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Regional disparities and determinants of growth in Mexico

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Abstract. Developing countries such as Mexico, in which profound processes of economic liberalization have taken place over the last few decades, offer fertile terrain for studies of regional disparities. Mexico has experienced a history of polarization between regions, the industrialized north and the underdeveloped south, which have seen their differences widen, exacerbated through recurrent crises and liberalization processes. This paper looks at the convergence process among regions, examining which factors might affect regional growth, tracking the evolution of single units and identifying winners and losers. The evidence shows that northern states, bordering the USA, moved from a condition that might be described as 'falling-behind' prior to liberalization to that of a 'winner' after that process, while southern states went from the position of 'catching-up' to that of 'loser'. Regional disparities in human capital would appear to be playing a decisive role in the existence of differences.

JEL classification: O10, O20, R11

1. Introduction

The neo-classical work of Barro and Sala-i-Martin (1991, 1992, 1995) on the convergence of per capita GDP among countries and regions started a stream of works investigating the speed at which disparities among economies tend to close or increase. Although much criticized (Quah 1993, 1996), this approach to the evolution of disparities developed the two main measures used in long-term growth analysis through the beta and sigma coefficients, even though to some extent the process of convergence is associated with periods of recession, while divergence is found in periods of economic boom (Chatterji and Dewhurst 1996). The concept of conditional convergence may be more relevant as it allows for differences in factors among regions. Thus, some regions can be described as 'winning', while other regions would be seen as 'losing'.

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Since the beginning of the 1970s Mexico has experienced deep transformations in its economic model. It has moved from an almost closed-to-trade and public-led economy, before 1985, to a very open economy and one of the least guided by public sector forces after 1985 (Aspe 1993). Nevertheless, various economic crises have undermined most of the efforts to increase the population's income, prompting further changes in economic strategy (Lustig 1998). Figure 1 depicts the uneven growth process of Mexico under the import substitution policies of the 1960s (the so-called stabilizing development), the populist period during the 1970s and beginning of the 1980s and the subsequent period of reform and liberalization.

The country's openness seems to have benefited more northern states close to the border with the USA, while southern states remain with low incomes and low levels of growth (See Annex 1 for example). The presence of great disparities in social development and economic growth across all the Mexican states may be a serious obstacle to the further integration of the national economy to free trade agreements and the global economy. In this context, the focus of public policies has been growth at the national level, while regional policies have been merely national policies with strong territorial implications (OECD 1997; Palacios 1989). In addition, the case of the Zapatista movement in Chiapas, one of the most underdeveloped states, demonstrates that regional inequality may result in political instability and this could lead to economic volatility. The evolution and impact of such disparities, and which factors should be the focus of a policy to alleviate such regional disparities, may be a subject of interest for researchers.

The purpose of this paper is to analyze the patterns of convergence and divergence among regions in Mexico since the 1970s and some factors relevant to growth, identifying the winners and losers in this process. The paper is organized as follows. The following section introduces the absolute convergence process, measured through β and σ coefficients and looks at which regions may be winning or losing. The third section analyses the impact of various factors on regional growth. In a final section some conclusions are drawn.

2. Per capita GDP and absolute convergence

Economic disparities between regions are traditionally measured in terms of per capita GDP. This measure is seen to be problematic, given that just one part of a region's GDP, composed of the sum of the total of its value added, goes to the income of the inhabitants in each region.

Furthermore, some analysts (OECD 1997) point out the existence of a type of statistical fallacy when using per capita GDP as an indicator of regional income in the case of Mexico. This fallacy derives from the fact that oil and petrochemicals have a significant weight in the total GDP, while at the same time these sectors are highly localized (mainly in the states of Campeche and Tabasco), being massive generators of value added, but with little impact on local economic development. However, there is no choice but to use per capita GDP since there are no alternative measures of income.

