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2026 **Iván Sosa**

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Regional Growth, Internal Migration, and Persistent Inequality in Mexico

Master's Thesis

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Study programme: **M.A. in Economic Research**

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In Prague on January 6th, 2026 Iván Sosa

References

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Abstract

This thesis examines regional income dynamics in Mexico from 1970 to 2019, focusing on whether internal migration and changes in population composition contributed to regional convergence. Despite deep economic transformation and increased trade integration since Mexico's accession to GATT in 1986 and NAFTA in 1994, substantial income differences across states have persisted. Using Gross State Product data, the analysis revisits absolute and conditional convergence and extends the framework with an accounting mechanism linking growth outcomes to internal migration and demographic change. Convergence patterns are reassessed using two alternative data series and extended to the post-2001 period, which includes heightened international competition following China's entry into the World Trade Organization (2001) and the Global Financial Crisis (2008). The results indicate that internal migration primarily operated as a reallocation mechanism, with flows directed toward higher-income and faster-growing states. While migration exerted a moderate convergence effect, this influence was outweighed by other forces shaping regional convergence and divergence, allowing leading regions to expand without substantially improving the relative position of lagging ones. Changes in indigenous-speaking population shares reflect demographic adjustment and mobility, but do not eliminate long-standing structural disadvantages.

Abstrakt

Tato disertační práce zkoumá dynamiku regionálních příjmů v Mexiku v období 1970–2019 se zaměřením na to, zda vnitřní migrace a změny ve složení obyvatelstva přispěly k regionální konvergenci. Navzdory hluboké ekonomické transformaci a rostoucí obchodní integraci od vstupu Mexika do GATT v roce 1986 a do NAFTA v roce 1994 přetrvávají mezi jednotlivými státy výrazné příjmové rozdíly. Na základě dat o hrubém státním produktu analýza znovu hodnotí absolutní a podmíněnou konvergenci a rozšiřuje tento rámec o účetní mechanismus, který propojuje výsledky růstu s vnitřní migrací a demografickými změnami. Vzorce konvergence jsou přehodnoceny pomocí dvou alternativních datových řad a rozšířeny do období po roce 2001, které zahrnuje zesílenou mezinárodní konkurenci po vstupu Číny do Světové obchodní organizace v roce 2001 a globální finanční krizi v roce 2008. Výsledky ukazují, že vnitřní migrace působila především jako mechanismus přerozdělování, přičemž migrační toky směřovaly do států s vyššími příjmy a rychlejším růstem. Ačkoli migrace vykazovala mírný konvergenční efekt, tento vliv byl převážen jinými faktory utvářejícími regionální konvergenci a divergenci, což umožnilo vedoucím regionům růst bez výrazného zlepšení relativní pozice zaostávajících oblastí. Změny v podílech obyvatel hovořících domorodými jazyky odrážejí demografické přizpůsobení a mobilitu, avšak neodstraňují dlouhodobé strukturální nevýhody.

Keywords

Regional convergence, income disparities, trade integration, internal migration, indigenous population, economic growth.

Klíčová slova

Regionální konvergence, příjmové rozdíly, obchodní integrace, vnitřní migrace, domorodé obyvatelstvo, ekonomický růst.

Název práce

Regionální dynamika příjmů, migrace a konvergence v Mexiku (1970–2019)

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I would like to express my gratitude to my colleagues, supervisor, family and friends.

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Section I - Introduction

Over the last five decades, Mexico has experienced deep economic transformation, yet regional income disparities have remained persistent and central to the country's development path. This persistence is not only a matter of uneven growth outcomes, but also reflects how structural change, market integration, and labor reallocation interacted with preexisting regional differences. As Mexico moved from the late stages of the import substitution industrialization (ISI) era toward a more open economic model, growth did not spread evenly across space. Instead, a long-standing divide remained visible, where northern and selected central states grew faster and reached higher income levels than much of the south. This broad picture is consistent with work that links Mexico's long run performance to structural constraints and uneven regional capacity to benefit from openness (Hanson, 2010), and with more recent evidence showing that income gaps across states can remain stable or even widen for long periods rather than mechanically shrinking over time (Germán Soto & Gluschenko, 2023; Spruk, 2021).

This spatial pattern did not appear suddenly. It developed through a sequence of economic events that changed incentives for firms and workers, and therefore, changed where production and jobs expanded. In the 1990s, deeper trade integration strengthened the role of manufacturing and export platforms in the north and in some central corridors. Then, after 2001, a new external shock arrived through product market competition. China's entry into the World Trade Organization (WTO) in 2001 increased competitive pressure in the United States import market, especially in the industries where Mexican export assembly plants were active. Research on Mexican maquiladoras documents strong adjustment pressures and employment effects linked to rising Chinese competition in overlapping product categories (Utar, 2013), and other studies connect post 2000 changes in Mexico's export composition to the China shock period, particularly in labor intensive manufacturing (Castillo & de Vries, 2018). In a regional setting, this matters because the exposure to these shocks was not uniform. Northern border states and manufacturing centers were more directly connected to this trade linked sectors, while southern states were less integrated and remained more dependent on low productivity activities.

The next large shock came through the Global Financial Crisis (GFC). Mexico's tight trade and production linkages with the United States made the collapse in external demand especially important. Policy and macro evidence documents a sharp contraction in exports during 2008 to 2009, reflecting how quickly the external channel transmitted the crisis to Mexico (Sidaoui, 2010). At the regional level, research on the Great Recession shows that output drops differed across states and sectors, with stronger impacts where exposure to external demand, manufacturing, and trade related activity was higher (Mejía, 2015). In other words, the same integration that supported growth in earlier phases also made some leading regions more sensitive to global downturn. This helps explain why regional trajectories in Mexico can show long periods of persistence with episodic re-ranking, rather than a simple convergence story.

As production and demand shocks reshaped regional labor markets, internal mobility became one of the main ways through which households adjusted. Internal migration is often treated as an equalizing force in simple models, but Mexico's experience suggests a more mixed role. Migration responded to opportunity differences and job creation and therefore tended to move toward higher income and faster growing destinations. Evidence for the NAFTA era indicates that trade related changes altered internal migration incentives and that migration responses were not uniform across groups or space (Arends, 2019). If migrants move toward already advantaged places, mobility can support expansion in leading regions while leaving lagging regions with weaker labor markets, lower fiscal capacity, and slower structural change. In this setting, migration is an adjustment mechanism, but it does not guarantee convergence.

These dynamics are especially important when considering Mexico's cultural and linguistic diversity. Indigenous peoples and indigenous language speakers remain more concentrated in poorer and more rural regions, particularly in the south, and this concentration is linked to unequal access to education, infrastructure, and formal labor markets. Policy oriented and empirical work emphasizes that indigenous identity and language are strongly associated with persistent poverty and weaker economic integration, reflecting long standing patterns of exclusion and spatial isolation. These characteristics are not simply demographic. They affect human capital formation, labor market participation, and the ability of households to benefit from economic change. As a result, changes over time in the spatial distribution of indigenous language speakers, including their partial reallocation through migration, interact directly with regional growth outcomes and the persistence of income gaps.

This thesis asks whether internal migration and changes in population composition have acted as forces of regional convergence in Mexico, or whether they primarily reinforced existing regional income differences.

Together, these elements motivate the central question of this thesis. Rather than asking only whether Mexican states converged or diverged, the analysis asks whether internal labor reallocation and changes in population composition helped poorer regions catch up, or whether they mainly worked as reallocation mechanisms that supported already advantaged destinations. The thesis argues that, over the long run Migration in Mexico primarily responded to regional opportunity differences, with flows consistently directed toward states with higher income, stronger job creation, and deeper links to trade-related production. At the same time, these movements exerted a moderate equalizing effect on per-capita income across states, contributing to partial convergence. Mobility therefore helped stabilize labor markets and support growth in leading regions, while generating only limited and incomplete convergence rather than full income equalization. This interpretation fits both the classic evidence on the post liberalization shift in convergence patterns (Chiquiar, 2005) and more recent work emphasizing that Mexican regional income gaps can follow multiple regimes, including persistent divergence for some parts of the country (Soto & Gluschenko, 2023; Mendoza et al., 2019).

To address this question, the thesis combines several empirical approaches. First, it revisits absolute and conditional convergence patterns across Mexican states to assess whether poorer regions tended to grow faster than richer ones once initial conditions and structural characteristics are considered. Second, it incorporates an accounting mechanism that links growth outcomes to internal migration flows and changes in population composition, allowing the analysis to move beyond reduced form convergence regressions. This framework is applied across different historical phases, including the period following Mexico's entry into GATT, the NAFTA era, and the post 2001 environment shaped by increased global competition and macroeconomic shocks. By doing so, the thesis connects standard convergence analysis with migration dynamics in a way that reflects the economic events.

The contribution of the thesis is to revisit these long run dynamics using an empirical strategy that both replicates and extends earlier work. The analysis combines absolute and conditional convergence regressions with an accounting-based decomposition that links migration flows and changes in population composition to observed growth outcomes. First, the thesis revisits the convergence framework associated with Chiquiar (2005) using two alternative Gross State Product series. This choice is important because long-term conclusions can be sensitive to how state output is constructed, linked across revisions, and made comparable over time. By explicitly checking robustness across two series, the thesis treats measurement as an empirical question rather than an assumption, strengthening confidence in the interpretation of long run regional trends.

Second, the thesis extends the analysis beyond the traditional endpoints used in earlier studies by incorporating the period from 2001 to 2019. This extension is not only a mechanical update. It captures a phase where Mexico faced the China WTO competition shock, followed later by the Global Financial Crisis, while still operating as a mature open economy with strong regional specialization. Studying this period allows the analysis to assess whether the convergence breakdown identified in earlier decades persisted, became stronger, or showed signs of stabilization, and whether these changes align with shifts in external conditions that affected export linked regions more than others (Utar, 2013; Castillo & de Vries, 2018; Mejía, 2015).

Third, the study integrates internal migration flows and indigenous speaking population shares shifts directly into the regional growth narrative. Instead of treating these variables as secondary controls, the analysis views them as key mechanisms through which regional labor markets adjust and population composition changes over time. This integrated perspective is consistent with evidence that migration responds to economic incentives and that trade and external shocks can reshape internal mobility patterns (Arends, 2019), while also recognizing that historical disadvantages linked to indigenous identity and language can limit the equalizing effects of mobility.

Overall, the thesis offers a clear interpretation of Mexico's regional development since the 1970s. It argues that regional inequality persists not because mobility is absent, but because mobility operates within unequal structural conditions and in an economy repeatedly shaped by large external and macro shocks. Migration reallocates labor toward higher-productivity regions and supports growth there, while lagging regions experience population outflows and slower structural change. At the same time, these movements generate a moderate equalizing effect on per-capita GSP across states, contributing to partial (though far from complete) convergence. simultaneously, the gradual reduction and redistribution of indigenous language concentration across space does not automatically lead to convergence, because basic constraints in human capital and local opportunity remain. By revisiting an established convergence framework with two GSP series, extending the analysis from 2001 to 2019, and linking migration and indigenous speaking dynamics to growth outcomes, this thesis provides an updated and well-grounded explanation of why regional inequality in Mexico has been so persistent.

Section II – Literature Review

This section reviews the evolution of the empirical literature on regional income convergence in Mexico, with an emphasis on how methodological choices, historical context, and structural change have shaped the evidence over time. Section 2.1 summarizes early cross-sectional and panel studies conducted prior to and around the mid-1980s, which focus on absolute and conditional convergence using aggregate growth regressions. Section 2.2 examines the openness-oriented literature that emerged after trade liberalization and NAFTA, documenting how regional outcomes diverged as states differed in their exposure to external markets. Section 2.3 discusses stochastic-convergence and structural-break approaches, which highlight the instability of long-run convergence paths across major economic regimes. Section 2.4 reviews club-convergence and nonlinear models that identify persistent regional groupings rather than a single steady state, while Section 2.5 surveys spatial-econometric contributions that emphasize geographic spillovers and localized dependence. Taken together, this literature documents persistent regional inequality and a weakening of convergence after the mid-1980s, while leaving the role of internal migration and demographic adjustment largely unexplored.

Section 2.1 Early Cross-Sectional and Panel Convergence Studies (1994–2001)

Over the past several decades, a large empirical literature has examined regional income convergence in Mexico. Early studies primarily relied on β-convergence frameworks, which assess whether poorer states tend to grow faster than richer ones. Within this approach, absolute β convergence tests whether incomes converge unconditionally toward a common steady state, while conditional β convergence allows steady states to differ across regions once structural characteristics are controlled for. Many contributions also report σ convergence, which measures whether the dispersion of income across regions declines over time.

Using these frameworks, the earliest cross-sectional studies documented mixed evidence on regional convergence. Mallick and Carayannis (1994), for example, employed multi-sector output data for the periods 1970–1980 and 1980–1985 and found a shift from convergence to divergence across states. Juan Ramón and Rivera-Batiz (1996), analyzing data from 1970 to 1993, identified a structural break around the mid-1980s, after which regional divergence became more pronounced. Esquivel (1999), using Gross State Product (GSP) data for 1940–1995, reported convergence across most subperiods but emphasized a substantial weakening after 1960, and especially after 1980. Cermeño (2001) applied dynamic panel models with bias correction to data from 1970 to 1995 and found evidence of convergence across different samples, though his conclusions were largely methodological in nature.

Taken together, these studies provide evidence of regional catch-up prior to the major structural reforms of the mid-1980s, followed by a marked weakening of convergence thereafter. Because most analyses were conducted before the full implementation of trade liberalization, they offered limited economic interpretation of the forces driving this shift. Nevertheless, the period under study coincided with major institutional and policy changes—including Mexico's accession to the General Agreement on Tariffs and Trade (GATT) in 1986, the debt renegotiation and stabilization programs of the late 1980s, large-scale privatizations, financial liberalization in the early 1990s, the ratification of NAFTA in 1994, and the Tequila Crisis—which fundamentally altered the country's economic structure and likely shaped the regional convergence patterns documented in this literature.

Section 2.2 Trade Liberalization, NAFTA, and Openness-Oriented Literature (1997–2019)

As Mexico entered a phase of trade liberalization, the literature shifted toward examining the regional effects of openness, foreign direct investment, and export-oriented growth. A central question in this strand of research is whether integration into global markets reinforced existing regional disparities or generated spillovers capable of supporting convergence.

Feenstra and Hanson (1997), using regional data on foreign manufacturing facilities for the period 1975 to 1988, show that foreign investment increased nonproduction sector wage shares, particularly in regions more exposed to international capital flows. Sánchez and Rodríguez (2002) analyze regional convergence in per capita GDP growth from 1970 to 1998 and find that economic liberalization, first under GATT and later under NAFTA, intensified the North South divide, with the strongest gains concentrated in border states. Esquivel and Rodríguez (2003), applying a mandated wage framework to manufacturing data from 1988 to 2002, conclude that technological change widened skill premia, while trade reforms modestly reduced inequality in the pre-NAFTA period.

Messmacher (2000) combines measures of beta convergence, which assess whether poorer states grow faster than richer ones, with sigma convergence, which examines whether the dispersion of income levels across states declines over time, and complements this analysis with a sectoral decomposition. He finds limited evidence of convergence, alongside indications that post 1980s reforms and NAFTA reinforced preexisting regional differences. Chiquiar (2005), using cross sectional GDP data for benchmark years between 1970 and 2001, argues that convergence broke down after 1985 because more developed states were better positioned to capture the gains from trade openness, while spillovers toward southern regions remained limited. Aroca, Bosch, and Maloney (2005), applying spatial econometric techniques to state level data for 1985 to 2002, attribute post liberalization divergence primarily to the persistent underperformance of southern states, with only weak evidence of a border driven growth advantage.

Subsequent studies present a heterogeneous and, at times, contrasting set of results that depend on the period, level of aggregation, and empirical approach. Calderón Villarreal and Tykhonenko (2007), using a Bayesian panel model for the period 1994 to 2002, find that convergence speeds differ substantially across regions, with southern states converging faster and richer northern states converging more slowly. By contrast, Fonseca et al. (2018), analyzing GSP per capita from 1994 to 2015, reports rising regional divergence and weak conditional convergence at the state level. Díaz et al. (2017, 2019), using municipal and state level data for 1980 to 2010, find evidence of faster convergence near the United States border alongside widening income gaps in southern regions. Taken together, these findings suggest that convergence patterns are highly sensitive to the time horizon and spatial scale considered, and that localized catch up in some regions can coexist with broader divergence across the national income distribution during the liberalization period.

Although this literature convincingly links trade liberalization to widening regional gaps, most contributions interpret divergence as a productivity or specialization outcome and implicitly treat population as fixed. As a result, little attention is paid to how expanding labor opportunities reshaped population movements across states and how such reallocation influenced observed income dynamics during the liberalization period.

Section 2.3 Stochastic Convergence and Structural-Break Approaches (2007–2016)

Beginning in the late 2000s, researchers increasingly adopted stochastic convergence tests to examine regional income dynamics from a time series perspective. Unlike the standard notion of convergence used in cross sectional growth regressions, which focuses on whether poorer regions grow faster than richer ones over a given period, stochastic convergence assesses whether regional income differences are temporary or permanent by testing whether state level income series share common long run stochastic trends. In this framework, convergence is present if deviations between regions are mean reverting or stationery once trends and structural changes are considered, even if short run growth rates differ.

Carrion-i-Silvestre and Soto (2007, 2009, 2010), in a series of studies using panel stationarity and unit root tests on GDP data for periods ranging from 1940 to 2003, show that standard tests often reject convergence. However, once cross section dependence and multiple structural breaks are incorporated, evidence of stochastic convergence becomes substantially stronger. Gómez and Ventosa (2010) demonstrate, using Dickey Fuller tests on Mexican GDP data for 1940 to 2001, that conclusions about convergence depend critically on whether deterministic trends are included. Their later application to state level data for 1955 to 2003 reaches similar conclusions, with several apparent divergence cases disappearing once trends are properly modeled.

Soto and Chapa (2015) apply unit root and cointegration tests with structural breaks to per capita GDP and inequality data for 1963 to 2010 and find a negative long run relationship that weakens after the breakpoints of the 1980s. Soto and Salazar (2016) examine stochastic convergence using polynomial regression techniques and show that convergence results depend strongly on the order of the trend specification, with several states failing to share a common long term path once nonlinear trends are considered.

Taken together, this literature highlights that convergence is not a stable or monotonic process but one that responds to major economic shocks and regime changes, including the macroeconomic crises of the 1980s, trade and financial liberalization, the implementation of NAFTA, and the growth deceleration observed since the early 2000s. While these econometric approaches are effective at detecting structural breaks and shifts in long run behavior, they devote relatively limited attention to the economic mechanisms that generate these transitions. In particular, the channels through which mobility, production structure, and regional adjustment interact with these breaks are often left implicit.

Section 2.4 Club-Convergence and Nonlinear Dynamics (2016–2022)

More recent research has focused on the possibility that Mexican regions do not converge toward a single steady state but instead form distinct convergence clubs. Rodríguez et al. (2016) use threshold panel models with GDP data for 1960 to 2010 and find evidence of partial and absolute convergence only among higher income states. Mendoza et al. (2019), using long run GSP inequality data for 1940 to 2010, document divergent inequality trends in roughly one third of states, with structural breaks linked to historical episodes such as the Mexican Miracle and the oil and debt crisis.

Castellanos (2020) analyzes labor productivity convergence using state sector data for 1999 to 2014 within an absolute beta convergence framework, where convergence is assessed by testing whether initially less productive regions experience faster productivity growth. He finds that productivity dynamics form distinct regional clubs, with the global financial crisis pushing many sectors toward stronger catch up. Mendoza et al. (2020) apply the Phillips Sul club convergence method to GDP data for 1940 to 2015 and identify two income clubs and two inequality clubs, indicating persistent long run segmentation across states. Rodríguez et al. (2022) examine sigma convergence, defined as changes over time in the dispersion of income levels across regions, for the period 1990 to 2018 and conclude that Mexico follows multiple long run trajectories rather than converging toward a single steady state, with divergence emerging after trade liberalization.

Overall, this literature emphasizes that regional outcomes in Mexico reflect multiple long run paths shaped by historical shocks, structural breaks, and sectoral heterogeneity. However, most club convergence studies treat club membership as an outcome rather than as the result of an underlying adjustment process. By contrast, this thesis interprets regional persistence as the joint outcome of structural characteristics and selective mobility, allowing migration and ethnic composition to influence which regions converge, stagnate, or diverge over time.

Section 2.5 Spatial-Econometric Literature (2011–2024)

A related strand of research applies spatial econometric methods to study regional growth and inequality in Mexico. Soto and Escobedo (2011) estimate spatial lag and spatial error models together with beta convergence tests, which evaluate whether poorer regions grow faster than richer ones, and sigma convergence measures, which track whether income dispersion across regions narrows over time, using annual GSP per capita data for 1940 to 2005. They find that trade liberalization weakened convergence and reinforced a persistent low-income cluster in the South through spatial spillovers. Valdez (2019) employs a Spatial Durbin Model on municipal data for 1988 to 2013 and shows that growth spillovers decay rapidly with distance and are insufficient to eliminate entrenched regional disparities.

Rodríguez and Cabrera (2020) analyze municipal income data for 1989 to 2014 using convergence tests and spatial diagnostics, documenting persistent divergence and clear income-based convergence clubs. Trejo (2021) studies GSP per capita and employment data for 1940 to 2013 and shows that regional inequality follows a long run U shaped pattern, declining during major recessions and widening during periods of liberalization. More recent contributions include Simionescu and Cifuentes (2023), who analyze state public debt for 2006 to 2021 and find strong spatial clustering and persistent divergence, and Méndez and Mendoza (2024), who document sigma convergence and conditional beta convergence, where growth differences are evaluated after controlling for structural characteristics, in the Mexico United States border region for the period 2010 to 2019. Their results suggest that spatial spillovers support catch up, although human capital gaps limit full convergence.

Overall, the spatial literature highlights how geography, localized spillovers, and structural asymmetries shape regional outcomes in Mexico. However, many studies emphasize spatial dependence over deeper economic interpretation, leaving the mechanisms behind these geographic patterns only partially explored.

One important dimension that remains largely absent from the convergence literature is the role of internal mobility and ethnic heterogeneity. Mexico exhibits large and persistent internal migration flows, particularly from rural to urban areas and from the southern regions toward the center and the north, alongside a strong geographic concentration of indigenous populations. These features have direct implications for labor supply, wages, productivity, and local demand, and therefore for regional growth dynamics. From an economic perspective, migration can act as an adjustment mechanism by reallocating labor toward higher-productivity regions and reducing wage differentials, while linguistic, cultural, or ethnic barriers may slow this process and limit spillovers. Because most convergence studies focus exclusively on income or productivity outcomes, they do not capture how population movements and ethnic composition interact with growth.

As a result, the existing literature provides only a partial explanation for the persistence of regional disparities. By incorporating migration and indigenous population shares, Sections 4 and 5 extend the existing literature toward a more complete account of the mechanisms shaping regional divergence and persistence in Mexico. Overall, the literature documents persistent regional inequality and a weakening of convergence after the mid-1980s offers mixed evidence on whether divergence is structural or fragile. The following sections revisit the convergence debate using updated data and explicitly incorporate migration as an adjustment mechanism.

Section III - Revisiting Chiquiar with Alternative GSP Series (1970, 1985, 2001)

In this section, I rebuild the per capita GSP series and replicate the main results from Chiquiar (2005). A central motivation for the analysis is that I work with two different GDP series, each serving a distinct purpose.

First, I construct an original GDP series that reproduces Chiquiar's values as closely as possible and extends them back to 1970. This version is used for replication, allowing differences in results to be attributed to estimation choices rather than discrepancies in the underlying data.

Second, I use an updated GDP series with a 2018 price base, retrieved from the Mexican statistics office (INEGI). This dataset does not replicate Chiquiar's numbers; instead, it reflects modern national accounts methodology and provides a dataset that is fully comparable to the next section of the thesis. Using both series, therefore, distinguishes between results that depend on the original measurement framework and those that remain robust under updated deflators, sector weights, and base years.

To clarify these distinctions, all tables in this section present two parallel panels: the left panel reports results using the original (Chiquiar-based) GDP series, while the right panel uses the updated INEGI 2018-based series. This structure separates the roles of data construction, estimation, and control-set choices.

For both absolute and conditional convergence exercises, the narrative follows the major trade-liberalization periods relevant to the Mexican growth story: 1970 to 1985 (pre-GATT), 1985 to 1993 (early GATT integration), and 1993 to 2001 (initial NAFTA period).

Section 3.1 Per capita GDP by state – Replication

As motivation before doing the convergence regressions, I need to understand how income levels evolve across states and how each data construction behaves. Table 1 helps determine whether the two GDP series convey the same message and if there are any differences in levels or growth rates. The table originally reported by the author can be found in the appendix 1.

Table 1. Per-Capita GDP by State: Index Levels and Growth Rates – Original GDP Vs. Updated GDP

	Original GDP (i)								Updated GDP (ii)						
Federal Entity	**Per capita GDP (nat.=100.0)**				**Annual per capita growth (%)**				**Per capita GDP (nat.=100.0)**				**Annual per capita growth (%)**		
	1970	1985	1993	2001	1970 1985	1985 2001	1985 1993	1993 2001	1980	1985	1993	2001	1985 2001	1985 1993	1993 2001
National	100.00	100.00	100.00	100.00	1.82	1.15	0.77	1.53	100.00	100.00	100.00	100.00	0.93	0.29	1.57
Border	128.69	125.30	129.42	135.24	1.64	1.63	1.18	2.09	145.62	144.88	141.24	148.26	1.07	-0.03	2.18
Baja California Norte	144.96	129.88	126.84	123.87	1.08	0.85	0.47	1.23	229.99	211.64	179.59	171.04	-0.40	-1.77	0.96
Coahuila	120.06	120.35	120.76	129.69	1.84	1.62	0.81	2.44	158.37	154.62	148.88	164.90	1.33	-0.19	2.85
Chihuahua	101.16	102.16	128.61	138.12	1.89	3.07	3.71	2.44	101.18	102.23	100.24	105.78	1.14	0.04	2.24
Nuevo León	166.46	164.67	166.02	173.21	1.75	1.47	0.87	2.07	168.35	169.61	172.33	182.19	1.38	0.49	2.27
Sonora	138.42	119.50	114.95	123.55	0.83	1.36	0.28	2.45	139.36	138.71	138.91	149.22	1.39	0.30	2.47
Tamaulipas	104.73	102.84	100.84	103.98	1.70	1.22	0.52	1.92	106.11	109.33	108.20	112.62	1.11	0.16	2.07
Northern central	72.55	79.03	79.64	81.04	2.41	1.31	0.86	1.75	79.55	80.68	83.53	82.89	1.10	0.72	1.48
Aguascalientes	79.45	85.59	105.53	122.21	2.33	3.42	3.44	3.41	97.02	93.78	95.09	101.22	1.41	0.46	2.35
Baja California Sur	138.66	117.76	132.46	126.82	0.72	1.62	2.26	0.98	170.01	158.36	138.56	133.13	-0.16	-1.38	1.07
Durango	71.51	90.18	80.84	85.34	3.41	0.80	-0.60	2.22	78.49	79.38	80.80	86.89	1.49	0.51	2.48
Nayarit	75.84	79.58	66.22	61.76	2.15	-0.44	-1.52	0.65	73.18	76.03	83.01	75.35	0.87	1.39	0.36
San Luis Potosí	58.38	70.18	72.62	72.85	3.08	1.38	1.20	1.57	74.25	74.23	76.92	77.12	1.17	0.73	1.60
Sinaloa	93.57	84.58	86.77	80.74	1.14	0.85	1.09	0.62	94.43	95.31	95.88	87.85	0.42	0.36	0.48
Zacatecas	51.43	59.44	55.69	56.44	2.81	0.82	-0.05	1.70	44.41	47.61	54.41	55.22	1.86	1.96	1.76
Southern central	74.86	78.76	72.94	72.93	2.17	0.66	-0.20	1.53	85.14	85.20	84.90	84.57	0.88	0.24	1.52
Colima	85.55	107.88	103.45	95.04	3.41	0.35	0.24	0.46	124.26	127.05	123.85	117.19	0.42	-0.03	0.88
Guanajuato	71.21	70.76	69.10	68.56	1.78	0.95	0.47	1.43	82.09	79.86	77.44	81.38	1.05	-0.10	2.19
Hidalgo	53.85	69.31	64.98	60.27	3.55	0.27	-0.04	0.58	91.60	92.07	95.63	85.98	0.50	0.76	0.24
Jalisco	103.77	106.50	100.18	98.69	2.00	0.67	0.00	1.34	117.00	117.11	114.94	112.74	0.69	0.05	1.33
Michoacán	52.43	55.75	54.49	56.71	2.24	1.26	0.48	2.04	59.83	61.32	59.76	64.14	1.21	-0.04	2.46
Morelos	84.10	86.06	96.80	91.23	1.98	1.52	2.26	0.78	93.09	90.47	86.51	80.37	0.19	-0.27	0.65
Puebla	61.97	67.65	63.64	65.46	2.42	0.94	0.00	1.89	61.10	60.92	60.17	64.89	1.32	0.13	2.52
Querétaro	79.05	109.04	104.72	117.66	4.03	1.63	0.26	3.02	160.84	148.49	142.07	149.29	0.96	-0.27	2.19
Tlaxcala	45.62	75.60	52.99	55.90	5.31	-0.74	-3.61	2.21	75.44	71.62	67.16	68.64	0.66	-0.52	1.84
Veracruz	81.23	75.52	60.79	57.83	1.33	-0.53	-1.93	0.90	74.53	76.83	80.45	73.98	0.69	0.86	0.52
Capital	162.12	143.91	154.18	151.30	1.02	1.47	1.64	1.29	114.16	117.14	122.09	118.91	1.02	0.80	1.24
Distrito Federal	192.35	189.16	248.43	254.56	1.71	3.04	4.26	1.84	138.58	153.96	185.15	195.04	2.41	2.59	2.22
México	107.89	99.13	82.49	79.42	1.25	-0.24	-1.52	1.05	84.93	79.89	73.21	69.40	0.05	-0.80	0.90
South	48.73	62.64	60.12	57.79	3.54	0.64	0.25	1.03	72.44	68.50	64.93	60.02	0.10	-0.38	0.59
Chiapas	49.22	68.98	45.35	42.50	4.14	-1.87	-4.38	0.71	63.60	57.45	52.36	45.29	-0.56	-0.87	-0.24
Guerrero	51.66	56.98	58.36	52.02	2.49	0.57	1.07	0.08	60.77	58.76	54.52	48.67	-0.25	-0.65	0.15
Oaxaca	35.24	50.89	46.07	42.32	4.35	-0.01	-0.48	0.46	67.64	66.13	65.20	60.11	0.33	0.11	0.56
Quintana Roo	97.97	117.59	183.34	150.79	3.07	2.73	6.52	-0.92	286.53	200.13	150.62	122.15	-2.16	-3.27	-1.05
Yucatán	71.49	70.93	76.72	79.92	1.77	1.90	1.76	2.05	81.16	80.19	78.68	81.95	1.07	0.05	2.08

Source: (i) INEGI Current-Price GDP by State (Economic Indicators Bank, Series Discontinued), divided by *CONAPO* Demographic Reconciliation population and recalibrated to Chiquiar's population proxy; log growth rates were taken between benchmark years; (ii) INEGI – 2018 price base GDP per state series.

