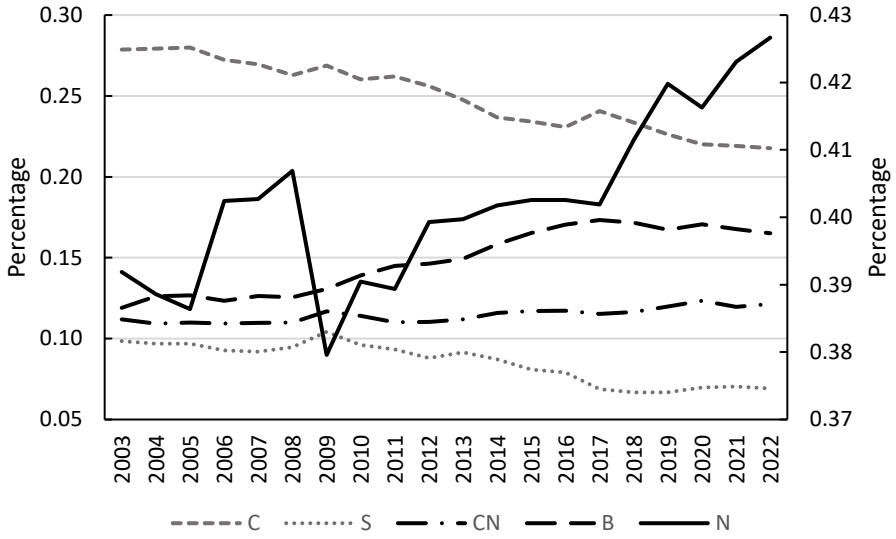


Figure 3 shows the absolute change in Value Added (VA) per MIG.[4] It is very clear that some MIGs perform much better than others. The average increase in VA of the 86 MIGs was 26 billion pesos; 68 MIGs recorded an increase below this mean (only three had relatively small negative values) and 18 above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

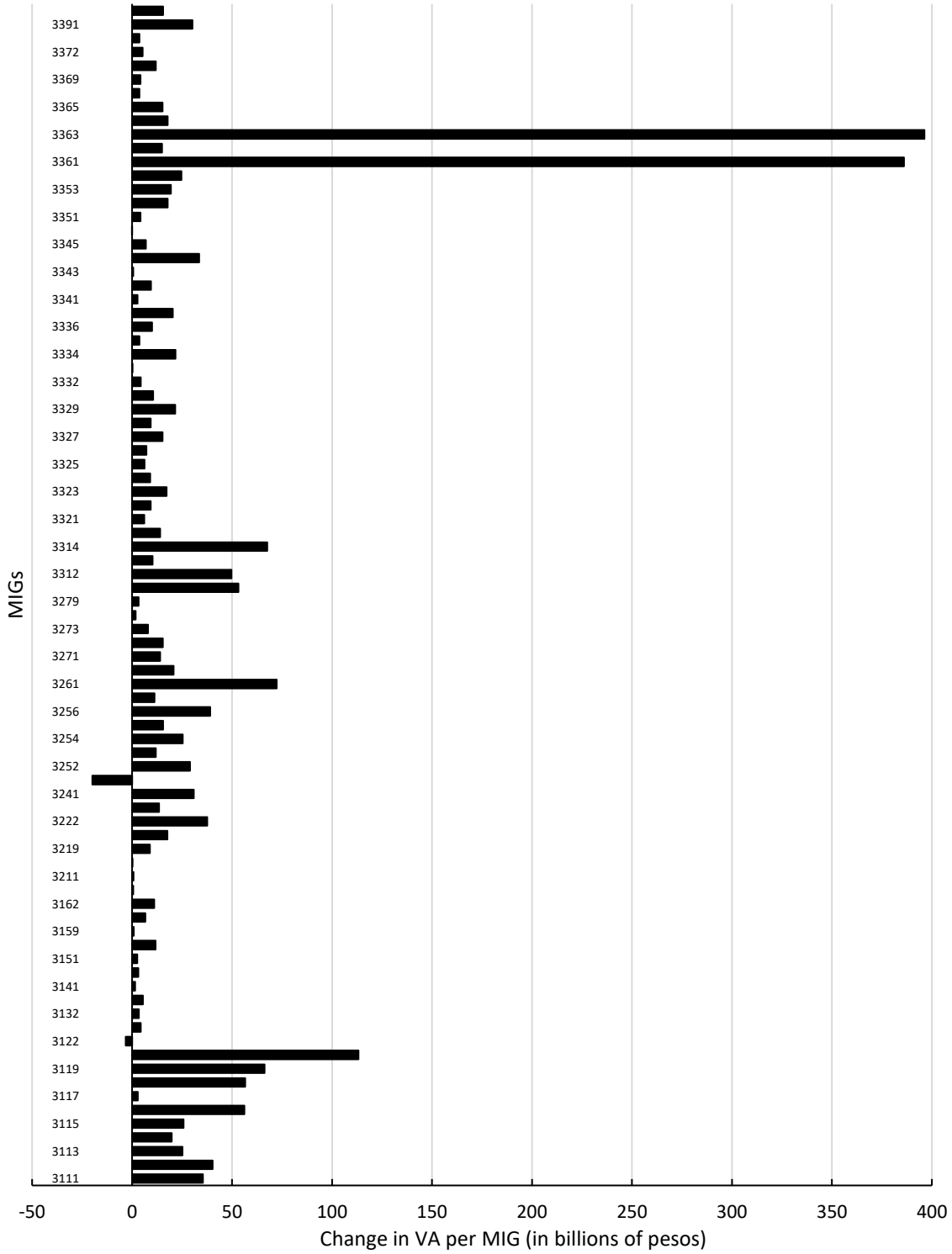
In sum, Mexico's manufacturing sector has exhibited no clear upward or downward trajectory over the past 30 years, but rather cyclical fluctuations around a relatively stable average. Regional development has been uneven: while some regions have gained prominence within the national manufacturing landscape, others have experienced relative decline. A similarly heterogeneous pattern emerges when analyzing output across different Manufacturing Industry Groups (MIGs), with even starker disparities.