The database of the state's GDP to be used in this work is from the National Institute for Statistics, Geography and Information (INEGI),

available at www.inegi.gob.mx. The methodology for calculation of GDP was based on the input-output matrix for 1970 and 1980. In 1998 INEGI changed its methodology for measuring the states' GDP, updating the figures from 1988 and subsequent years to a 1993 base year. The reasons argued for such a change were that advances in technology and demand structure were among the factors behind the rise or extinction of economic activities. Therefore, there is a considerable variation in the weight of each sector in the generation of national wealth, a phenomenon called structural change. To a certain extent, the so-called fallacy was eradicated from the data.

With this updated database, variations in each state's GDP can be summarized in three groups (Banamex 1999). In the first group there is an increase in the participation of northern states or those whose production is supported by a foreign market. INEGI argues that this modification more accurately mirrors the effects of trade opening and export dynamics. In the second group the oil states experience a reduction in their relative weight, mainly due to changes in the commercial activities related to this industry. The third group, comprising those states whose economic performance is highly vulnerable to a neighboring market, experiences a drop in their relative weight.

During the period 1970–1985[1] the group of states growing most in terms of per capita GDP is headed by two states growing more than ten per cent annually in real terms: Campeche and Tabasco, their growth originating in the oil boom in that period. As mentioned above, this period is characterized by being closed to free international trade. Excluding the oil states, growth is concentrated in central and some southern states, and a few of the northern states, while most of those bordering the USA fall within the lower group in terms of growth.

The regional distribution of annual average growth rates of per capita GDP changed during the period 1985–2000. The country was by then open to free international trade and northern states were to be found in the upper groups in terms of growth. Oil producing states such as Campeche and Tabasco experienced negative growth in this period. These growth rates also reflect the change of methodology used by INEGI to calculate the GDP, lending more weight to northern states because of free trade activity and less weight to the oil producing states. These diverse spectrums of performance lead us to wonder the extent to which there has been a convergence or divergence process among regions and which states are winning or losing from this process. All this changes are reflected in Annex 1, where rates of growth are presented, as well as a division of categories taking into account growth and initial per capita GDP. In order to analyze the evolution of such patterns a study on convergence will be performed.

Following the work of Barro and Sala-i-Martin (1991, 1992, 1995) on the pattern of growth at regional level there have been several streams of works investigating the common speed at which economies converge to their own steady state. These ideas were first suggested by Abramovitz (1986) and

[1] The year 1985 marks a change in policies towards a free trade environment and broad economic reforms. Then, this is a structural change that will be the axis on which the analysis of the paper shall be based. The Mexican structural change in 1985 has been statistically tested in many others works (e.g., Lächler and Aschauer 1998).

operationalized by Baumol (1986) and are supported by the neo-classical growth theory assuming diminishing returns to capital, with the implication that each addition to capital will generate a more than proportional addition in output when the capital is small, and small addition when the capital is large. Consequently, if the only difference across economies is the initial capital stock, poor regions (with a small capital stock) will grow faster than rich regions (with a large capital stock), creating a convergence effect.

The literature uses the β coefficient to measure the speed of convergence. There is β convergence if, on average, poor regions are growing faster than rich regions. In a cross-section of areas, we can find β convergence if there is a negative relationship between the growth rate of per capita income during a period and the initial level of income. The speed of convergence is estimated through the following equation (Sala-i-Martin 1996):

$$\frac{1}{T}\ln\left(\frac{y_{i,t_0+T}}{y_{i,t_0}}\right) = a - \left(\frac{1-e^{-\beta t}}{T}\right)\ln\left(y_{i,t_0}\right) + u_{it_0,t_0+t} \quad (1)$$

Where the right side is the average growth rate on the initial level of income of a set of regions between time t_0 and t_0+T. β coefficient is the absolute β coefficient, without conditioning on any other characteristic of the states. The model can be adapted to include some variables to calculate conditional beta convergence.

Table 1 displays the ordinary least squares results for Eq. 1, separated into diverse time spans. The period 1970–2000 shows a positive sign, which would mean divergence, but it is not significant. This may reflect the uneven growth process experienced in the period 1970–1985 and subsequently as displayed in Fig. 1.