Table 1 compares each state's per capita GDP with the national average, expressed as indices. The table has two panels. The left panel reconstructs per capita GDP from 1970 to 2001 using a population-weighted index that maintains comparable levels over time. The right panel reports the official series under INEGI's updated GDP starting in 1980. In both panels, I exclude Campeche and Tabasco to match the classic sample in the literature.

The resulting original GDP series differs from that reported in Chiquiar (Table A.1) for two main reasons. First, the present reconstruction relies on updated state-level national accounts and revised deflators that were not available at the time of Chiquiar's study, leading to small but systematic differences in per-capita income levels across states. Second, population figures are harmonized to ensure internal consistency between GDP levels and the population concept implicit in Chiquiar's per-capita income measures, rather than mechanically replicating the original census-based series. Despite these differences, the reconstruction preserves the relative ranking of states and closely matches the cross-sectional distribution of income reported by the author. Among the alternative constructions considered, this approach delivers the closest fit to Chiquiar's reported levels while ensuring consistency with updated data sources and the subsequent growth calculations used in this thesis.

For the original GDP series shown in the left panel, I use current-price Gross State Product data from the INEGI Economic Indicators Bank and construct state-level per-capita income only for the base year 1970 by dividing output by population from CONAPO's Demographic Reconciliation series. These population data are also used to compute population-weighted national aggregates, so that the national benchmark corresponds to total national income divided by total national population rather than a simple average across states.

For subsequent benchmark years, state per-capita income levels are reconstructed by chaining Chiquiar's reported state-level growth rates forward from the 1970 anchor. Specifically, let y_s^{1970} denote observed per-capita income in 1970. Using Chiquiar's annual growth rates reported in Table A.1, state income levels are rebuilt as:

$$y_s^{1985} = y_s^{1970}(1 + g_{s,Ch}^{70,85})^{15}, y_s^{1993} = y_s^{1985}(1 + g_{s,Ch}^{85,93})^{8}, y_s^{2001} = y_s^{1993}(1 + g_{s,Ch}^{93,01})^{8}.$$

In each benchmark year $Y \in \{1970, 1985, 1993, 2001\}$, national per-capita income is then obtained as the population-weighted average of these (observed or reconstructed) state-level incomes:

$$y_{\text{nat}}^Y = \sum_s \omega_s^Y\, y_s^Y, \omega_s^Y = \frac{\text{Pop}_s^Y}{\sum_j \text{Pop}_j^Y}.$$

Each state's per-capita income is expressed as a normalized index by dividing by the national benchmark in the same year,

$$I_s^Y = 100 \times \frac{y_s^Y}{y_{\text{nat}}^Y},$$

so that the national index equals one hundred by construction and the population-weighted average of state indices equals one hundred in each benchmark year up to rounding.

State growth is summarized in two complementary ways. First, changes in I_s^Y capture relative performance across benchmark years. Second, the table reports growth rates $g_s^{(A\,,\,B)}$from Table A1. The value of $g_s^{(85-01)}$ is computed as $\left(y_s^{2001}/y_s^{1985}\right)^{1/15}-1$, and may differ slightly from Table A1 due to rounding.

with $T = 15$ for 1970–1985, $T = 8$ for 1985–1993 and 1993–2001, and $T = 16$ for 1985–2001.

As main takeaways of the left panel, the Border and Northern-Central regions in the overall picture look like Chiquiar's. The Border has great growth performance, especially between 1993 to 2001 due to NAFTA, The northern-central aggregate shows mild catch-up, and individual state paths follow the classic pattern: Aguascalientes improves strongly after 1985, San Luis Potosí also gains ground, Durango rises until the mid-1980s before slowing and later recovering, while Nayarit and Sinaloa decline, and Zacatecas remain among the lowest performers.

In the Southern-Central region, performance is more mixed. Querétaro experiences a sharp improvement after 1985; Colima starts above the national average but slows; Jalisco slips slightly from its initial level; Puebla stays close to the national index; Michoacán recovers from a low starting point; and Hidalgo and Veracruz show marked declines. Tlaxcala's rise began before 1985, declined in the early 1990s, and only partially rebounded afterward.

In the Capital region, Mexico City continues to outperform other states but still trends downward, but it maintains a stronger position rather the State of Mexico which gradually loses some ground.

In the South, the region remains the poorest throughout the period. The aggregate improves before 1985 but weakens after. Chiapas falls sharply, Guerrero makes little net progress, and Oaxaca improves early and then slows. Yucatán rises by 2001, and Quintana Roo becomes a clear outlier thanks to rapid tourism-driven growth in the 1990s.

For the "updated GDP" shown in the right panel, I use INEGI's updated 2018 price base per state. The series begins in 1980, so I cannot compare it with the 1970 data. I divided the values by CONAPO population and normalized them to keep the national index at one hundred each year. I compute growth over the same windows as log differences of state per-capita GDP in levels. When reporting growth implied by the normalized index, I recover level growth by adding back national per-capita GDP growth, since log differences of the index capture only growth relative to the national average. As explained in the introductory paragraph of this section, the updated series serves as the backbone for all subsequent figures and regressions. The left panel provides a comparable bridge back to 1970 that is consistent with the existing literature.

Regarding the right panel takeaways, the Border and Northern-Central regions for the updated series show clear dominance after trade liberalization. These regions display sustained increases in relative income and repeatedly outpace the national average. Their growth paths strengthen the long-run pattern of northern leadership.

In the Southern-Central region, outcomes are more stable. Most states maintain their relative positions, with neither major state catching up nor experiencing large declines. The region holds steady growth, showing a moderate performance rather than strong divergence in either direction.

In the Capital region, the pattern is again mixed but more stable than in the left panel. Mexico City remains high in the distribution, the Federal District stays relatively strong, and the State of Mexico shifts downward relative to the national trend.

In the South, the states fall further behind when measured with the updated base. Growth is weak, and several states lose relative ground over time. While a few cases show moderate improvement, the region diverges from the national average, reinforcing the long-standing north–south gap.

Although both panels stem from INEGI's GDP by state, the updated series differ from the original series mainly due to shifts in base-year benchmarking, deflator adjustments, chain-linking adjustments, and state-output allocation revisions.

Beyond preserving state rankings, the comparison between the original and updated GDP series highlights that measured income gaps are sensitive to deflator choices and benchmarking. This matters for convergence analysis, because convergence depends not only on relative ordering but on the magnitude of initial disparities. The updated series therefore provides a more conservative and arguably more realistic picture of regional inequality entering the liberalization period.

Overall, both databases confirm that regional rankings are continuous. Before 1985, the South and several central states had caught up, but after trade liberalization, the border and northern central regions gained the most, while the southern states fell behind. Within regions, Aguascalientes, Querétaro, and Quintana Roo stand out as clear winners, while Chiapas, Veracruz, Hidalgo, and the State of Mexico lose relative ground.

Scatter plots - Per capita GDP indexes - Original vs Updated

Figure 1. 1985 per capita GDP indexes: Panel (i) vs Panel (ii)

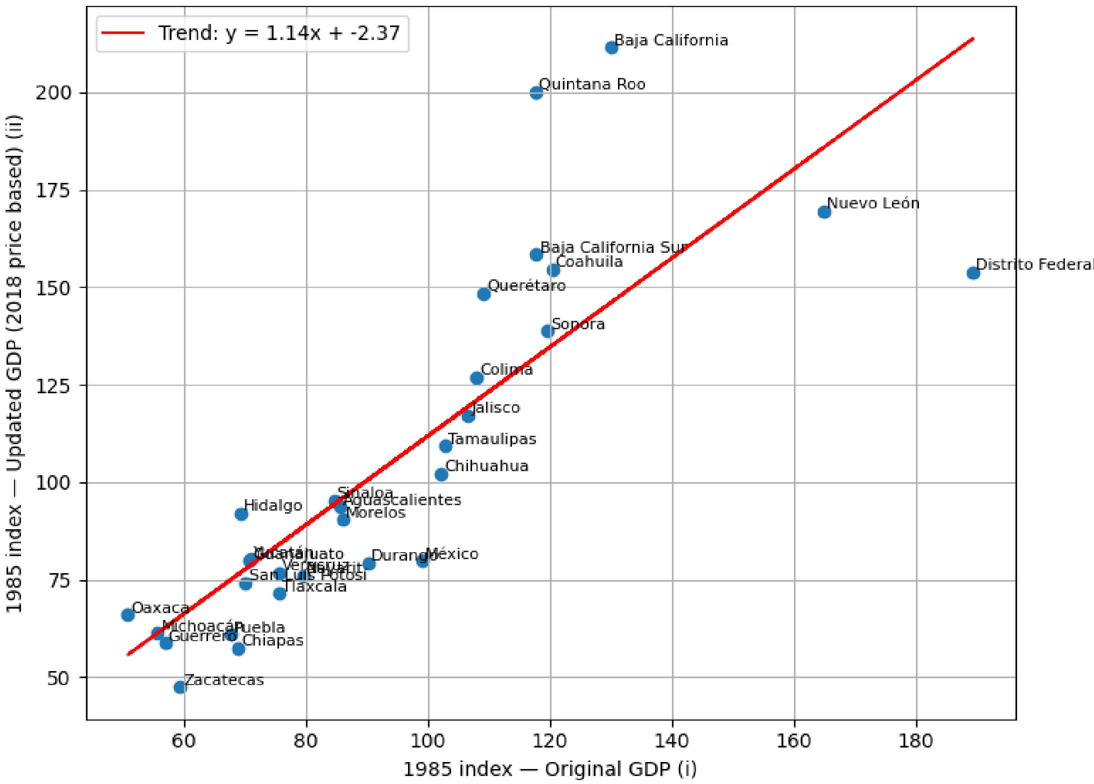


Figure 2. 1993 per capita GDP indexes: Panel (i) vs Panel (ii)

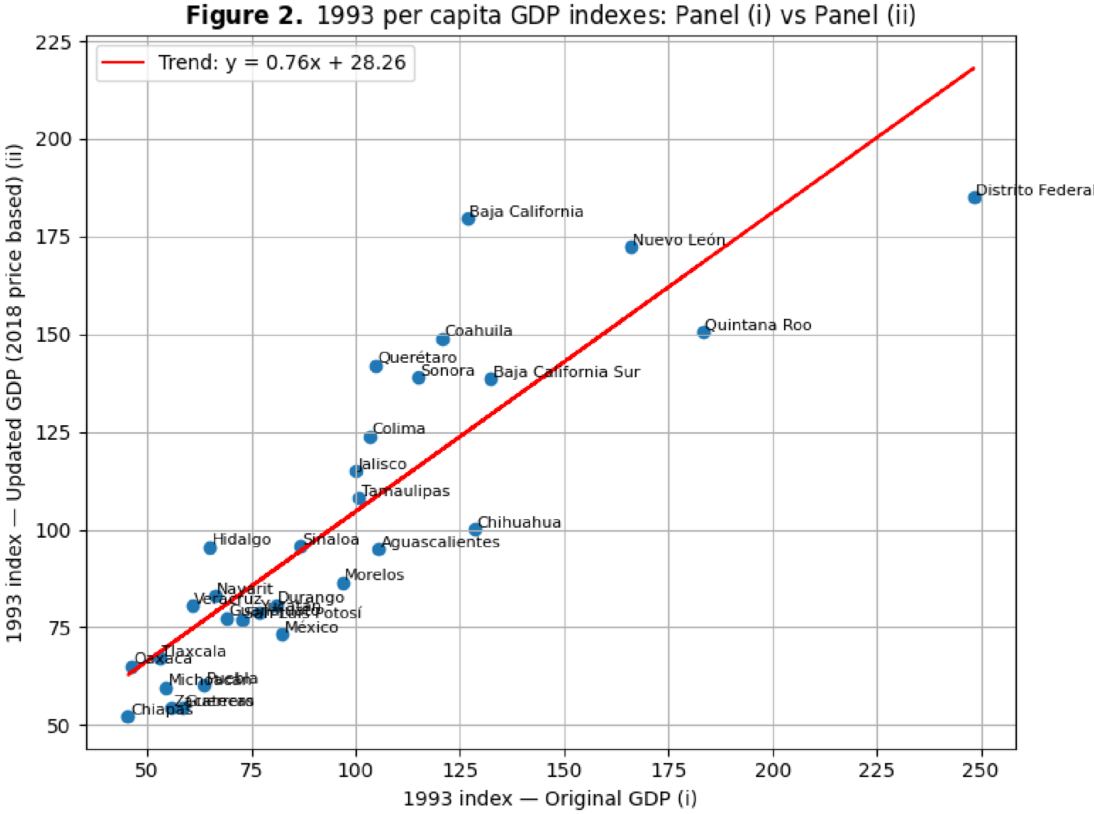
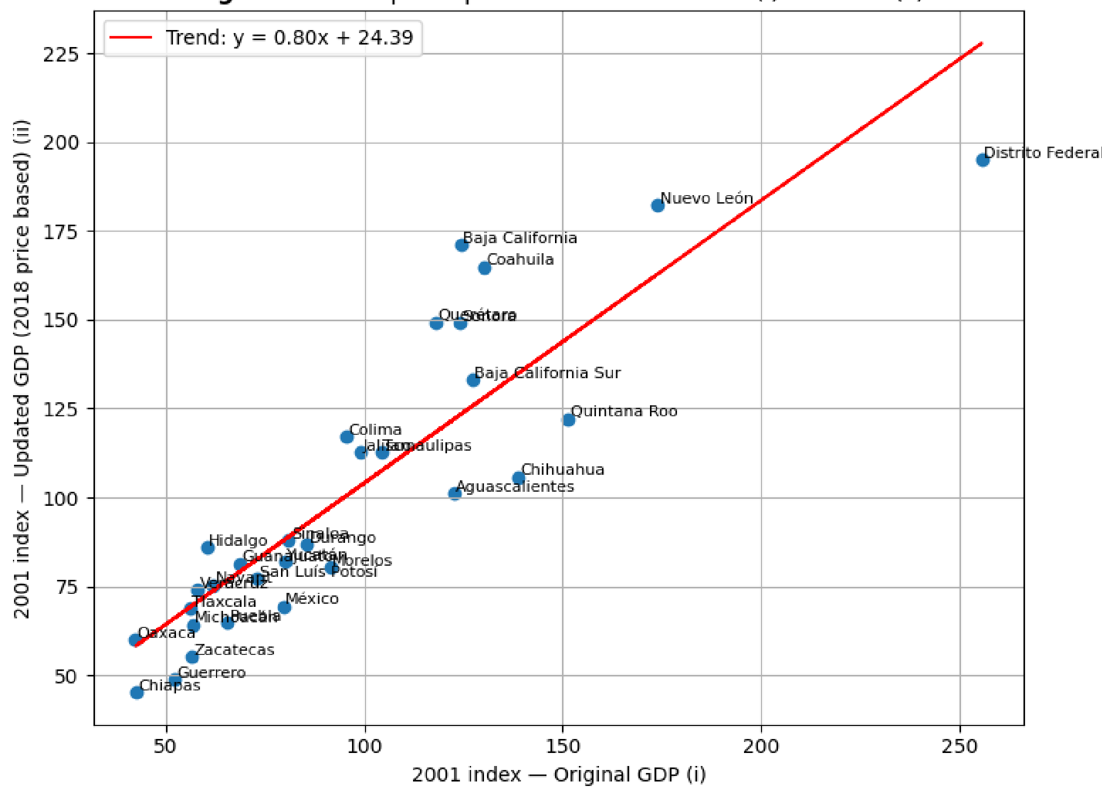


Figure 3. 2001 per capita GDP indexes: Panel (i) vs Panel (ii)



The three plots compare the updated per capita GDP series with the original reconstruction for the benchmark years for 1985, 1993, and 2001. In every case the points line up closely with an upward-sloping line, which shows that both versions of the data capture the same basic ordering of states.

What differs across the three years is how far apart the states appear from one another. In the earliest benchmark (1985), the updated series places rich and poor states farther from each other than in the original data. The richest states sit noticeably above the trend line, while some of the poorest fall well below it, which suggests that the updated series portrays a larger gap between the top and the bottom at that point in time.

The 1993 plot shows a shift; the points are pulled closer together, and the updated series shows a more compact group overall. Differences across states look smaller than in the original reconstruction, even though the overall ranking is almost identical. This indicates that the updated data softens the contrast between the richest and poorest states during this period.

In the 2001 plot, the pattern lies between the previous two. The updated series still reduces some of the extreme values, but not as strongly as in the early nineties. The richest states remain clearly above the rest, and the poorest states remain grouped at the lower end, but the distance between them is neither as large as in the 1985 plot nor as compressed as in the 1993 one.

Summarizing, the three figures show that the updated GDP series preserves the cross-state ranking found in the original data while adjusting the relative distance between states. The 1985 plot shows a wider separation, the 1993 plot shows a much closer grouping, and the 2001 plot fell in the middle.

Section 3.2 Absolute convergence - Replication

The motivation for this subsection lies in examining whether poorer states grew faster than richer ones, following Barro and Martín's (1992) absolute convergence framework, which assumes that all states converge to the same steady state in the long run. Equation (1) shows the linearized convergence relationship. The average growth rate over T years depends on a constant, the log of initial income, and an error term. The coefficient β in the initial income term captures the speed of convergence. When its positive, poorer states tend to grow faster, and income gaps narrow. If it is negative, the contrary happens.

$$\frac{1}{T}\log\left[\frac{y_{i,t_0+T}}{y_{i,t_0}}\right] = \alpha - \frac{1- e^{-\beta T}}{T}\log\left[y_{i,t_0}\right] + u_{i,t_0 \cdot t_0+T} \qquad (1)$$

The intercept (α) is not arbitrary but reflects the steady-state income level. Equation (2) constant term (*x)* represents the constant rate of technological progress that is assumed to be the same across states for determining the steady state.

$$\alpha = x + \frac{1- e^{-\beta T}}{T}\log[y^*] + xt_0 \qquad (2)$$

Table 2. Absolute convergence (NLLS) — Original GDP Reconstruction vs Updated GDP 2018 price base.

	Original GDP (1970–2001)						Updated GDP			
	1970–2001	1970–1985	1985–2001	1985–1993	1993–2001 (all)	1993–2001[1]	1985–2001 (Total)	1985–1993	1993–2001 (all)	1993–2001[1]
α	0.0208	0.0608	-0.0278	-0.0572	0.0074	-0.0021	0.0562	0.1104	-0.0287	-0.0663
	(3.513)	(8.546)	(-1.909)	(-2.069)	(0.736)	(-0.241)	(1.171)	(1.951)	(-0.490)	(-1.265)
β	0.0022	0.0222	-0.0145	-0.0245	-0.0029	-0.0072	0.0043	0.0097	-0.0036	-0.0067
	(0.706)	(4.508)	(-2.938)	(-2.528)	(-0.721)	(-2.050)	(0.987)	(1.873)	(-0.743)	(-1.593)
$T_{1/2}$	311.6	31.2	48.0	28.3	236.7	96.6	162.0	71.8	194.4	103.7
R^2	0.019	0.505	0.197	0.158	0.018	0.128	0.036	0.119	0.019	0.082
T (years)	31	15	16	8	8	8	16	8	8	8

Notes: (t-statistics in parentheses) All regressions exclude Campeche and Tabasco. Left panel uses current-values recalibration for 1970–2001. Right panel uses INEGI 2018 price base. [1] Regression excluding Quintana Roo. When $\beta < 0$, $T_{1/2} = \ln(2)/\beta$ represents years to *double* the current gap.

Table 2 compares a nonlinear least squares regression following the absolute convergence framework across different period windows and under the two data constructions used in Table 1. The left panel displays two distinct phases in the original GDP data series. From 1970 to 1985, the coefficient is positive, indicating convergence with half-lives on the order of a few decades. After 1985, the sign switches and becomes negative for both 1985 to 2001 and 1985 to 1993, suggesting divergence. For the period between 1993 and 2001, the estimate is positive but small and imprecise. This lack of precision is driven in part by Quintana Roo, which followed a growth trajectory that differed markedly from most states during the 1990s. Unlike states whose performance remained closely tied to manufacturing dynamics, agricultural productivity, or gradual service sector expansion, Quintana Roo benefited from a sharp tourism led boom associated with the consolidation and expansion of the Cancún and Riviera Maya corridor. This generated unusually rapid growth in market services, construction, and related local demand, supported by sizable inflows of private investment and internal migrants. As a result, Quintana Roo appears to be a high growth outlier in the convergence regression, weakening the precision of the estimated relationship between initial income and subsequent growth. Once Quintana Roo is excluded, the coefficient becomes negative, and the post 1985 divergence pattern emerges more clearly. The results align with Chiquiar's findings in Table A.2.

The right panel (updated GDP) keeps the same broad story but shifts the timing. Convergence was still present before 1985. For the period from 1985 to 1993, the estimates remain consistent with catch-up; however, the long window from 1985 to 2001 yields a small and imprecise parameter. Divergence is clearer in the 1993 to 2001 window, and again, the relation becomes clearer when Quintana Roo is omitted as a tourism-driven outlier.

The difference between the two panels arises because the original GDP reconstruction rebuilds historical GDP using a single deflator, whereas the updated series follows the newer national accounts, which incorporate updates in deflator prices and sector weights. As a result, the two data sets do not track the same relative movements across states, which alters the scale and timing of the estimated convergence parameter.

The shifts in the convergence parameter across periods in table 2 could be explained by major changes in Mexico's economic environment and integration into the global economy. Between 1970 and 1985, convergence was consistent with an economic model based on import substitution, centralized public investment, and redistributive federal policies, which helped sustain income catch-up across states despite modest economic growth. This framework weakened after the external debt crisis (1982), which initiated a new phase relying on an open market structure marked by fiscal retrenchment, privatization, and a reduced role of the federal government in regional development. Mexico's integration into GATT (1986) accelerated trade liberalization and began to reorient growth toward states with stronger industrial bases and external linkages, contributing to the emergence of divergence in the post-1985 windows.

The reform cycle of the early 1990s, which included financial liberalization and the opening of capital accounts (1990 to 1993), reinforced uneven growth patterns by favoring states better positioned to attract foreign investment. This process was interrupted by the Tequila Crisis (marked in the periods between 1994 to 1995), which led to a sharp contraction in output and credit. States more integrated into tradable activities recovered faster, while others experienced more persistent stagnation. The implementation of NAFTA (1994) strengthened this pattern during the recovery, as export-oriented manufacturing expanded but remained geographically concentrated.

After 2001, Mexico faced a new external environment shaped by China's integration into the WTO (2001), increased competition in labor-intensive manufacturing has reduced Mexico's comparative advantage in several export sectors, particularly those located in regions that had previously benefited from NAFTA-driven industrialization. This shift helps explain why the post-2001 estimates show weak convergence or mild divergence, as growth became more dependent on a state's ability to upgrade supply chain and production structures, integrate into higher-value segments, or diversify beyond traditional manufacturing.

In comparison to Chiquiar's results (see appendix table A.2) the takeaways show: firstly, that the left panel matches the author's idea of convergence before 1985, and divergence after 1985 with a weak relationship; secondly the right panel displays a different timeline narrative as the divergence pattern starts appearing in the 1993 to 2001 period, suggesting convergence under the GATT narrative and a frail divergence under the start of the NAFTA period.

In summary, the key result from the absolute convergence exercise is not the emergence of strong divergence after liberalization, but the disappearance of a robust convergence force. Once the import-substitution period ends, growth differences become smaller, noisier, and less systematically related to initial income, suggesting that regional dynamics are no longer governed by a simple catch-up mechanism.

Section 3.3 Conditional Convergence Indicators – Replication

This section replicates the set of regional indicators used by Chiquiar for the conditional convergence analysis. Tables 3.1 and 3.2 report the original indicators for 1985 and 1970, respectively, reconstructed to match the definitions and structure of the original study.

Table 3.1. Replication of Chiquiar's Regional Indicators for Conditional Convergence - 1985

Regional indicators	Human capital indicators (for individuals 15 years or older)		Infrastructure indicators			Economic orientation		Manufacturing plants (250+ employees)		Demographic indicators	
	Average schooling	Illiteracy rate	Railroads / 100 km^2	Telephones / 100 persons	% Households with electrical supply	Agriculture (% of GDP)	Manufacturing (% of GDP)	% Regional share in total plants	% Regional share in total employees	Rural population (%)	Fertility (log)
National	5.19	14.70	1.34	10.08	82.12	9.42	24.84	100.00	100.00	30.85	3.19
Border	5.96	6.88	1.14	12.48	86.35	10.01	24.15	31.08	35.02	18.42	3.08
Baja California	6.09	5.64	0.29	8.66	89.12	10.25	17.15	3.87	2.78	11.64	2.48
Coahuila	5.89	6.69	1.46	11.40	90.49	8.71	29.07	3.77	5.46	17.76	3.53
Chihuahua	5.58	7.48	1.08	11.14	80.94	15.99	18.29	8.26	9.78	25.94	3.56
Nuevo León	6.49	5.96	1.96	16.60	92.75	1.70	37.14	7.64	8.34	10.03	0.88
Sonora	5.97	7.07	1.08	12.44	84.54	20.27	13.37	3.67	3.09	24.79	1.15
Tamaulipas	5.63	8.28	1.18	11.92	80.33	13.10	13.55	3.87	5.58	21.70	0.73
Northern Central	4.96	12.64	1.15	6.93	84.54	19.34	17.44	7.80	5.74	44.22	2.50
Aguascalientes	5.45	8.96	3.91	8.98	89.52	7.64	27.63	1.29	1.11	26.96	2.54
Baja California Sur	5.95	6.44	0.00	18.57	82.10	12.31	7.60	0.15	0.08	26.31	2.52
Durango	5.03	8.23	1.00	6.25	81.18	21.84	23.02	2.07	1.30	46.06	3.23
Nayarit	4.99	13.89	1.44	5.51	85.15	20.81	17.10	0.46	0.34	40.44	0.18
San Luis Potosí	4.51	18.28	1.82	5.99	62.71	10.36	27.98	2.48	2.00	48.99	1.42
Sinaloa	5.32	11.87	2.11	8.81	82.85	25.71	10.05	0.98	0.80	39.55	0.23
Zacatecas	4.44	12.40	0.92	3.28	73.30	26.58	4.36	0.36	0.10	58.18	1.38
Southern Central	4.56	18.94	2.45	7.19	76.85	12.24	23.60	22.92	26.07	38.41	3.26
Colima	5.47	11.07	3.83	10.42	88.19	18.06	6.13	0.26	0.08	20.55	2.90
Guanajuato	4.08	20.29	3.52	6.51	79.56	12.52	22.14	3.46	3.29	39.73	3.51
Hidalgo	4.08	25.31	3.61	4.38	66.21	10.26	31.27	1.24	1.86	61.26	3.86
Jalisco	5.45	11.07	1.28	11.26	86.94	11.02	26.81	5.58	5.44	21.07	3.67
Michoacán	4.13	21.24	1.91	5.50	77.87	17.77	12.55	1.55	1.84	42.60	1.20
Morelos	5.37	14.42	5.54	10.24	90.57	7.74	26.29	1.14	1.25	19.44	1.33
Puebla	4.48	22.97	3.03	6.29	76.17	10.94	25.82	3.10	3.21	39.55	1.54
Querétaro	4.76	20.72	2.63	6.37	73.03	6.99	39.50	1.45	2.37	47.12	1.08
Tlaxcala	5.12	13.95	8.96	3.02	87.71	13.46	30.98	1.29	0.87	31.58	1.33
Veracruz	4.36	20.80	2.45	6.36	66.51	13.96	18.55	3.87	5.85	46.53	1.01
Mexico City	6.63	7.89	6.30	17.19	94.48	1.53	31.92	35.73	30.83	9.05	2.73
Distrito Federal	7.44	4.94	21.16	27.27	98.30	0.23	27.53	17.60	15.61	0.12	3.01
Mexico State	5.71	11.32	5.27	7.20	89.85	3.99	40.20	18.12	15.22	18.05	1.29
South	3.69	29.55	0.60	4.50	64.41	21.02	8.71	2.48	2.35	55.92	3.65
Chiapas	3.18	33.99	0.73	3.09	54.60	29.69	6.56	0.26	0.39	67.42	4.04
Guerrero	3.80	31.20	0.16	5.41	66.76	15.86	5.07	0.36	0.25	53.05	3.72
Oaxaca	3.51	31.71	0.73	2.69	60.80	25.11	11.16	0.77	1.04	65.27	2.02
Quintana Roo	4.93	14.57	0.00	9.93	77.19	8.54	5.69	0.15	0.09	37.89	-0.19
Yucatán	4.52	17.43	1.58	8.25	84.24	10.21	16.36	0.93	0.58	24.03	0.71

Source: Based on figures from INEGI. All data are for 1985, except manufacturing establishments (1988). Schooling, illiteracy and household electricity supply are averages of the 1980 and 1990 census values. Campeche and Tabasco are excluded.

Table 3.1 reconstructs Chiquiar's conditional convergence indicators for 1985. The indicators were measured as follows:

The illiteracy rate indicator was calculated as the share of the population aged 15 and older who reported being unable to read or write in 1980 and 1990 INEGI National Population and Housing Censuses. The 1985 value corresponds to the average of those two years. This measure reflects basic skill limitations that can affect productivity and social participation.

The average schooling data were taken from the same 1980 and 1990 INEGI Censuses. I calculated the average years of schooling for people aged 15 and older, using the full distribution of education levels for each state. The 1985 proxy is the average of both census values. These variables measure the stock of human capital that supports productivity growth and structural change.

For railroads per 100 square kilometers, data were obtained from the INEGI Economic Censuses and the National Statistical Yearbook of 1985. I used the total track length reported by the state and divided it by each state's land area to express kilometers of railway per 100 square kilometers. Because data for 1985 are available directly, no averaging was required. This indicator reflects spatial integration with national markets and the cost of transporting goods.

Regarding the telephones per 100 persons' indicator, I used the number of telephone lines from the INEGI Economic Censuses and the National Statistical Yearbook 1985, combined with population data from CONAPO's Demographic Reconciliation, to calculate the number of lines per 100 persons for 1980 and 1990. The 1985 proxy equals the average of those two rates. This indicator measures access to communication technologies that improve information exchange and coordination. The same values used by Chiquiar are applied here for comparison.

The percentage share of households with electricity was measured using the 1980 and 1990 INEGI Economic Censuses and National Statistical Yearbooks. I calculated the share of households with electricity in each year and averaged them to estimate the 1985 value. This indicator reflects living standards and productive capacity, since access to electricity enables the use of modern technologies and equipment.

For the agricultural percentage share of GDP, data were obtained from the INEGI System of National Accounts of Mexico, specifically Gross Domestic Product by Federal Entity. I divided agricultural value added by total GSP for 1985 to obtain agricultural shares. No averaging was required, and the results match those reported by Chiquiar. A higher agricultural share typically indicates a less industrialized production structure, characterized by lower productivity. Results are shown in both samples.

Manufacturing percentage share of GDP was collected from the same INEGI source. I calculated the share of manufacturing value added in total GSP for 1985. This variable indicates the degree of industrialization and exposure to tradable production, where a larger share reflects stronger industrial integration.