To identify the factors underlying these divergent regional outcomes—measured in terms of changes in their share of national manufacturing output—we assess not only the number of MIGs in which municipalities specialize, but also the sophistication of these specializations, as captured by their level of economic complexity.

[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 VA of MIGs, 2004–2019



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):

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[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.

$$k_{m,N} = \frac{1}{k_{m,0}} \sum_{c=1}^{n_c} m_{m,i}^{b} \cdot k_{i,N-1} \quad (3)$$

$$k_{i,N} = \frac{1}{k_{i,0}} \sum_{m=1}^{n_m} m_{m,i}^{b} \cdot k_{m,N-1} \quad (4)$$

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 with a broader base of productive knowledge and capabilities are better equipped to produce a wider variety of goods, resulting in more diverse economies with higher levels of economic complexity. In contrast, more sophisticated MIGs—those associated with the production of higher value-added or technologically advanced goods—are typically concentrated in a smaller subset of municipalities that possess more advanced productive capabilities.

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.

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			

This table 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]

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 increasing regional diversification does not necessarily translate into higher shares of manufacturing output across all regions, it is essential to examine both the quantity and the quality—that is, the level of sophistication or economic complexity—of the MIGs in which each region specializes during the period. Table 2 shows the change in municipal specialization based on the 86 MIGs involved, i.e., the change in the number of municipalities specialized in each MIG between 2004 and 2019 and the economic complexity of each of the latter.

The first row in Table 2, the one that corresponds to MIG 3111, should be interpreted as follow: two municipalities from the North region, ten of the Bajio, five of the Center-North, thirty of the Center and eleven of the South were specialized, in 2019, and were not in 2004, in MIG 3111. This MIG has an economic complexity below the average, -0.3, i.e., it is a relatively low complex MIG. The negative 17 in the second row should be interpreted as follow: 17 municipalities of the North region that were specialized in MIG 3112 in 2004 were no longer specialized in this MIG by 2019.

Table 2. Economic complexity and change in the number of municipalities specialized in each MIG, 2004–2019*

MIG Code	***Region***					***MIG's Economic Complexity***	***MIG Code***	***Region***					***MIG's Economic Complexity***
	N	***B***	***CN***	***C***	***S***			***N***	***B***	***CN***	***C***	***S***	
3111	2	10	5	30	11	-0.3	**3311**	1	0	1	2	3	1.1
3112	-17	2	0	50	32	-0.2	**3312**	6	3	11	23	3	1.0
3113	1	4	46	71	128	-0.8	**3313**	2	9	4	5	-1	1.3
3114	14	10	54	129	114	-0.5	**3314**	11	7	4	8	0	1.0
3115	-21	-2	27	80	163	-1.4	**3315**	2	-5	-11	-11	-15	0.2
3116	54	15	103	115	152	-1.3	**3321**	8	5	5	5	-2	0.6
3117	-3	1	1	0	-10	0.1	**3322**	-3	8	3	18	21	-0.1
3118	15	-12	-28	-18	84	-1.9	**3323**	0	-2	10	5	174	-1.5

[9] Appendix 2 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).