The period before the liberalization of the economy (1970–1985) shows a negative and significant beta coefficient, with the coefficient ranging between 1.9 and 1.7 %, which is close to the rates of convergence of around two per cent found in international studies (Barro and Sala-i-Martin 1991, 1995). The period 1970–1985 shows an especially high R square.

The coefficient for the period 1985–2000 is statistically significant but with a positive sign in Table 1, while in the periods 1988–2000 and 1994–2000 the coefficients are positive and statistically significant; that is, during these periods it is possible to detect a process of β divergence, with the gap between

Table 1. Absolute convergence in the Mexican regions

	1970–2000	1970–1985[a]	1985–2000[a]	1988–2000[a]	1994–2000[a]	1970–1985[b]	1985–2000[b]
α	0.0142*	0.0646***	−0.054***	0.0006	−0.0426**	0.0619***	−0.028
	(0.0078)	(0.0075)	(0.0209)	(0.0114)	(0.0165)	(0.0132)	(0.019)
β	0.0002	−0.019***	0.0242***	0.0095**	0.0217***	−0.017***	0.0139*
	(0.0035)	(0.0034)	(0.0082)	(0.0047)	(0.0064)	(0.0059)	(0.007)
R^2	0.0002	0.5276	0.2376	0.1246	0.2921	0.7647	0.6281
T	30	15	15	12	6	15	15
N	30	30	30	30	30	32	32

[a] Excluding Oil states of Campeche and Tabasco.
[b] Includes a dummy variable for Oil states of Campeche and Tabasco.
OLS. *, ** and *** Significant at 10, 5 and 1% , respectively.

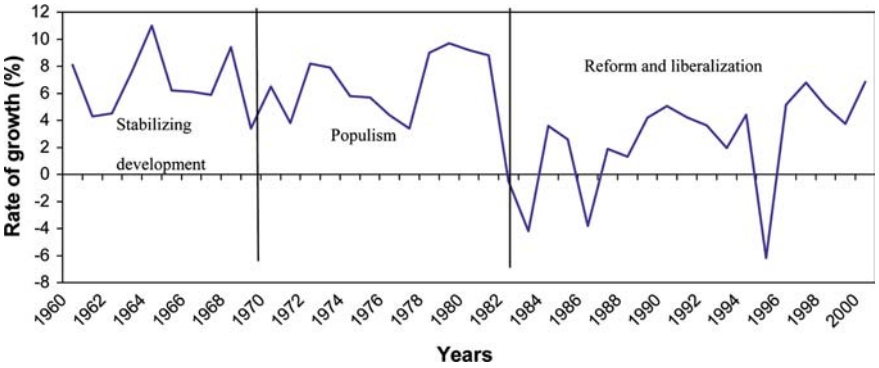

Fig. 1. Growth of real GDP (*Source:* INEGI 2001 and Banco de México 2001)

rich and poor regions tending to widen, the opposite of the findings of convergence for the previous period.

Another important indicator of the evolution of income disparities among regions is the dispersion of income. GDP dispersion across states is typically measured by the standard deviation of the natural logarithm of the states' real per capita GDP. This concept is called the sigma in the literature and this measures how the distribution of income evolves over time (Sala-i-Martin 1996), there being a sigma convergence when the coefficient gets smaller.

To assess to what extent there has been σ convergence across states in Mexico, the standard deviation for the natural logarithm of the real per capita GDP since 1970 was calculated, as shown in Fig. 2. These results show that the dispersion of per capita GDP, or sigma convergence, for all states declined from 0.41 in 1970 to 0.32 in 1985. The big leap in dispersion occurred in the period 1985–1988, and since then dispersion has remained almost constant at around 0.43, then reaching 0.47 in 2000. The sigma convergence coefficient in the second half of the 1990s was at the same level as it was in 1970. These findings adjust to the beta coefficients, the sigma coefficient decreasing in the period that the beta shows a negative and significant coefficient, while in the period that the sigma increases the beta shows a positive coefficient.