The share of large manufacturing plants and employment was retrieved from the INEGI Economic Census, specifically the Industrial Census. For the 1989 subcategory, I calculated each state's share of national industrial establishments and employment in firms with 250 or more workers. Closely representing mid-1980s conditions aligning with Chiquiar's definition. These indicators describe the concentration of large-scale industrial capacity and employment.

Rural population percentage share is based on the 1980 and 1990 INEGI Censuses. I identified residents living in localities with fewer than 2,500 inhabitants and divided this by the total state population. The 1985 proxy equals the average of both years. This variable reflects the transition to urbanization and its effects on labor reallocation, and, consequently, productivity spillovers.

Lastly, for the log fertility rate, the numerator corresponds to the total number of children born to women aged 15 to 49 in 1985, as reported in INEGI's Demographic and Social Statistics (Registered Births). The denominator is the average number of women aged 15 to 49, calculated as the mean of the data from the 1980 and 1990 Censuses. Afterwards, I multiplied the rate by 1,000 to add interpretability, referring to the number of births per 1,000 women. Then, I transformed the result into log form. This approach centers the measure on 1985 and smooths short-term differences between census years.

As a final remark, Table 3.1 preserves Chiquiar's conceptual framework for the construction of regional indicators used in the conditional convergence analysis, while making explicit several definitional and measurement choices that are implicit or undocumented in Table A.3. Indicators related to production structure and industrial concentration match Chiquiar's construction exactly, including agricultural and manufacturing shares of GDP for 1985. Other indicators follow the same economic interpretation but differ in their operationalization of 1985 values. Human capital measures, rural population, and household electricity coverage are constructed as averages of the 1980 and 1990 Population and Housing Censuses, with all human capital indicators explicitly defined for the population aged 15 and older, a standard labor relevant definition not documented in Chiquiar. Infrastructure indicators also retain the same interpretation but differ slightly in implementation, with railroads per 100 square kilometers computed directly from 1985 track length and state land area, and telephone density combining telephone line data with population figures from CONAPO for consistency across the thesis.

Finally, fertility is constructed using registered births centered on 1985 and census-based averages of women of reproductive age from 1980 and 1990, making explicit demographic definitions that are not detailed in Table A.3.

Table 3.2. Regional Indicators for Conditional Convergence - 1970

Regional indicators	Human capital indicators (for individuals 15 years or older)	Infrastructure indicators		Economic orientation	Manufacturing plants (250+ employees)		Demographic indicators	State Expenditures Growth
	Average schooling	Telephones / 100 persons	% Households with electrical supply	Agriculture (% of GDP)	% Regional share in total plants	% Regional share in total employees	Rural population (%)	State Expenditures pc, 1970–1985 (cum. %)
National	2.49	36.42	59.28	12.02	100.00	100.00	40.92	1356.43
Border	2.87	37.17	69.83	12.74	13.18	18.50	28.24	2568.19
Baja California	3.16	37.55	79.03	8.25	1.38	1.98	15.70	3515.79
Coahuila	2.56	36.54	73.39	9.69	2.55	3.10	27.25	2652.89
Chihuahua	2.66	36.50	62.47	14.74	1.73	1.88	34.56	986.58
Nuevo León	3.15	38.18	78.47	5.25	4.01	8.37	23.48	4173.14
Sonora	2.99	37.06	64.61	29.49	1.34	1.53	33.49	1091.30
Tamaulipas	2.73	37.09	64.04	14.15	2.16	1.65	31.05	1642.49
Northern Central	2.61	34.61	46.90	25.41	8.85	5.33	56.82	1413.48
Aguascalientes	3.54	34.17	64.59	19.25	0.57	0.39	36.37	3712.05
Baja California Sur	6.15	36.36	50.26	21.39	0.01	0.11	46.06	995.63
Durango	2.73	34.52	47.17	25.46	1.18	1.01	58.53	978.67
Nayarit	2.91	34.79	58.15	33.11	0.77	0.69	49.99	1908.27
San Luis Potosí	2.09	34.84	40.91	16.76	3.81	1.70	61.00	1803.22
Sinaloa	2.45	35.92	53.03	28.96	1.27	1.21	51.94	1140.61
Zacatecas	2.45	32.46	33.18	29.80	1.22	0.22	68.65	1929.46
Southern Central	2.11	35.34	52.00	18.78	34.62	23.38	48.77	2148.42
Colima	6.42	35.24	58.49	26.37	0.27	0.11	30.78	5007.67
Guanajuato	1.67	34.18	51.57	21.16	4.64	3.34	47.88	567.23
Hidalgo	1.94	35.50	37.68	16.12	1.49	1.34	71.78	2813.85
Jalisco	2.41	34.91	64.15	17.15	8.38	6.53	31.49	3529.21
Michoacán	1.79	33.73	48.89	24.75	4.62	1.89	53.87	1503.69
Morelos	2.82	36.60	64.41	20.59	1.02	0.95	30.05	2658.90
Puebla	1.96	35.52	48.31	14.64	6.25	53.43	39.55	2118.66
Querétaro	2.53	34.26	37.50	17.95	0.87	0.82	64.41	6791.69
Tlaxcala	3.01	33.83	64.20	11.61	1.55	0.53	50.29	3731.11
Veracruz	1.90	37.29	49.36	19.35	5.53	4.09	52.88	2538.31
Mexico City	2.05	38.90	83.59	1.67	35.47	49.33	15.62	709.99
Distrito Federal	1.97	40.26	94.68	0.27	27.18	33.75	3.34	558.69
México	2.21	36.43	61.92	6.16	8.29	15.58	37.65	2640.36
South	3.82	35.81	34.23	23.09	7.89	3.46	65.59	4123.12
Chiapas	9.32	36.14	30.84	31.01	1.12	0.49	72.25	5478.69
Guerrero	1.64	35.10	36.95	19.55	1.38	0.45	64.37	1921.75
Oaxaca	1.62	35.67	27.84	25.93	2.55	0.84	72.97	8289.49
Quintana Roo	7.34	37.27	44.40	33.55	0.01	0.09	63.46	2731.56
Yucatán	2.73	36.84	52.97	11.75	2.83	1.59	35.00	1885.16

Source: Based on figures from INEGI. All data are for 1970. Schooling and rural population from the 1970 census. Plants and employees correspond to establishments with 250+ employees. Campeche and Tabasco are excluded. State expenditure growth is cumulative between 1970 and 1985.

Table 3.2. provides a similar cross-section of indicators from the previous table now centered on 1970, This for all variables that already appear in table 3.1, following the same construction and now using 1970 data without averaging across decades. Schooling, illiteracy, electricity, rural population, and sectoral shares are measured directly from the 1970 census, statistical yearbooks, and state accounts, with the same age cutoffs and definitions.

Two elements are specific to the earlier period. First, the distribution of large manufacturing plants and employment is taken from the 1971 industrial statistics, which provide the earliest post-1970 information on the location of large establishments and their workforce. Second, I add state expenditure growth between 1970 and 1985, constructed from INEGI statistical yearbooks as the cumulative change in state expenditures. This fiscal indicator proxy captures long-term expansion in state-level spending prior to the liberalization period.

Section 3.4 Conditional Convergence Summary Results - Replication

Now that the controls are reconstructed, I run the conditional-convergence framework by using an OLS regression to see whether adding the indicators changes the convergence patterns across periods, and comparing my results to Chiquiar's estimates.

Sala-I-Martín (1994) conditional convergence hypothesis is used (equation 3) as the economic and population features across the states and regions don't share the same steady state due to their heterogeneity, to address omitted variable bias concerns that the absolute convergence framework might present. Each regression follows the next structure:

$$\frac{1}{T}\log\frac{y_{i,t_0+T}}{y_{i,t_0}} = \alpha + \beta_0 \log[y_{i,t_0}] + \sum_{i=1}^{k} \beta_k X_{i,t_0} + u_{i,t_0 \cdot t_0+T} \qquad (3)$$

Table 4. Conditional Convergence OLS – Original GDP (Using Chiquiar's Data Set) and Updated GDP (Own Data Set)

	(Original GDP, Chiquiar controls) 1970–1985			(Original GDP, Chiquiar controls) 1985–2001			(Updated GDP, own controls) 1985–2001		
	Coefficient	t-statistic	p-value	Coefficient	t-statistic	p-value	Coefficient	t-statistic	p-value
Log initial per-capita GDP	-0.0129	-1.25	0.226	-0.0131	-0.31	0.763	-0.0315	-1.29	0.215
Average schooling years	0.0110	1.30	0.208	0.0008	0.05	0.963	-0.0426	-0.71	0.490
Log(initial per-capita GDP)×Schooling	-0.0039	-1.05	0.307	-0.0013	-0.17	0.868	0.0027	0.55	0.587
Telephones per 100 persons	-0.0006	-0.47	0.646	0.0011	1.01	0.327	0.0017	2.90	0.010
Federal investment (% of GDP)	–	–	–	–	–	–	–	–	–
State expenditures (% growth in period)	0.0003	3.39	0.003	–	–	–	–	–	–
Agricultural output (% of GDP)	-0.0050	-0.22	0.829	-0.1554	-3.02	0.008	0.0344	1.00	0.330
Manufacturing output (% of GDP)	–	–	–	-0.0623	-1.78	0.094	0.0612	3.04	0.008
% Large firms	0.0405	0.98	0.340	-0.0018	-0.04	0.966	-0.0454	-1.60	0.130
Crime rate	–	–	–	–	–	–	–	–	–
Illiteracy rate	–	–	–	-0.0006	-1.03	0.318	-0.0011	-2.17	0.045
Rural population (% of total)	-0.0035	-0.34	0.740	0.0485	1.88	0.079	0.0163	0.71	0.485
Log(fertility rate)	–	–	–	0.0002	0.16	0.875	-0.0005	-0.51	0.619
Railroads/size of state	–	–	–	0.0002	0.23	0.825	0.0008	1.62	0.124
Dummy border states×Schooling	-0.0006	-0.57	0.576	0.0008	0.65	0.525	0.0018	2.27	0.038
% Households with electricity	0.0049	0.26	0.798	0.0946	1.47	0.160	0.0171	0.63	0.538
R^2	0.7599			0.6812			0.7734		
Adjusted R^2	0.6336			0.4221			0.5893		
N	30			30			30		

Notes: Campeche and Tabasco excluded. "–" indicates the variable is not included in the corresponding equation window.

Table 4 reports OLS conditional convergence regressions for Mexican states across alternative period windows and data constructions. The left panel presents results for the periods 1970 to 1985 and 1985 to 2001 using the original GDP series and the same set of controls included in Chiquiar's study, except for crime rates and federal investment, which are omitted due to data availability. These regressions combine indicators drawn directly from Chiquiar's dataset with reconstructed controls described in Tables 3.1 and 3.2. The right panel reports results for the period 1985 to 2001 using the updated GDP series together with the full reconstructed control set.

Across specifications, once structural characteristics are controlled for, initial income plays a limited and statistically weak role in explaining growth differences across states. This finding suggests that post liberalization regional outcomes reflect persistent heterogeneity in education, infrastructure, production structure, and demographic conditions rather than a stable divergence or convergence process driven directly by initial income levels.

Using the original GDP series, the estimated coefficient on initial per capita income is negative in the pre-1985 period, consistent with the convergence result reported by Chiquiar. However, unlike the original study, the coefficient remains negative in the post 1985 period. As a result, I do not find evidence of systematic divergence during the post liberalization era once conditioning variables are included. This difference relative to Chiquiar's findings reflects the fact that the underlying dataset and indicator construction are not identical, and that inference in small samples with many correlated controls is inherently sensitive to such differences.

When the updated GDP series is used for the period 1985 to 2001, the qualitative results remain unchanged and, if anything, the convergence pattern becomes slightly stronger. Although the updated national accounts modify the relative income ranking of states, lagging regions display a greater tendency to catch up once structural controls are included. These results provide limited support for the hypothesis that trade liberalization induced a structural shift toward divergence in regional income dynamics.

A notable feature of Table 4 is the relatively high p-values on several coefficients, particularly when compared with Chiquiar's Table A.4. This contrast should not be interpreted as evidence of poor data quality or absence of meaningful relationships, instead differences could be addressed by the possibility of the author's data set uniqueness, joint to this, a set of multiple combinations of methodological and statistical factors could also influence the differences. First, Table 4 reports OLS estimates, whereas Chiquiar's baseline conditional results rely on GLS type corrections that impose additional structure on the error covariance matrix. In small cross-sectional samples with heteroscedasticity and correlated regressors, OLS based inference can yield larger standard errors even when point estimates are similar.

Second, the reconstructed control variables necessarily involve explicit harmonization choices that are not fully documented in the original study. Even when conceptual definitions align, small differences in timing, population denominators, or aggregation can introduce measurement noise that weakens partial correlations in a high dimensional regression. In this setting, statistical significance becomes fragile and sensitive to specification details.

Third, the sensitivity of the results highlights an important feature of conditional convergence exercises more generally. With many highly correlated controls and a limited number of observations, alternative but defensible construction choices can materially affect inference. The sharper significance patterns reported in the original study may therefore reflect the configuration of controls and data available at the time rather than a robust structural relationship.

The auxiliary exercises reported in Appendix A4 clarify these issues. Across intermediate specifications that vary the control set, restrict attention to reconstructed indicators, and apply GLS type estimators, the qualitative conclusion remains stable: once structural characteristics are accounted for, initial income does not emerge as a robust driver of state level growth. While the sign of the coefficient on initial income is generally stable across specifications, statistical significance varies considerably with the estimation method and the dimensionality of the control vector. This pattern indicates that the contrast with Chiquiar's Table A.4 is primarily driven by inference sensitivity in the sample environment set rather than by substantive differences in the underlying growth process.

Taken together, the conditional results complement the unconditional evidence reported in Table 2. Rather than overturning the absolute convergence findings, they clarify their interpretation by showing that much of the variation in regional growth during Mexico's transition from a closed to an open economy is accounted for by persistent differences in human capital, production structure, infrastructure, and demographic conditions. Once these factors are considered, there is little evidence that regional income dynamics followed a stable convergence-divergence pattern tied directly to initial income levels.

Section IV - Extending the Framework (2001–2019)

In this section, I extend the convergence analysis by introducing a new benchmark period and the analysis on the post-2001 absolute and conditional convergence estimates. The purpose is to place the updated per capita GDP series in a broader time frame and to describe how state-level income evolved during the early 2000s (following the continuation of NAFTA) and the decade that followed the Great Financial Crisis (GFC).

First, as in the previous section, I display a benchmark table that reports relative income levels and growth rates for 2001, 2008, and 2019, expressing the level values as indices to ensure consistency with the earlier benchmarks.

Second, the section then reports the estimates of absolute convergence for the same subperiods. These estimates follow the same functional form as in the previous section but focus on the period after 2000. The aim is to extend the period and provide updated evidence to describe the broad direction of income dynamics during these years.

Thirdly, the section shows the updated conditional convergence indicators reported in tables 7.1 and 7.2. These indicators follow the same measurement principles as in Section 3 but updating each variable using INEGI figures from 1999 to 2001 and 2008 to 2010, covering same structural covariates. The main difference across benchmarks relies in the definition of large manufacturing plants, which shifts to +501-employee threshold in 2001 and returns to +250-employee bracket in the 2008 table, this due to changes in census stratification.

Finally, I employ an OLS specification based on the conditional convergence framework introduced in Section 3, using different cutoff periods to capture both short- and medium-run dynamics. Table 8 focuses on the subperiods 2001 to 2008 and 2008 to 2019 and 2001 to 2019, which isolates key economic episodes such as NAFTA consolidation, the global financial crisis, and the recovery that followed. Together, these cutoffs allow me to assess whether the weak convergence patterns observed in short windows persist when growth is measured over longer periods, and to distinguish period-specific effects from more persistent structural forces shaping regional growth.

The choice of 2001, 2008, and 2019 as benchmark years is motivated by their economic and institutional significance in Mexico's recent development trajectory, as well as by data availability constraints that ensure comparability across periods. Each benchmark marks the end of a distinct phase characterized by different growth regimes, exposure to external shocks, and regional adjustment mechanisms.

The year 2001 serves as a natural post liberalization benchmark. By this point, NAFTA had been fully implemented for several years, and most transitional tariff reductions and institutional adjustments associated with the agreement had been completed. Growth patterns observed by 2001 therefore reflect the consolidation of trade integration rather than short run adjustment effects. Using 2001 as a cutoff allows the analysis to separate the immediate transition period of the 1990s from the more mature phase of export-oriented growth and regional specialization that followed.

The year 2008 marks the onset of the global financial crisis, which represented the largest external macroeconomic shock affecting Mexico since the debt crisis of the 1980s. The crisis generated a sharp contraction in output, trade, and employment, with heterogeneous effects across states depending on their exposure to manufacturing exports, remittances, tourism, and domestic demand. Using 2008 as a benchmark isolates the pre-crisis expansion phase from the adjustment that followed, allowing the analysis to distinguish convergence dynamics driven by structural integration from those shaped by a large negative aggregate shock.

The year 2019 is chosen as the terminal benchmark to capture the medium run recovery following the global financial crisis while avoiding contamination from the COVID 19 pandemic. By 2019, Mexico had experienced a full decade of post crisis adjustment, during which growth resumed under different global and domestic conditions, including slower world trade growth and changes in industrial composition. This benchmark therefore reflects post crisis steady state dynamics rather than short run volatility or extraordinary policy interventions.

Section 4.1 Per capita GDP by state (2001, 2008 & 2019)

This section presents state-level per-capita GDP levels and growth rates for 2001, 2008, and 2019 using the 2018 price base. Table 5 summarizes relative income positions and growth performance across regions and states over this period.

Table 5. Per capita GDP by state — Price Base 2018 (2001, 2008 and 2019)

Federal Entity	**Per capita GDP (national average = 100.0)**			**Annual per capita growth (percentage)**		
	2001	2008	2019	2001 2019	2001 2008	2008 2019
National	100.00	100.00	100.00	0.52	0.75	0.37
Border	146.47	144.23	141.54	0.33	0.53	0.20
Baja California N.	169.70	139.14	128.79	-1.02	-2.09	-0.33
Coahuila	163.61	168.06	162.54	0.48	1.13	0.07
Chihuahua	104.95	114.87	123.73	1.43	2.04	1.05
Nuevo León	180.76	188.93	179.69	0.48	1.38	-0.09
Sonora	148.05	134.97	141.29	0.26	-0.58	0.79
Tamaulipas	111.73	119.42	113.18	0.59	1.70	-0.12
Northern Central	87.42	93.32	95.32	1.00	1.68	0.56
Aguascalientes	100.43	106.14	123.94	1.68	1.54	1.78
Baja California S.	132.09	136.12	120.85	0.02	1.18	-0.71
Durango	86.21	90.27	90.15	0.76	1.40	0.36
Nayarit	74.76	77.00	68.20	0.01	1.17	-0.73
San Luis Potosí	76.51	86.43	100.64	2.04	2.49	1.75
Sinaloa	87.16	91.70	91.48	0.79	1.47	0.35
Zacatecas	54.79	65.55	71.97	2.03	3.31	1.22
Southern Central	89.15	87.00	87.78	0.43	0.40	0.45
Colima	116.27	112.12	116.88	0.55	0.23	0.75
Guanajuato	80.74	83.98	95.24	1.43	1.31	1.51
Hidalgo	85.30	80.69	71.36	-0.47	-0.05	-0.75
Jalisco	111.85	108.98	113.12	0.58	0.37	0.71
México	68.86	65.97	69.38	0.56	0.14	0.83
Michoacán	63.63	66.95	71.22	1.14	1.47	0.93
Morelos	79.74	74.67	72.77	0.01	-0.19	0.13
Puebla	64.38	65.49	69.63	0.95	0.99	0.93
Querétaro	148.12	144.14	140.04	0.20	0.36	0.11
Tlaxcala	68.10	58.21	58.65	-0.31	-1.50	0.44
Veracruz	73.40	74.82	68.89	0.16	1.02	-0.38
Capital	131.18	131.54	140.51	0.90	0.78	0.97
Distrito Federal	193.51	197.10	211.65	1.01	1.01	1.02
Mexico	69.40	66.45	75.21	0.55	0.14	0.83
South	71.07	69.66	64.95	0.02	0.46	-0.27
Chiapas	44.94	40.21	33.31	-1.15	-0.84	-1.34
Guerrero	48.28	48.04	47.12	0.38	0.67	0.19
Oaxaca	59.64	57.58	47.27	-0.77	0.25	-1.42
Quintana Roo	121.19	120.99	111.95	0.08	0.72	-0.34
Yucatán	81.31	81.47	85.09	0.77	0.77	0.77

Source: Author's calculations based on National Institute of Statistics and Geography (INEGI). Gross Domestic Product by Federal Entity, base 2018 and CONAPO: Demographic Reconciliation 1950–2019.

Table 5 extends the analysis of the updated GDP series by presenting per capita income levels for the years 2001, 2008, and 2019. The values are expressed as indices where the national average equals 100. As in Section 3.1, the table excludes Campeche and Tabasco because their oil-based production tends to distort regional comparisons.

Regarding regional performance, several notable patterns emerge. In the Border region, the relative position remains above the national average in all three years, although the growth rates indicate a more moderate expansion than in the earlier benchmark. The central region shows a clearer upward movement, states that already appeared as strong performers in the earlier benchmark, such as Aguascalientes and Queretaro, outperform the national average. In the case of San Luis Potosí, it continues to catch up to the national average.

The Southern Central region displays a mixed pattern. Some states maintain positions close to the national average, while others record declines in their relative index between 2001 and 2019. Although the group does not exhibit a major reshuffling in its internal ranking, the dispersion across states remains moderate.

The Capital region still shows improvement; in the case of Mexico City, its index remains above the national average, increasing slightly through 2019. By contrast, the State of Mexico remains below the national average throughout and shows a small increase over time rather than a decline.

The South continues to record the lowest relative income levels and a declining trend. Most states in this region remain well below the national average, and several experiences limited or negative growth in some subperiods. Although Yucatán shows improvement from 2001 to 2019, the region still maintains a significant gap compared to the rest of the country.

Overall, the table confirms that regional positions have remained broadly stable. The northern states continue to display higher income levels, the central regions show mixed developments, and the southern states remain below the national average. These descriptive patterns provide the basis for the convergence estimations that follow.

Section 4.2 Absolute convergence

This subsection examines absolute convergence across Mexican states in the post-2001 period. Table 6 reports estimates for the full sample and for subperiods before and after the global financial crisis.

Table 6. Absolute convergence (2001–2019)

	2001–2019	**2001–2019**[1]	**2001–2008**	**2001–2008**[1]	**2008–2019**	**2008–2019**[1]
	Total					
α	0.0087	0.0059	0.0391	0.0393	-0.0318	-0.0370
	(0.192)	(0.126)	(0.619)	(0.606)	(-0.672)	(-0.771)
β	0.0003	0.0001	0.0027	0.0027	-0.0029	-0.0033
	(0.084)	(0.018)	(0.494)	(0.484)	(-0.751)	(-0.858)
$T_{1/2}$	2158.9	10120.1	261.4	259.4	241.9	210.2
R^2	0.000	0.000	0.009	0.009	0.019	0.026
T (years)	18	18	7	7	11	11

Notes: (t-statistics in parentheses). All regressions exclude Campeche and Tabasco from the sample. [1] Regression excluding Quintana Roo. $T_{1/2} = \ln(2)/\beta$ is the half-life.

Table 6 presents the absolute convergence framework described in Section 3.2, employing NLLS estimates for the updated per capita GDP series using the 2001, 2008, and 2019 benchmarks. Across the full period from 2001 to 2019, the estimated β remains very small and close to zero. For the subperiod between 2001 to 2008, the coefficient shows only a weak sign of convergence, which is consistent with the idea that major spillover effects from NAFTA (particularly in the border region) did not translate into significant catch-up among the poorest states. In terms of the subperiod between 2008 to 2019, there is a weak divergence relation, which can also be considered as non-divergent. In practical terms, initial income levels in 2001 and 2008 do not adequately explain the role of subsequent growth patterns: poorer states did not grow faster, and richer states did not systematically slow down and outpace other regions, as might be expected at first glance. Regional income positions were therefore broadly maintained. In other words, the estimates show near-zero convergence, consistent with a macroeconomic environment characterized by slower national growth and limited scope for regional catch-up.

Taken together, the estimates provide a comprehensive view of how Mexico's state-level income dynamics evolved during the two phases covered by the benchmark. In the post-NAFTA years (2001 to 2008), the small positive β indicates a nearly flat convergence pattern, suggesting that the expansion of trade and manufacturing did not drive a substantial systematic reduction in regional income disparities. States that attracted export manufacturing, FDI, and participation in global value chains did not generate sufficient spillovers to pull the rest of the country upward, while states more dependent on agriculture, tourism, public employment, or traditional services did not experience accelerated catch-up. The small and statistically weak β captures a phase in which NAFTA's benefits were absorbed unevenly across the country, rather than producing broad-based convergence from the south or divergence from the north regions. The results from the updated GDP data set suggest that the country's income development, driven by economic growth, was largely consistent across the timeline period.

In the period following the GFC (2008 to 2019), the picture remains largely unchanged; the β coefficient turns weakly negative, indicating a fragile divergence relation. This pattern aligns with an environment in which higher-income states (those with more diversified industrial bases and stronger trade integration with the United States) were better positioned to benefit from the recovery, the peso depreciation, and the expansion of manufacturing exports, not to a significant extent. In contrast, states with more limited industrial structures or greater reliance on federal transfers, oil-related activities, labor market informality, or slower-moving service sectors saw weaker gains and, in some cases, fell modestly behind. Even so, the magnitude of the estimated coefficients is small, implying that these differences reflect a mild, almost non-meaningful tendency rather than a pronounced shift in regional dynamics.

The near-zero convergence estimates after 2001 reflect a macroeconomic environment characterized by slower national growth, repeated external shocks, and limited scope for regional catch-up. In such a context, even large income gaps do not necessarily translate into faster growth for poorer states, as growth opportunities themselves become uneven and increasingly constrained by global conditions.

Overall, the results indicate that in both phases there is no evidence of a strong or systematic convergence process. State income rankings remain broadly stable, and the post-crisis decade appears to have slightly reinforced pre-existing gaps rather than closing them. As an extension, the same methodology (including all states in the sample) is replicated in Appendix 5.

Section 4.3 Conditional Convergence Indicators

This subsection describes the set of state-level indicators used in the conditional convergence analysis. Tables 7.1 and 7.2 summarize human capital, infrastructure, sectoral composition, manufacturing structure, and demographic characteristics for 2001 and 2008.

Table 7.1. Regional Indicators for Conditional Convergence - 2001

Regional indicators	**Human capital indicators** (for individuals 15 years or older)		**Infrastructure indicators**			**Economic orientation**		**Manufacturing plants** (501+ employees)		**Demographic indicators**	
	Average schooling	Illiteracy rate	Railroads / 100 km^2	Telephones/ 100 persons	% Households with electrical supply	Agriculture (% of GDP)	Manufacturing (% of GDP)	% Regional share in total plants	% Regional share in total employees	Rural population (%)	Fertility (log)
National	7.54	3.55	1.38	12.35	95.09	4.10	20.76	100.00	100.00	24.92	1.99
Border	8.23	1.93	1.15	15.95	96.41	3.17	24.14	47.50	52.60	12.11	1.97
Baja California	8.15	1.50	0.32	17.80	97.17	1.52	21.97	8.09	7.94	8.42	1.97
Coahuila	8.33	2.30	1.48	13.20	98.14	4.01	33.27	6.72	7.02	10.59	1.97
Chihuahua	7.59	3.36	1.08	13.80	93.93	4.31	22.83	13.78	17.31	17.47	2.01
Nuevo León	8.80	1.40	1.68	21.20	98.53	1.54	25.04	8.43	8.48	6.59	1.94
Sonora	8.31	2.17	1.10	13.60	96.11	6.41	19.80	4.11	4.31	16.91	1.98
Tamaulipas	8.04	2.18	1.17	13.40	94.60	3.49	21.42	6.37	7.54	14.58	1.96
Northern Central	7.40	3.61	1.15	9.16	94.02	10.48	16.50	7.40	5.66	35.46	2.01
Aguascalientes	8.10	2.00	4.07	11.50	97.94	4.18	27.95	1.78	1.75	19.77	1.97
Baja California Sur	8.38	1.97	0.00	14.90	94.60	4.78	4.44	0.14	0.10	18.70	1.97
Durango	7.31	2.53	0.94	9.10	93.59	13.10	19.78	1.71	1.12	36.21	2.06
Nayarit	7.42	4.74	1.31	9.10	92.56	13.90	17.01	0.49	0.37	32.94	2.00
San Luis Potosí	6.99	6.61	1.72	7.50	84.68	12.33	26.32	2.10	1.64	46.99	2.03
Sinaloa	7.84	4.85	1.96	10.50	93.29	15.26	19.41	1.79	1.60	25.00	1.98
Zacatecas	6.50	5.41	0.92	6.10	86.64	18.63	6.28	0.55	0.48	46.66	2.02
Southern Central	6.90	5.60	2.33	9.52	89.50	7.92	22.07	19.82	24.30	32.02	2.01
Colima	7.78	3.79	3.80	13.80	96.11	7.30	10.12	0.29	0.11	20.75	1.94
Guanajuato	6.42	7.21	3.64	8.20	91.65	9.46	25.40	2.24	2.54	34.23	2.01
Hidalgo	6.75	8.99	3.31	5.90	79.61	6.10	27.58	1.14	1.51	45.41	2.00
Jalisco	7.58	4.83	1.26	16.30	94.47	7.49	22.76	5.45	5.24	18.94	1.99
Michoacán	6.27	5.87	2.07	7.80	86.70	10.29	16.75	1.25	1.50	34.60	2.02
Morelos	7.82	3.48	5.23	13.90	96.50	2.56	26.08	0.84	1.13	14.57	1.93
Puebla	6.80	4.96	3.12	7.70	87.35	6.39	22.82	3.37	3.89	31.72	2.08
Querétaro	7.68	3.33	4.16	10.10	90.80	4.43	34.18	1.40	2.16	32.43	2.01
Tlaxcala	7.77	2.60	8.76	6.50	97.15	4.60	28.90	1.03	0.94	21.54	2.02
Veracruz	6.53	5.51	2.52	6.90	89.39	7.89	18.23	2.88	3.28	40.95	1.97
Mexico City	8.82	3.28	6.82	19.86	98.61	0.64	21.34	20.36	17.67	8.35	1.92
Distrito Federal	9.76	8.11	18.53	31.60	99.53	0.09	16.56	9.12	8.25	0.24	1.86
Mexico State	8.11	1.95	6.01	11.80	97.90	1.87	31.98	11.24	9.42	13.68	1.95
South	6.05	5.61	0.59	5.57	89.66	7.11	8.09	2.12	1.81	45.29	2.08
Chiapas	5.41	1.77	0.75	3.30	87.90	10.42	4.59	0.21	0.20	54.30	2.08
Guerrero	6.20	8.22	0.15	6.80	89.33	7.58	5.99	0.07	0.08	44.69	2.19
Oaxaca	5.68	7.23	0.67	3.80	87.33	10.91	14.90	0.69	0.69	55.47	2.06
Quintana Roo	7.80	2.92	0.00	11.20	95.32	0.78	1.08	0.00	0.00	17.54	2.00
Yucatán	6.92	4.84	1.59	9.40	95.35	4.98	14.53	1.17	0.83	18.66	1.96

Source: Based on figures from INEGI. Indicators constructed from various INEGI publications (population and housing census, economic census, and state statistical yearbooks). Campeche and Tabasco are excluded.