3119	8	1	40	99	114	-0.9	**3324**	6	7	-4	-2	1	0.5
3121	21	11	-1	68	125	-1.2	**3325**	6	3	2	6	0	0.9
3122	-2	0	-5	-5	-3	0.5	**3326**	10	7	18	40	17	0.7
3131	-7	-4	-3	-7	117	-1.8	**3327**	25	6	15	7	10	-0.1
3132	-4	2	3	15	85	0.0	**3328**	14	16	6	20	0	1.0
3133	1	6	11	30	58	0.3	**3329**	4	4	-3	-1	-7	0.1
3141	2	10	25	50	52	-1.8	**3331**	4	4	6	12	0	0.1
3149	-2	-1	7	13	136	-2.1	**3332**	-4	7	5	17	18	0.8
3151	-2	11	19	44	112	-1.2	**3333**	12	6	10	15	3	1.2
3152	-6	-13	-11	-13	103	-1.6	**3334**	8	3	4	11	3	1.0
3159	24	15	71	96	62	-1.2	**3335**	2	5	-2	-2	-10	0.9
3161	-5	-1	0	3	1	-0.8	**3336**	8	1	-3	-4	2	1.4
3162	-2	-1	-25	-14	4	-1.4	**3339**	3	4	3	4	-3	0.6
3169	3	4	-8	11	48	-1.1	**3341**	-6	4	-2	-3	-3	1.6
3211	-1	3	-14	-9	5	-1.1	**3342**	1	0	1	2	4	1.4
3212	-6	5	9	11	1	0.5	**3343**	2	1	5	10	2	1.4
3219	-4	29	52	85	153	-1.5	**3344**	0	5	3	7	3	0.7
3221	3	4	-1	4	-2	0.9	**3345**	9	-1	1	3	1	1.3
3222	21	8	44	68	175	-0.3	**3346**	-1	-2	-1	0	-1	1.9
3231	7	0	12	29	20	0.4	**3351**	3	4	11	11	5	1.2
3241	-7	2	-6	-1	-3	0.8	**3352**	4	1	7	14	6	1.2
3251	-5	2	7	9	7	0.3	**3353**	0	4	10	16	4	0.9
3252	2	5	4	8	0	0.9	**3359**	14	3	0	-1	0	0.9
3253	7	8	23	37	19	0.7	**3361**	0	3	1	7	0	1.3
3254	5	4	17	30	12	0.6	**3362**	13	5	13	31	14	0.0
3255	6	13	4	8	12	0.9	**3363**	6	12	5	10	-3	0.1
3256	26	15	27	70	29	0.6	**3364**	8	4	3	3	-1	1.4
3259	6	0	3	18	37	-0.5	**3365**	9	-1	1	4	1	1.5
3261	11	12	3	19	14	0.1	**3366**	4	-1	5	6	8	0.7
3262	5	5	10	11	6	0.5	**3369**	3	2	6	8	10	1.3
3271	5	-7	8	1	29	-1.3	**3371**	11	-1	-1	4	108	-1.7
3272	4	10	-3	5	-9	0.2	**3372**	3	-6	8		-13	0.0
3273	-6	5	30	11	93	-1.2	**3379**	14	4	25		20	0.7
3274	-23	-1	22	27	12	-0.3	**3391**	8	2	10		-17	0.0
3279	18	7	41	49	27	-0.9	**3399**	-4	3	33		68	-1.4