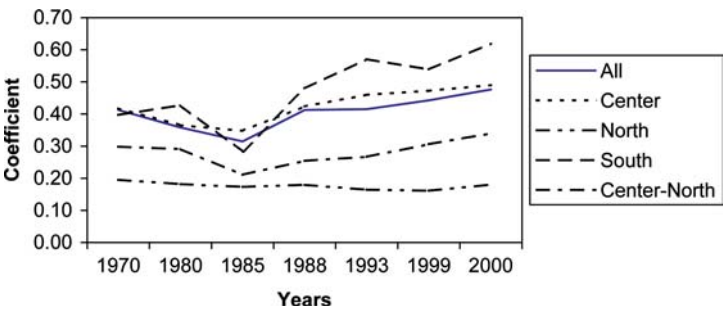

Fig. 2. Sigma convergence (Excluding the oil states of Campeche and Tabasco)

Dividing the country into areas, one can note that states in the north have slowly converged, while differences among states in the center and south have increased. These results for beta and sigma coefficients differ slightly from those presented in earlier studies of absolute convergence, using the database with the previous methodology by INEGI (e.g., Juan-Ramon and Rivera-Batiz 1996, although they do not track the evolution of single units). In those results the dramatic rise in disparity occurs during the period 1988–1993, while in the results presented in this study it takes place during the period 1985–1988, disparities not having too much variation. In both cases it becomes clear that it will be more difficult to close differences between rich and poor states.

The evidence also reflects a similar pattern in the European regions, but here the opposite explanation is likely. Boldrin and Canova (2001) show that a process of convergence occurred in the period 1950–1973, while in subsequent periods the process halted, the coefficient becoming insignificant. They argue that the period of convergence corresponds with an absence of regional policies and with an increase in trade, while subsequently, with regional policies, the increase in trade was not accompanied by a reduction in disparities. In Mexico, the outcome shows convergence during a period of failed regional policy attempts and high state intervention, while in the period of liberalization and increasing trade there is a divergence process. Which factors may have affected such growth patterns in the Mexican context? The next section focuses on the effects of different factors in a conditional convergence analysis.

3. Convergence and differences in factors

This section extends the analysis to include differences in factors among the regions in order to account for a conditional convergence. Considering a simple model with human and physical capital, we can set a model so that:

$$\begin{aligned} \mathrm{Dy} = {} & \beta_0 + \beta_1 \mathrm{y}_{0\mathrm{i}} + \beta_2 \mathrm{Oil} + \beta_3 \mathrm{H}_{0\mathrm{i}} + \beta_4 \mathrm{Kpriv}_{0\mathrm{i}} + \beta_5 \mathrm{Kpub}_{0\mathrm{i}} \\ & + \beta_6 \mathrm{Agriculture}_{0\mathrm{i}} + \varepsilon_{\mathrm{i}} \end{aligned} \tag{2}$$

where Dy is the average rate of growth of per capita GDP in the period, corresponding to the left hand side of Eq. (1). Y_0 corresponds to the log of initial per capital GDP in the period. Oil is a dummy variable for Campeche and Tabasco, the oil states. H_0 is a measure of human capital proxied by the share of the workforce in medium skill occupations at the beginning of the period. Kpriv_0 is the log of the stock of private capital per worker at the beginning of the period. Kpub_0 is the log of the stock of public infrastructure per capita at the beginning of the period. However, in the 1970s and beginning of the 1980s during the populist periods there was a strong government policy of public spending (Bazdresch and Levy 1991; Rodriguez-Oreggia 2002). To account for this Kpub_0 was replaced at some points with the variable G measuring the growth of the public expenditure[2].

[2] This account, to some extent, for a ''Keynesian effect'', i.e. the view that public spending could spur private consumption and this help the economy rise from a slump. The populist governments saw such spending as a way to increase growth and stabilise political and social problems in the country (see for example Bazdresch and Levy 1991).

Agriculture is the share of the GDP accounted for by the primary sector in the region at the beginning of the period. ε is the error term. Annex 2 includes a description and sources of the variables.