For subsection 4.3, table 7.1 updates regional indicators for 2001 based on table 3.1. It is important to note that all indicators are measured with data between 1999, 2000 and 2001 from INEGI, and their transformations follow exactly the same procedures described in Section 3 (illiteracy rates, average schooling, agriculture and manufacturing GDP shares, rural population shares, and the log fertility rate) without any average approximation as the years which data was collected were those in which there was substantial data availability based on different year publications. I therefore highlight only the differences in the data and definitions specific to this table.

As in subsection 3.3, the human capital indicators (average years of schooling and the illiteracy rate for individuals aged 15 and older) are computed from the INEGI 2000 National Population and Housing Census. The rural population share and the log fertility rate also follow the same methodology as before, now centered on the 2000 Census and INEGI Demographic and Social Statistics, respectively. The rural population is defined as the share of residents living in localities with fewer than 2,500 inhabitants. The fertility indicator is the logarithm of births per 1,000 women aged 15 to 49, constructed from INEGI-registered births and census counts of women by age group.

The infrastructure indicator for railroads (kilometers of track per 100 square km of state land area) is updated using INEGI transport statistics and state statistical yearbooks for 2004, which present the 2001 data series. I use the total length of railway track in each state and divide it by the state's land area, scaled to 100 square kilometers, so the measure is directly comparable to the 1985 indicator but reflects the rail network in the early 2000s. In addition, I construct a telephone density indicator (telephone lines per 100 persons) using data reported in the 2013 state statistical yearbook and CONAPO population data series, which captures access to traditional communication infrastructure across states. The percentage of households with electricity is taken from the 2000 Census. It corresponds to the share of occupied houses that report access to electricity and continues to proxy basic infrastructure, living standards, and the capacity for modernization adaptability.

The economic orientation indicators (the agriculture and manufacturing shares of GSP) are obtained from the INEGI System of National Accounts using state value added by sector for 2000. I divide agricultural value added and manufacturing value added by total GSP. As in Section 3, a higher agricultural share indicates a production structure that remains more intensive in primary activities, while a higher manufacturing share reflects stronger integration into tradable industrial production.

The indicators for large manufacturing plants and workers are based on INEGI's Economic Census, specifically the Manufacturing Establishment Statistics publication for the 1999 data series. In contrast to table 3.1, where large plants were defined as firms with 250 or more workers, I now consider those firms with more than 501 workers as large, as the 1999 economic census publication doesn't reflect the same stratification brackets in the same way as table 3.1 and 3.2 from the last subsection. For each state, I calculate its share of the national total number of large plants and its share of the total number of workers employed in these plants.

Finally, table 7.1 combination of indicators such as infrastructure, sectoral composition, large plant concentration, and demographic indicators, offers a well-fitted picture of Mexico's regional structure around 2001.

Table 7.2. Regional Indicators for Conditional Convergence - 2008

Regional indicators	Human capital indicators (for individuals 15 years or older)		Infrastructure indicators			Economic orientation		Manufacturing plants (250+ employees)		Demographic indicators	
	Average schooling	Illiteracy rate	Railroads / 100 km^2	Telephones/ 100 persons	% Households with electrical supply	Agriculture (% of GDP)	Manufacturing (% of GDP)	% Regional share in total plants	% Regional share in total employees	Rural population (%)	Fertility (log)
National	8.57	6.86	1.38	19.39	97.78	3.74	19.73	100.00	100.00	22.77	1.91
Border	9.16	2.90	1.15	19.95	97.82	3.14	24.16	42.69	48.66	10.32	1.87
Baja California	9.05	2.57	0.32	21.00	98.52	2.91	20.63	8.66	9.18	7.71	1.84
Coahuila	9.37	2.63	1.48	21.40	99.13	2.66	36.06	5.64	6.28	10.01	1.88
Chihuahua	8.70	3.66	1.08	21.30	96.28	5.87	24.59	8.97	12.10	15.18	1.90
Nuevo León	9.50	2.20	1.68	18.70	98.29	0.69	26.38	8.94	8.92	5.32	1.86
Sonora	9.37	3.04	1.10	19.40	97.89	7.91	20.08	3.71	4.24	13.98	1.88
Tamaulipas	8.90	3.61	1.18	19.30	96.97	3.31	13.74	6.76	7.94	12.21	1.87
Northern Central	8.63	5.40	1.15	16.91	97.29	8.63	16.90	7.95	7.19	30.33	1.92
Aguascalientes	9.23	3.26	4.07	20.40	99.25	4.63	29.92	1.68	1.97	19.19	1.90
Baja California Sur	9.32	3.21	0.00	21.10	96.65	4.24	3.26	0.09	0.05	13.86	1.89
Durango	8.55	3.82	0.94	16.20	96.12	10.91	21.11	1.53	1.10	31.14	1.98
Nayarit	8.59	6.31	1.46	18.60	96.86	8.74	5.26	0.16	0.13	31.06	1.93
San Luis Potosí	8.23	7.91	1.96	13.80	95.61	4.13	26.76	2.99	2.60	36.16	1.92
Sinaloa	9.03	4.97	2.05	19.00	98.43	13.85	7.91	1.06	0.86	27.17	1.90
Zacatecas	7.88	5.55	0.92	14.30	98.30	10.57	12.14	0.44	0.48	40.52	1.95
Southern Central	8.09	8.48	2.63	18.31	97.87	5.42	22.61	25.96	24.83	28.47	1.92
Colima	8.91	5.13	4.60	21.00	99.04	7.20	8.88	0.12	0.13	11.22	1.86
Guanajuato	7.72	8.18	3.56	15.60	98.24	4.73	28.61	5.30	4.59	30.10	1.90
Hidalgo	8.08	10.23	4.15	21.80	96.90	4.50	33.03	1.75	1.70	47.80	1.90
Jalisco	8.71	4.36	1.37	24.30	98.95	5.68	21.68	6.33	7.02	13.40	1.90
Michoacán	7.38	10.18	2.07	14.30	97.98	10.32	15.69	0.97	0.79	31.32	1.97
Morelos	8.89	6.42	5.23	23.80	98.83	3.74	23.47	0.81	0.70	16.14	1.88
Puebla	7.95	10.38	3.12	16.40	97.74	4.53	27.39	3.65	3.57	28.23	1.98
Querétaro	8.93	6.31	4.16	20.10	97.70	2.52	24.15	3.43	2.90	29.58	1.88
Tlaxcala	8.78	5.19	8.76	11.40	98.52	4.86	27.55	1.12	1.01	20.15	1.90
Veracruz	7.67	11.44	2.52	17.00	96.64	5.40	15.76	2.49	2.42	38.94	1.89
Mexico City	9.60	3.49	6.94	27.66	99.15	0.61	16.39	21.13	17.10	8.38	1.84
Distrito Federal	10.45	2.09	19.03	45.90	99.54	0.06	11.02	8.10	6.46	0.46	1.79
Mexico State	9.06	4.38	6.11	16.70	98.90	1.68	26.78	13.03	10.64	13.00	1.87
South	7.28	14.82	0.59	9.83	95.60	5.20	11.10	2.27	2.22	41.58	2.03
Chiapas	6.67	17.80	0.75	6.00	95.87	8.67	7.21	0.28	0.38	51.27	2.12
Guerrero	7.25	16.68	0.15	16.90	95.31	5.77	6.83	0.12	0.06	41.81	2.09
Oaxaca	6.94	16.27	0.69	8.00	94.35	6.22	24.79	0.41	0.47	52.68	1.98
Quintana Roo	8.95	4.77	0.00	11.40	96.18	0.60	2.26	0.09	0.10	11.85	1.86
Yucatán	8.20	9.23	1.59	13.60	97.36	3.60	14.27	1.37	1.22	16.00	1.84

Source: Based on figures from INEGI. Indicators constructed from various publications (population and housing census, economic census, and state statistical yearbooks). Campeche and Tabasco are excluded.

Table 7.2 reports the regional indicators for 2008 that are majorly comparable to those in table 7.1 (the manufacturing indicator now reverts to the +250 employees' bracket) All indicators are constructed from INEGI figures, and they are related to publications data series from 2008 and 2010, following the same definitions as in subsection 3.3 for human capital, infrastructure, economic orientation, demographic structure, and fertility. Here, I provide a summary of the sources and the specific reference years used for each indicator.

The human capital indicators (average years of schooling and the illiteracy rate for individuals aged 15 and older) are taken from the 2010 National Population and Housing Census. The same census provides the percentage of households with access to electricity, which continues to serve as a proxy for basic infrastructure, living standards, and the capacity for modernization and technological adoption.

The demographic indicators are also based on data from 2010. The rural population share is measured using the same methodology as the tables before but now based on the 2010 census. The fertility indicator is the logarithm of births per 1,000 women aged 15 to 49, derived from INEGI vital statistics on registered births and census information on the number of women by age group in 2010.

Infrastructure indicators are updated to reflect conditions in the late 2000s. The railroads variable (kilometers of track per 100 square kilometers of state land area) uses 2008 information from INEGI transport statistics and state statistical yearbooks. The telephone density indicator (telephone lines per 100 persons) is based on 2008 figures from state statistical yearbooks, combined with CONAPO population series, which captures cross-state differences in access to traditional communication networks. The percentage of households with electricity is taken from the 2010 Census

The economic orientation indicators, namely the agriculture and manufacturing shares of GSP, rely on 2008 value added by sector from INEGI's System of National Accounts, as reported in the 2011 publication of the state statistical yearbooks.

Finally, the indicators for large manufacturing plants and employment are derived from INEGI's 2009 economic census, based on the stratification of manufacturing plants, which reports data for 2008. In line with subsection 3.3, large plants are defined as establishments with 250 or more employees. For each state, I calculate its share of the national total number of large plants and its share of the total number of workers employed in these plants. Together, the infrastructure, sectoral composition, large manufacturing plants, and demographic indicators in table 7.2 provide a consistent picture of Mexico's regional structure around 2008 that can be directly compared with the 2001 benchmark in table 7.1.

Section 4.4 Conditional Convergence (2001-2019) – Summary Results

This subsection presents OLS conditional convergence results for Mexican states over the post-2001 period using updated per-capita GDP data. Table 8 reports estimates for 2001 to 2008, 2008 to 2019, and the full 2001 to 2019 interval, controlling for structural state-level characteristics.

Table 8. OLS Conditional Convergence (2001–2008, 2008–2019, 2001–2019)

	Updated GDP (price base 2018)								
	2001–2008			2008–2019			2001–2019		
	Coefficient	*t*-statistic	*p*-value	Coefficient	*t*-statistic	*p*-value	Coefficient	*t*-statistic	*p*-value
Log(initial per-capita GDP)	-0.0509	-0.65	0.528	0.0706	0.79	0.439	0.0037	0.06	0.952
Average schooling years	-0.0734	-0.58	0.568	0.0755	0.68	0.508	0.0041	0.04	0.967
Log(initial per-capita GDP)×Schooling	0.0070	0.65	0.526	-0.0072	-0.77	0.451	-0.0002	-0.02	0.981
Dummy border states×Schooling	-0.0023	-1.33	0.203	-0.0006	-0.74	0.468	-0.0012	-0.94	0.362
Illiteracy rate	0.0027	1.54	0.144	-0.0010	-0.72	0.484	0.0012	0.89	0.385
Railroads/size of state	-0.0024	-1.63	0.122	0.0012	1.05	0.309	-0.0005	-0.46	0.654
Telephones per 100 persons	-0.0011	-0.55	0.590	0.0001	0.13	0.899	-0.0003	-0.19	0.851
% Households with electricity	0.0003	0.20	0.846	0.0004	0.18	0.857	0.0004	0.32	0.754
Agricultural output (% of GDP)	0.0013	1.18	0.257	0.0006	0.67	0.510	0.0010	1.18	0.255
Manufacturing output (% of GDP)	0.0001	0.18	0.861	0.0002	0.75	0.464	0.0002	0.52	0.611
% Large firms	0.0019	1.60	0.128	0.0002	0.24	0.816	0.0010	1.09	0.293
Rural population (% of total)	0.0000	0.00	0.996	-0.0004	-1.25	0.230	-0.0002	-0.47	0.648
Log(fertility rate)	-0.0530	-0.76	0.460	0.0566	0.91	0.375	0.0104	0.19	0.849
R^2	0.3944			0.4984			0.3011		
Adjusted R^2	-0.0976			0.0909			-0.2668		
N	30			30			30		

Notes: Following Chiquiar's (2005) control variables set. Constant terms are estimated but not reported. Campeche and Tabasco excluded.

Table 8 reports OLS conditional convergence regressions for the updated per capita GDP series, using the control variables reconstructed in Tables 7.1 and 7.2. Across all specifications, the conditional relationship between initial income and subsequent growth is weak and statistically not significant. This pattern holds both when the post 2001 period is split into two subperiods, 2001 to 2008 and 2008 to 2019, and when growth is evaluated over the full horizon from 2001 to 2019. Taken together, the results indicate that once structural characteristics are controlled for, initial income does not emerge as a systematic driver of state level growth in the post 2001 era.

For 2001 to 2008, most coefficients are small and imprecisely estimated. The point estimate on initial log income is negative, but it is not statistically distinguishable from zero. This imprecision is consistent with a period in which trade integration continued after NAFTA, but the gains from export-oriented manufacturing remained concentrated in a limited set of northern and central states. During the early 2000s, manufacturing expansion was reinforced by the post 2000 acceleration of integration and by shifts in global competition after China joined the World Trade Organization in 2001. In contrast, many other states remained dependent on lower productivity activities, including agriculture, local services, public administration, and an expanding informal sector. In this environment, conditional convergence is not expected to operate through a stable income-based mechanism, because growth depended primarily on whether a state was positioned to benefit from external demand and manufacturing agglomeration rather than on its initial income level.

For 2008 to 2019, the coefficient on initial income becomes positive, but it remains statistically insignificant. The interpretation is that the divergence signal suggested by the point estimate loses relevance once inference is considered. This period includes the contraction associated with the global financial crisis, followed by a slow and uneven recovery in global investment and trade. These dynamics are particularly relevant for an export-oriented economy such as Mexico, and they likely amplified cross state heterogeneity through differences in industrial exposure and trade sensitivity. The period also coincides with sustained weakness in the oil and gas sector associated with the decline in PEMEX output and revenues beginning around 2012. Even though Campeche and Tabasco are excluded from the baseline sample, oil related activities remain relevant for several states through employment and public finance linkages. At the same time, manufacturing intensive regions benefited from peso depreciation during 2014 to 2016 and from stronger US manufacturing demand during much of the 2011 to 2018 recovery, while other states were more constrained by limited industrial diversification, weaker fiscal capacity, or stagnant public spending. Overall, the evidence suggests that post crisis growth outcomes were shaped more by the interaction between localized shocks and preexisting structural rigidities than by a stable convergence or divergence process tied to initial income.

Evaluating the full period from 2001 to 2019 yields the same qualitative conclusion. The coefficient on initial income is effectively zero and imprecise, indicating that any convergence or divergence forces operating within the subperiods do not cumulate into a systematic long run income-based pattern once controls are included. This result is consistent with the interpretation that the post 2001 period is characterized by income persistence driven by heterogeneous exposure to global shocks and structural constraints, rather than by a common adjustment mechanism pushing poorer states to catch up or richer states to pull away.

The conditional evidence in Table 8 also aligns with the absolute convergence results reported earlier. In particular, the weak and unstable association between initial income and growth resembles the nearly flat growth income relationship documented in Table 6. Across both unconditional and conditional specifications, the post 2001 period does not display a robust tendency toward convergence or divergence. Instead, relative income positions appear broadly persistent, and the determinants of growth are better captured by differences in human capital, infrastructure, sectoral composition, and exposure to external disturbances than by initial income itself.

Section V - Migration, Reallocation, and Indigenous Dynamics (1980–2020)

Migration interacts with regional convergence through several closely related channels. First, population movements reallocate labor toward regions with higher income levels and stronger economic performance. Second, migration mechanically affects per-capita income measures through changes in population size. Third, migration reshapes the observed relationship between initial income and subsequent growth. This section examines these channels using a descriptive and accounting approach rather than a causal framework. Migration is considered a response to regional economic conditions, and the analysis focuses on how population movements mechanically influence observed income levels and growth patterns.

The section begins by documenting the empirical relationship between internal migration and regional income levels. Using state-level data and aggregated macro-regions, subsection 5.1 shows that higher-income regions tend to attract net migration inflows, while lower-income regions experience net outflows, although the strength of this pattern varies across decades. subsections 5.2 and 5.3 then translate these migration patterns into growth implications. An accounting decomposition links net migration to per-capita growth and observed growth–income relationships are compared with counterfactual paths that abstract from migration. This comparison clarifies how migration can flatten or steepen the growth–income relationship depending on the broader macroeconomic environment.

The final parts of the section extend the analysis to population composition and spatial patterns. subsection 5.4 examines how migration flows interact with changes in indigenous-speaking population shares across states, documenting demographic reallocation without implying structural convergence. subsection 5.5 complements this analysis with migration and indigenous population maps that visualize these dynamics and connect demographic change to the convergence patterns discussed earlier.

Section 5.1 Relative Per capita GSP Levels VS. Internal Migration (1985–2020)

This subsection describes the relationship between per capita gross state product levels and net inflow rates at the state level. For descriptive and visual purposes, states are grouped into five macro regions Border, Northern Central, Southern Central, Capital, and South, as defined in Table 1. This regional classification is used solely to organize states with broadly similar income levels and migration patterns and does not alter the underlying state level analysis.

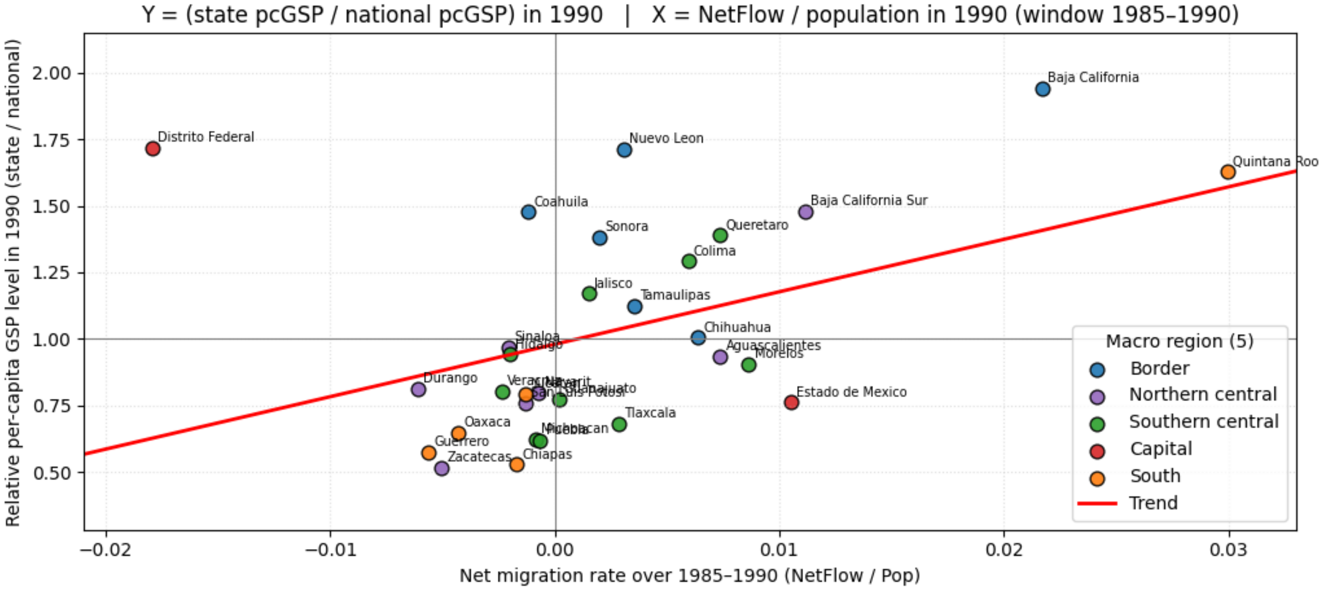
All migration variables are constructed using data from the INEGI Population and Housing Censuses (from 1980, 1990, 2000, 2010 and 2020), which are conducted at ten-year intervals. Migration flows are derived from the census question that asks individuals whether they changed their state of residence during the previous five years. As a result, the analysis naturally relies on five-year migration windows centered on each census round. Specifically, the exercise considers the periods 1985 to 1990, 1995 to 2000, 2005 to 2010, and 2015 to 2020.

For each migration window, all states are plotted individually. The horizontal axis reports the net inflow rate, defined as net migration inflows divided by state population and annualized by dividing by five to ensure consistency across periods. The vertical axis shows per capita gross state product relative to the national average in the final year of each window, using the same normalization procedure applied throughout the section.

Gross state product and population data are obtained from INEGI and CONAPO, respectively, and are harmonized to ensure consistency across periods. States are color coded by macro region, and a fitted line summarizes the overall cross-sectional relationship in each period. The analysis is purely descriptive and does not aim to establish causal effects.

To maintain consistency with earlier sections and to avoid distortions driven by oil related output dynamics, Campeche and Tabasco are excluded from the sample throughout this section.

Figure 4. Mexico states (5 Regions): Relative per-capita GSP level vs net migration rate (1985–1990)
Y = (state pcGSP / national pcGSP) in 1990 | X = NetFlow / population in 1990 (window 1985–1990)



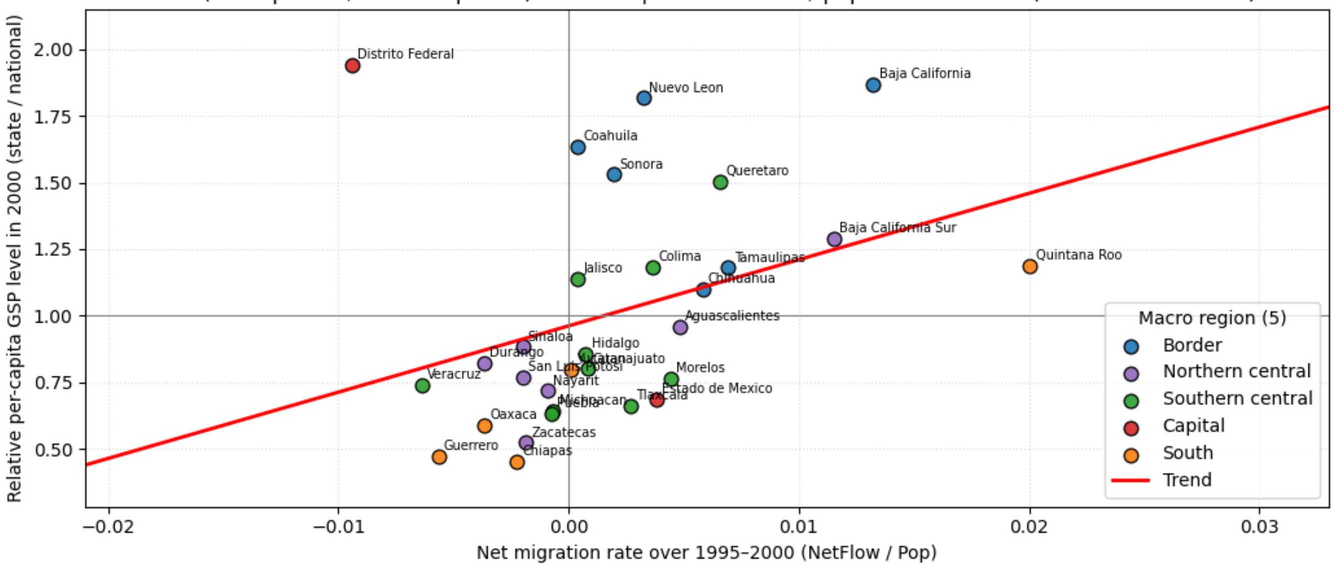
Notes: Campeche and Tabasco are excluded from the sample.

Migration rates are computed from five-year net flows and reported in annual units (divided by 5).

In the late 1980s, the plot already looks consistent with the broader reallocation that followed the debt crisis and the first phase of market reforms. Even before NAFTA, trade liberalization and the gradual rise of export-oriented production started to shift labor demand toward the north. Border states tend to combine above average income levels with positive net inflow rates, which fits the early expansion of maquila activity after Mexico joined GATT in 1986 and the growing importance of cross border logistics and manufacturing supply chains. By contrast, many southern states remain concentrated at low-income levels and show net outflows, consistent with slower structural change, weaker infrastructure, and continued reliance on lower productivity sectors.

A useful feature of this period is the position of Distrito Federal. It sits at a very high-income level but exhibits net outflows. Rather than contradicting the income gradient, this pattern is consistent with a setting where migration responds to a wider set of forces than wages alone. In a large metropolitan economy, internal migration can reflect suburbanization, housing market pressures, congestion costs, and the relocation of households to nearby states within the same functional labor market. In that sense, Distrito Federal can be interpreted as an early example of spatial reallocation within a metropolitan region, where workers and households move for affordability and amenities while remaining connected to the capital's labor market. This helps explain why a high-income location can be a net sender in the data even if it remains the core of high productivity activity.

Figure 5. Mexico states (5 Regions): Relative per-capita GSP level vs net migration rate (1995–2000)
Y = (state pcGSP / national pcGSP) in 2000 | X = NetFlow / population in 2000 (window 1995–2000)

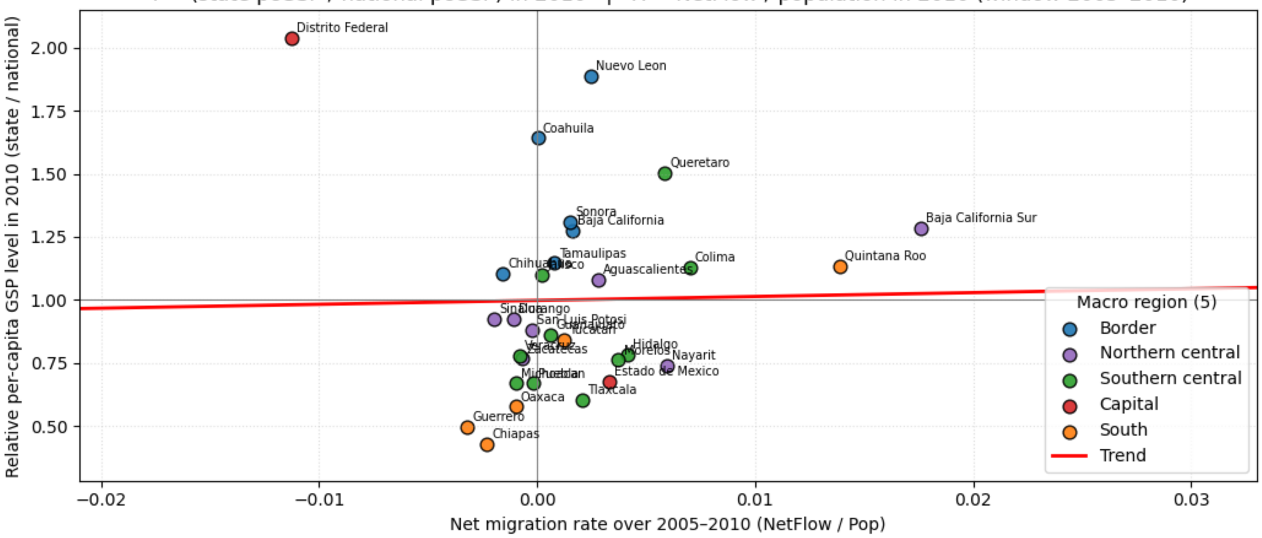


Notes: Campeche and Tabasco are excluded from the sample.

Migration rates are computed from five-year net flows and reported in annual units (divided by 5).

The income migration relationship becomes sharper in the second half of the 1990s, during the period shaped by NAFTA and the recovery from the peso crisis. Border states consolidate as major destinations of internal migration. They combine high income levels with strong net inflows, consistent with rapid expansion in export manufacturing, foreign direct investment, and the concentration of tradable sector job creation in the north. The contrast with the south also becomes clearer. Most southern states remain net senders at low-income levels, reflecting weaker integration into trade related growth and slower labor demand growth in formal sectors. Quintana Roo remains a partial exception because its growth is tied more to tourism and services than to manufacturing, so it can attract migrants despite being outside the export corridor. Distrito Federal again stands out as a high-income but net-outflow state. While the Capital retained a dominant role in services and administration, its industrial base continued to decline, and rising urban costs reduced its attractiveness relative to emerging northern and central manufacturing hubs. The five-region breakdown highlights that migration during this period responded not only to income gaps but also to differences in regional growth trajectories and labor-market dynamism.

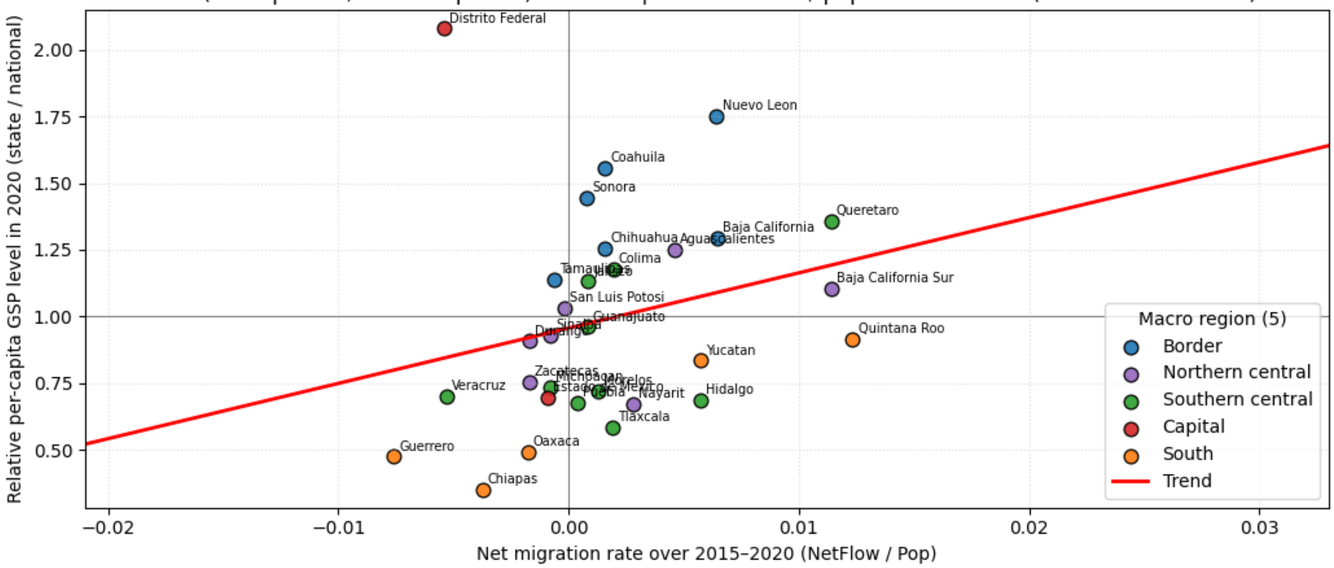
Figure 6. Mexico states (5 Regions): Relative per-capita GSP level vs net migration rate (2005–2010)
Y = (state pcGSP / national pcGSP) in 2010 | X = NetFlow / population in 2010 (window 2005–2010)



Notes: Campeche and Tabasco are excluded from the sample.
Migration rates are computed from five-year net flows and reported in annual units (divided by 5).