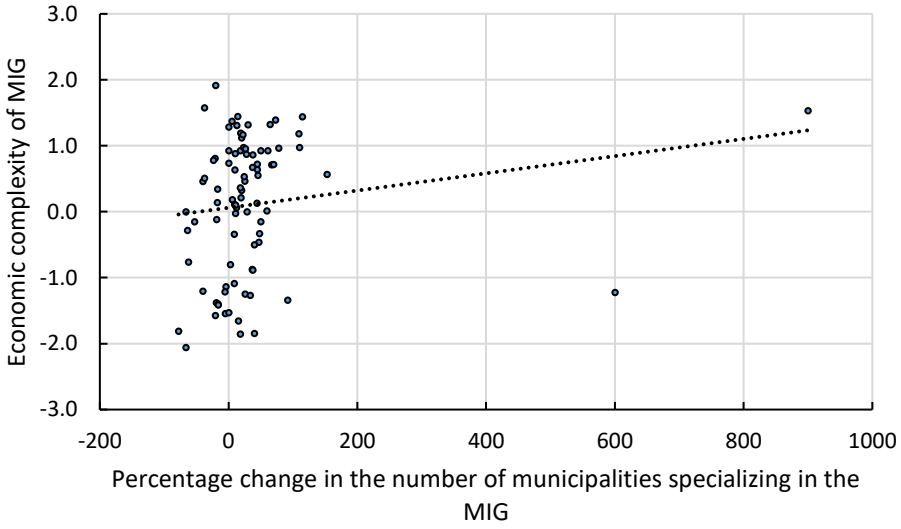
* The economic complexity presented in the table is calculated using 2004 data.

5.3 Relationship between economic complexity and the specialization of municipalities

The information in Table 2 is used to draw scatterplots of the level of sophistication (economic complexity) of the MIGs in which each municipality specializes during the period 2004–2019 and the percentage change in the number of municipalities specializing in each, by region.[10] 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.[11]

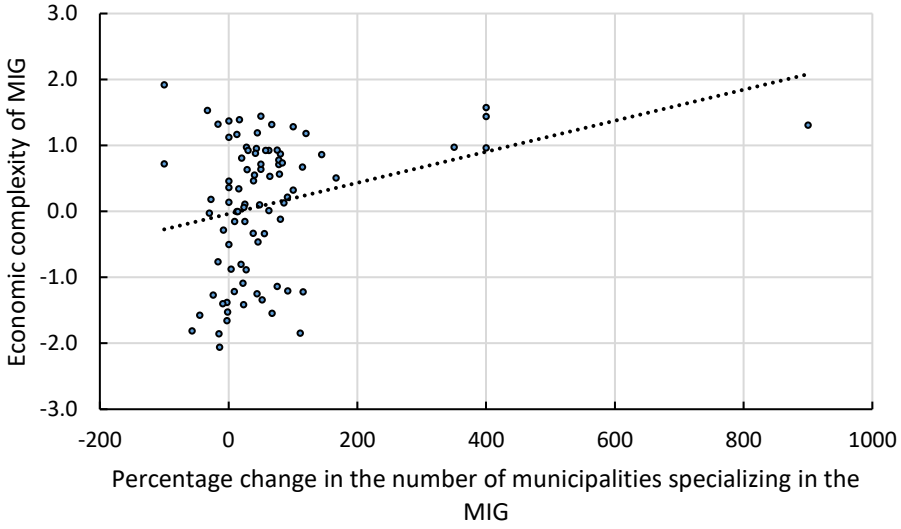
[10] The percentage change is the change in the number of municipalities specializing in each MIG (as shown in Table 2) divided by the number of municipalities specialized in that particular MIG in 2004, multiplied by 100.
[11] Nevertheless, Figures 4-8 are similar if the absolute change is used rather than the relative change.

Figure 4. Quantity and sophistication of MIGs in which municipalities specialize, North region



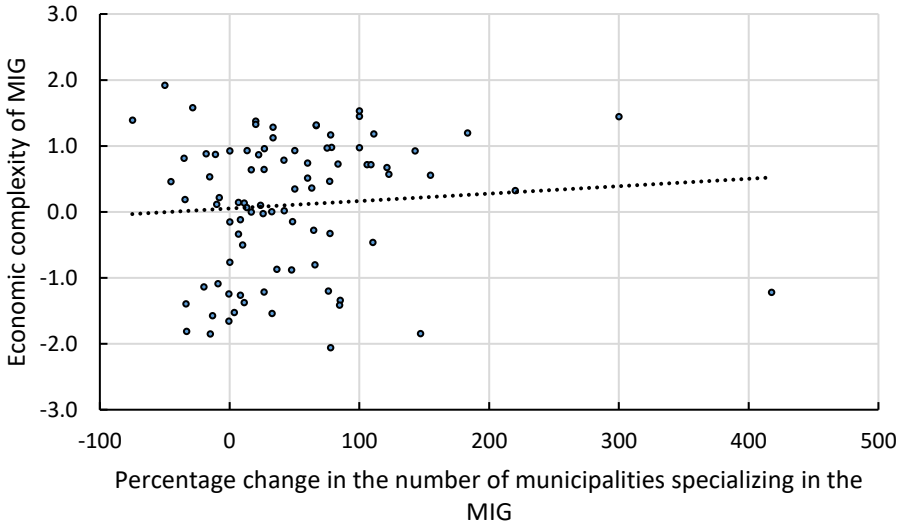
A positive correlation between these two variables suggests that, during this period, a relatively large number of municipalities within the region acquired new productive capabilities, allowing them to specialize in more complex and sophisticated MIGs. Simultaneously, many municipalities shifted away from MIGs characterized by lower levels of economic complexity. According to Figures 4, 5, and 6, this is the scenario for the North, Bajío, and Center-North regions.

