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Economic Polarization Through Trade

Trade Liberalization and Regional Growth in Mexico

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Abstract

The paper analyses the impact trade liberalization and economic integration have had on regional growth and regional disparities in Mexico over the last two decades. It is highlighted that the passage from an import substitution system to membership of the General Agreement on Tariffs and Trade (GATT) first, and to economic integration in the North American Free Trade Agreement (NAFTA) later, has been associated with greater concentration of economic activity and territorial polarization. The analysis also shows that these changes herald a period of transition between two growth models. Regional growth in the final stages of the import substitution period was mainly characterized by convergence and linked to the presence of oil and raw materials and proximity to Mexico City. Economic liberalization and regional integration in NAFTA has been related to regional divergence, a reduction of the importance of Mexico City as the main market and to the emergence of an economic system in which the endowment of skilled labour starts to play a more important role.

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Acknowledgements

1 Introduction

Trade and economic integration are generally considered to have a beneficial impact on economic growth. Two types of gains from trade have been identified by international trade theory. First, gains from exchange arise since differences in endowments or preferences make countries profit from trading with each other. Second, gains from specialization arise from trade, since specialization in a narrow range of activities brings about efficiency (Markusen et al. 1995). Gains from trade often result in countries with open economies outgrowing those with closed economies (Sachs and Warner 1995; Frankel and Romer 1999; OECD 1999). There is however greater controversy regarding the factors that impinge on trade. Models based on the Heckscher-Ohlin (H-O) approach focus fundamentally on factor structure; Ricardian models highlight technology; new economic geography models stress the importance of transportation costs, agglomeration and backward and forward linkages; and dynamic trade models emphasize the importance of spillovers. There is also much discussion about the spatial distribution of the benefits of trade and economic integration. H-O models underline that engaging in trade leads to the equalization of factor prices (Mundell 1957; Markusen et al. 1995) and, although they tend to be more 'agnostic' regarding regional growth, some authors have hinted that factor mobility may also yield a reduction in territorial disparities (Wood 1994). Neoclassical growth theories with immobile factors do not consider trade, but predict that increases in investment and capital—which may or may not be related to trade—trigger economic convergence. New economic geography models do not make clear territorial predictions, although many indicate that increases in trade and in economic integration may result in the territorial concentration of economic activity (Fujita et al. 1999). And the territorial outcome of dynamic trade models depends on the specific framework.

This paper explores what has been the territorial impact of trade reform and economic integration by analysing the evolution of regional disparities in Mexico since 1980. The choice of Mexico is not arbitrary. Mexico is arguably the country that has undergone the deepest process of economic liberalization and regional integration in the world since the mid 1980s. It first shifted its economic policy from a closed-economy approach to trade liberalization, and since 1994 to economic integration with the United States and Canada. The paper focuses on how these processes have affected regional growth and its determinants during the three stages of Mexico's economic transformation since 1980: the import substitution industrialization (ISI) period until 1985; early trade liberalization and membership of GATT, between 1985 and 1994; and increasing economic integration since the signing of NAFTA in 1994.

The main question addressed in the paper is whether trade and economic integration have had an impact on regional economic growth[1]; that is, whether progressive trade liberalization has led to changes in regional inequalities amongst Mexican states. The paper also explores the factors behind such transformations. In order to achieve these goals the paper is divided into four further sections. The first section of the paper briefly describes the changes in economic policy in Mexico since the 1980s. Section two analyses the effects the opening of the Mexican economy has had on regional disparities. Section three tries to establish through the use of multiple regression analysis which factors have made the greatest contribution to regional growth in the three economic stages (ISI, GATT and NAFTA) of the recent Mexican economic history. The conclusions are presented in section four.

1.1　Economic policy changes in Mexico since 1980

The revival of growth theory since the late 1980s has brought the analysis of the genesis and evolution of regional disparities to the fore. Neoclassical and endogenous growth theories as well as the new economic geography approach have analysed the connection between factors such as capital accumulation, investment, technological change, economies of agglomeration, population growth, human capital and transport costs, among many others, and economic growth. Trade and economic integration have also played a relevant role in growth studies (Grossman and Helpman 1991). However, despite recent advances in growth theory, the effect of trade and economic integration on national and regional economic growth is still very much debated. Different theories and empirical analyses often reach contrasting results about the territorial impact of trade and economic liberalization. These range from those that highlight that trade leads to greater concentration of economic activity and greater polarization (Krugman 1991; Krugman 1993; Venables 1998; Venables and Limao 1999) to those that highlight that economic liberalization and increases in trade ultimately lead to a reduction of disparities (Sachs and Warner 1995).

The main aim of this paper is to provide an empirical analysis of what has been the impact of the last three stages (final period of ISI, GATT, and NAFTA) of the passage from a closed economy to an increasingly open and regionally integrated economy on Mexican regional disparities. The choice of Mexico is determined by the profound economic reforms that the country has undertaken since the mid 1980s. The choice of periods is fundamentally based on economic policy decisions and the two breaking points coincide with the signature of the GATT by Mexico in 1986 and with the establishment of NAFTA in 1994, respectively. The main objective behind economic reforms was to achieve greater economic stability and sustainable growth through trade liberalization. Trade liberalization

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[1] A series of recent studies, such as Esquivel and Messmacher (2002) or López-Córdoba and Moreira (2002), have focussed on the link between shifts in policy and changes in productivity, rather than on GDP per capita, as is the aim of this chapter. The results of the analyses using productivity as the dependent variable largely corroborate our results.

and economic integration have thus marked a radical change in the economic regime of a country that was until then notorious for its economic and political immobility. Since independence from Spain in the early nineteenth century until the 1980s, Mexico had only implemented two economic models: (a) the enclave-economy model, stemming from colonial times and which lasted until the 1930s and (b) the import substitution industrialization (ISI) model, between the 1930s and 1985 (Villarreal 1988). The former model was characterized by relatively high levels of foreign investment, few links with domestic firms and the export of a high percentage of local production. The latter was characterized by the use of both tariff and non-tariff barriers to international trade in order to promote industrialization and protect national firms from foreign competition, although since the mid 1970s the ISI economy had basically ceased to exist and Mexico—as was the case under the enclave-economy model earlier—became increasingly dependent on exports of oil and other raw materials. This final state of the ISI model is thus also known as the period of the 'petrolization' of the Mexican economy.

Since the demise of the ISI model and of the 'petrolized' economy in 1985 the rhythm of economic change has increased considerably. Import substitution has given way to economic liberalization, openness to trade and to the establishment of an export promotion model. Two phases can be distinguished within this period: (a) the early trade liberalization phase, triggered by Mexico's signature of the GATT in 1985; and (b) the economic integration phase, linked to the signing of NAFTA in 1994, and to the endorsement of a series of bilateral and multilateral agreements with other countries. The GATT years, brought about a sustained increase in the export of intermediate goods and in the flow of foreign direct investment (FDI) to the country. A large percentage of this investment came under the maquiladora[2] scheme, which led to a substantial increase in the exchange of intermediate goods across the border (Weintraub 1988). Membership of NAFTA, together with the signature of other trade agreements with many Latin American countries, with the EU and Israel in the 1990s, have also provoked significant changes in the Mexican economy. Mexico has undertaken reforms in the fields of intellectual property rights, equal treatment of foreign and domestic investors and the participation of foreign individuals and firms in the financial sector. The benefits induced by economic integration include greater stability and attraction of FDI, repatriation of capital, recognition by the international community, and the restoration of confidence in the Mexican economy.