From 2005 to 2010, the relationship weakens in a way that is consistent with several shocks hitting the same set of destination states. Border states remain among the highest income states, but their net inflow rates become smaller and more dispersed. A plausible interpretation is that the "income signal" was partly dominated by changes in expected job finding and perceived risk. First, the mid 2000s were the period in which Mexico's labor-intensive manufacturing faced sharper competition from China, reducing the certainty of employment growth in some export-oriented locations even when income levels stayed high. Second, the global financial crisis from 2008 to 2009 produced a sudden fall in external demand, which is precisely the margin that matters for border manufacturing hubs tied to the US cycle. Third, and implicit shift on importance for migration decisions, this window overlaps with the sharp rise in drug related violence after 2006. Even if insecurity is not observed, it can affect migration by changing the utility of living in some places, shifting destination choices away from high income but high-risk municipalities, and increasing the option value of staying put. In practice, this can flatten the relationship because some high-income border states no longer attract the same net inflows, while some safer central states can receive migrants even without being at the very top of the income distribution

Figure 7. Mexico states (5 Regions): Relative per-capita GSP level vs net migration rate (2015–2020)
Y = (state pcGSP / national pcGSP) in 2020 | X = NetFlow / population in 2020 (window 2015–2020)



Notes: Campeche and Tabasco are excluded from the sample.

Migration rates are computed from five-year net flows and reported in annual units (divided by 5).

By the late 2010s, income-related migration patterns become more pronounced again. Border states re-emerge as strong net recipients of migrants while maintaining high relative per-capita GSP, consistent with renewed industrial expansion, tighter U.S.–Mexico production linkages, and early signs of nearshoring dynamics. Southern states remain net senders with low-income levels, showing little evidence of convergence despite a decade of national policy efforts aimed at regional development. Distrito Federal continues to combine very high income with net out-migration, underscoring the persistence of decentralization and the limited capacity of the Capital to absorb additional inter-state population. Taken together, the figure indicates that internal migration remains systematically oriented toward high-income, high-growth regions, while the South continues to supply labor to the rest of the country, reinforcing long-standing spatial inequalities.

In summary, these patterns confirm that internal migration in Mexico is systematically oriented toward higher-income and faster-growing regions, reinforcing existing spatial asymmetries. This directional flow implies that labor reallocation follows, rather than counteracts, pre-existing regional differences, shaping income dynamics even without changes in underlying productivity.

Section 5.2 Internal Migration and Per-Capita Growth Accounting Decomposition

This subsection builds on the descriptive evidence on internal migration and relative income by quantifying the potential contribution of interstate migration to per capita output growth. The purpose is not to estimate the causal effect of migration on growth. Instead, the analysis applies a simple accounting framework that uses observed net inflow rates to compute implied per capita growth effects under alternative assumptions about how gross state product responds to population changes. The main motivation is to assess whether the magnitude of internal migration observed across Mexican states is large enough to generate economically meaningful effects on per capita growth, and to provide a transparent link between migration patterns and the convergence results documented earlier.

The analysis combines state level migration data with state level output data over four decades. Net migration is measured as the annualized net inflow rate, computed as total net inflows over each migration window divided by population and scaled by the length of the window. Per capita output growth is computed from real gross state product per capita using annualized log differences. To align migration with subsequent growth outcomes, each decade of per capita growth is matched to the final five-year migration window within that decade. Specifically, growth over 1980 to 1990 is matched with migration over 1985 to 1990, and this timing convention is applied consistently through the final period of the analysis. This approach treats migration as occurring late in each decade and avoids mechanically pairing long run growth with contemporaneous decade average migration flows.

Because the population concept underlying the migration data differs from that implicit in the output accounts, net inflow rates are computed using the population denominators reported in the census migration data for each decade. Aggregation across states is performed using gross state product weights constructed from the output data. This weighting scheme follows the logic of the accounting exercise and ensures that aggregate effects reflect economic size rather than population size.

Formally, let $m_{s,w}$ denote the net inflow rate of state (s) over window (w), defined as net inflows relative to population. Let $GSP_{s,w}$ denote gross state product and let $g_{s,w}$ denote the annual growth rate of per capita output. Per capita growth can be written as the difference between growth in total output and population growth associated with migration:

$$g_{s,w} = \Delta \ln\left(GSP_{s,w}\right) - m_{s,w}. \qquad (4)$$

Define $\varepsilon_{s,w}$ as the elasticity of gross state product with respect to migration. The percentage change in total output associated with migration is:

$$\Delta \ln\left(GSP_{s,w}\right) = m_{s,w} \cdot \varepsilon_{s,w}. \qquad (5)$$

Substituting equation (5) into equation (4) yields the migration induced component of per capita growth:

$$\Delta g_{s,w} = m_{s,w}(\varepsilon_{s,w} - 1). \qquad (6)$$

Equation (6) makes clear that migration affects per capita growth only if total output does not adjust one for one with population. When $\varepsilon_{s,w} = 1$, output grows proportionally with population and migration has no effect on per capita growth. When $\varepsilon_{s,w} < 1$, inflows raise output less than proportionally, reducing per capita growth. When $\varepsilon_{s,w} > 1$, inflows raise output more than proportionally, increasing per capita growth.

Using this identity, a counterfactual per capita growth rate in the absence of migration is constructed as:

$$g_{s,w}^{cf} = g_{s,w}^{obs} - \Delta g_{s,w}. \qquad (7)$$

This counterfactual captures how fast per capita output would have grown absent net migration, given a particular elasticity assumption.

It is important to emphasize that a moderate convergence effect of migration does not imply overall convergence in per capita incomes. Migration affects growth only through the accounting channel captured by $\Delta g_{s,w}$. Overall growth differences across states also reflect a residual component, $g_{s,w}^{cf}$, which aggregates all non migration forces, including productivity growth, capital accumulation, institutional quality, and infrastructure investment. This decomposition is made explicit in equation (7) and is illustrated in Figures 8 to 11, where the counterfactual growth rate is shown by the red lines. In several periods, particularly in states experiencing large migration inflows, counterfactual growth remains high, indicating that migration dampens divergence without overturning underlying productivity driven growth differences.

The decade specific evidence suggests that migration reinforces convergence in periods where underlying growth forces are already convergent, notably in the 1980s and the early 2000s. In contrast, during the 1990s and the 2010s, divergence driven by productivity and investment dynamics dominates, and the equalizing effect of migration is quantitatively insufficient to offset these forces.

To clarify this mechanism, consider two states with equal initial populations, one net inflow state and one net outflow state. A convergent migration effect requires:

$$\Delta g^{out} - \Delta g^{in} > 0, \qquad (8)$$

since outflows raise per capita growth in the sending state relative to the receiving state. However, the overall growth differential satisfies:

$$g_{out}^{obs} - g_{in}^{obs} = (g_{out}^{cf} - g_{in}^{cf}) + (\Delta g_{out} - \Delta g_{in}).$$

Even when migration contributes to convergence, overall divergence remains possible if non migration forces favor the inflow state strongly enough:

$$g_{out}^{obs} - g_{in}^{obs} < 0 \text{ if } g_{out}^{cf} - g_{in}^{cf} < -(\Delta g_{out} - \Delta g_{in}). \qquad (9)$$

Migration can therefore act as an equalizing adjustment mechanism without being the dominant driver of long run convergence.

The key input in the counterfactual exercise is the elasticity $\varepsilon_{s,w}$, which is not estimated. Instead, the analysis proceeds by calibration. I adopted a simple production-based decomposition:

$$\varepsilon_{s,w} = \lambda_{s,w}(\theta + \eta(1 - \theta)). \qquad (10)$$

Here, θ denotes the labor share in production, $\lambda_{s,w}$ captures the effectiveness of migrant labor relative to native labor, and η measures the elasticity of non-labor inputs with respect to effective labor. The parameter $\lambda_{s,w}$ is allowed to differ between net inflow ($\lambda_{s,w}^{in}$ if $m_{s,w} > 0$) and net outflow states ($\lambda_{s,w}^{out}$ if $m_{s,w} < 0$) , while θ and η are assumed constant across states and over time.

The assumption that $\eta < 1$ reflects adjustment frictions in non-labor inputs. As migration increases effective labor, complementary inputs such as physical capital, infrastructure, housing, and public services cannot expand one for one due to capacity constraints, rising marginal costs, regulatory friction, and time to build. These mechanisms generate diminishing returns at the local level and provide an economic rationale for allowing the elasticity of non-labor input to be below unity.

A useful benchmark is the case $\lambda^{in} = \lambda^{out} = \eta = 1$, under which $\varepsilon = 1$ for all states and migration has no effect on per capita growth by construction. Departures from this benchmark generate nonzero migration effects by introducing heterogeneity in elasticities across states. When λ^{in} and λ^{out} are comparable, changes in θ and η have a roughly neutral effect on the aggregate migration contribution, since positive and negative effects tend to offset across inflow and outflow states.

The calibration of λ^{in} and λ^{out} is motivated by the substantial and persistent per capita GSP gaps documented in Table 1. For net inflow states, migrant labor is assumed to be less effective on impact and λ^{in} is set to 0.7, reflecting frictions such as imperfect matching, lack of local experience, sectoral mismatch, and higher participation in informal employment. For net outflow states, λ^{out} is set to 1.30, capturing the possibility of positive selection among migrants and implying that population losses may reduce effective labor more than proportionally. These values are not intended as structural estimates but as transparent benchmarks that allow the implied output elasticity to fall below one in inflow states and slightly above one in outflow states.

Finally, the calibration values to the parameters θ and η are set to 0.75 and 0.50 respectively which are consistent values with national accounts evidence and plausible adjustment frictions. Together with the migrant effectiveness parameters, they determine the magnitude of the accounting terms without altering the qualitative conclusions. As with all calibration choices in this subsection, the objective is not identification but clarity, providing an interpretable benchmark that links observed migration flows to implied per capita growth effects.

Table 9. Robustness: Counterfactual Growth (Including vs Excluding the Capital)

Panel A. Including all states

Decade window	GSP-weighted mean of m	GSP-weighted mean of $m\varepsilon$	GSP-weighted mean of $\Delta g = m(\varepsilon - 1)$	GSP-weighted mean of g^{obs}	GSP-weighted mean of g^{cf}	Share of GSP in outflow states	Number of states
1980–1990	-0.000828	-0.002547	-0.001719	-0.002925	-0.001206	0.521188	30
1990–2000	-0.000330	-0.001457	-0.001127	0.019780	0.020907	0.443916	30
2000–2010	-0.000937	-0.001692	-0.000755	-0.001632	-0.000877	0.444113	30
2010–2020	0.000252	-0.000655	-0.000906	0.000857	0.001763	0.498910	30

Panel B. Excluding the capital (Ciudad de México)

Decade window	GSP-weighted mean of m	GSP-weighted mean of $m\varepsilon$	GSP-weighted mean of $\Delta g = m(\varepsilon - 1)$	GSP-weighted mean of g^{obs}	GSP-weighted mean of g^{cf}	Share of GSP in outflow states	Number of states
1980–1990	0.003131	0.001359	-0.001771	-0.007527	-0.005756	0.410218	29
1990–2000	0.001634	0.000432	-0.001202	0.017142	0.018344	0.323288	29
2000–2010	0.001260	0.000543	-0.000716	-0.002713	-0.001997	0.325913	29
2010–2020	0.001376	0.000379	-0.000997	0.000375	0.001372	0.399169	29

Notes. GSP-weighted decade aggregates. Campeche and Tabasco are excluded from the sample. Migration rates (m) are annualized by dividing five-year flows by 5, so Δg and g^{obs} are in consistent annual units.

Table 9 reports decade-level aggregates constructed as GSP-weighted averages across states. For each decade, the table summarizes the average net inflow rate, the migration-related output term implied by the accounting framework, and the resulting contribution of migration to per-capita GSP growth. Observed growth and counterfactual growth are reported together, where the counterfactual removes the migration-induced component from observed growth. The table should be interpreted as an aggregate accounting decomposition that translates migration flows into per-capita growth outcomes at the national level, rather than as evidence from a regression or causal identification strategy.

The table is organized into two panels. Panel A includes all states, while Panel B excludes the capital (Distrito Federal). The motivation for separating the capital is economic rather than mechanical. Distrito Federal combines a very large share of national output with a migration pattern that differs from standard predictions of internal migration models. Despite relatively high per-capita GSP, the capital records net outflows in most decades, a pattern that is informative rather than anomalous.

A natural interpretation is that migration involving the capital reflects metropolitan reallocation rather than movement driven by regional income differentials. Distrito Federal functions as the core of a large urban labor market, and population movements toward surrounding states often correspond to residential relocation within the same metropolitan area. In administrative data, these flows appear as inter-state outflows even though they do not imply a reduction in economic activity at the center. In addition, the migration data capture only domestic inter-state movements; they do not account for foreign migrants entering the capital or residents who leave the country, which may further affect the measured net inflow rate.

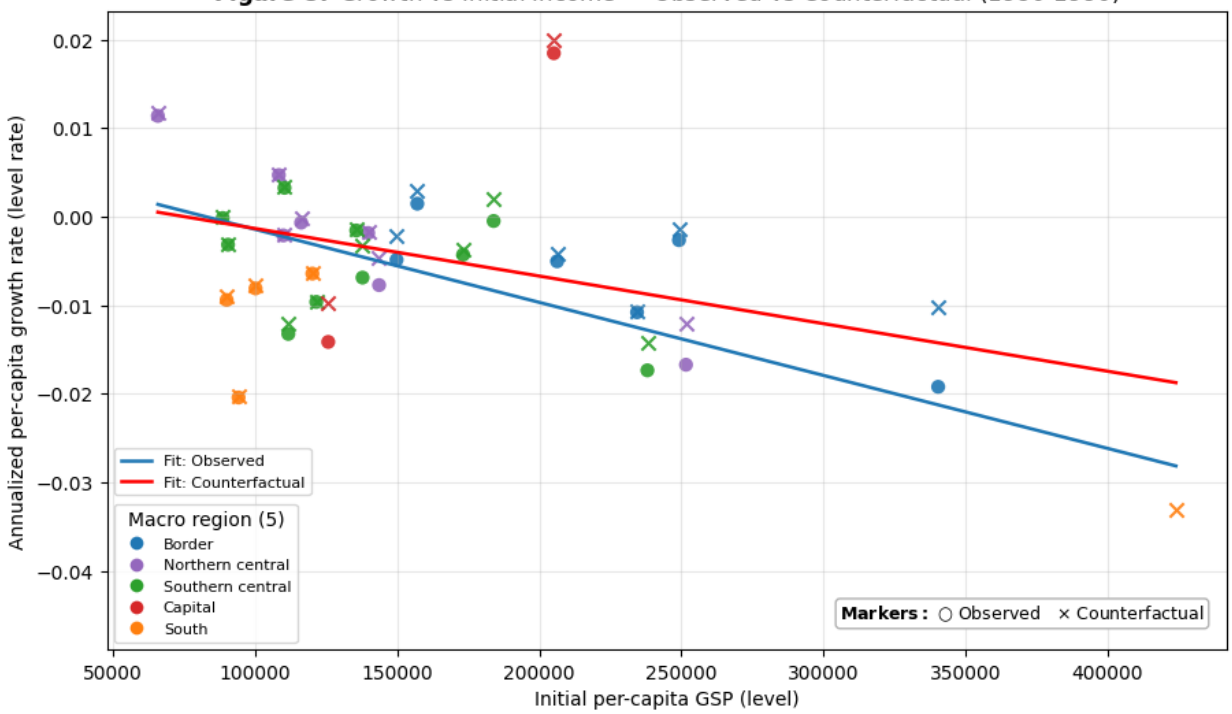
This feature has first-order implications for GSP-weighted aggregates. When Distrito Federal is included, its large economic weight gives substantial influence on its net outflow rate, leading the GSP-weighted mean of the net inflow rate to be negative in several decades, even when many other states exhibit positive inflows. Panel B therefore excludes the capital as a robustness check. While the sign and magnitude of the average inflow rate changes, the migration-induced growth component remains negative, indicating that the aggregate accounting results are not driven mechanically by the capital but are sensitive to heterogeneity in state size and migration behavior.

It is important to mention that this interpretation is reinforced by the regional decomposition presented in Appendix A.9. While Table 9 aggregates migration and growth at the national level, Appendix A.9 reorganizes the same accounting framework at the level of five macro regions, allowing the contribution of the capital region to be assessed in its broader spatial context. The regional results show that the capital consistently combines a large GSP share with net outflows, while surrounding regions absorb inflows associated with metropolitan expansion. As a result, the negative migration related growth component observed at the national level is not driven solely by the capital but reflects a systematic reallocation of population across economically interconnected regions. By aggregating states into macro regions, Appendix A.9 clarifies that the capital's migration pattern is not anomalous but representative of a broader metropolitan adjustment process, in which population movements reflect residential reallocation and congestion dynamics rather than income driven migration alone. This regional perspective helps explain why excluding Distrito Federal in Panel B of Table 10 alters the average inflow rate while leaving the qualitative accounting results unchanged and highlights the role of spatial heterogeneity in shaping the decade level migration growth relationship.

Section 5.3 Migration Effects Under Observed VS Counterfactual GSP (1980-2020)

To relate the migration analysis in subsections 5.1 and 5.2 to the broader convergence–divergence patterns studied earlier in the paper, this subsection examines how migration affects the cross-state relationship between initial income and subsequent growth. For each decade, I compare the observed relationship between annualized per-capita GSP growth and initial per-capita GSP with a counterfactual relationship in which the migration-induced growth component is removed. This comparison is not intended as a causal exercise. Rather, it uses the accounting framework developed in subsection 5.2 to assess how internal migration mechanically influences the income–growth profile across states. By focusing on the slope of the growth–income relationship, the figures illustrate whether migration amplifies convergence, attenuates divergence, or reshapes the overall growth–income gradient through population reallocation. To be consistent with previous sections, all figures exclude oil states to avoid distortions from resource-driven dynamics and focus on domestic inter-state movements only.

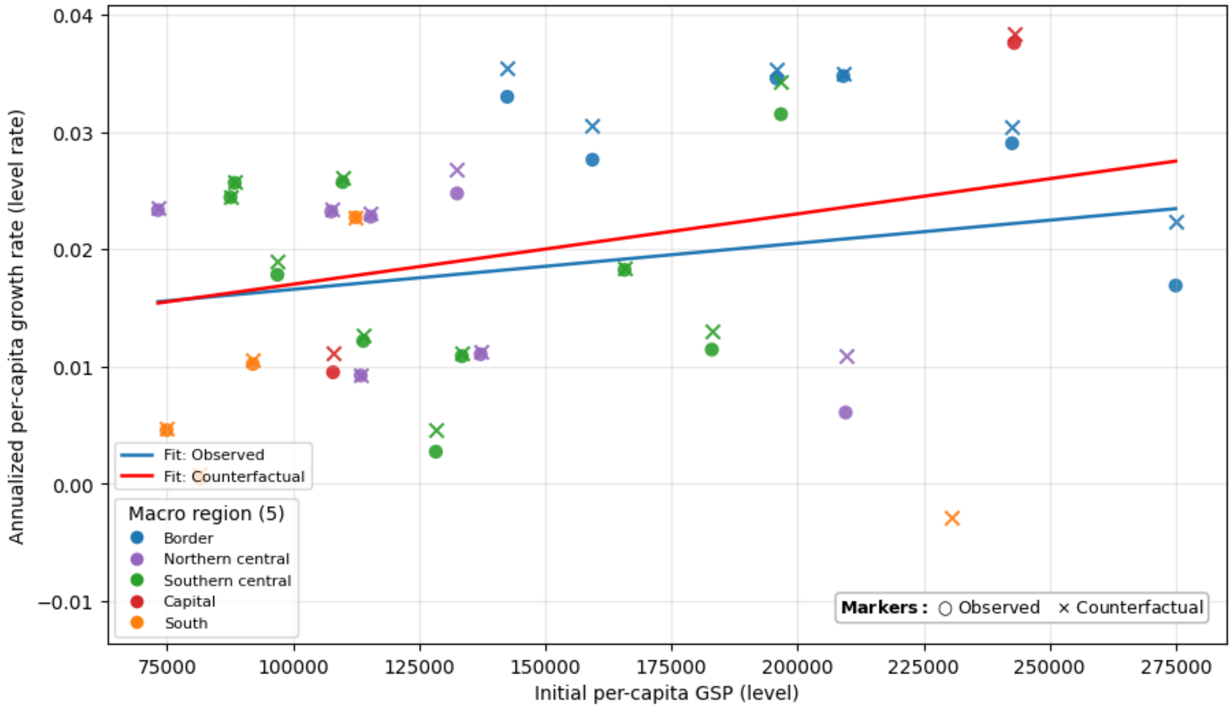
Figure 8. Growth vs Initial Income — Observed vs Counterfactual (1980-1990)



Notes: Campeche and Tabasco are excluded from the sample. Migration rates (m) are annualized: 5-year rate divided by 5.

The 1980 to 1990 decade displays a clearly negative relationship between observed growth and initial income, consistent with the strong convergence dynamics documented earlier and characteristic of a low-growth, capital-constrained economy emerging from the debt crisis and the collapse of the ISI regime. In this environment, growth opportunities were broadly limited and highly sensitive to labor reallocations rather than to capital deepening or technological upgrading. The counterfactual relationship remains negative but is noticeably flatter, indicating that without migration convergence would still have occurred but at a slower pace. Migration therefore strengthens the observed convergence pattern by increasing the responsiveness of growth to initial income differences: labor flows out of low-productivity, low-income regions and into relatively more productive ones, accelerating the equalization of income levels even when aggregate growth is weak.

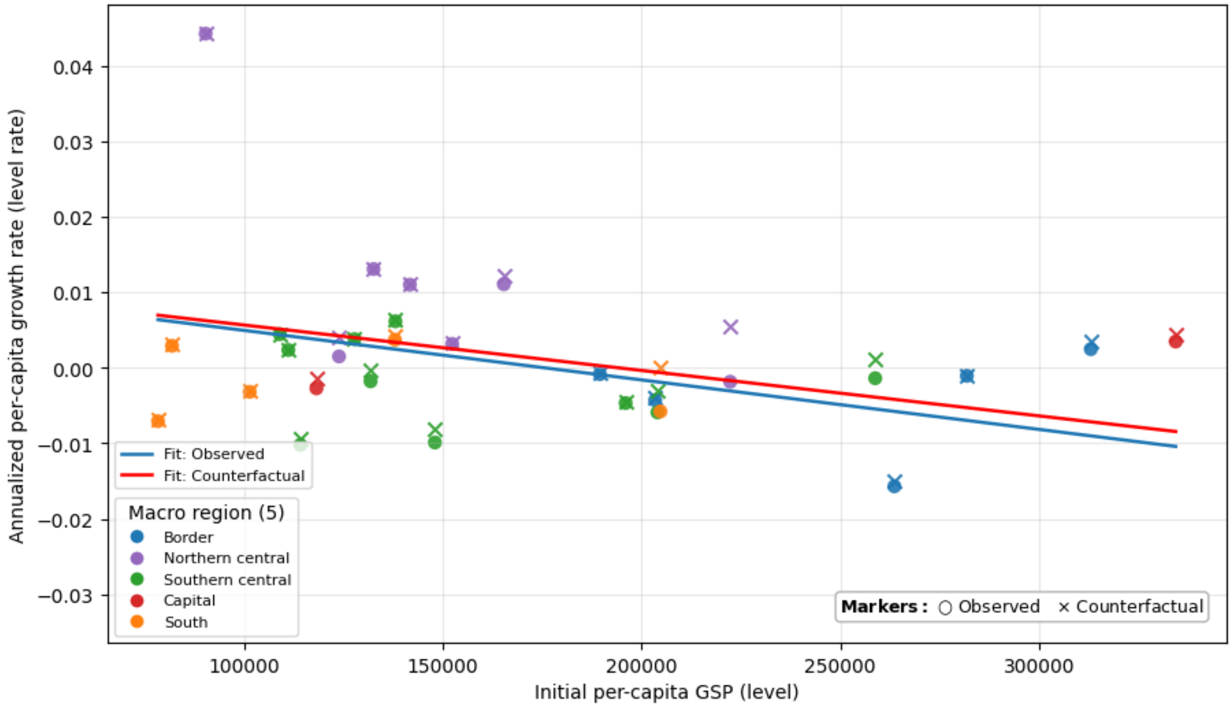
Figure 9. Growth vs Initial Income — Observed vs Counterfactual (1990-2000)



Notes: Campeche and Tabasco are excluded from the sample. Migration rates (m) are annualized: 5-year rate divided by 5.

The macroeconomic environment changed fundamentally in the 1990 to 2000 decade following trade liberalization, NAFTA, and the Tequila crisis. In this period, the counterfactual growth–income relationship becomes upward sloping, indicating that underlying growth forces favored divergence, as higher-income states were better positioned to attract foreign investment, integrate into export markets, and exploit scale economies. Migration operates against this structural tendency. By reallocating workers toward expanding, high-productivity regions, migration raises effective labor supply precisely where capital accumulation and productivity are strongest, thereby compressing regional growth differentials. As a result, the observed growth–income relationship is substantially flatter than the counterfactual one. From a macroeconomic perspective, migration acts as a stabilizer that dampens trade-induced divergence, even though it does not fully reverse the underlying structural advantage of richer regions.

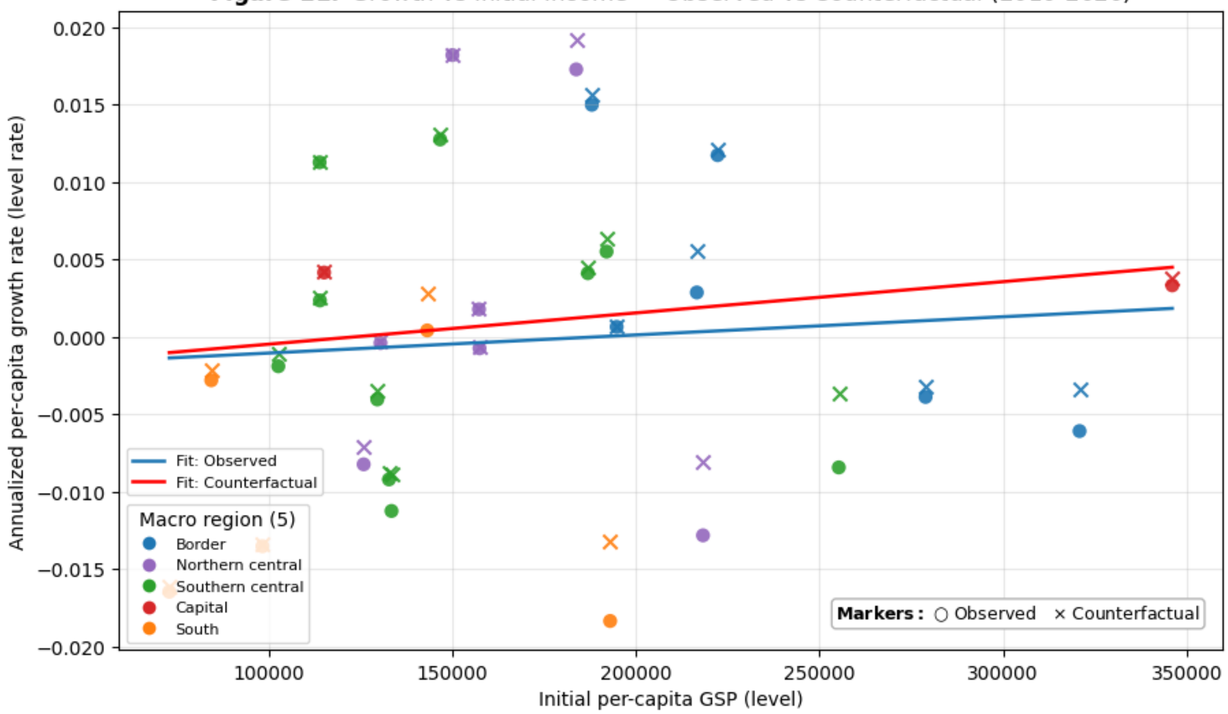
Figure 10. Growth vs Initial Income — Observed vs Counterfactual (2000-2010)



Notes: Campeche and Tabasco are excluded from the sample. Migration rates (m) are annualized: 5-year rate divided by 5.

During the 2000 to 2010 decade, both observed and counterfactual relationships revert to negative slopes, reflecting a period of slower and more synchronized growth following China's WTO entry and culminating in the global financial crisis. In this environment, growth is less driven by regional specialization and more constrained by common macroeconomic shocks and financial conditions. The smaller gap between observed and counterfactual slopes implies that migration continues to matter, but its quantitative impact on the cross-state growth pattern is reduced. Labor reallocation still operates, but with fewer high-growth poles to absorb migrants, its effect on relative growth becomes more muted.

Figure 11. Growth vs Initial Income — Observed vs Counterfactual (2010-2020)



Notes: Campeche and Tabasco are excluded from the sample. Migration rates (m) are annualized: 5-year rate divided by 5.

In the 2010 to 2020 period, the economy enters a prolonged phase of low growth characterized by weak investment, slow productivity gains, and limited structural transformation. The counterfactual relationship is again upward sloping, indicating that absent migration, higher-income states would have experienced faster growth due to persistent advantages in human capital, infrastructure, and market access. Migration partially offsets this divergence by reallocating labor toward these high-productivity regions, expanding labor supply and limiting wage and output growth there relative to what would otherwise have occurred. Consequently, the observed growth–income relationship is flatter than the counterfactual one, but still upward sloping. Migration therefore moderates divergence but no longer has the strength to generate convergence in a stagnating macroeconomic environment.

As a conclusion, the four decades together show that internal migration consistently flattens the income growth relationship across Mexican states. When underlying forces point toward convergence, migration makes convergence stronger; when structural change or trade integration generates divergence, migration dampens but does not eliminate it. Migration thus operates as a powerful stabilizing mechanism, reducing the sensitivity of regional growth to initial income. Crucially, this stabilization arises mechanically through population reallocation rather than through changes in productivity, technology, or capital accumulation. As a result, part of the convergence or divergence observed in standard growth regressions reflects demographic adjustment rather than purely economic fundamentals.