Figure 5. Quantity and sophistication of MIGs in which municipalities specialize, Bajío region



These findings align with the literature reviewed, which highlights that municipalities in the North and Bajío regions continued to benefit during the period under analysis. Three main factors help explain this pattern. First, these regions are the primary recipients of foreign direct investment (FDI). As noted by Gómez-Zaldívar *et al.* (2021), their higher levels of economic complexity and industrial diversity make them more attractive to foreign investors, who seek profitable and diversified opportunities in regions specializing in sophisticated economic activities. Second, their advantageous geographic location—particularly their proximity to the United States and Canada—facilitates firm relocation and enhances access to international markets. Third, the presence of superior infrastructure, human capital, and institutional quality enables these regions to sustain and expand more complex manufacturing activities.

Figure 6. Quantity and sophistication of MIGs in which municipalities specialize, Center-North region

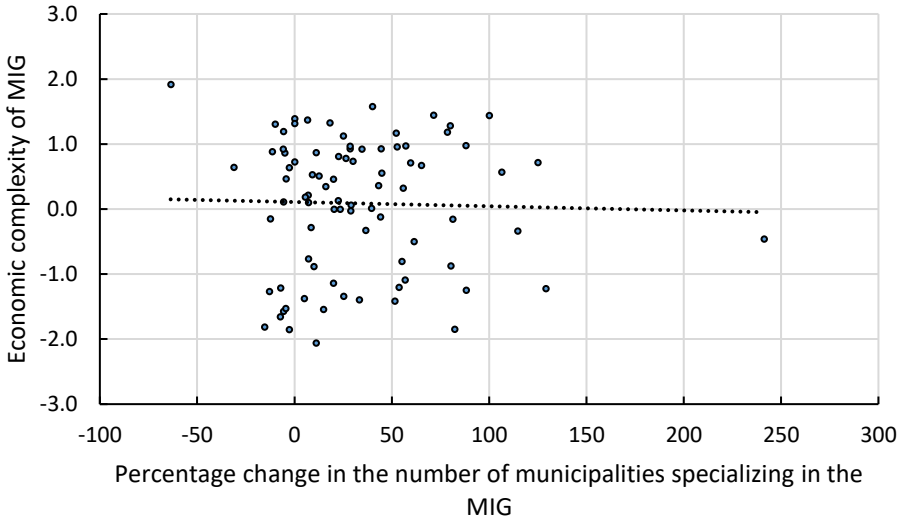


There is significant regional variation in the manufacturing contributions of each state in the Center-North region, though the evidence reveals that the region is finally beginning to gain prominence on a national scale. Jalisco, the only state highlighted in previous studies, leads the way, followed by states that primarily specialize in food manufacturing industries. Although these MIGs may not be the most economically complex, they were among the fastest growing during the period analyzed, as shown in Figure 3, which explains the increase in its contribution to domestic manufacturing output.

Figures 7 and 8 show that there is a negative association between these two variables for the remaining two regions, which implies that the municipalities in each of these tended to specialize in less complex MIGs, while reducing their involvement in more complex or sophisticated MIGs.