In addition to the processes of economic liberalization and regional integration, the last two decades of the twentieth century in Mexico also featured a series of events that have caused significant macroeconomic turmoil. The steady decline in oil prices of the early 1980s provoked in 1982 the partial collapse of the economy which had grown increasingly dependent on oil revenues. The oil bust triggered a debt crisis that dominated Mexico's economy during the 1980s. The shift in presidency from Carlos Salinas de Gortari to

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[2] Assembly plants which import parts and components (mainly from the United States) in order to make finished goods for re-export. Most maquiladoras are located along the Mexican-American border.

Ernesto Zedillo in late 1994 was engulfed in another huge macroeconomic crisis ('the tequlia effect') which led to a serious dent in economic growth and to a considerable devaluation of the peso. Each of these two crises coincided closely with the shifts in trade regimes and, to a certain extent, are linked to them. The oil bust and the debt crisis of 1982 can be regarded as the trigger of the liberalization process as a result of the need to look for macroeconomic policy alternatives to the demise of the oil dependency. The tequila effect is closely associated to costs of economic integration within the framework of NAFTA .

Figure 1. The evolution of trade as a percentage of GDP and GDP per capita in Mexico, 1970-2000
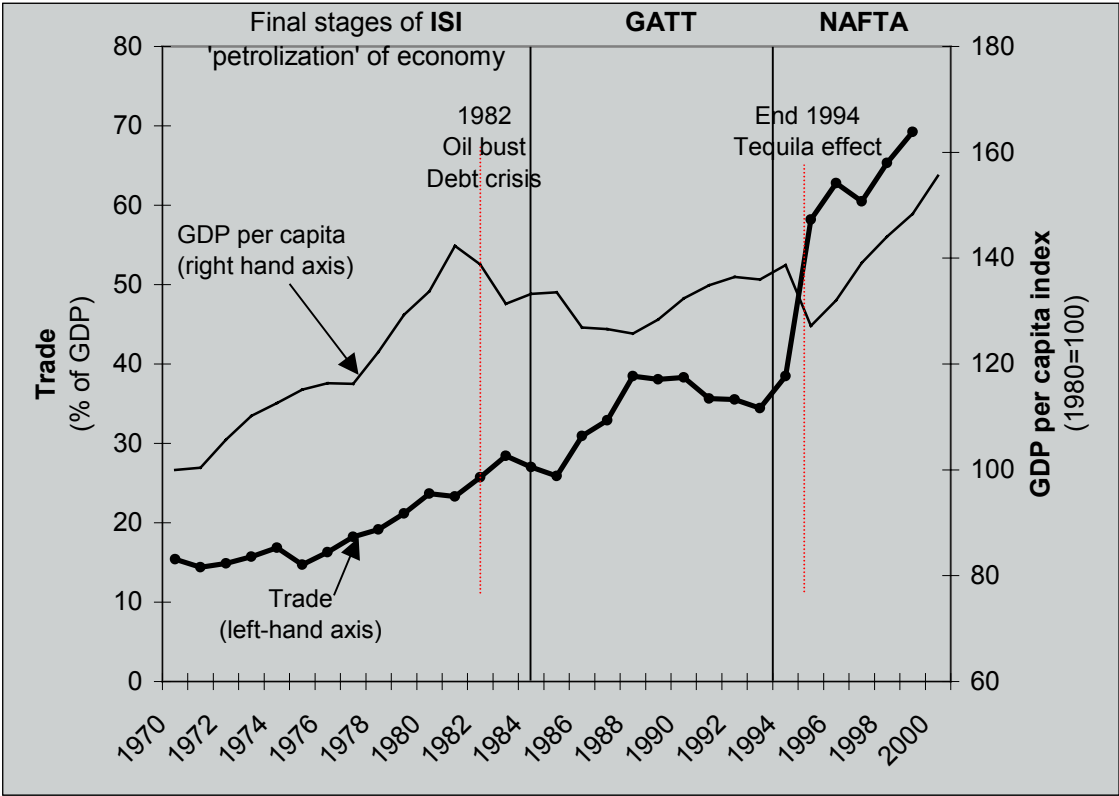
GDP data calculated using 1993 Mexican pesos.
Sources: World Bank (trade data) and INEGI (GDP data).

The implications for the Mexican economy of the changes in economic regimes are evident. Figure 1 depicts the evolution of trade as a percentage of GDP (left-hand axis) and GDP per capita (right-hand axis) between 1970 and 2000. The figure highlights that every change in trade regime has been accompanied by an almost immediate rapid rise in trade as a percentage of GDP. The signature of GATT led to an increase in trade as a percentage of GDP from a rate of 25 per cent in 1985 to 38 per cent in 1988. Membership of NAFTA—together with the 1994 devaluation of the Mexican peso—provoked a 20 point increase, from 38 per cent to 58 per cent in 1995 alone (Figure 1). Since then, trade expansion has continued, albeit at a slower rate. These changes have transformed Mexico within a period of little more than a decade, from a relatively closed country into one of the most open in the American continent with levels of trade as a percentage of GDP that are comparable to those of the more open European economies. Around 90 per cent of Mexican trade is with

the US. The connection between changes in trade regimes and growth in GDP per capita is less evident. Whereas the last stages of ISI were dominated by economic decline, the GATT years were associated to moderate economic growth, which has been replaced—despite a significant destruction of wealth in 1994—by high economic growth in the first years of NAFTA (Figure 1).

The processes of economic liberalization and integration have not been territorially neutral and had significant effects on regional inequalities in Mexico, which are explored in the following section.

2 The territorial impact of economic liberalization and regional integration

2.1 The territorial effect of ISI

Regional disparities have always existed in Mexico. The territorial legacy of the enclave-economy model is what can be defined as a dual economy. Economic activity and industrial production had become concentrated in the centre of the country—in the states of the Federal District of Mexico (Mexico DF), Puebla and Veracruz—and in the northern states. In contrast most of the south had remained dependent, agricultural and poor (López Malo 1960). The establishment of an ISI model in the 1930s further contributed to foster territorial inequalities in the country. Import substitution accentuated the economic decline of the states which relied on the export of natural resources—with the exception of oil and certain minerals—and agricultural produce, generally located along the Gulf of Mexico and in the south, and triggered a process of industrialization which favoured the concentration of economic activity in large metropolitan areas. Relatively large industrial poles emerged in and around Mexico City, in Jalisco and along the Mexican-US border, especially in the state of Nuevo León. The industrial poles were associated with the large metropolitan areas of Mexico City, Monterrey, and Guadalajara and with the establishment in 1966 of a maquiladora scheme restricted to the northern border (Smith 1990). High-income regions were also found in the oil producing southern states of Campeche, Tabasco and, to a lesser extent, Veracruz, or in tourist states, such as Quintana Roo.

In contrast, southwestern states and northern states not bordering the US remained relatively isolated from the whole process. Most of the northern states away from the border could only achieve very modest and precarious industrialization. Most states in the south, which did not rely on oil revenues, remained dependent on agriculture and backward.

In the final years of the ISI model, regional disparities in GDP per capita reflected the level of polarization in the country (Figure 2). The highest GDP per capital was found in the northern border states, around Mexico City and Jalisco. The Pacific coastal state of Sinaloa, and Quintana Roo, in the Yucatán peninsula, also enjoyed relatively high levels of GDP per capita. The southern Pacific coastal states of Chiapas, Oaxaca, Guerrero, and

Michoacán, as well as many of the central states surrounding Mexico DF had, in contrast, the lowest GDP per capita (Figure 2). GDP per capita in the poorest state (Oaxaca) only represented one quarter (26.7 per cent) of that of the richest state (Mexico DF). Similarly, the GDP per capita of the four poorest states (Oaxaca, Michoacán, Guerrero, and Zacatecas) was barely one third (34.4 per cent) of that of the four richest states (Mexico DF, Nuevo León, Baja California, and Cohahuila).