The stabilizing role of migration can be illustrated by a simple two state benchmark. Consider two states of equal population, one net inflow state and one net outflow state, with migration rates satisfying $m^{in} = -m^{out}$. The difference between the migration induced growth components in the outflow and inflow states can be written as:

$$\Delta g^{out} - \Delta g^{in} = m^{out}\big(\lambda^{out}\big(\theta + \eta(1-\theta)\big) - 1\big) - m^{in}\big(\lambda^{in}\big(\theta + \eta(1-\theta)\big) - 1\big)$$

$$= -m^{in}((\lambda^{in} + \lambda^{out})(\theta + \eta(1-\theta)) - 2).$$

Migration contributes to convergence whenever this difference is positive, which occurs only if:

$$(\lambda^{in} + \lambda^{out})(\theta + \eta(1-\theta)) < 2 \qquad (11)$$

Equation (11) condition has a transparent interpretation. The term $\theta + \eta\,(1-\theta)$ summarizes the effective elasticity of output with respect to labor once adjustment frictions in non-labor inputs are considered, while $\lambda^{in} + \lambda^{out}$ captures the combined effectiveness of migrant labor across inflow and outflow states. When the product of these terms is sufficiently small, population movements reduce growth more in inflow states than in outflow states, narrowing growth differentials and generating a convergence effect. Conversely, if migrant labor were fully effective and complementary inputs adjusted one for one, migration would have little effect on relative growth.

This benchmark helps clarify the broader results. Under plausible calibrations in which migrant labor is less effective on impact in inflow states and non-labor inputs adjust sluggishly, the condition for convergence is naturally satisfied. Migration therefore tends to compress growth differences even in environments where underlying structural forces generate divergence. Importantly, this mechanism operates mechanically through population reallocation rather than through changes in productivity, technology, or capital accumulation. As a result, part of the convergence or divergence observed in standard growth regressions reflects demographic adjustment rather than purely economic fundamentals, reinforcing the interpretation that migration acts as a stabilizing force in Mexico's regional growth dynamics.

Section 5.4 Indigenous Population Plots

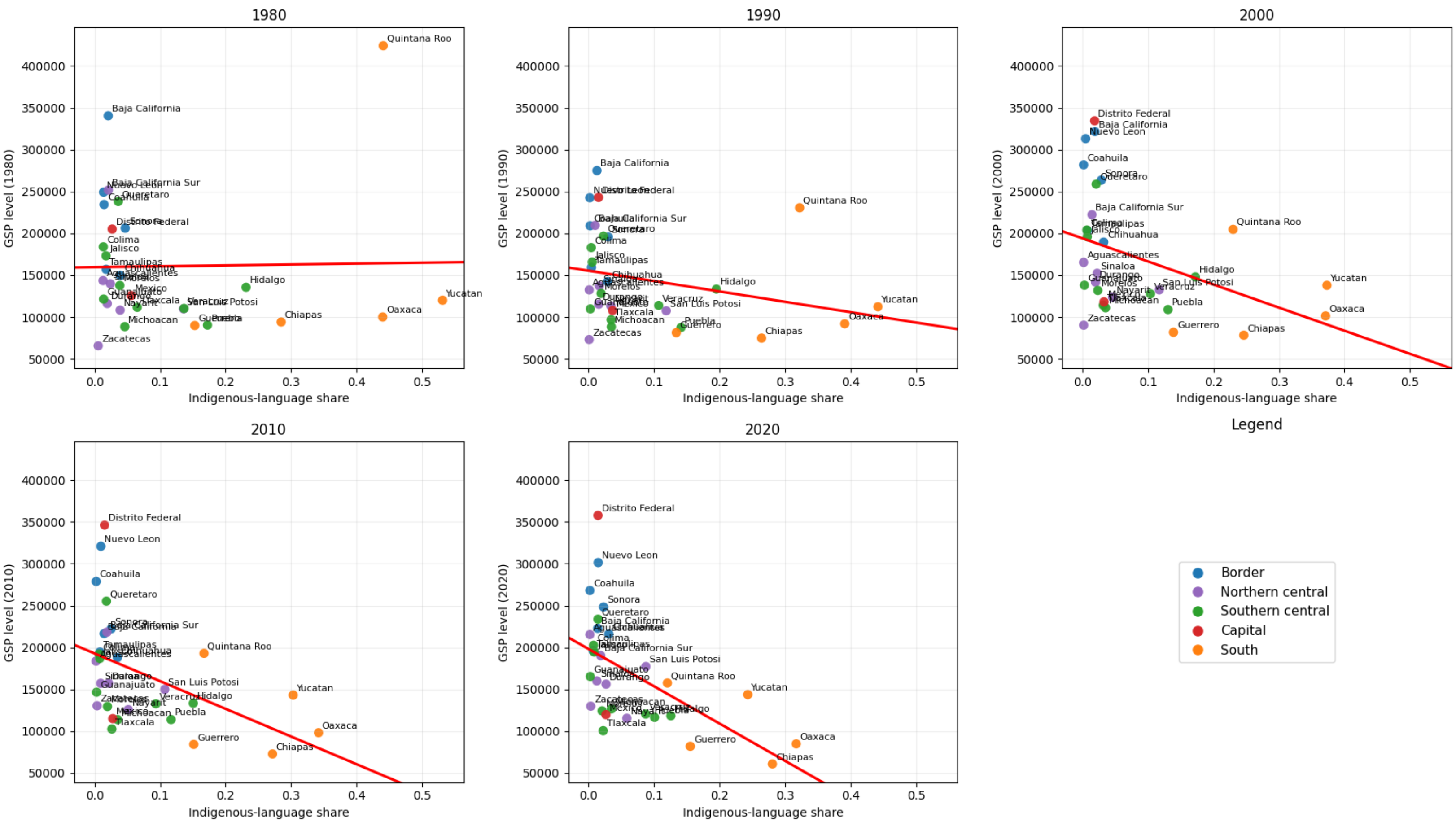
This subsection examines the relationship between internal migration, changes in the indigenous share of the population, and regional income dynamics. The objective is not to interpret indigenous status as a causal determinant of growth, but rather to use variation in indigenous population shares as an informative proxy for long run structural and demographic heterogeneity across states. In the Mexican context, indigenous language prevalence is strongly correlated with historical patterns of settlement, educational attainment, labor market segmentation, and access to infrastructure, all which shape both migration behavior and economic outcomes.

The indigenous share is defined as the fraction of the +5 years old population that reports speaking an indigenous language. This measure reflects a complex combination of factors, including historical persistence of indigenous communities, selective out migration, educational access, urbanization, and assimilation dynamics. Changes in the indigenous share over time may arise from migration flows that are themselves selective by skill, language, and sector of employment, from demographic trends, or from shifts in self-identification and language transmission across generations. As a result, movements in this variable capture broader processes of social and economic transformation rather than a single underlying mechanism.

The empirical analysis focuses on how migration flows mechanically affect the spatial distribution of indigenous populations and how this redistribution interacts with observed growth patterns. Migration from traditionally high indigenous share regions toward lower share regions can dilute indigenous concentration in origin states while increasing it in destination states, even in the absence of changes in individual productivity or preferences. The section therefore treats changes in indigenous share as an outcome of migration and demographic adjustment, rather than as an exogenous driver of economic performance.

All indigenous share measures are constructed using data from the INEGI Population and Housing Censuses (1980, 1990, 2000, 2010 and 2020), which report indigenous language use at the individual level. Consistent with the migration analysis in earlier sections, the data are organized by decade, and changes in indigenous share are evaluated over the same census-based windows. This ensures coherence between the migration measures, which rely on the census question about place of residence five years earlier, and the demographic composition variables used.

Figure. 12 Indigenous share and per-capita GSP level (levels by year)



Notes: Campeche and Tabasco excluded from the sample.

Figure 12 shows the indigenous shares computed as total indigenous population divided by total population per state and per capita GSP level in real terms (updated series from previous sections) INEGI's "2018-price based" for each start of decade between 1980 to 2020:

In 1980, income levels across states already display a clear structural divide associated with indigenous population share. States with high indigenous language presence are systematically concentrated at the bottom of the income distribution, while high-income states almost exclusively exhibit very low indigenous shares. This suggests that regional inequality predates the major reform episodes and reflects long-standing differences in productive structure, urbanization, and access to formal markets. At this stage, the relationship appears rigid rather than transitional, indicating limited scope for spontaneous convergence.

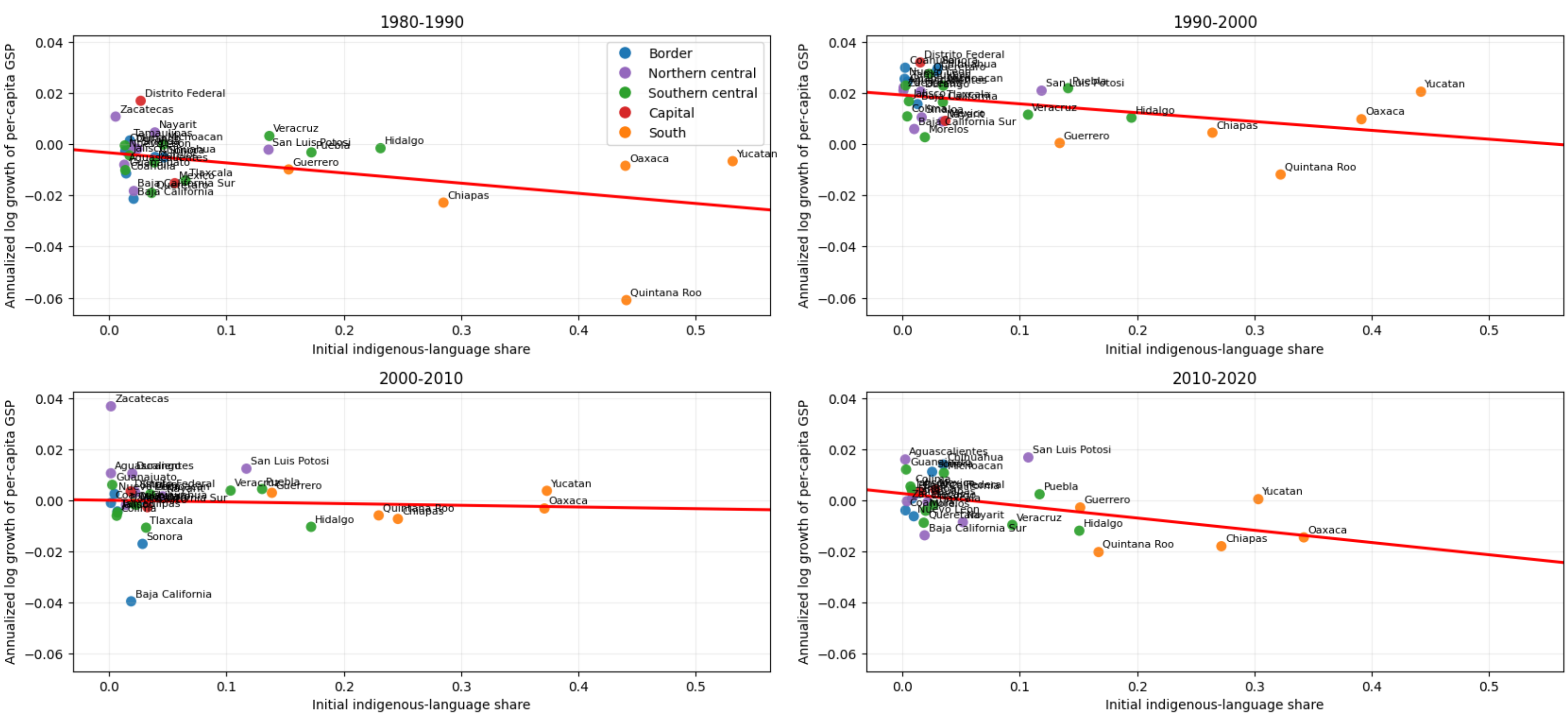
A decade later (1990), income dispersion increases and the negative association with indigenous share becomes more pronounced. High-income states consolidate their advantage, while indigenous-intensive states remain trapped at low-income levels. The absence of upward movement among high indigenous-share states suggests that the growth of the late 1980s and early 1990s did not translate into structural upgrading for these regions. Income differences increasingly reflect cumulative advantages rather than short-run shocks.

Moving into 2000, the income hierarchy across states is even more clearly stratified. Several low indigenous-share states move further ahead, widening the gap relative to indigenous-intensive regions. While some middle-income states emerge, they are still characterized by relatively low indigenous shares. This indicates that economic expansion during the 1990s benefited regions already integrated into national and international markets, leaving traditional indigenous regions largely unaffected in terms of income levels.

For the 2010 analysis, the income distribution shows strong persistence. The top of the distribution is dominated by a small group of states with favorable geography, infrastructure, and industrial composition, while indigenous-intensive states remain far below the national frontier. Even states with moderate indigenous shares do not exhibit significant income catching up. This pattern suggests that structural constraints linked to human capital, informality, and remoteness continue to limit income growth in indigenous regions.

By the end of the sample period 2020, income rankings appear remarkably stable relative to the previous decade. Indigenous-intensive states continue to occupy the lowest positions in the income distribution, indicating strong path dependence. Despite overall national growth and regional diversification elsewhere, these states remain largely disconnected from high-income trajectories. Figure 12 thus highlights that income inequality across Mexican states is deeply entrenched and closely aligned with indigenous population concentration, reflecting persistent structural and institutional barriers rather than temporary economic conditions.

Figure. 13 Indigenous share (initial) and per-capita GSP growth (annualized log)



Notes: Campeche and Tabasco excluded from the sample.

Figure 13 focuses on growth rather than levels, examining whether states with higher indigenous population shares display systematically different growth trajectories over time. While Figure 12 documents persistent income gaps, this figure addresses whether these gaps tend to narrow or widen through differential growth. It therefore provides direct evidence on convergence versus divergence dynamics across regions.

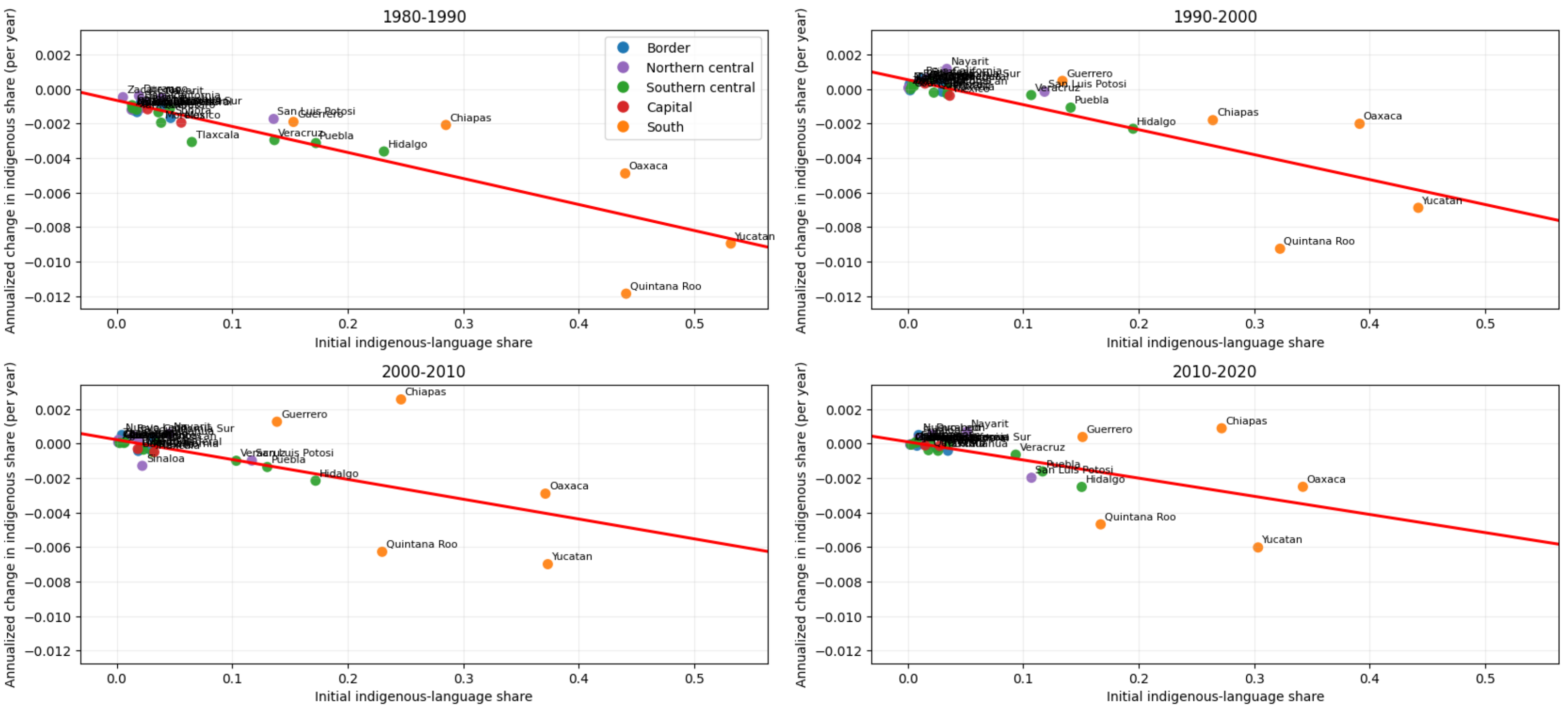
In the 1980s, Figure 13 shows a weak but negative relationship between initial indigenous share and subsequent income growth. This suggests that indigenous-intensive states did not catch up during the early phase of structural adjustment. Growth was limited everywhere due to the debt crisis, but poorer and more indigenous regions performed especially badly. This decade establishes that indigenous concentration is associated not only with low levels, but also with weaker short-run growth capacity.

During the 1990s, the negative slope becomes clearer. States with low indigenous shares experienced higher growth, while indigenous-intensive regions failed to benefit from trade liberalization and industrial expansion. Figure 13 highlights that growth opportunities created by NAFTA were spatially selective and favored already advantaged regions. Indigenous concentration is correlated with exclusion from the growth channels opened by globalization

In the 2000s, the relationship flattens somewhat. Growth differences narrow, but not because lagging regions accelerate, but rather because leading regions slow down. This suggests a temporary weakening of diverging forces, driven by macroeconomic shocks and security issues, not by structural convergence. Indigenous-intensive states still do not display systematically higher growth, reinforcing the idea that growth constraints remain structural.

By the 2010s, the negative relationship re-emerges more clearly. Regions with higher indigenous shares again show lower growth rates. Figure 13 indicates that long-run growth dynamics continue to favor regions with better human capital, connectivity, and institutional capacity.

Figure. 14 Indigenous share (initial) and annualized change in indigenous share



Notes: Campeche and Tabasco excluded from the sample.

Figure 14 shifts attention from economic outcomes to demographic change, linking initial indigenous population shares to subsequent changes in those shares. The figure captures how migration, assimilation, and differential population growth reshape regional population composition over time. This perspective helps distinguish persistent structural characteristics from evolving demographic processes.

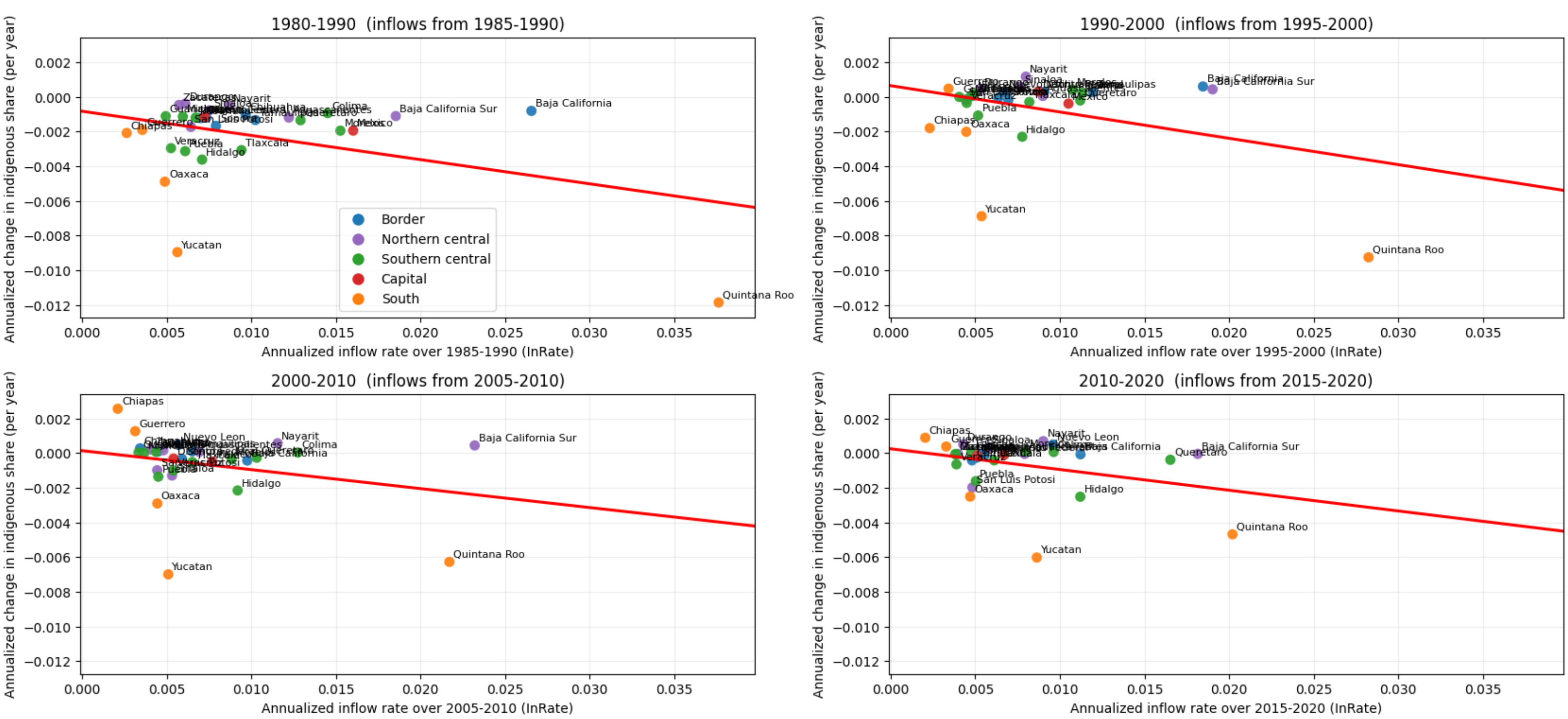
In the 1980s the figure shows a strong negative relationship between initial indigenous share and changes in that share. States with large indigenous populations experienced the fastest declines. This reflects strong assimilation pressures and selective migration: non-indigenous inflows and language shift disproportionately affected high-indigenous regions. The figure highlights demographic vulnerability rather than economic performance.

In the 1990s, this pattern intensifies. Indigenous-intensive states continue to lose share rapidly, while low-indigenous states experience stability or slight increases. Figure 14 suggests that internal migration redistributes indigenous populations across space, weakening their concentration in traditional regions. This decade emphasizes mobility and compositional change rather than natural population growth.

During the 2000s, the relationship weakens and partially reverses for some high-indigenous states. Several traditional indigenous regions stabilize or even increase their indigenous share. This reflects reduced in-migration of non-indigenous populations and continued demographic resilience. Figure 14 here captures a pause in assimilation dynamics rather than a reversal of long-term trends.

For the last period between 2010 to 2020, declines resume in several high-indigenous states, especially those undergoing urban expansion. Figure 14 suggests that demographic change is now driven less by massive migration waves and more by generational language loss and urban integration. Indigenous share changes become slower but remain asymmetric across regions.

Figure. 15 Migration inflow rate (annualized) and annualized change in indigenous share



Notes : Campeche and Tabasco excluded from the sample.

Figure 15 connects migration inflows directly to changes in indigenous population shares, highlighting migration as a key mechanism behind demographic transformation. It clarifies whether migration acts as a neutral adjustment process or whether it systematically alters regional composition. In doing so, the figure links economic opportunity to demographic outcomes.

Between 1980 to 1990 the figure shows a clear negative association: states with higher migration inflows experience larger declines in indigenous share. Migration acts as a direct dilution mechanism. This indicates that demographic change is not random but tightly linked to population mobility toward expanding regions.

The relationship strengthens in the 1990s. Migration inflows increasingly concentrate in dynamic regions, accelerating the reduction of indigenous shares there. Figure 15 highlights migration as a channel through which economic restructuring reshapes demographic composition.

In the 2000s, the link weakens. Migration becomes more dispersed and constrained by insecurity, reducing its demographic impact. Figure 15 suggests that migration loses part of its explanatory power for indigenous share changes during this decade.

By the 2010s, migration again correlates with declining indigenous shares, but more moderately. Migration now reinforces existing demographic patterns rather than transforming them. Figure 15 points to migration as a reinforcing, not equalizing, force in the long run.

Taken together, Figure 12 through 15 provides a coherent picture of persistent regional inequality shaped by structural conditions, migration, and demographic change. Income levels are strongly stratified along indigenous population lines, and growth dynamics do little to offset these initial disparities, indicating limited convergence over time. Demographic adjustments through migration and changes in indigenous population shares do not operate as equalizing forces; instead, migration tends to reinforce existing spatial and economic patterns by concentrating population growth in already dynamic regions and altering local population composition. Overall, the panel evidence suggests that internal migration and demographic change interact with pre-existing structural constraints, reinforcing long-run regional divergence rather than mitigating it.

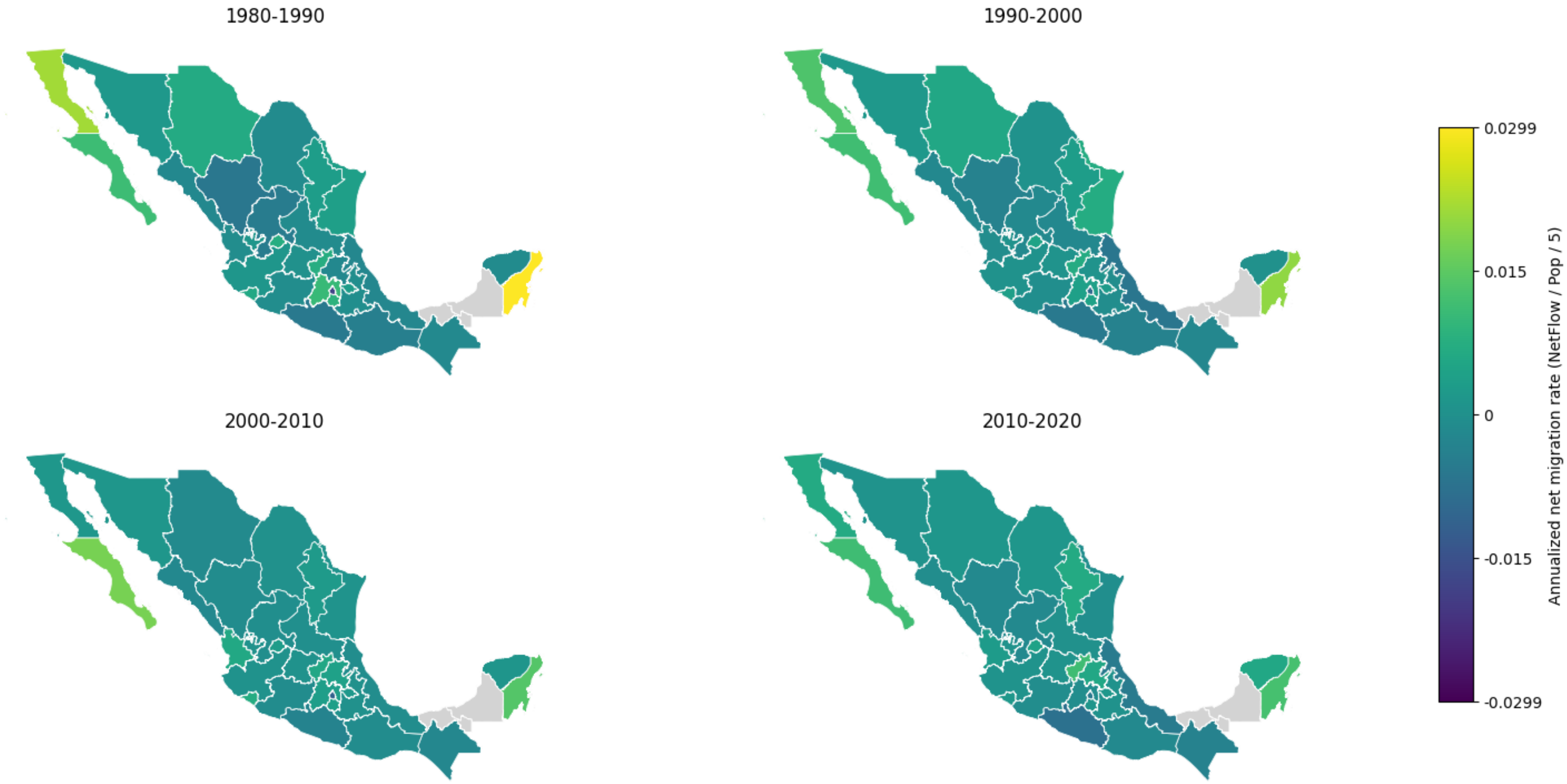
Section 5.5 Migration and Indigenous Speaking Population Maps

This subsection complements the previous empirical exercises by providing a spatial perspective on internal migration flows and the distribution of the indigenous speaking population across Mexican states. While earlier sections focused on regression-based relationships and accounting decompositions at the state level, the maps presented here are intended to visualize how migration and demographic composition are organized in geographic space and how these patterns evolve over time. The objective is to highlight spatial regularities and regional clustering that may be less transparent in tabular or scatter plot representations.

The maps display the intensity of migration inflows and outflows alongside the spatial distribution of indigenous language prevalence, allowing a direct visual comparison between population movements and long-standing demographic heterogeneity. This perspective is particularly useful for understanding whether migration flows tend to reinforce existing spatial disparities or contribute to their gradual diffusion across regions. By examining both variables jointly, the section provides additional intuition on how migration reshapes the geographic distribution of population groups that are historically linked to differences in education, sectoral composition, and access to infrastructure.

Importantly, the maps are descriptive and do not imply causal relationships between migration and indigenous population shares. They serve to summarize complex spatial dynamics in a transparent way and to connect the state level evidence discussed earlier with the underlying geography of Mexico. In doing so, the section reinforces the interpretation that internal migration operates through spatial reallocation processes that interact with preexisting demographic and economic structures, rather than through uniform national mechanisms.

Figure 16. Annualized net migration rate (oil states shown in grey)



Notes: Campeche and Tabasco excluded from the sample.

Figure 16 Mexico's map displays the annualized net migration rate, defined as net flows divided by state population and then divided by five years. From 1980 to 1990 net migration is already very uneven across space. Tourism and border destinations (Quintana Roo, Baja California, Baja California Sur) stand out as clear net receivers with annual net inflow rates well above the rest of the country, while many central and southern states in the South region (for example Puebla, Oaxaca, Chiapas) show values close to zero or slightly negative, which indicates that they send more migrants out than they receive.