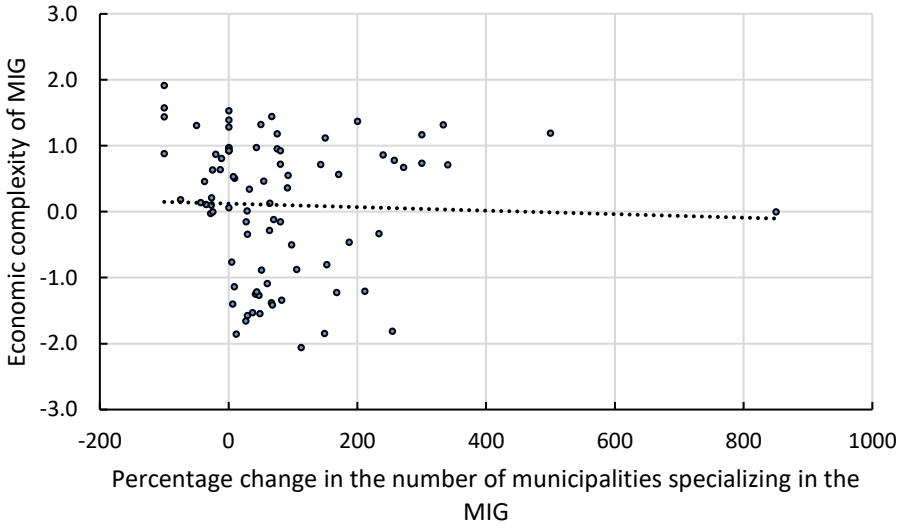
The evidence that all regions experienced an increase in the diversity of their municipalities—with the South region showing the most significant rise—highlights the fact that what truly matters is the quality or economic complexity of the MIGs they specialize in, rather than the sheer quantity.

Figure 7. Quantity and sophistication of MIGs in which municipalities specialize, Center region



The central argument of this study is that understanding the factors driving regional contributions to national manufacturing output requires identifying the shared characteristics of the MIGs in which each region specializes. Our findings indicate that the North, Bajío, and Center-North regions increased their share of manufacturing output during the period by specializing in more complex and higher value-added economic activities. In contrast, the Center and South regions experienced a relative decline, largely due to their continued focus on less sophisticated industries.

Figure 8. Quantity and sophistication of MIGs in which municipalities specialize, South region



6. Final comments

Countries are composed of regions that differ significantly in their economic structures, geographic locations, exposure to global dynamics, and responsiveness to policy decisions. These structural and contextual differences give rise to uneven patterns of regional growth. Mexico is a clear example of this, having exhibited distinct trajectories of regional manufacturing development over time.

An analysis of the evolution of regional manufacturing in Mexico from 2004 to 2019 reveals that the types of Manufacturing Industry Groups (MIGs) in which regions specialize are key to understanding their relative contributions to national manufacturing output. Regions that specialized in more complex and higher value-added industries increased their share of national manufacturing, while those focused on less sophisticated activities saw their share decline.

These findings are consistent with prior research showing that, since the onset of trade liberalization in the mid-1980s, two regions have emerged as the principal beneficiaries: the North—comprising the six U.S. border states of Baja California, Chihuahua, Coahuila, Nuevo León, Sonora, and Tamaulipas—and the Bajío region, which includes Aguascalientes, Guanajuato, Querétaro, and San Luis Potosí. These areas began to grow in prominence just as Mexico City and its surrounding areas began to decline in their contribution to national manufacturing. This shift can be attributed to a set of favorable regional characteristics that

provided a competitive advantage: robust infrastructure, strategic geographic location, a business-friendly environment, and comparatively stronger institutional frameworks, including the rule of law. These regions were also the most industrialized, hosting the most technologically advanced segments of the manufacturing sector. As a result, they became preferred destinations for international investors, offering a broader and more profitable range of investment opportunities—leading in recent years to further acceleration driven by increased foreign direct investment (FDI).

These results offer a crucial foundation for discussions on the future of investment attraction and the promotion of inclusive regional development. In light of ongoing geopolitical and trade shifts, and given the current window of opportunity presented by nearshoring, it becomes increasingly important to identify and prioritize industries whose sophistication not only fosters sustainable development but also helps to reduce regional inequalities. Future research should focus on informing regional productive development strategies by mapping the specific capabilities of each region and identifying which complex manufacturing industries are most feasible to promote in the context of global value chain reconfiguration. Crucially, such analyses must recognize that economic and industrial diversity across regions allows for differentiated yet complementary development opportunities throughout the country.