Figure 2. Regional GDP per capita in 1970 (national average = 100)
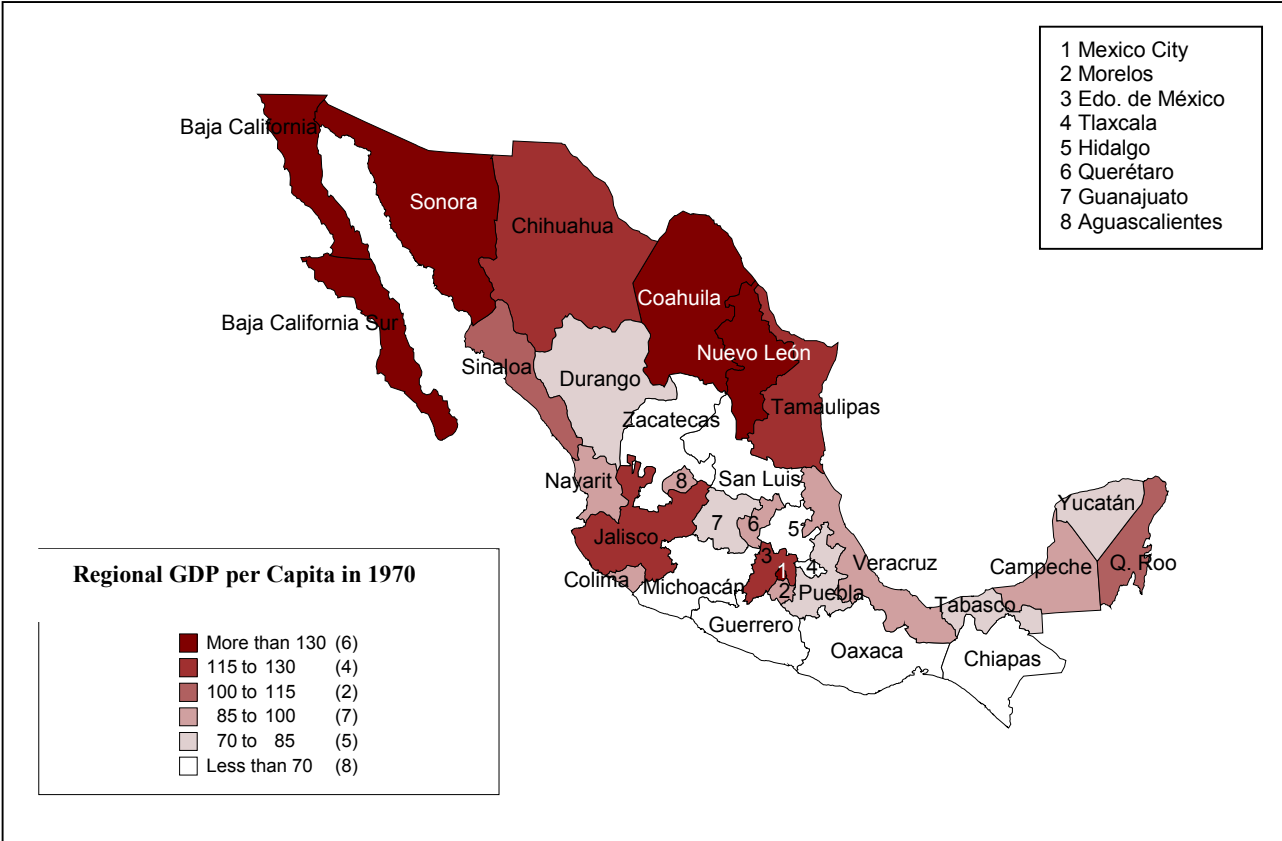
Source: Authors.

Most of the concentration of economic activities in the north of the country, Jalisco and in and around Mexico took place during the early stages of ISI. The final years of the ISI model witnessed, in contrast, a strong process of regional convergence, which contributed to a reduction in regional disparities (Sánchez-Reaza and Rodríguez-Pose 2002). Between 1970 and 1985 regional per capita growth rates in many lagging states such as Tlaxcala, Oaxaca, Chiapas, or Querétaro more than doubled those of Mexico DF, Nuevo León, or Baja California (Figure 3). The ß-convergence rate across Mexican states during this period was of 1.85 per cent per annum,[3] close to the rate of 2 per cent reported by many neoclassical empirical analyses.

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[3] The results of the regression are as follows: ß coefficient=-0.0185; t-statistic=-4.417; Adj. R^2=0.374.

The process of catch-up in the 1970s and early 1980s came, however, to an abrupt end after the signature of GATT. The GATT and NAFTA years have been associated first with

Figure 3: Initial income and growth in the Mexican regions during the final stages of ISI
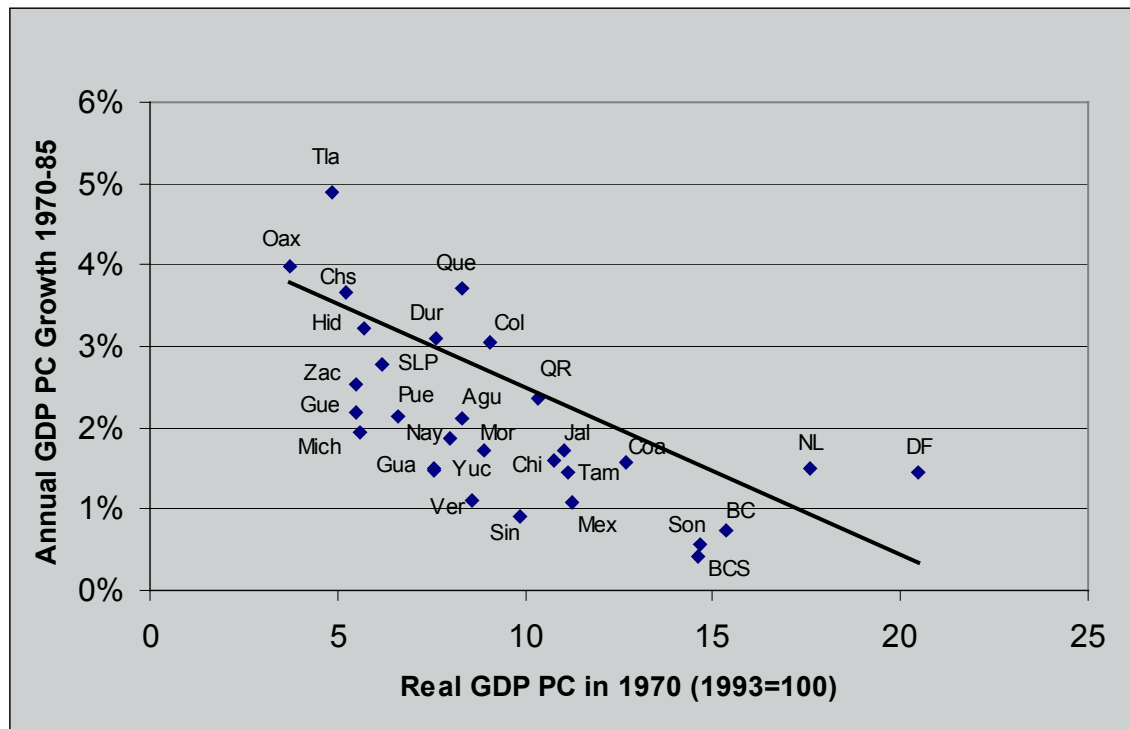
an overall decline in national growth (Juan-Ramón and Rivera-Batiz 1996), and second with a deepening of regional inequalities. National per capita GDP growth fell from 1.94 per cent per annum during the period 1970-85 to 1 per cent in the years between 1985 and 2000 (and only 0.58 per cent between 1985-98).