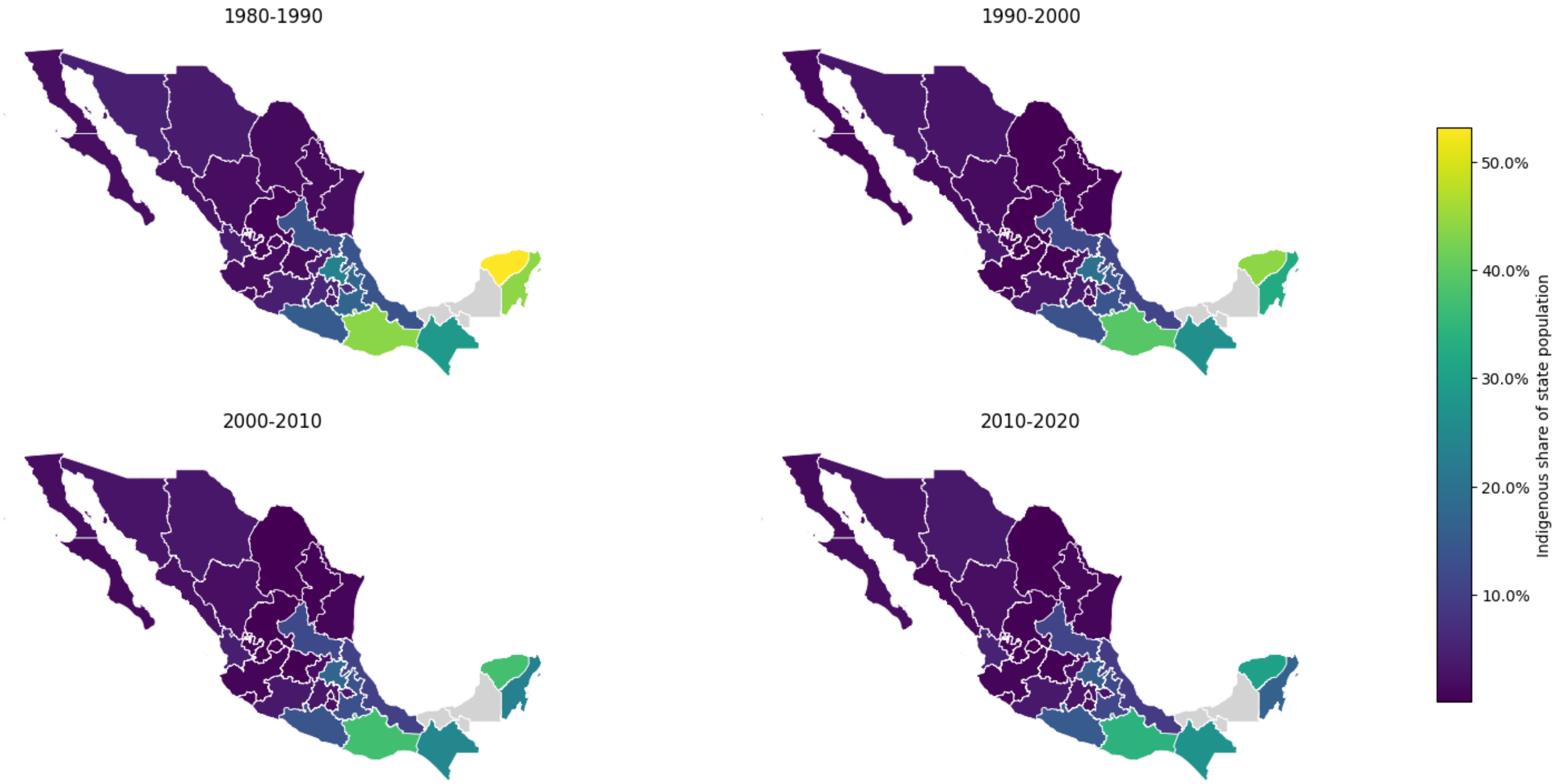
In 1990 to 2000 these destinations remain dominant. Tourism and border states (Quintana Roo, Baja California, Baja California Sur) continue to absorb positive net inflows, and the map suggests that once a region becomes a migration pole, networks and accumulated advantages help sustain that role. At the same time a large group of southern and interior states in the South region (Puebla, Oaxaca, Chiapas, Guerrero) keep recording small negative or near zero net rates, which implies that internal migration is not redirecting population toward lagging regions.

In 2000 to 2010 net migration rates become somewhat less extreme but still show a clear concentration. Tourism and border states (Quintana Roo, Baja California, Baja California Sur) continue to receive population on net, whereas most other states, including many in the south-central corridor (Puebla, Hidalgo, Veracruz), lie close to the zero line. This pattern points to high gross mobility but relatively small net changes in population for most states and suggests that internal migration does not generate large scale re allocation at the state level.

In 2010 to 2020 the polarization remains visible. A short list of relatively prosperous and safer regions in the tourism and central growth corridor (Quintana Roo, Baja California, some central states such as Querétaro and Aguascalientes) records positive net inflows, while several poorer or more conflict affected states in the South region (Guerrero, Oaxaca, Chiapas) exhibit negative rates. Most states still cluster around small values, so even where signs differ, the quantitative magnitude of net migration is limited. Over the four decades internal migration consistently adds population to a few growth poles while leaving many other states either slowly losing population or roughly in balance.

As main takeaways from figure 16, net migration is spatially very concentrated and numerically modest for most states. A small number of tourism and border destinations (Quintana Roo and Baja California) systematically gain population through internal migration. Many central and southern states in the South region (Puebla, Oaxaca, Chiapas, Guerrero) rarely become strong net receivers and often act as mild net senders. Migration therefore appears to reinforce existing growth poles rather than redistributing population broadly across Mexican states.

Figure 17. Indigenous share within each state (oil states shown in grey)



Notes: Campeche and Tabasco excluded from the sample.

Figure 17 reports, for each decade, the indigenous share within each state, measured as the fraction of the state population aged five and above that speaks an indigenous language. The map therefore captures differences in indigenous intensity across states. Campeche and Tabasco are excluded from the sample and shown in grey.

In 1980 to 1990, indigenous intensity is clearly concentrated in the southern and southeastern part of the country. States such as Oaxaca, Chiapas, Yucatán and Quintana Roo exhibit the highest indigenous shares within their population. A second group of states in the south-central corridor, including Guerrero, Puebla, Veracruz and Hidalgo, shows intermediate levels. In contrast, northern and northwestern states such as Nuevo León, Coahuila, Sonora and Chihuahua display very low indigenous shares, establishing a strong spatial gradient early on.

In 1990 to 2000, the same regional hierarchy remains firmly in place. The southern states continue to record the highest indigenous intensity, while the south-central belt occupies an intermediate position. Northern and border states remain characterized by very low indigenous shares. Differences across decades are modest and do not alter the ranking of states in any substantial way.

In 2000 to 2010, the map continues to highlight the dominance of the southern corridor in terms of indigenous population intensity. Oaxaca and Chiapas remain at the top of the distribution, followed by Yucatán and Quintana Roo, while the south-central states retain intermediate values. The North remains uniformly low, reinforcing the idea that indigenous population patterns are strongly rooted in long standing regional structures.

In 2010 to 2020, the overall picture is largely unchanged. High indigenous shares persist in the South and Southeast, intermediate shares remain concentrated in the south-central states, and very low shares characterize most northern and border states. While some variation in intensity can be observed across decades, these movements are small relative to the large and persistent regional gaps.

The main takeaway from Figure 17 is that indigenous population intensity in Mexico is geographically concentrated and highly persistent over time. Southern states consistently display high indigenous shares within their population, south central states occupy an intermediate position, and most northern and border states remain at very low levels. The stability of this pattern suggests that indigenous demography is a slow-moving process closely tied to historical, social and economic conditions at the regional level.

Taken together, Figures 16 and 17 show that internal migration and indigenous population intensity follow distinct but closely related spatial patterns. Net migration is concentrated in a limited set of dynamic destinations, particularly tourism-oriented states, border regions, and a few central growth poles such as Quintana Roo, Baja California, Baja California Sur, Querétaro and Aguascalientes. In contrast, states with high indigenous population intensity, primarily in the South and parts of the south-central corridor, rarely emerge as major net receivers of population.

Section VI - Conclusion

This thesis set out to examine why regional income disparities in Mexico have remained present over time, despite deep economic transformation, increasing trade integration since GATT and NAFTA, and sustained internal migration. Rather than focusing only on whether convergence occurred, the analysis considered how internal labor reallocation and changes in population composition interacted with long run growth dynamics across states. By combining absolute and conditional convergence analysis with an accounting mechanism that links growth to migration flows and population shifts, the thesis provides a more detailed interpretation of Mexico's regional development experience.

The main result is that internal migration in Mexico has functioned as a reallocation mechanism and, at the same time, has not operated as a force generating sustained regional convergence. Across decades and specifications, migration flows were generally directed toward states with higher income levels, stronger employment growth, and closer links to trade related production. This pattern holds both when revisiting the original convergence framework using alternative Gross State Product series and when extending the analysis to the post 2001 period. Migration responded systematically to differences in regional opportunities, supporting expansion in leading states, but these movements did not translate into a meaningful improvement in the relative position of lagging regions.

The convergence analysis confirms that the breakdown documented in earlier decades did not reverse in a more mature open economy. Even after accounting for conditioning variables, convergence remained limited, particularly in periods shaped by stronger external competition following China's entry into the WTO and by the contraction associated with the global financial crisis. These results suggest that openness and external shocks affect regions asymmetrically, reinforcing existing differences rather than eliminating them.

Migration plays an important role in this interpretation. While mobility helped labor markets adjust to trade related and macroeconomic shocks, it operated as a moderate equalizing force rather than a mechanism of full convergence. Migration flows tended to follow growth opportunities, reallocating labor toward higher productivity regions, but this reallocation also dampened growth differentials by limiting divergence. As workers moved toward leading states, sending regions experienced population outflows that mechanically reduced pressure on local labor markets, while receiving regions faced diminishing returns and congestion effects. As a result, migration contributed to partial convergence without fundamentally reshaping the relative position of lagging regions.

The analysis of indigenous speaking population shares adds an additional layer to this interpretation. The decline in indigenous concentration in southern regions and its partial redistribution across space reflects demographic adjustment and mobility, but it does not eliminate long standing disadvantages related to human capital, sectoral composition, and labor market integration. Changes in population composition therefore interacted with migration and growth in ways that moderated, but did not overturn, persistent regional disparities.

In conclusion, the findings suggest that regional inequality in Mexico persists not because labor mobility is absent, but because mobility operates within unequal structural conditions shaped by trade integration, external shocks, and long-standing regional differences. Revisiting convergence through multiple methods and extending the analysis to recent decades helps clarify why these patterns have endured over time. Migration has a moderate convergence effect that contributes to adjustment and stability, but it falls far short of generating full convergence in the absence of parallel improvements in local conditions in lagging regions.

Czech Summary

Práce ukazuje, že regionální příjmové rozdíly v Mexiku přetrvávají navzdory ekonomické transformaci, obchodní integraci a dlouhodobé vnitřní migraci. Migrace zde funguje především jako mechanismus přerozdělování pracovní síly, nikoli jako zdroj trvalé regionální konvergence. Migrační toky směřují zejména do států s vyššími příjmy a produktivitou, čímž podporují růst vedoucích regionů, aniž by zásadně zlepšily postavení regionů zaostávajících.
Konvergenční analýza potvrzuje, že ani v pozdějším období otevřené ekonomiky nedošlo k výrazné konvergenci. Regionální nerovnosti tak odrážejí přetrvávající strukturální rozdíly, které samotná mobilita pracovní síly nedokáže odstranit.

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Appendix

Appendix 1. Per capita GDP by state – Chiquiar

Table A.1. Chiquiar's Per capita GDP by state

Federal Entity	Per capita GDP (national average = 100.0)				Annual per capita growth (percentage)			
	1970	1985	1993	2001	1970–1985	1985–2001	1985–1993	1993–2001
National	100.00	100.00	100.00	100.00	1.82	1.13	0.78	1.48
Border	128.70	125.30	129.28	135.73	1.64	1.64	1.18	2.09
Baja California	144.98	129.85	126.63	124.19	1.08	0.85	0.47	1.23
Coahuila	120.07	120.32	120.55	130.07	1.84	1.62	0.81	2.44
Chihuahua	101.17	102.24	128.58	138.73	1.89	3.08	3.71	2.44
Nuevo León	166.48	164.64	165.81	173.74	1.75	1.47	0.87	2.07
Sonora	138.44	119.50	114.79	123.96	0.83	1.36	0.28	2.45
Tamaulipas	104.74	102.86	100.67	104.28	1.70	1.22	0.52	1.92
Northern central	72.55	79.04	79.52	80.77	2.41	1.27	0.86	1.67
Aguascalientes	79.46	85.59	105.42	122.61	2.33	3.43	3.44	3.41
Baja California Sur	138.68	117.73	132.27	127.15	0.72	1.62	2.26	0.98
Durango	71.52	90.17	80.72	85.56	3.41	0.80	-0.60	2.22
Nayarit	75.85	79.56	66.15	61.96	2.15	-0.44	-1.52	0.65
San Luis Potosí	58.39	70.18	72.55	73.11	3.08	1.39	1.20	1.57
Sinaloa	93.58	84.61	86.70	81.03	1.14	0.86	1.09	0.62
Zacatecas	51.44	59.42	55.58	56.58	2.81	0.82	-0.05	1.70
Southern central	74.86	78.77	72.86	73.10	2.17	0.66	-0.19	1.52
Colima	85.56	107.88	103.29	95.32	3.41	0.35	0.24	0.46
Guanajuato	71.22	70.73	69.01	68.74	1.78	0.95	0.47	1.43
Hidalgo	53.86	69.33	64.93	60.47	3.55	0.27	-0.04	0.58
Jalisco	103.78	106.45	100.01	99.28	2.00	0.69	0.00	1.38
Michoacán	52.44	55.72	54.39	56.88	2.24	1.26	0.48	2.04
Morelos	84.11	86.08	96.69	91.48	1.98	1.51	2.26	0.78
Puebla	61.98	67.71	63.60	65.73	2.42	0.94	0.00	1.89
Querétaro	79.06	109.10	104.67	118.16	4.03	1.63	0.26	3.02
Tlaxcala	45.63	75.66	52.96	56.13	5.31	-0.74	-3.61	2.21
Veracruz	81.24	75.59	60.74	58.04	1.33	-0.53	-1.93	0.90
Capital	162.13	143.90	154.42	148.49	1.02	1.33	1.68	0.98
Distrito Federal	192.37	189.14	248.09	255.24	1.71	3.04	4.26	1.84
México	107.90	99.13	82.42	79.71	1.25	-0.24	-1.52	1.05
South	48.71	62.65	60.04	57.15	3.55	0.55	0.25	0.85
Chiapas	49.23	60.01	45.30	42.63	4.14	-1.87	-4.38	0.71
Guerrero	51.67	56.95	58.24	52.13	2.49	0.57	1.07	0.08
Oaxaca	35.24	50.93	46.05	42.48	4.35	-0.01	-0.48	0.46
Quintana Roo	97.98	117.55	183.06	151.21	3.07	2.73	6.52	-0.92
Yucatán	71.50	70.94	76.63	80.21	1.77	1.91	1.76	2.05

Source: INEGI. Campeche and Tabasco are excluded from the sample.

Appendix 1 displays Chiquiar's descriptive panel of state income levels relative to the national average, grouping states into the standard regional classifications and excluding Campeche and Tabasco because their oil activity distorts comparisons. The table shows how each region's position evolves over time and how the distribution shifts before and after trade liberalization. During the earlier period the south gains ground relative to the national average, suggesting a temporary phase of catch-up, while the northern regions also improve but more moderately. After liberalization the pattern changes, with the northern border and more industrial regions strengthening their position and the southern regions beginning to fall behind. In the most recent window, these differences become even clearer, as the gains concentrate in the north while the south continues to lose relative ground. Overall, the table highlights a transition from earlier signs of convergence to a later pattern in which regional performance becomes more uneven.

Appendix 2. Absolute convergence - Chiquiar

Table A.2. Chiquiar's Absolute convergence

	1970–2001	1970–1985			1985–2001			
	Total	**Total**	**1970–1980**	**1980–1985**	**Total**	**1985–1993**	**1993–2001**	**1993–2001**[1]
α	0.0363	0.1940	0.2020	0.2970	-0.1430	-0.2472	-0.0134	-0.0539
	(1.380)	(6.144)	(3.830)	(2.183)	(2.480)	(2.256)	(0.344)	(1.553)
β	0.0023	0.0224	0.0210	0.0340	-0.0146	-0.0246	-0.0030	-0.0072
	(0.724)	(4.549)	(2.907)	(2.849)	(2.978)	(2.544)	(0.723)	(2.052)
$T_{1/2}$	304	31	33	20	48	28	231	96
R^2	0.020	0.511	0.270	0.260	0.201	0.160	0.018	0.128
T (years)	31	15	10	5	16	8	8	8

Notes: (t-statistics in parentheses) All regressions exclude Campeche and Tabasco from the sample. [1] Regression excluding Quintana Roo. [2] $T_{1/2} = \ln(2)/\beta$ is the half-life; for 1985–2001, 1985–1993, and 1993–2001 it measures the number of years to double the current gap.

Appendix 2 shows Chiquiar's absolute convergence regression estimates using a nonlinear least squares (NLLS) regression version of the Barro and Sala-I-Martin (1992) framework. Columns follow the same benchmark period as table A.1, adding a 1980 window between 1970 and 1985 and including a 1993 to 2001 variant that excludes Quintana Roo because it is treated as an outlier due to its dependence on the tourism sector. He converts β into a time statistic using T-half equal to ln (2)/β. When β is positive, T-half is the half-life of the initial gap. When negative, it means the years it would take the gap to double.

Chiquiar's estimates show two phases. Before 1985, β is positive and clearly different from zero, indicating convergence across states. The shorter 1980 to 1985 window strengthens this result, implying faster convergence and a shorter half-life (roughly 20 to 30 years).

After 1985, β becomes negative and is statistically strong for both 1985 to 2001 and 1985 to 1993, suggesting divergence across states; the implied doubling times are in the order of a few decades (about 30 to 50 years). For 1993 to 2001 the relation weakens significantly, β is close to zero and not decisive, but once Quintana Roo exclusion the divergence results strengthen and become modestly more negative and meaningful, pointing to slow and almost non-divergent result.

Appendix 3. Conditional Convergence Indicators – Chiquiar

Table A.3. Chiquiar's Regional Indicators for Conditional Convergence - 1985

Regional indicators	**Human capital indicators**		**Infrastructure indicators**			**Economic orientation**		**Manufacturing plants (250+ employees)**	
	Average schooling	Illiteracy rate	Railroads / 100 km^2	Telephones / 100 persons	% Households with electrical supply	Agriculture (% of GDP)	Manufacturing (% of GDP)	% Regional share in total plants	% Regional share in total employees
National	5.58	14.62	1.34	10.08	81.29	9.42	24.84	100.00	100.00
Border	6.33	6.84	1.14	12.48	86.38	10.01	24.15	34.49	39.86
Baja California	6.45	5.68	0.29	8.66	89.10	10.25	17.15	4.53	3.54
Coahuila	6.25	6.64	1.46	11.40	90.50	8.71	29.07	2.02	1.91
Chihuahua	5.85	7.44	1.08	11.14	80.95	15.99	18.29	12.52	16.25
Nuevo León	7.00	5.91	1.69	16.60	92.75	1.70	37.14	9.73	9.97
Sonora	6.25	7.07	1.08	12.44	84.55	20.27	13.37	2.41	1.77
Tamaulipas	6.00	8.23	1.18	11.92	80.35	13.10	13.55	3.28	6.43
Northern central	5.20	12.52	1.15	6.93	77.31	19.34	17.44	6.07	4.94
Aguascalientes	5.70	8.79	3.91	8.98	89.55	7.64	27.63	1.35	1.17
Baja California Sur	6.35	6.59	0.00	18.57	82.15	12.31	7.60	0.00	0.00
Durango	5.25	8.20	1.00	6.25	81.20	21.84	23.02	1.83	1.22
Nayarit	5.25	13.88	1.44	5.51	85.15	20.81	17.10	0.00	0.00
San Luis Potosí	4.75	18.05	1.82	5.99	62.70	10.36	27.98	1.64	1.58
Sinaloa	5.60	11.83	2.11	8.81	82.85	25.71	10.05	0.87	0.88
Zacatecas	4.60	12.19	0.92	3.28	73.30	26.58	4.36	0.39	0.08
Southern central	4.77	18.77	2.45	7.19	76.84	12.24	23.60	16.67	18.80
Colima	5.75	11.00	3.83	10.42	88.15	18.06	6.13	0.00	0.00
Guanajuato	4.25	20.11	3.52	6.51	79.55	12.52	22.14	2.22	1.69
Hidalgo	4.45	25.03	3.61	4.38	66.20	10.26	31.27	0.39	0.60
Jalisco	5.50	10.89	1.28	11.26	86.90	11.02	26.81	4.62	7.64
Michoacán	4.30	21.05	1.91	5.50	77.85	17.77	12.55	0.39	0.26
Morelos	5.70	14.23	5.54	10.24	90.55	7.74	26.29	0.29	0.39
Puebla	4.65	22.79	3.03	6.29	76.20	10.94	25.82	3.66	2.79
Querétaro	4.95	20.09	2.63	6.37	73.05	6.99	39.50	1.45	1.20
Tlaxcala	5.35	13.71	8.96	3.02	87.70	13.46	30.98	0.67	0.48
Veracruz	4.55	20.74	2.45	6.36	66.50	13.96	18.55	2.99	3.75
Mexico City	7.03	7.86	6.30	17.19	94.38	1.53	31.92	42.20	35.96
Distrito Federal	7.90	4.91	21.16	27.27	98.35	0.23	27.53	18.30	15.64
Mexico State	6.05	11.17	5.27	7.20	89.85	3.99	40.20	23.89	20.33
South	4.21	29.46	0.60	4.50	64.47	21.02	8.71	0.58	0.44
Chiapas	3.35	33.99	0.73	3.09	54.65	29.69	6.56	0.00	0.00
Guerrero	5.35	31.00	0.16	5.41	66.75	15.86	5.07	0.00	0.00
Oaxaca	3.65	31.53	0.73	3.09	54.65	29.69	6.56	0.00	0.00
Quintana Roo	5.20	14.58	0.00	9.93	77.20	8.54	5.69	0.00	0.00
Yucatán	4.75	17.43	1.58	8.25	84.20	10.21	16.36	0.29	0.25

Source: Based on figures from INEGI and NAFINSA. All data are for 1985, except manufacturing establishments (1988). Schooling, illiteracy and household electricity supply are averages of the 1980 and 1990 census values. Campeche and Tabasco are excluded.

For appendix 3 Chiquiar assembles a cross section of state indicators centered on 1985 and organizes them into four groups: human capital, infrastructure, economic orientation, and the footprint of large manufacturing. The sample excludes Campeche and Tabasco as in other tables. When a true 1985 observation is not available, he uses a proxy equal to the average of 1980 and 1990. That is the case for average schooling, the illiteracy rate, and the share of households with electricity, all taken from the INEGI sources. Infrastructure includes railroad density in kilometers per 100 square kilometers and telephones per 100 persons. Agriculture and manufacturing are reported as percentages of GSP using the INEGI System of National Accounts. The manufacturing columns report on the regional shares in the national totals of plants and of employees based on INEGI'S and NAFINSA data, with the focus on establishments with 250 or more employees. My version shown below follows this construction closely so that the indicators are directly comparable.

Moving forward, it is important to keep in mind that averaging across 1980 and 1990 and combining data from different year publications can introduce measurement errors and some fuzziness to the model, especially in places where access to services or huge sectoral development expanded quickly during the decade. This might tend to bias the regression coefficients.

Appendix 4. Conditional Convergence Summary Results – Chiquiar

Table A.4. Chiquiar's GLS Conditional Convergence Results

	Growth 1970–1985			Growth 1985–2001		
	Coefficient	*t*-statistic	*p*-value	Coefficient	*t*-statistic	*p*-value
Log initial per-capita GDP	-0.008	-4.857	0.000	0.055	2.347	0.025
Average schooling years	0.109	7.434	0.000	0.091	2.444	0.020
Log(initial per-capita GDP)×Schooling	-0.012	-7.616	0.000	-0.011	-2.732	0.010
Telephones per 100 persons	0.007	6.634	0.000	0.004	6.099	0.000
Federal investment (% of GDP)	0.061	3.534	0.001	–	–	–
State expenditures (% growth in period)	0.151	5.861	0.000	–	–	–
Agricultural output (% of GDP)	0.063	4.058	0.000	-0.191	-6.106	0.000
Manufacturing output (% of GDP)	–	–	–	-0.075	-4.292	0.000
% Large firms	0.853	5.488	0.000	0.464	2.206	0.035
Crime rate	0.000	-4.587	0.000	0.000	1.746	0.090
Illiteracy rate	–	–	–	-0.096	-2.625	0.013
Rural population (% of total)	0.055	4.257	0.000	0.108	4.539	0.000
Log(fertility rate)	–	–	–	0.051	3.757	0.001
Railroads/size of state	–	–	–	0.128	2.404	0.022
Dummy border states×Schooling	-0.001	-2.019	0.052	0.003	3.428	0.002
% Households with electricity	0.064	3.773	0.001	0.098	2.891	0.007
R^2	0.878			0.813		
Adjusted R^2	0.803			0.638		

Notes: All regressions exclude Campeche and Tabasco from the sample. "–" indicates a variable omitted in the final specification due to non-significance of its coefficient in the corresponding equation. Unimportant constants are omitted.

Appendix 4 reports conditional convergence estimates obtained via Generalized Least Squares (GLS) from Chiquiar's paper. The GLS estimator is used because the author stacks the two growth periods (1970 to 1985 and 1985 to 2001) into a single system, which helps address the correlated residuals across equations. Using the explanatory variables listed in his appendix table A4 and an general to specific system approach, the author finds evidence of conditional convergence during 1970 to 1985: states with lower initial GDP per capita grew faster once structural controls are included. For 1985 to 2001, however, the estimated relationship becomes positive, indicating divergence. The divergence result for 1985 to 2001 appears within a historical setting defined by Mexico's entry into trade liberalization. During this period, export-oriented manufacturing and foreign investment expanded unevenly across regions. These trends provide a context for interpreting the estimated divergence.

Appendix 4.1. Conditional Convergence Intermediate Reg. Summary Results – Replication

Table A.4.1. C.C. Intermediate Regressions OLS – Original GDP (Using Own Data Set) and Updated GDP (Using Chiquiar's Data Set)

	(Original GDP, own controls) 1970–1985			(Original GDP, own controls) 1985–2001			(Updated GDP, Chiquiar controls) 1985–2001		
	Coefficient	t-statistic	p-value	Coefficient	t-statistic	p-value	Coefficient	t-statistic	p-value
Log initial per-capita GDP	-0.0129	-1.25	0.226	0.0147	0.32	0.754	-0.0494	-2.46	0.026
Average schooling years	0.0110	1.30	0.208	0.0059	0.23	0.824	-0.0634	-1.47	0.161
Log(initial per-capita GDP)×Schooling	-0.0039	-1.05	0.307	-0.0066	-0.71	0.489	0.0053	1.42	0.175
Telephones per 100 persons	-0.0006	-0.47	0.646	0.0024	2.17	0.045	0.0006	1.15	0.267
Federal investment (% of GDP)	–	–	–	–	–	–	–	–	–
State expenditures (% growth in period)	0.0003	3.39	0.003	–	–	–	–	–	–
Agricultural output (% of GDP)	-0.0050	-0.22	0.829	-0.1267	-2.45	0.026	-0.0110	-0.41	0.691
Manufacturing output (% of GDP)	–	–	–	-0.0322	-1.00	0.331	0.0165	0.96	0.350
% Large firms	0.0405	0.98	0.340	0.0055	0.12	0.906	-0.0441	-2.00	0.062
Crime rate	–	–	–	–	–	–	–	–	–
Illiteracy rate	–	–	–	-0.0011	-1.42	0.174	-0.0001	-0.36	0.724
Rural population (% of total)	-0.0035	-0.34	0.740	0.0660	1.68	0.113	0.0248	1.94	0.070
Log(fertility rate)	–	–	–	-0.0004	-0.24	0.816	0.0002	0.24	0.816
Railroads/size of state	–	–	–	0.0004	0.49	0.633	0.0005	1.34	0.200
Dummy border states×Schooling	-0.0006	-0.57	0.576	0.0020	1.44	0.168	0.0010	1.63	0.122
% Households with electricity	0.0049	0.26	0.798	0.0499	1.09	0.291	0.1119	3.23	0.005
R^2	0.7599			0.6529			0.8622		
Adjusted R^2	0.6336			0.3708			0.7503		
N	30			30			30		

Notes: Campeche and Tabasco excluded. "–" indicates the variable is not included in the corresponding equation window.

Appendix 4.1 presents two intermediate versions of the conditional convergence regressions. The left panel uses the original GDP series for both periods (1970 to 1985 and 1985 to 2001) with the reconstructed control set, while the right panel uses the updated GDP series with the indicators available in the original study. The goal is to show how results shift when moving between data sets and control specifications.

In the OLS estimates, the left panel reproduces the pre 1985 convergence reported in the original work, but the post 1985 coefficient shows a weak sign of divergence as found in the author's GLS results. The right panel, using updated GDP with the author's control set, again points to a more consistent convergence path as expected.

These intermediate results show that both the GDP series and the controls shape the estimated coefficients. Relative to the original specification, my regressions omit Federal investment and Crime rate, which may contribute to the small positive but unstable coefficient on initial income after 1985. This sensitivity indicates frailness in the divergence pattern and depends on the exact controls used in a small sample. With the updated GDP series, the coefficient becomes negative again, and the divergent result does not reappear, indicating some fragility in Chiquiar's results.

Appendix 4.2. Conditional Convergence (GLS) Summary Results – Replication

Table A.4.2. Original GDP (SUR – GLS Regression)

	SUR GLS – (Original GDP, Chiquiar Controls) 1970–1985			SUR GLS – (Original GDP, Chiquiar Controls) 1985–2001		
	Coefficient	t-statistic	p-value	Coefficient	t-statistic	p-value
Log initial per-capita GDP	-0.0129	-1.57	0.115	-0.0135	-0.43	0.665
Schooling	0.0110	1.63	0.103	0.0007	0.05	0.957
Log(initial GDP)×Schooling	-0.0039	-1.32	0.188	-0.0013	-0.22	0.824
Telephones per 100 persons	-0.0006	-0.58	0.560	0.0011	1.38	0.166
% Households with electricity	0.0049	0.32	0.745	0.0945	2.02	0.044
Agricultural output (% of GDP)	-0.0050	-0.28	0.782	-0.1555	-4.14	0.00003
Manufacturing output (% of GDP)	–	–	–	-0.0623	-2.44	0.0147
% Large firms	0.0404	1.23	0.219	-0.0015	-0.05	0.959
Rural population (% of total)	-0.0035	-0.42	0.674	0.0482	2.55	0.011
Log(fertility rate)	–	–	–	0.0002	0.21	0.833
Railroads/size of state	–	–	–	0.0002	0.29	0.772
Illiteracy rate	–	–	–	-0.0006	-1.41	0.159
Dummy border×Schooling	-0.0006	-0.71	0.476	0.0008	0.88	0.381
State expenditure growth	0.0003***	4.25	0.00002	–	–	–
R^2	0.7599			0.6811		
Adjusted R^2	0.6336			0.4221		
N	30			30		

Notes: Campeche and Tabasco excluded. "–" indicates the variable was not included.