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Appendix 1. MIGs according to the NAICS

Table A1.1 MIG codes and definitions according to NAICS

Code	MIG definition	Code	MIG definition
3111	Animal Food Manufacturing	3311	Iron and Steel Mills and Ferroalloy Manufacturing
3112	Grain and Oilseed Milling	3312	Steel Product Manufacturing from Purchased Steel
3113	Sugar and Confectionery Product Manufacturing	3313	Alumina and Aluminum Production and Processing
3114	Fruit and Vegetable Preserving and Specialty Food Manufacturing	3314	Nonferrous Metal (except Aluminum) Production and Processing
3115	Dairy Product Manufacturing	3315	Foundries
3116	Animal Slaughtering and Processing	3321	Forging and Stamping
3117	Seafood Product Preparation and Packaging	3322	Cutlery and Handtool Manufacturing
3118	Bakeries and Tortilla Manufacturing	3323	Architectural and Structural Metals Manufacturing
3119	Other Food Manufacturing	3324	Boiler, Tank, and Shipping Container Manufacturing
3121	Beverage Manufacturing	3325	Hardware Manufacturing
3122	Tobacco Manufacturing	3326	Spring and Wire Product Manufacturing
3131	Fiber, Yarn, and Thread Mills	3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
3132	Fabric Mills	3328	Coating, Engraving, Heat Treating, and Allied Activities
3133	Textile and Fabric Finishing and Fabric Coating Mills	3329	Other Fabricated Metal Product Manufacturing
3141	Textile Furnishings Mills	3331	Agriculture, Construction, and Mining Machinery Manufacturing
3149	Other Textile Product Mills	3332	Industrial Machinery Manufacturing
3151	Apparel Knitting Mills	3333	Commercial and Service Industry Machinery Manufacturing
3152	Cut and Sew Apparel Manufacturing	3334	Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing
3159	Apparel Accessories and Other Apparel Manufacturing	3335	Metalworking Machinery Manufacturing
3161	Leather and Hide Tanning and Finishing	3336	Engine, Turbine, and Power Transmission Equipment Manufacturing
3162	Footwear Manufacturing	3339	Other General Purpose Machinery Manufacturing
3169	Other Leather and Allied Product Manufacturing	3341	Computer and Peripheral Equipment Manufacturing
3211	Sawmills and Wood Preservation	3342	Communications Equipment Manufacturing
3212	Veneer, Plywood, and Engineered Wood Product Manufacturing	3343	Audio and Video Equipment Manufacturing
3219	Other Wood Product Manufacturing	3344	Semiconductor and Other Electronic Component Manufacturing
3221	Pulp, Paper, and Paperboard Mills	3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
3222	Converted Paper Product Manufacturing	3346	Manufacturing and Reproducing Magnetic and Optical Media
3231	Printing and Related Support Activities	3351	Electric Lighting Equipment Manufacturing
3241	Petroleum and Coal Products Manufacturing	3352	Household Appliance Manufacturing
3251	Basic Chemical Manufacturing	3353	Electrical Equipment Manufacturing
3252	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	3359	Other Electrical Equipment and Component Manufacturing
3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	3361	Motor Vehicle Manufacturing
3254	Pharmaceutical and Medicine Manufacturing	3362	Motor Vehicle Body and Trailer Manufacturing
3255	Paint, Coating, and Adhesive Manufacturing	3363	Motor Vehicle Parts Manufacturing
3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	3364	Aerospace Product and Parts Manufacturing
3259	Other Chemical Product and Preparation Manufacturing	3365	Railroad Rolling Stock Manufacturing
3261	Plastics Product Manufacturing	3366	Ship and Boat Building
3262	Rubber Product Manufacturing	3369	Other Transportation Equipment Manufacturing
3271	Clay Product and Refractory Manufacturing	3371	Household and Institutional Furniture and Kitchen Cabinet Manufacturing
3272	Glass and Glass Product Manufacturing	3372	Office Furniture (including Fixtures) Manufacturing
3273	Cement and Concrete Product Manufacturing	3379	Other Furniture Related Product Manufacturing
3274	Lime and Gypsum Product Manufacturing	3391	Medical Equipment and Supplies Manufacturing
3279	Other Nonmetallic Mineral Product Manufacturing	3399	Other Miscellaneous Manufacturing

Appendix 2. Regional diversity robustness check

Table A2.1 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 A2.1 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 A2.2 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 A2.2 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 confirms that the pattern of increasing diversity across all regions is robust to variations in the variables and levels of economic aggregation used. Regional rankings based on percentage changes in diversity remain consistent across all three scenarios, with the South region consistently exhibiting the highest increase and the North the lowest. The remaining three regions display similar percentage changes, and their relative positions in the ranking vary slightly depending on the specific variable and level of aggregation applied.