At a regional level, the convergence of the 1970s and early 1980s became a ß divergence of 1.36 per cent per annum.[4] Many of the lagging regions in Mexico saw their growth rates decrease significantly. Chiapas, with an annual rate of per capita growth of -2 per cent, suffered the strongest fall in growth rates (Figure 4). Tlaxcala, Nayarit, Veracruz, and Oaxaca were not far behind. Indeed, all the states south of the Mexico City agglomeration—with the exception of Campeche, Puebla, Quintana Roo, and Yucatán—had negative per capita growth rates throughout this period. The highest rates of growth took place in some of the richer states; the industrial states of Chihuahua and Aguascalientes and the tourist state of Quintana Roo had the highest growth, with annual rates close to or above 3 per cent, with Coahuila, Querétaro, and DF also faring relatively well (Figure 4).

Trade liberalization and economic integration have thus led to a deepening of regional inequalities in Mexico. Mexico DF and the northern border states have reaped the lion's

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4 The results of the regression are as follows: ß coefficient=0.0136; t-statistic=2.281; Adj. R^2=0.148.

share from the opening of borders and North American economic integration, whereas the south—save the Yucatán peninsula—has become even more economically backward (Figure 5). Overall, the shift in macroeconomic regimes has been associated with a radical change in the evolution of regional disparities.

Figure 4: Initial income and growth in the Mexican regions after trade liberalization
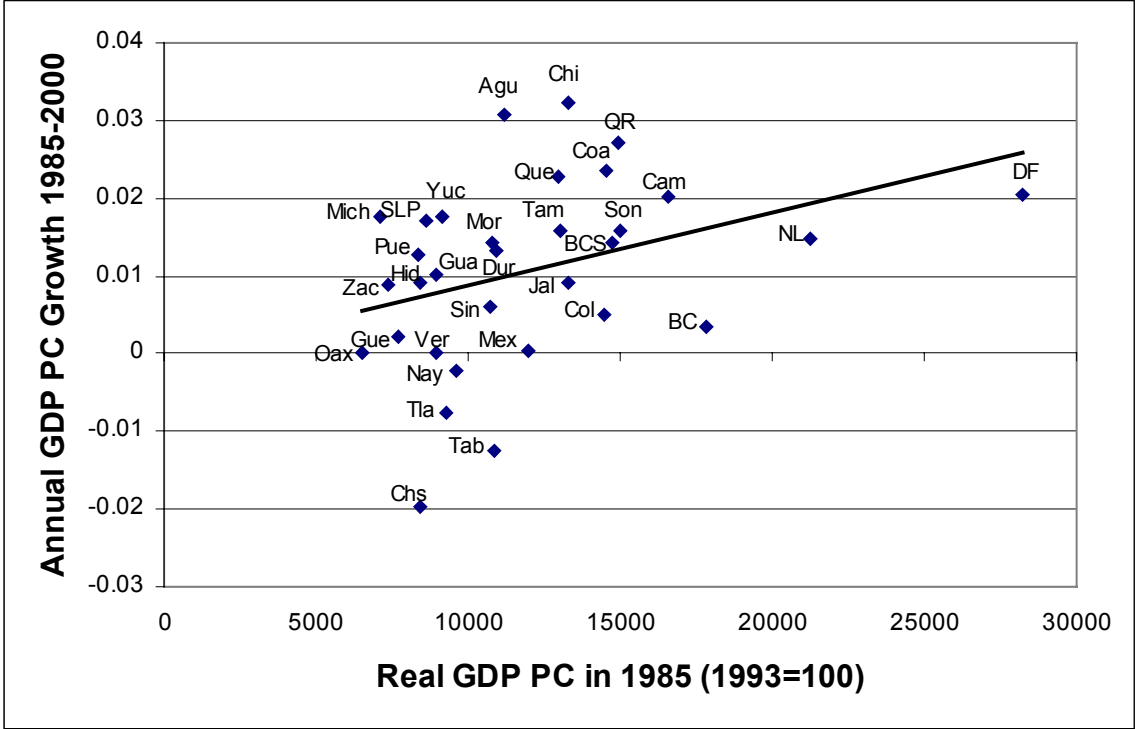

Figure 5. Regional GDP per capita in 2000
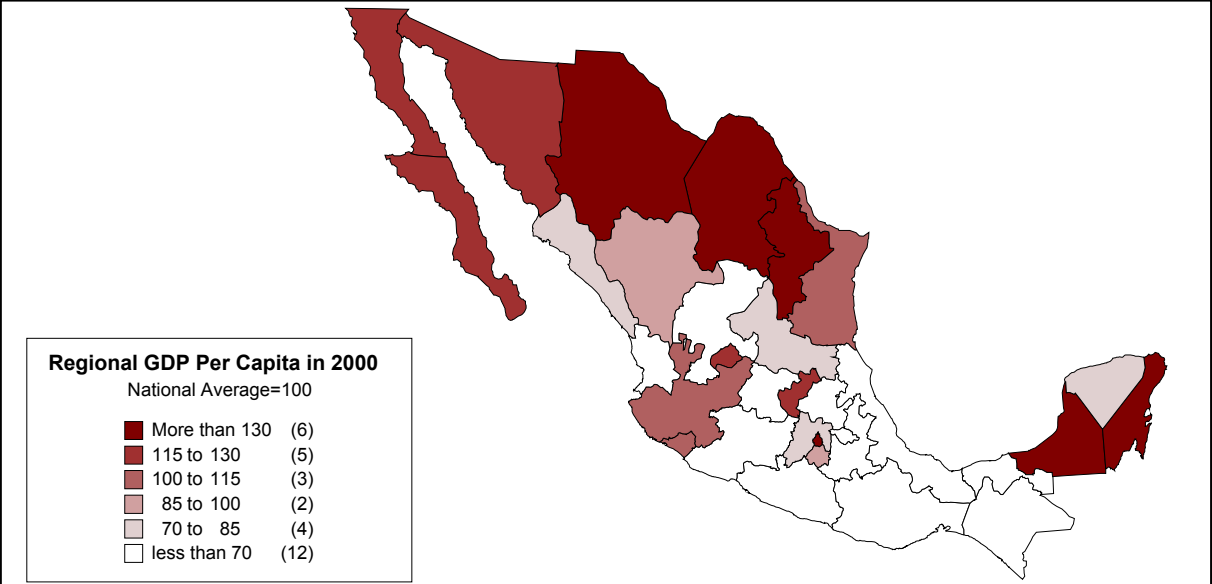
Source: Authors.