Appendix table 4.2 examines whether the remaining differences with the original study come from the estimation method or from the explanatory variables. Following the structure of the original study, the table applies SUR GLS proposed by Zellner (1962) to the two equations constructed with the original GDP series, since the two periods may have correlated residuals across states. This reproduces the logic behind the author's use of GLS.

The comparison between my SUR GLS results and those in the original study shows that differences are not driven by the estimator methodology. For 1970 to 1985 my GLS coefficient on initial income is negative but small, and for 1985 to 2001 it remains negative, unlike the divergence reported in table A.4. Even when GLS is applied in the same way, the pattern in the original study does not reappear. This indicates that the divergence result is tied to the specific data and control definitions in the original study rather than to the GLS method itself.

Appendix 5. Absolute Convergence (2001-2019)

Table A.5. Absolute convergence (2001–2019) (including Campeche and Tabasco)

	2001–2019	**2001–2019**[1]	**2001–2008**	**2001–2008**[1]	**2008–2019**	**2008–2019**[1]
	Total					
α	0.1407	0.1407	0.1219	0.1225	0.1399	0.1394
	(3.431)	(3.367)	(2.556)	(2.523)	(2.650)	(2.592)
β	0.0128	0.0128	0.0099	0.0100	0.0123	0.0123
	(2.989)	(2.932)	(2.336)	(2.306)	(2.466)	(2.410)
$T_{1/2}$	54.1	54.1	70.0	69.6	56.2	56.5
R^2	0.274	0.273	0.163	0.164	0.189	0.187
T (years)	18	18	7	7	11	11

Notes: (t-statistics in parentheses). These regressions include Campeche and Tabasco. [1] Regression excluding Quintana Roo. $T_{1/2} = \ln(2)/\beta$ is the half-life.

Appendix 5 extends the results from section 3.2 by estimating the same nonlinear least squares specification including Campeche and Tabasco in the sample.

The purpose of presenting these estimates is to show how the convergence results change once the full set of states is used. Since the states of Campeche and Tabasco are highly dependent on the oil sector and the unusual large movements on the income levels during the period, it is useful to contrast the significance of the estimates in the restricted sample with the significance that emerges when those states are included. This comparison helps clarify whether the conclusions reached in the main table reflect a general tendency across the country or whether they are sensitive to the full sample. table A.5 therefore offers a reference point to assess the robustness of the patterns observed in table 6.

The estimates in this table differ from those reported in table 6 pointing that the β coefficient is now positive and of a meaningful size across all periods. This indicates that, when the full set of states is considered, there is a pattern that resembles absolute convergence during both the post NAFTA period (2001 to 2008) and the years after the global financial crisis (2008 to 2019). At the same time, the contrast with the main results shown in section 3.2 table A5 shows that this pattern is not common to all states and is influenced by movements that were specific to the states excluded in table 6.

Appendix 6. SUR GLS- Conditional Convergence (2001-2019)

Table A.6. SUR GLS Conditional Convergence (2001–2008, 2008–2019)

	SUR GLS – Updated GDP (price based 2018)					
	2001–2008			2008–2019		
	Coefficient	t-statistic	p-value	Coefficient	t-statistic	p-value
Log(initial per-capita GDP)	-0.0511	-0.99	0.324	0.0290	0.56	0.577
Average schooling years	-0.0736	-0.90	0.370	0.0361	0.54	0.589
Log(initial per-capita GDP)×Schooling	0.0070	0.98	0.325	-0.0033	-0.60	0.548
Dummy border states×Schooling	-0.0023	-1.59	0.111	-0.0008	-1.47	0.141
Illiteracy rate	0.0021	2.66	0.008	-0.0002	-0.23	0.818
Railroads/size of state	-0.0025	-3.08	0.002	0.0004	0.71	0.477
Telephones per 100 persons	-0.0009	-0.74	0.461	0.0001	0.40	0.692
% Households with electricity	0.0005	0.49	0.624	0.0007	0.45	0.654
Agricultural output (% of GDP)	0.0013	2.19	0.028	0.0010	2.17	0.030
Manufacturing output (% of GDP)	0.0001	0.43	0.667	0.0003	1.52	0.128
% Large firms	0.0019	2.66	0.008	0.0005	1.42	0.156
Rural population (% of total)	0.0001	0.36	0.720	-0.0004	-1.72	0.085
Log(fertility rate)	-0.0737	-2.20	0.028	0.0118	0.29	0.769
N	30			30		

Notes: System GLS (SUR) with heteroskedasticity-robust covariance.

Following Chiquiar's (2005) control variables set.

Constant terms are estimated but not reported. Campeche and Tabasco excluded from the sample.

The SUR GLS results in appendix 6 (more consistent to Chiquiar's framework followed in section 2, plus the exclusion of the two oil dependent states) confirm table 8 interpretation. Even when both growth equations are estimated jointly, the link between initial income and growth remains statistically weak and unstable, but other controls gain more relevance. In the 2001 to 2008 window, the estimates reflect an environment in which the benefits from deeper integration into global value chains were uneven. States that managed to attract export-oriented manufacturing or logistics corridors (often supported by rising foreign direct investment during 2000 to 2006) experienced different dynamics than states whose productive structures remained centered on agriculture or traditional services. These differences were also influenced by early-decade adjustments mentioned in the paragraph above.

In the 2008 to 2019 period, the SUR results again show a statistically noisy relationship driven by broader macroeconomic and structural developments. Mexico's recovery from the GFC was moderate, public investment stagnated for much of the decade, and oil-producing states were affected by falling crude output and fiscal pressures. At the same time, manufacturing hubs tied to the US recovery performed more favorably, particularly in cars and electronics (2011 to 2018), while states with weaker industrial bases faced slower growth. The SUR framework therefore reinforces the conclusion that growth differences in this period responded mainly to sector-specific and state-specific shocks rather than to initial income conditions.

Appendix 7. OLS & SUR GLS- Conditional Convergence (Full Sample) (2001-2019)

Table A.7.1. OLS Conditional Convergence (Full Sample) (2001–2008, 2008–2019)

	Updated GDP (price based 2018)					
	2001–2008			2008–2019		
	Coefficient	t-statistic	p-value	Coefficient	t-statistic	p-value
Log(initial per-capita GDP)	-0.0612	-0.82	0.421	-0.0719	-1.28	0.219
Average schooling years	-0.0670	-0.55	0.587	-0.0856	-1.07	0.299
Log(initial per-capita GDP)×Schooling	0.0067	0.64	0.529	0.0064	0.97	0.344
Dummy border states×Schooling	-0.0018	-1.14	0.268	-0.0008	-0.92	0.368
Illiteracy rate	0.0026	1.54	0.142	-0.0023	-1.68	0.110
Railroads/size of state	-0.0029	-2.18	0.0426	-0.0004	-0.40	0.696
Telephones per 100 persons	-0.0004	-0.25	0.805	0.0006	1.35	0.194
% Households with electricity	0.0009	0.68	0.504	-0.0006	-0.36	0.722
Agricultural output (% of GDP)	0.0007	0.83	0.415	0.0005	0.64	0.532
Manufacturing output (% of GDP)	0.0001	0.29	0.778	0.0005	2.22	0.0395
% Large firms	0.0016	1.52	0.146	-0.0001	-0.13	0.900
Rural population (% of total)	0.0004	0.75	0.462	-0.0004	-1.68	0.110
Log(fertility rate)	-0.0778	-1.24	0.232	-0.0270	-0.55	0.591
R^2	0.5360			0.7669		
Adjusted R^2	0.2009			0.5985		
N	32			32		

Notes: Following Chiquiar's (2005) control variables set. Constant terms are estimated but not reported.
Campeche and Tabasco included; national aggregate excluded.

Table A.7.1 reports the same conditional convergence setup as in section 3 (table 8) but now uses the full sample that includes Campeche and Tabasco Mexican states. The motivation is simple: these are oil dependent states and bringing them back allows us to see whether the conditional framework behaves differently once the most extreme production structure is present in the cross section which also includes significant noise to the results. In this specific setup, the results suggest an overall convergence pattern among both analysis periods, but its significance remains weak, it is important to mention that some parts of the model look cleaner in relation to table 8. In particular, the fit improves and some coefficients become more precisely estimated, so in that sense the statistical relevance of a few controls increases compared with the restricted sample.

As main takeaways, for 2001 to 2008, the coefficient on log initial income stays negative, which signals convergence, but it is still statistically not significant. The results suggest that once the controls are included and the oil states are added, initial income by itself loses relevance as a predictor of subsequent growth. This is consistent with the idea from the absolute convergence framework that any break or flattening in convergence makes the log initial income coefficient loose relevance, because growth differences are more related to specific sectoral and structural exposure than to a simple catch-up mechanism. In terms of the historical narrative, this period is still connected to the consolidation of NAFTA dynamics and export manufacturing expansion (2001 to 2004), plus the global competitive shock after China joined the WTO (2001). These events affected Mexico broadly through trade and supply chain reallocation, but they did not translate into a stable convergence process across states. The fact that the oil dependent states enter the sample also means that part of the variation in growth is driven by commodity linked activity rather than the income level at the start of the period, which again can dilute the role of log initial income.

For 2008 to 2019, the negative coefficient on log initial income is again not significant, and the results suggest that the conditional convergence channel is weak once I control for differences in structure and include the oil states. This makes sense given the sequence of aggregate shocks that hit the whole country. The global financial crisis (2008 to 2009) was a clear push back for all states, because it reduced demand, credit, and export activity at the same time, so many states were lagged together rather than showing a clean ranking where poorer ones systematically grow faster. At the same time, the states dependent on the oil sector through PEMEX becomes more visible in a full sample, and this can shift explanatory power away from initial income toward sectoral exposure. Even if some manufacturing states benefited from peso depreciation and stronger US demand (2014 to 2016, and more generally between 2011 to 2018), the results suggest that these advantages are not captured by a divergence between high- and poorer-income states once the full set of controls and the oil states are included.

With this said, as mentioned above table A.7.1 suggests that there is convergence between 2001 to 2008 or 2008 to 2019 without sufficient statistical proof. What changes with the full sample is that the model seems to pick up in a clearer way the role of structural variables and broad shocks, while log initial income becomes even less central for explaining growth. The results suggest that the main drivers in these years were economy-wide events that moved most states in the same direction, plus persistent differences in production structure, rather than a systematic tendency for poorer states to catch up or richer states to slow down.

Table A.7.2. SUR GLS Conditional Convergence (Full Sample) (2001–2008, 2008–2019)

	SUR GLS – Updated GDP (price based 2018)					
	2001–2008			2008–2019		
	Coefficient	*t*-statistic	*p*-value	Coefficient	*t*-statistic	*p*-value
Log(initial per-capita GDP)	-0.0737	-1.52	0.129	-0.0656	-1.82	0.0689
Average schooling years	-0.0894	-1.12	0.262	-0.0678	-1.30	0.195
Log(initial per-capita GDP)×Schooling	0.0086	1.25	0.210	0.0056	1.31	0.191
Dummy border states×Schooling	-0.0022	-1.59	0.112	-0.0010	-1.75	0.0801
Illiteracy rate	0.0022	3.08	0.0021	-0.0006	-0.86	0.391
Railroads/size of state	-0.0030	-4.41	0.0000	-0.0007	-1.33	0.185
Telephones per 100 persons	-0.0008	-0.69	0.490	0.0004	1.48	0.139
% Households with electricity	0.0008	1.01	0.311	0.0002	0.15	0.884
Agricultural output (% of GDP)	0.0010	2.43	0.0152	0.0012	2.98	0.0029
Manufacturing output (% of GDP)	0.0001	0.62	0.537	0.0004	3.16	0.0016
% Large firms	0.0019	2.51	0.0121	0.0005	1.16	0.244
Rural population (% of total)	0.0003	1.25	0.211	-0.0004	-2.66	0.0079
Log(fertility rate)	-0.1101	-4.10	0.0000	-0.0504	-1.65	0.0991
N	32			32		

Notes: System GLS (SUR) with heteroskedasticity-robust covariance.

Following Chiquiar's (2005) control variables set. Constant terms are estimated but not reported.

Campeche and Tabasco included.

The SUR GLS results in table A.7.2 strengthen the convergence evidence from table A.7.1 and show a clear statistical improvement relative to the earlier restricted sample. Estimating both periods jointly increases precision and delivers a stronger conditional convergence signal. In both subperiods, the coefficient on log initial per capita GDP is negative, and in the second period it approaches conventional significance levels, suggesting a more robust convergence pattern once Campeche and Tabasco are included.

For 2001 to 2008, the estimated coefficient on initial income is larger in absolute value than in the OLS results, which indicates that the joint estimation recovers a clearer convergence tendency. Several structural controls also become statistically significant, pointing to the role of human capital, infrastructure, and sectoral composition during the NAFTA consolidation phase and the expansion of export manufacturing (2001 to 2004), as well as the competitive shock following China's WTO entry (2001). These results suggest that convergence in this period was closely linked to how states were positioned to benefit from global integration.

For 2008 to 2019, the convergence signal remains present, with a negative coefficient on initial income that is closer to statistical significance. The global financial crisis (2008 to 2009) and the slow recovery that followed (2010 to 2014) acted as common setbacks across states, while the contraction of the oil sector after 2012 becomes visible in the full sample. At the same time, the significance of agricultural and manufacturing shares highlights the importance of production structure during the US manufacturing recovery (2011 to 2018) and the peso depreciation episode (2014 to 2016).

Appendix 8. SUR GLS Conditional Convergence (1985-2001 & 2001-2019)

Table A.8. SUR GLS Conditional Convergence (1985–2001, 2001–2019)

	SUR GLS estimates					
	1985–2001			2001–2019		
	Coefficient	t-statistic	p-value	Coefficient	t-statistic	p-value
Log(initial per-capita GDP)	-0.0308	-1.73	0.093	-0.0044	-0.10	0.922
Average schooling years	-0.0417	-0.95	0.349	0.0030	0.04	0.966
Log(initial per-capita GDP)×Schooling	0.0029	0.80	0.429	0.0000	0.01	0.995
Dummy border states×Schooling	0.0016	2.84	0.008	-0.0010	-1.08	0.290
Illiteracy rate	-0.0008	-2.26	0.031	0.0008	0.85	0.403
Railroads/size of state	0.0007	1.93	0.063	-0.0006	-0.69	0.493
Telephones per 100 persons	0.0015	3.59	0.001	-0.0002	-0.17	0.869
% Households with electricity	0.0222	1.12	0.272	0.0005	0.57	0.574
Agricultural output (% of GDP)	0.0460	1.86	0.072	0.0007	1.13	0.268
Manufacturing output (% of GDP)	0.0624	4.25	0.000	0.0001	0.47	0.641
% Large firms (employment share)	-0.0420	-2.02	0.052	0.0009	1.33	0.193
Rural population (% of total)	0.0150	0.89	0.377	-0.0001	-0.37	0.714
Log(fertility rate)	-0.0005	-0.67	0.507	0.0061	0.16	0.876
R^2	0.7632			0.2780		
Adjusted R^2	0.5708			-0.3087		
N	30			30		

Notes: System GLS (SUR) with heteroskedasticity-robust covariance.

Following Chiquiar's (2005) control variables set. Constant terms are estimated but not reported.

Campeche and Tabasco excluded in the sample.

The SUR GLS results in Table A.8 provide a robustness check for Table 9 by estimating the conditional convergence framework over two long horizons, 1985 to 2001 and 2001 to 2019, within a single system. By allowing for correlated shocks across periods, the SUR approach improves efficiency relative to separate OLS regressions and offers a clearer assessment of medium-run convergence patterns. The fit of the model is substantially higher in the earlier period, reinforcing the idea that growth outcomes in 1985 to 2001 are more systematically related to observable structural characteristics than in the later period.

For 1985 to 2001, the negative coefficient on initial income is consistent with a catch-up mechanism once differences in human capital, infrastructure, and productive structure are considered. Growth is more strongly associated with manufacturing intensity, telecommunications, and the interaction between schooling and border location, highlighting the role of trade exposure and early export-oriented industrialization. This suggests that convergence during this phase operates primarily through differential access to international markets and the capacity to absorb productivity-enhancing technologies.

In contrast, for 2001 to 2019 the convergence framework explains much less of the cross-state growth variation. The relationship between growth and both initial income and structural controls becomes weaker, reflecting a period dominated by economy-wide shocks and persistent heterogeneity across states. This supports the broader conclusion that, after 2001, Mexico's regional growth dynamics became increasingly state-specific and less aligned with the traditional channels emphasized in conditional convergence models.

Appendix 9. (5 Region Aggregate division) Relative Per capita GSP Levels VS. Internal Migration (1985–2020) & Elasticity Decomposition Analysis

Appendix A.9 provides additional regional detail underlying the migration–growth relationship analyzed in Sections 4.1 and 4.2. Table A.9 reports the accounting decomposition of per-capita GSP growth at the level of five macro-regions and decades, together with the GSP-weighted regional totals. The table applies the same framework as in Section 4.2 but aggregates states into macro-regions to highlight how migration-related growth components differ systematically across space and over time. This regional perspective helps clarify which parts of the country account for the aggregate patterns documented in Table 10 and how heterogeneity in migration flows and economic size shapes the decade-level results.

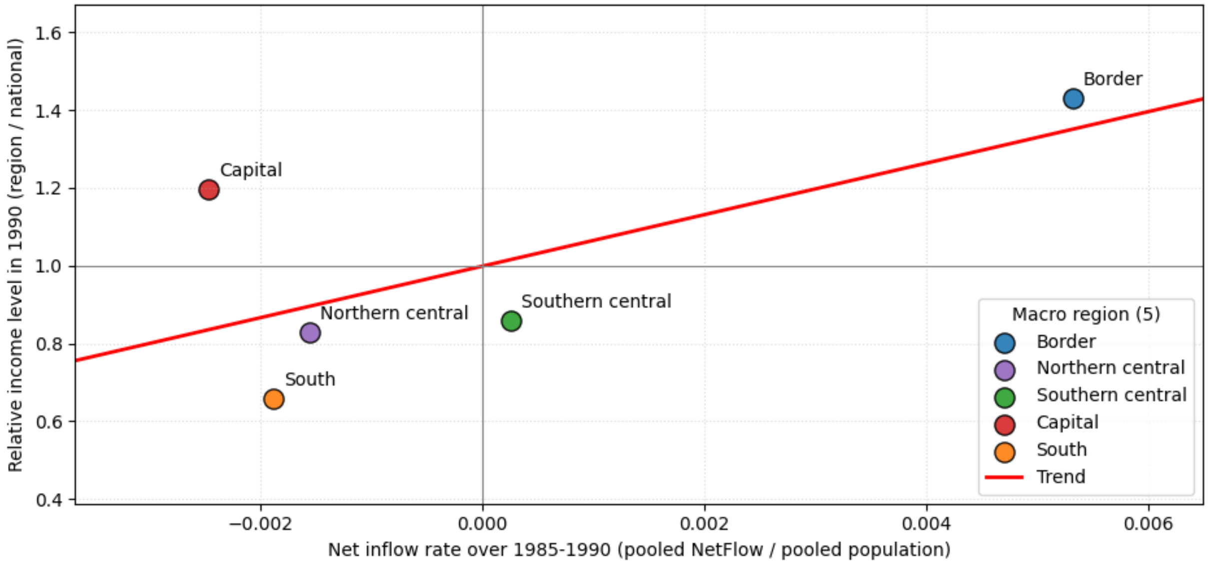
The accompanying figures (Plots A.1–A.4) complement the table by visualizing the relationship between regional relative per-capita GSP levels and net migration rates for successive periods. These plots mirror the state-level analysis in Section 4.1 but collapse the data to macro-regions, making clear how the positive association between income levels and net inflows emerges at an aggregated spatial scale. Together, the table and figures illustrate the same mechanism from two angles: Section 4.1 documents the empirical correlation between income levels and migration, Section 4.2 translates migration flows into growth effects through an accounting decomposition, and Appendix A.9 shows how these forces interact across regions and decades. The appendix therefore serves to bridge the micro-level migration patterns and the aggregate counterfactual growth results, reinforcing the interpretation that regional heterogeneity in migration behavior plays a central role in shaping the observed convergence and divergence dynamics.

Table A.9. Regional Counterfactual Growth by Region and Decade, with Decade Totals (1980–2020)

Decade window	Region	m	$m\varepsilon$	Δg	g^{obs}	g^{cf}	GSP share
1980–1990	Border	0.005318	0.003102	-0.002216	-0.006202	-0.003987	0.235858
	Northern central	-0.001561	-0.001691	-0.000130	-0.000249	-0.000118	0.088508
	Southern central	0.000254	0.000148	-0.000106	-0.003642	-0.003536	0.302895
	Capital	-0.002466	-0.002672	-0.000206	0.000343	0.000549	0.284482
	South	-0.001890	-0.002048	-0.000158	-0.014034	-0.013876	0.088257
	Total	**0.000325**	**-0.000314**	**-0.000639**	**-0.003729**	**-0.003090**	**1.000000**
1990–2000	Border	0.005251	0.003063	-0.002188	0.025922	0.028110	0.237888
	Northern central	-0.000899	-0.000973	-0.000075	0.017044	0.017119	0.090904
	Southern central	-0.000642	-0.000696	-0.000054	0.017665	0.017719	0.309691
	Capital	-0.001425	-0.001543	-0.000119	0.018488	0.018607	0.272551
	South	-0.001623	-0.001758	-0.000135	0.008470	0.008605	0.088966
	Total	**0.000436**	**-0.000152**	**-0.000588**	**0.018979**	**0.019567**	**1.000000**
2000–2010	Border	0.000900	0.000525	-0.000375	-0.008177	-0.007802	0.265513
	Northern central	0.001057	0.000617	-0.000440	0.010821	0.011261	0.084809
	Southern central	0.000753	0.000440	-0.000314	0.000508	0.000822	0.299537
	Capital	-0.002061	-0.002233	-0.000172	-0.001786	-0.001614	0.269560
	South	-0.000321	-0.000348	-0.000027	-0.000508	-0.000482	0.080581
	Total	**-0.000027**	**-0.000307**	**-0.000279**	**-0.001624**	**-0.001344**	**1.000000**
2010–2020	Border	0.003165	0.001846	-0.001319	0.002056	0.003374	0.257942
	Northern central	0.000816	0.000476	-0.000340	0.005040	0.005380	0.095081
	Southern central	0.000447	0.000261	-0.000186	0.001643	0.001829	0.303689
	Capital	-0.002499	-0.002707	-0.000208	0.001499	0.001707	0.260181
	South	-0.001074	-0.001164	-0.000090	-0.008980	-0.008890	0.083107
	Total	**0.000290**	**-0.000200**	**-0.000491**	**0.001152**	**0.001643**	**1.000000**

Notes. Campeche and Tabasco are excluded. For each decade, rows report regional objects; the bold row is the GSP-weighted total across the five regions (GSP shares sum to 1). m is the net inflow rate, $m\varepsilon$ the migration-related output term, $\Delta g = m(\varepsilon - 1)$, and $g^{cf} = g^{obs} - \Delta g$.

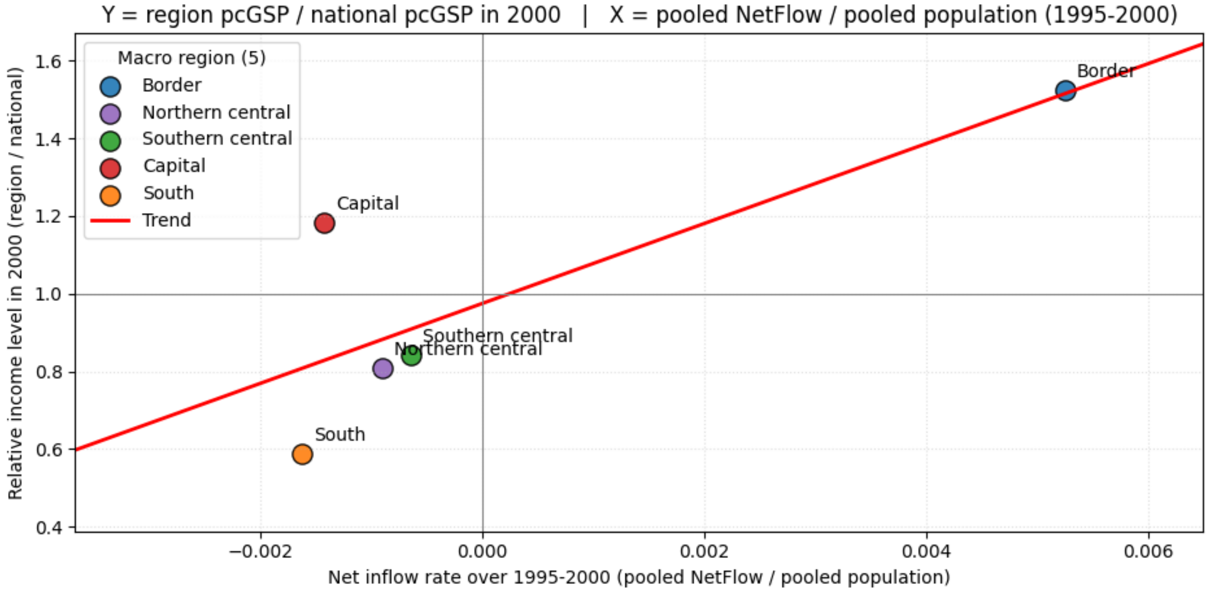
Plot A. 1. Five macro-regions: Relative income level vs net inflow rate (1985-1990)
Y = region pcGSP / national pcGSP in 1990 | X = pooled NetFlow / pooled population (1985-1990)



Notes: Campeche and Tabasco are excluded from the sample.

Migration rates are computed from five-year net flows and reported in annual units (divided by 5).

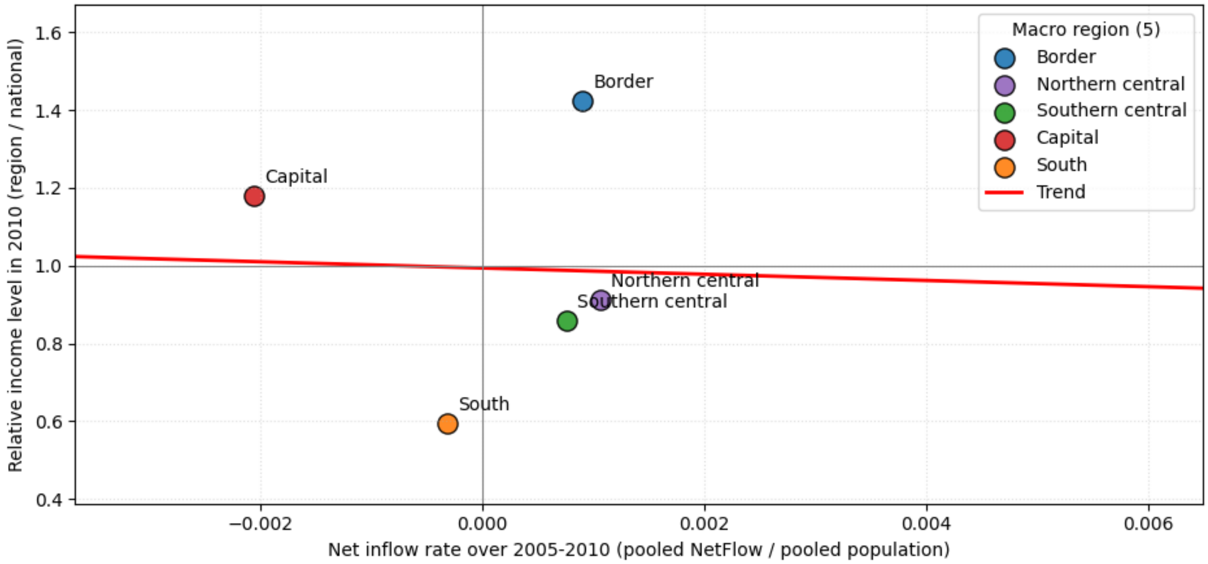
Plot A. 2. Five macro-regions: Relative income level vs net inflow rate (1995-2000)
Y = region pcGSP / national pcGSP in 2000 | X = pooled NetFlow / pooled population (1995-2000)



Notes: Campeche and Tabasco are excluded from the sample.

Migration rates are computed from five-year net flows and reported in annual units (divided by 5).

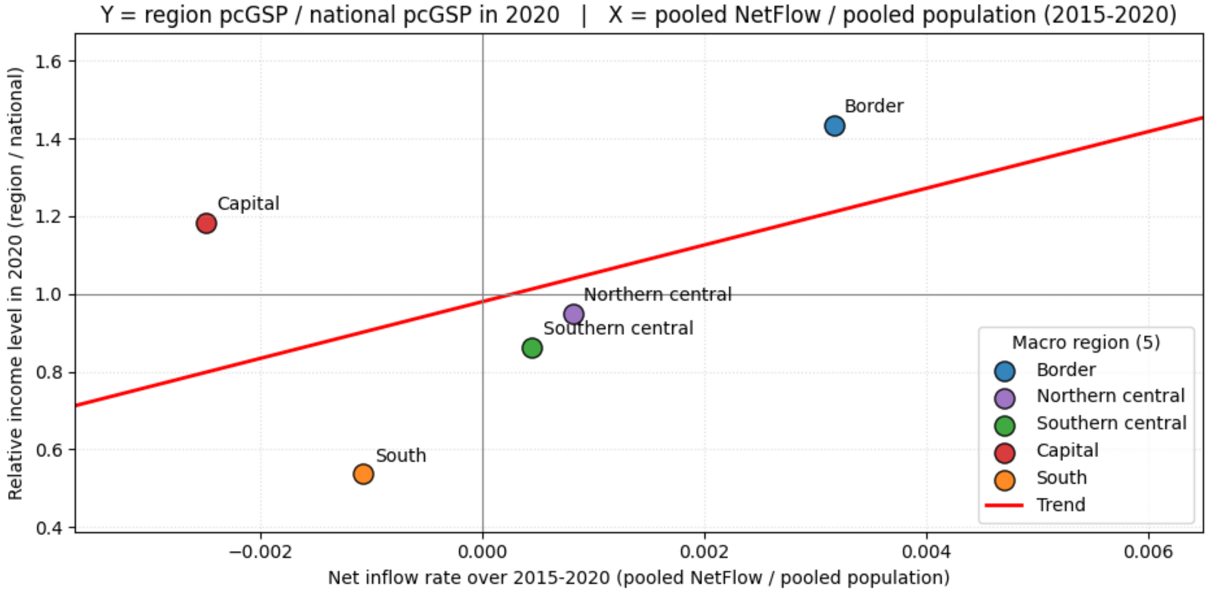
Plot A. 3. Five macro-regions: Relative income level vs net inflow rate (2005-2010)
Y = region pcGSP / national pcGSP in 2010 | X = pooled NetFlow / pooled population (2005-2010)



Notes: Campeche and Tabasco are excluded from the sample.

Migration rates are computed from five-year net flows and reported in annual units (divided by 5).

Plot A. 4. Five macro-regions: Relative income level vs net inflow rate (2015-2020)
Y = region pcGSP / national pcGSP in 2020 | X = pooled NetFlow / pooled population (2015-2020)



Notes: Campeche and Tabasco are excluded from the sample.

Migration rates are computed from five-year net flows and reported in annual units (divided by 5).