The results are presented in Table 2, which displays the coefficients for the two periods 1970–1985 and 1985–2000. The division corresponds to the structural change in terms of economic policy occurring in the year 1985[3] (see for example Aspe 1993; Lächler and Aschauer 1998). Regressions were estimated with an OLS cross-section for the 32 states and tested for heteroscedasticity with the Cook-Weisberg test (Cook and Weisberg 1983), correcting with the Huber-White-Sandwich method (White 1980; Huber 1983; Moulton 1986) when necessary. Tests for multicollinearity through the variance inflation factor (Chatterjee and Price 1991) were also carried out.

Different sets of regressions were carried out in order to measure the sensitivity of the variables. For the 1970–1985 period results for the variable for the initial per capita GDP are mainly negative, but these turn out to be not significant when the variable for the growth of public investment was included in regression (3), while the stock of public infrastructure is not significant.[4] This may be explained by the fact that such investment in this period was focused on political pay-off instead of questions of efficiency or even redistribution (Rodríguez-Oreggia 2002). Therefore, the formation of a stock does not necessarily have an impact on productivity, but it is the only effect on demand that fosters temporal growth. For the period 1985–2000, the stock of infrastructure remains without significance, but nor is public investment significant. During the reform and liberalization, the budget was cut and investment fell to the proportions seen at the beginning of the 1970s. In addition to the strong cuts, some government programs were clearly aimed at attracting votes in order to keep the majority of elected positions under the control of the ruling party (Molinar and Weldon 1994; Rodriguez 1997) and therefore one would not expect to see an effect on productivity. Furthermore, at the regional levels some evidence has pointed that the allocation of public investment follows a pork barrel politic, and not either efficiency or redistribution, and then removing the positive effect on growth (Costa et al. 2003; Rodríguez-Orregia and Rodríguez-Pose 2004).

The lack of significance of the variable for private investment may be linked to the changes in public investment. For example, Lächler and Aschauer (1998) found that in Mexico there was a crowding out of private

[3] This division of previous/after liberalization is important for policy implications. Growth in both period are qualitative different, as it is shown in Annex 1. In addition, a body of work have remarked how the effects of liberalisation and reform have not been homogenous among regions in Mexico as they have modified the location choice of manufacturing firms, lead to a change in returns across sectors, and also increased the skilled-unskilled wage gap (see for example works by Krugman and Livas 1996; Hanson 1998; Cragg and Eppelbaum 1996).

[4] The variable g entails endogeneity. For this reason instrumental variables are performed in regressions (4) and (8) using the lags of g as instruments. Although there are some similarities between the findings, the null hypothesis of the OLS regressors as consistent and efficient cannot be rejected. Therefore, interpretations could be based on the OLS results. It was also used as an instrument an estimator of g using the density of the regions and the relative income position, but results were very similar to those presented here. Although some correlation exists between y_0 and g, the results are similar in both variables when excluding the other from the regressions.

Table 2. Conditional convergence in the Mexican regions

	1970–1985				1985–2000			
	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) OLS	(6) OLS	(7) OLS	(8) IV
Constant	0.1194***	0.1192***	0.0531**	0.0298	0.0033	0.0010	0.0066	−0.0004
	(0.0312)	(0.0312)	(0.0218)	(0.1180)	(0.0451)	(0.0466)	(0.0167)	(0.0214)
y_0	−0.0406***	−0.0304**	−0.0081	0.0061	−0.0291***	−0.026***	−0.0260**	−0.0267**
	(0.0145)	(0.0116)	(0.0178)	(0.1082)	(0.0062)	(0.007)	(0.0076)	(0.0084)
Oil	0.0968***	0.0961***	0.0777***	0.0711***	−0.0368***	−0.0326**	−0.0344**	−0.0267**
	(0.0250)	(0.0267)	(0.0178)	(0.0219)	(0.0105)	(0.0125)	(0.0137)	(0.0084)
H	0.1672**	0.0944**	−0.0112	−0.0706	0.1704***	0.2186***	0.2366***	0.2705***
	(0.0951)	(0.0494)	(0.0703)	(0.4632)	(0.0595)	(0.0643)	(0.0487)	(0.0731)
Agriculture	0.0459				−0.0745**			
	(0.0449)				(0.0292)			
Kpriv	−0.0040	−0.0065	−0.0044	−0.0033	−0.0007	−0.0002	0.0011	0.0038
	(0.0033)	(0.0048)	(0.0032)	(0.0061)	(0.0051)	(0.0057)	(0.0059)	(0.0071)
Kpub	−0.0061	−0.0043			0.0056	0.0015		
	(0.0049)	(0.0038)			(0.0078)	(0.008)		
G			0.1818**	0.2609*			0.0463	0.1846
			(0.0865)	(0.1567)			(0.0791)	(0.2202)
R^2	0.8160	0.8067	0.8562	0.8456	0.8256	0.7985	0.7994	0.7867
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hausman				Accept				Accept