This change in trend is evident in Figure 6, which depicts changes in Mexican σ convergence, that is, the evolution of the coefficient of variation of log-GDP per capita

between 1970 and 2000, following Sánchez-Reaza and Rodríguez-Pose (2002). Whereas the final stages of ISI and the petrolization of the economy oversaw a 24 per cent reduction

Figure 6: Evolution of the coefficient of variation of regional disparities in Mexico
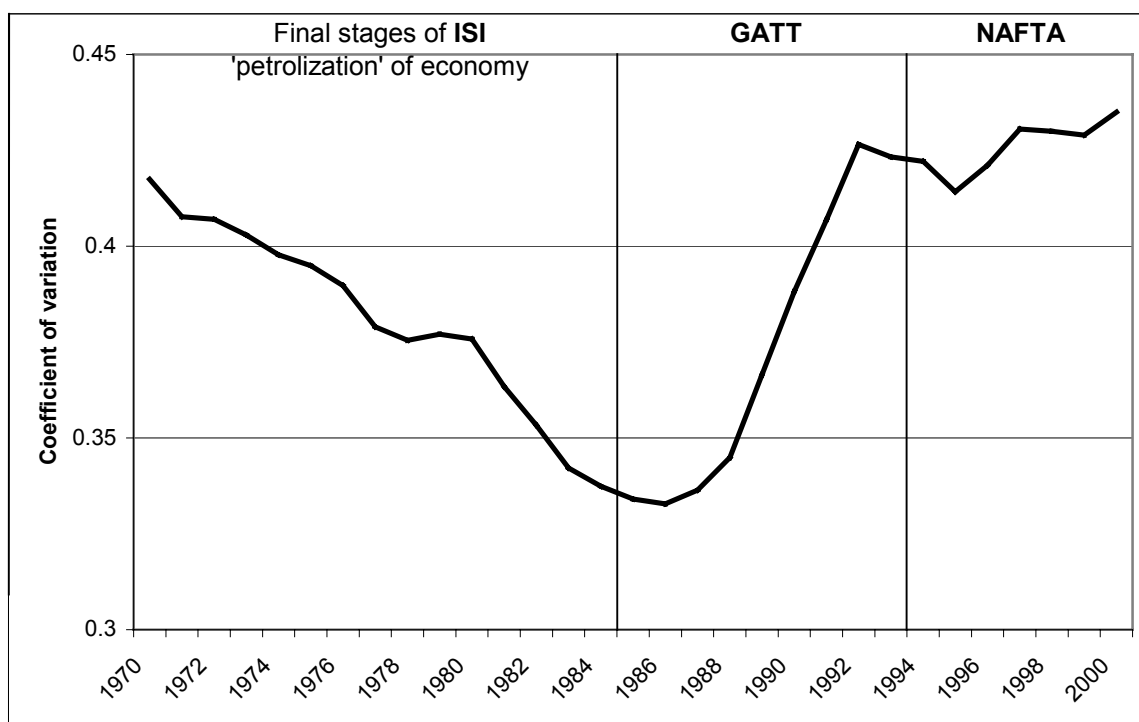
in regional disparities in the fifteen years between 1970 and 1985, the signature of GATT marked a clear reversal in the trend, with the coefficient of variation growing rapidly between 1986 and 1993 and returning by 1991 to the levels of disparities of the late 1960s. Since becoming a member of NAFTA, the evolution of the coefficient of variation has stabilized, but remains at levels above those of 1970 (Figure 6).

As a whole, regional inequalities in Mexico are much greater than regional disparities in most developed countries, and roughly similar to those found in other countries of the so-called South, such as Brazil or India (Rodríguez-Pose and Gill 2003). In 2000 GDP per capita in Chiapas, which had become the poorest state, was only 16.3 per cent that of Mexico DF, the richest state. The combined GDP per capita of the four poorest states—Chiapas, Oaxaca, Guerrero, and Tlaxcala—was just one quarter of that of the four richest states (Mexico DF, Quintana Roo, Nuevo León, and Campeche) (Figure 5).

What are the reasons behind the significant deepening of regional disparities in Mexico since the beginning of the process of economic liberalization? To what extent has membership of GATT and NAFTA contributed to turning regional convergence into regional divergence? What are the factors that have affected regional economic growth in the different stages of economic liberalization? The following section tries to give an answer to these questions.

3 Economic liberalization and the factors behind regional growth

3.1 The model and the variables

In order to test whether trade liberalization and economic integration have had an impact on regional economic growth, we perform three OLS regressions,[5] one for each of the three corresponding stages of economic liberalization: (a) the import-substitution industrialization (ISI) period between 1980 and 1985; (b) early trade liberalization and membership of GATT, between 1985 and 1994; and (c) increasing economic integration since the signing of NAFTA, between 1994 and 2000. The model, used in the three stages, adopts the following form:

$$G_{i,t} = f \{y_0, m_0, dismx, disus, k_0, ed_0, hsg_0 \ camtab, maq_0, pubinv_0\}$$

where $G_{i,t}$ is regional real per capita GDP growth in each Mexican state for each period covered in the analysis (1980-5, 1985-94, and 1994-2000) and y_0 represents the natural logarithm of the initial regional GDP per capita. Net migration rates at the beginning of the period are represented by m_0. The natural logarithm of the distance in kilometers by road from the capital of each state to Mexico City is captured in *dismx* and that to the nearest border city with the US in *disus*. k_0 and ed_0 refer to the per capita initial level of state commercial banking deposits and to initial level of education in each state, measured as the average years of schooling of the population, respectively. Higher levels of education in the labour market are depicted by hsg_0, which refers to the population weighted natural logarithm of the number of high school graduates at the beginning of each period. The final variables are used to control for biases in the structure of the economy, such as the effect of oil (*camtab*), maquiladora (*maq_0*) and public investment (*pubinv_0*). A more detailed description of each variable and its sources is included in the Annex.

The choice of variables reflects a compromise between the factors that according to recent literature have shaped economic growth in Mexico and data availability. The oil (*camtab*) variable is introduced in the model in order to capture the expected distortionary effects of oil in what was a 'petrolized' economy in the early 1980s.[6] The maquiladora (*maq_0*) represents a proxy for the location of foreign direct investment at the beginning of each period. This special export oriented form of investment accounted for 47 per cent of recorded FDI in Mexico in 1998 (CNIE 1998) and has, despite its recent spread throughout

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[5] Lack of adequate time-series regional data for Mexico have prevented us from using alternative techniques such as panel data analysis.

[6] Other studies of the evolution of regional disparities in Mexico have used different methods to control for the problems related to the concentration of the oil industry in the states of Campeche and Tabasco, and, to a much lesser extent, Veracruz and for the fluctuations in oil prices. Juan-Ramón and Rivera-Batiz (1996) conducted parallel analyses without the two most important oil producing states, whereas Esquivel and Messmacher (2002) have used oil-corrected incomes as an alternative. The results of these analyses largely coincide with ours.

the country, been heavily concentrated along the border with the US (Hanson 1996; Sánchez-Reaza and Rodríguez-Pose 2002). The initial migration variable (m_0)—defined as the number of outmigrants minus immigrants—aims at encapsulating the constant flow over the last few decades of Mexicans from rural to urban areas, from the south and centre-north to Mexico City and the northern border states, and from the whole country to the US (Durand et al. 2001). The level of education (ed_0) and the indicator of high school graduates (hsg_0) are proxies for the general improvement in human capital endowment and for the specific expansion of the qualified labour force at the beginning of the period; k_0 is used as a proxy for the availability of capital and $pubinv_0$ for the effects of public policies.

The reason for including the distance to Mexico City (*dismx*) and to the border of the US (*disus*) in the regressions performed for each of the three economic stages is based on one of the new economic geography's determinants of concentration: proximity to markets. As Hanson underlines 'the importance of trade liberalization is that it changes the reference market for firms in a country. Given transport costs, we expect trade to shift resources to locations with relatively low-cost access to foreign markets, such as border regions and port cities' (1998a:420). Trade liberalization and economic integration would have accordingly brought about a shift in the reference market from Mexico City during the ISI period to the United States during GATT, but especially under NAFTA (Krugman and Livas Elizondo 1996; Hanson 1998a and 1998b). Therefore, the use of *dismx* and *disus* will help to compare the extent to which distance to Mexico City or distance to the US border plays a role in determining growth. The inclusion of distances to the main market will determine whether there has been in fact a shift in the relevant market, and if such shift is associated to particular trade policies.

3.2   A cautionary note about Mexican regional data

Researchers studying regional disparities in Mexico have to face numerous problems. Perhaps the most important one is that of lack of data. Despite having one of the most comprehensive subnational data compilations outside Europe and the US and of recent improvements, many difficulties remain. With the exception of GDP indicators there is little regional information available prior to 1980, and whenever it can be found, questions arise about its reliability. This factor has limited our analysis to the post-1980 evolution of regional disparities. But even after 1980 Mexican regional data are often missing. There are, for example, no data on technological change, R&D investment, or capital accumulation. In some cases proxies can be used, as is the case of regional commercial banking deposits as a proxy for capital accumulation. In others, this is not possible. And even when regional data are available, they are often haphazard. Serious problems are encountered, for example, with migration indicators. Mexican migration rates at a regional level are not published on a regular basis.

For the 1990s, they are only available for 1990 (INEGI 1995) and 1995 (INEGI 1997). Therefore the migration indicators used for the GATT and NAFTA periods in our analysis represent the year closest to the beginning of each period. For the ISI period we use

regional inward migration statistics from INEGI (1986), as well as our own calculations of regional outward migration figures based on those provided by Partida Bush (1994). Given the above-mentioned difficulties with regional data availability and reliability, the results and interpretations of the analysis must be valued in light of the inherent limitations of the datasets.

4   The results of the analysis

4.1   Regional growth in the late stages of ISI

Which factors determined regional growth and the formation of regional disparities at the end of the ISI period, when the Mexican economy was already largely reliant on oil? Table 1 reports the results of regressing regional per capita growth rates for the period during 1980-5 on the independent variables. Five models are performed. The first four models include different subsets of independent variables: model 1 contains just the initial level of GDP per capita; model 2, the basic structural variables associated to economic growth in developing economies (dependence on raw materials and migration); model 3, the distances to the main market; and model 4, the structural variables associated with growth in more developed economies. Model 5 represents the most satisfactory simplification of the general model at a 90 percent level of significance. VIF, Cook-Weisberg, and Moran's I tests have been carried out in order to check for multicollinearity, heteroskedasticity, and spatial autocorrelation respectively. Any violation of the assumptions is reported at the bottom of the table.

Four factors emerge as the main determinants of growth during the final years of ISI. Almost half of the variance in growth across Mexican states during this period was explained by the initial levels of GDP per capita, the presence of oil, the initial general levels of human capital, and proximity to Mexico City (Table 1). As expected in a period characterized by regional convergence, high initial levels of GDP per capita (y_0) were inversely correlated with growth rates, meaning that the highest growth was concentrated in the poor southern states. The regional convergence rate during this period remains fairly stable even when other variables are introduced in the model.

Contrary to what could have been expected under an ISI regime—but not under an economy that had become increasingly dependent on oil revenues—the presence of oil had a positive and very significant correlation with growth rates (Table 1). The combination of raw materials (mainly oil, but also minerals) and agricultural produce contributed to the growth of those Mexican states with the highest endowment of natural resources and/or with the lowest labour costs. This factor fostered growth in the south and centre of Mexico, where large reserves of natural resources and the lowest labour costs could be found. The south of the country was also home to a large percentage of the outward migrants towards other parts of the country and the US.

Table 1: OLS results for the end of the ISI period

ISI Indep. Var.	[1] Coef.	[2] Coef.	[3] Coef.	[4] Coef.	[5] Coef.
y_0	-0.463*** *-2.864*	-0.267 *-1.119*	-0.375 *-1.366*	-1.253** *-2.179*	-0.942*** *-3.698*
camtab		0.391** *2.616*	0.432*** *2.768*	0.255 *1.100*	0.403*** *2.882*
m_0		-0.243 *-1.017*	-0.198 *-0.740*	0.025 *0.073*	
dismx			-0.093 *-0.519*	-0.218 *-0.897*	-0.285* *-1.721*
disus			-0.194 *-1.120*	-0.184 *-0.909*	
k_0				0.336 *0.729*	
ed_0				0.710* *2.047*	0.581** *2.278*
hsg_0				-0.626 *-1.443*	
maq_0				-0.051 *-0.225*	
$pubinv_0$				0.263 *0.817*	
F	8.202	5.714	3.596	2.372	7.868
Prob>F	0.008	0.004	0.013	0.046	0.001
df	*1,30*	*3,28*	*5,26*	*10,21*	*3,28*
R^2	0.215	0.380	0.409	0.530	0.457
Adj. R^2	0.189	0.313	0.295	0.307	0.399
Multicollinearity	no	no	no	yes	no
Heteroskedasticity	no	no	no	no	no
Sp. Autocorrelation	borderline	borderline	no	no	no

Note: Standardized coefficients reported; t-statistics in italics under coefficients; ***, **, and * denote significance at the 99%, 95%, and 90% respectively.
Source: see text.

The general level of education (ed_0) is also significant and positively associated with growth, whereas the variable used as a proxy for the skilled workforce (hsg_0) has a negative coefficient (Table 1). This result reinforces the view presented earlier for the Mexican economy in the final years of the ISI period as sharing some of the features of less developed economies. During the late 1970s and early 1980s Mexico's national and regional economies had become extremely dependent on oil and other natural resources and agricultural goods. This reliance on natural resources and the relative absence of

advanced manufacturing and services among the most dynamic export-oriented sectors of the economy, while positively associated by the general level of education of the population, rendered the presence of people with higher education levels somewhat redundant, as the highest skills were generally found in sectors orientated to the less lucrative national market.

Finally and in accordance with new economic geography postulates, the coefficient for the distance to Mexico City (*dismx*) is significant in model 5 and negatively associated with growth (Table 1). This underlines the importance of the Mexican Capital as the reference market and the advantages of being geographically close to it.

Altogether, the regional growth panorama in Mexico in the final stages of ISI seems to reproduce many of the neoclassical postulates, highlighted by the fact that there is notable regional convergence. Some of the postulates defended by the new economic geography approach are also fulfilled, especially the importance of Mexico City, rather than the US, as the main market during the final stages of economic protectionism. Centrifugal forces, however, prevailed over centripetal forces.

4.2   Regional growth during GATT

Table 2 reports the results of regressing regional GDP per capita growth during the GATT years (1985-94) on the independent variables for that period. The procedure followed is the same as for the previous period. The results expose the existence of a radical shift in the factors connected to regional growth in Mexico after the demise of the ISI system. First and foremost the explanatory capacity of the model is severely reduced. If we take model 5—which represents the most satisfactory simplification of the general model—we find that the initial GDP per capita (y_0) and the initial number of high school graduates divided by population (hsg_0) are the only two significant variables, and that the model only explains less than a quarter of the variance in growth per capita in Mexico during the GATT period (Table 2). Factors such as exports or proximity to Mexico City as the main national market, that were among the main determinants of regional growth in the earlier period, are no longer relevant, as indeed are most of the other regional variables included in the model.

One of the important differences with the previous period is the shift from regional convergence to divergence. The sign of the coefficient of the initial GDP per capita becomes positive and significant in all models, bar model 4, which suffers from multicollinearity. As described earlier, economic growth in the wealthier regions of the north and centre of the country outstripped growth in the south. Apart from initial GDP per capita, only the proxy for the endowment in qualified human capital displays a negative association with regional growth (Table 2).

The coefficients of the two variables indicating distance to the two main markets show little sign of change in the reference market. The coefficient of *dismx* changes sign in

model 3, but loses significance, and *disus* is not significant in any of the models (Table 2). This implies that whereas proximity to Mexico City has lost relevance as a determinant of regional economic growth during the GATT period, there is still no sign of the new economic geography shift in the main market to the regions bordering the main Mexican export market, the US.

Table 2: OLS results for the GATT period

GATT Indep. Var.	[1] Coef.	[2] Coef.	[3] Coef.	[4] Coef.	[5] Coef.
y_0	0.389**	0.307	0.459*	-0.140	0.391**
	2.314	*1.458*	*1.957*	*-0.299*	*2.411*
camtab		-0.015	-0.109	-0.148	
		-0.088	*-0.597*	*-0.631*	
m_0		0.150	0.127	0.267	
		0.718	*0.558*	*1.077*	
dismx			0.164	-0.194	
			0.822	*-0.674*	
disus			0.317	0.277	
			1.583	*1.264*	
k_0				0.886	
				1.513	
ed_0				0.079	
				0.204	
hsg_0				-1.299**	-0.295*
				-2.281	*-1.820*
maq_0				0.127	
				0.496	
$pubinv_0$				0.229	
				0.653	
F	5.353	1.873	1.674	1.407	4.539
Prob>F	0.028	0.157	0.176	0.244	0.019
df	*1,30*	*3,28*	*5,26*	*10,21*	*2,29*
R^2	0.151	0.167	0.244	0.401	0.238
Adj. R^2	0.123	0.078	0.098	0.116	0.186
Multicollinearity	no	no	no	yes	no
Heteroskedasticity	no	no	no	no	no
Sp. Autocorrelation	no	no	no	no	no

Note: Standardized coefficients reported; t-statistics in italics under coefficients; ***, **, and * denote significance at the 99%, 95%, and 90% respectively.
Source: See text.

Overall the results of the analysis of the GATT years point more towards a country still under the shock of the collapse of its import-substitution strategy, rather than to a country

starting to feel the effects of economic liberalization. The foundations of the later years of the ISI model, such as oil dependency and the reliance on natural resources, were being shaken, but no clear alternative was emerging. The Mexican economy could no longer rely on its traditional products for growth, but the incipient and still rather tentative process of economic liberalization had not yet generated an alternative economic system, in which other factors could have filled in the vacuum left by the steep decline in revenues caused by the collapse of the price of oil and other natural resources. The 'petrolization' of the economy during the early 1980s resulted in a postponement of the structural change reform in the late stages of ISI (Smith 1990) and led to a doubling of public expenditure and to the expansion of external debt, which reached 61.9 per cent of GDP by the mid 1980s (Ramírez 1989). As a result, after the sharp decline of oil prices of the early 1980s the government was more concerned with cutting expenditure, reducing public deficit, and servicing the debt under a stabilization programme carried out under the auspices of the IMF (Auty 1994), than with preparing the Mexican economy for trade liberalization.

4.3 Regional growth during NAFTA

Greater changes in the factors affecting regional growth can be observed after membership of NAFTA. After the transition of the GATT years, the results for the NAFTA period point in the direction of the emergence of what can be the seed of a new economic model of regional growth in Mexico. As evidenced by model 5—and considering the caveat that model is marginally affected by a problem of spatial autocorrelation—three variables alone explain more than forty percent of the variance in regional growth in Mexico between 1994 and 2000. Initial GDP per capita (y_0) has the most robust and significant coefficient. As in the GATT years, the standardized coefficient is positive, pointing to the existence of regional divergence, which, in combination with other variables, tends to be stronger than in the previous period (Table 3).

The other two significant variables, initial migration (m_0) and the proxy for the endowment of qualified human capital (hsg_0), indicate that profound changes were happening in Mexican regional growth in the last few years of the 20th century and corroborate claims by other authors of a significant structural change in the Mexican economy (Esquivel and Messmacher 2002; Esquivel et al. 2002). The standardized coefficient of hsg_0 takes on a positive sign (Table 3). This means that regional growth in Mexico, as in most developed areas of the world, is increasingly associated with the quality of the local human capital endowment. This variable, which was negatively associated with growth both during ISI and GATT, indicates that in the NAFTA period the skilled labour force not only starts to play a more important role (Esquivel 1999), but also that the returns to higher levels of education may be increasing, as shown by Esquivel and Messmacher (2002) when analysing the evolution of labour productivity in Mexico. In brief, education and skills are becoming more relevant and investment in this sector may be starting to yield greater returns. For the first time in the analysis regions with higher levels of education and skills are growing faster than the rest of the country.

Table 3: OLS results for the NAFTA period

NAFTA Indep. var.	[1] Coef.	[2] Coef.	[3] Coef.	[4] Coef.	[5] Coef.
y_0	0.448***	0.624***	0.692***	1.951***	0.629***
	2.745	3.563	3.694	4.475	3.888
camtab		0.081	0.038	0.066	
		0.521	0.234	0.363	
m_0		-0.400**	-0.469**	-0.969***	-0.474***
		-2.290	-2.415	-3.815	-2.868
dismx			0.204	-0.044	
			1.153	-0.170	
disus			0.084	-0.214	
			0.477	-1.210	
k_0				-1.327**	
				-2.494	
ed_0				-0.393	
				-1.480	
hsg_0				1.224**	0.329**
				2.147	2.229
maq_0				-0.125	
				-0.494	
$pubinv_0$				-0.703**	
				-2.737	
F	7.533	4.615	2.981	3.959	6.933
Prob>F	0.010	0.010	0.029	0.004	0.001
df	1,30	3,28	5,26	10,21	3,28
R^2	0.201	0.331	0.364	0.653	0.426
Adj. R^2	0.174	0.259	0.242	0.488	0.365
Multicollinearity	no	no	no	yes	no
Heteroskedasticity	no	no	no	no	no
Sp. Autocorrelation	borderline	borderline	yes	no	borderline

Note: Standardized coefficients reported; t-statistics in italics under coefficients; ***, **, and * denote significance at the 99%, 95%, and 90% respectively.

Source: See text.

The coefficient of the initial migration variable has a negative sign (Table 3). Migration within Mexico from the poorer areas to the more developed states and to the US had been a common feature of the Mexican economic and social history of the last few decades. In many ways it represented a safety valve for poorer states since, first, it contributed to keep population growth in states with scarce economic potential at bay and, second, because the remittances from migrants represented an important source of income for the inhabitants of many states (Taylor 1999). The fact that the coefficient of migration is negative implies

that losing human resources to other states can no longer be considered an asset for economic growth, which may be one of the factors behind the slowdown in the process of migration across states (Esquivel 1999). This evidence in combination with the positive sign of the endowment of qualified human capital point in the direction of the emergence of an economy which is less based on natural resources, basic agriculture, and undifferentiated manufacturing production and more reliant, albeit still in an initial stage, on knowledge. There is however no sign of a change in the relevant market from Mexico City to the US. The fact that both *dismx* and *disus* are not significant may be an indication that the change in the relevant market (Hanson 1996 and 1998a) may be happening at a lower rate than expected, if at all.

In sum, changes in the results of the analysis conducted during the NAFTA period herald an important structural transformation in the Mexican economy. The increasing regional divergence, the negative connection between outmigration and growth, the increasing returns of education may be signalling the possible emergence of a new, more knowledge-based economy linked to economic liberalization and regional integration.

5   Conclusion

The paper has analysed whether changes in trade policies and economic integration in NAFTA have had an influence on regional growth and the evolution of regional disparities in Mexico. As mentioned earlier, problems linked to the availability and reliability of regional data imply that any conclusion should be considered with caution. Bearing this in mind, the results of the analysis have shown that the successive passage from a crumbling ISI system to incipient trade liberalization through membership of GATT, and then to economic integration in NAFTA, has provoked major changes in regional disparities and in the importance of the factors that generate growth.

First, trade liberalization and economic integration have brought about a shift in regional inequalities. Despite the fact that regional disparities and a north-south divide has existed in Mexico since industrialization took off in the 1930s (López Malo 1960), recent changes in economic regimes have been associated with a change in regional trends. Whereas the end of the ISI period was characterized by regional convergence, economic liberalization and integration have been connected to economic divergence and to a widening of the gap between a relatively rich north of the country and an increasingly poor south. Economic liberalization and integration have also spurred greater concentration of economic activity in the main economic poles of the country. The states bordering the USA have mainly benefited from this, but Mexico City has also fared well. Despite reducing its share of manufacturing jobs (Hanson 1998b), the capital is attracting high value-added services and becoming an important financial centre. In contrast, the agricultural and natural resource-dependent states of the south of the country have suffered severe relative declines. This is especially the case in some oil-producing states, such as Tabasco, whose GDP per capita has been seriously dented by the decrease in oil prices and the ebbing oil dependence of the

Mexican economy. The rural and agricultural states of Chiapas, Oaxaca, Guerrero, and Tlaxcala also shared poor rates of growth.

Many of the explanations of the widening regional gap lay in the changes of the relative importance of the factors associated to regional growth. During the late stages of the ISI period Mexican regional growth was mainly associated with the production of oil, raw materials, and agricultural produce. During this period the poorer southern states supplied the bulk of the exports. In this context, investing in improving human skills or in trying to generate endogenous growth opportunities in relatively poor states made little sense as a regional development strategy. Workers with the highest skills tended to find jobs in the less productive nationally-orientated manufacturing and service sectors. The mobility of labour and exports of natural resources sufficed to reduce inequalities across states. Yet, this situation entailed serious risks which became evident once the ISI system collapsed. Mexico had become too dependent on oil and the exploitation of other natural resources, and their price decline contributed to the collapse of the ISI model and to the debt crisis that ravaged Mexico throughout most of the 1980s.

The demise of ISI led to economic liberalization and greater openness to trade. The signature of GATT was a capital step in this strategy. However, in terms of regional growth and the evolution of regional disparities, the GATT years were still dominated by the effects of the breakdown of the previous system. Increases in trade were associated with a reversal in the regional growth trends. Regional convergence, which had been the norm since the 1970s, gave way to regional divergence. Only during the NAFTA period have the full effects of trade liberalization and economic integration become more apparent. These forces seemed to have unleashed a process of greater economic concentration which has mainly benefited the relatively advanced regions of the north. Regional disparities have been reinforced, fundamentally in favour of those regions with the highest endowment in human capital and the lowest levels of outmigration. Centrifugal forces are currently less important than centripetal forces and there are initial signs of the emergence of an increasingly knowledge-based economy, which is likely to further widen regional disparities across Mexico.

In brief, trade liberalization and economic integration have not provoked a reduction in territorial disparities, but have led to greater polarization (Dussel Peters 1997). As predicted in some Heckscher-Ohlin-von Thünen models (Venables and Limão 1999), Mexican states close to the North American market have profited from integration, increasing their production and incomes, although there is no clear econometric indication yet of a change in the relevant market from Mexico City to the US. States farther away from the US have lost out in relative terms and have become more detached from the recent insertion of the Mexican economy in world markets. Although centrifugal forces may start playing a greater role in the future, once congestion and environmental degradation start to affect the efficiency of the main economic poles, greater policy intervention than hitherto may be needed in order to curb the spiralling of regional

disparities. Industrial, educational, and regional development policies need to be developed fast in order to set up the bases for development in a series of Mexican states which, until recently, relied almost solely on migration and their natural resources to survive. In any case, further research is needed in order to determine what are the factors behind regional growth in Mexico in the last few years, since the traditional factors which influenced growth until very recently are giving way to new and less well known factors which are likely to shape growth and regional disparities in Mexico in years to come.

Annex

Description of the dependent and independent variables

The dependent variable included in the model ($G_{i,t}$) represents regional real per capita GDP growth in each Mexican state for each period covered in the analysis. The data sources are the economic censuses carried out in 1980, 1985 and 1993 and the 2000 estimation made by INEGI (National Statistical and Geographical Institute) (INEGI 2000) for GDP, and the Presidencia de la República (1999) reports for the state population.

The independent variables reproduce—to the extent that available data allow—the factors highlighted by growth theories as the main determinants of growth. y_0 depicts the natural logarithm of the initial regional GDP per capita, extracted from the same data sources as the dependent variable, as a proxy for the agglomeration and initial concentration of economic activity.

Initial state net migration rates—calculated as the number of outmigrants minus the number of immigrants—are depicted by m_0. Apart from interregional migration, there are no data on factor mobility in Mexico. Net state migration rates at the beginning of each period are used in order to test to what extent the mobility of labour has played a role in the evolution of Mexican regional inequalities. Migration also represents a (somewhat imperfect) proxy for the remittances of immigrants, which have played a major role in the development of the Mexican economy (Conway and Cohen 1998; Taylor 1999).

Distance to the most important markets is a key variable for the new economic geography. This strand assumes that once trade is introduced a shift in the relevant market occurs. In the Mexican case the relevant market should be Mexico City during ISI, and the border with the US during GATT and especially since the implementation of NAFTA (Hanson 1996 and 1998a; Krugman and Livas Elizondo 1996). The natural logarithmic function of road distances, measured in kilometers, from the capital of each state to Mexico City (*dismx*) and to the nearest border with the US (*disus*), are used to represent proximity to the two largest markets. Both variables are tested for all three periods, in order to assess whether the domestic or foreign market is the most relevant in each period.

Other factors considered by growth theorists as key determinants of growth are also included in the model. The natural logarithm of the initial state commercial banking deposits (k_0), measured in current pesos and weighted by the population of each state, is introduced as a proxy for capital accumulation. The average years of schooling (ed_0) of the adult population at the beginning of the period and the initial number of high school graduates divided by the population of each state (hgs_0) provide two measures of the educational attainment level of the population.

Other variables are used to control for other influences in the structure of the Mexican economy, such as the effect of oil on the economy (*camtab*), the initial location of maquiladora (*maq₀*) and public investment (*pubinv₀*). Oil, which has provoked significant distortions in regional disparities, has been included in the model as a dummy variable representing the two main oil producing states, Campeche and Tabasco. These two states accounted for 94.65 per cent of the total Mexican oil production in 1998, and their GDP per capita have fluctuated enormously according to the price of oil and to the level of production (PEMEX 1999). The maquiladora scheme, which is becoming increasingly important and was until recently restricted to the border with the US, has also been included as a variable in the form of maquiladora employment levels at the beginning of each period constructed using INEGI data (INEGI 1998). Finally, the natural logarithm of public investment, measured in current pesos in each Mexican state at the beginning of each period, is also included in the model.

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