OLS. White, Huber, Sandwich standard errors in parentheses
*, ** and *** Significant at 10, 5 and 1% respectively
Instruments are the lags of G and same variables for the remainder. N = 32

investment by public investment, weakening the relationship between public investment and growth. Ramírez (1994) finds that the unsystematic cuts in the public budget impact negatively on capital expenditure as changes in public investment precede changes in private capital.

The dummy for the oil states is significant but it changes sign according to the period; while in the period of the oil boom it is positive, during the period of liberalization it becomes negative. As discussed earlier, these states experienced higher growth due to the oil boom in the 1970s. The variable for agriculture has no significance in the first period, while it is negative and significant during the second period, during which states may have taken advantage of the free trade in terms of industrialization (the agricultural section of the NAFTA taking effect in 2003).

The variable for human capital, H, is significant during the period 1970–85 until the variable for public investment, *G*, is included. However, during the 1985–2000 period it is strongly significant and also it has the effect of yielding negative results for the variable initial per capital GDP. That is, in this last period there is conditional convergence due to the effect of human capital. This result shows a stable estimates for y_0 of about 2% or a bit higher, which is in harmony with the 2–4% estimates all around the world (e.g. Barro and Sala-i-Martin 1995 among many others).

There are plausible explanations for human capital findings. One explanation is that human capital did not have a strong effect on growth during the 1970–1985 period because the economy was based on the exploitation of raw material, mainly oil. Another plausible explanation for the weak of the impact of human capital may be that put forward by Griliches (1997). He suggests that there should be a lack of significance between human capital and growth if most of the growth in human capital is absorbed in the public sector. This does not necessarily mean that workers are unproductive, but their contribution to productivity – to growth in per capital GDP – is not reflected because of ineffective measurement of output in that sector. This is a plausible explanation for this period, given that, as mentioned in Aspe and Beristain (1984), Bazdresch and Levy (1991) and Lustig (1998) among many others, the public sector increased its presence in the economy, leading to a high share of workers employed in such sector. Data from the Economic Census does not allow one to identify – apart from in the Public Administration category – the number of workers employed in the public sector, given that many companies were also public.

It is important to note that, as stated in Azariades and Drazden (1991), levels of human capital had a consistent impact on growth in the last period of analysis, 1985–2000. It is also important to relate the findings for human capital over the two periods (1970–1985 and 1985–2000) and the openness of the economy to empirical works at the international level. López et al. (1998) analyzed the varying effects of the education coefficients according to the presence or absence of economic reforms in a set of countries. They found a positive and powerful effect of human capital on economic growth in reform episodes, but a lack of significance in the absence of reforms.

The Mexican findings here, then, support the evidence that in over regulated economies, like in the period 1970–1985, human capital may not contribute to the productivity of physical capital and economic growth. On

the other hand, this evidence, for the period 1985–2000, also supports the idea that human capital could do much to boost the marginal productivity of physical capital and economic growth in a market-friendly environment.

4. Conclusions

This paper has represented an attempt to identify the patterns of growth of the Mexican regions and some factors that may be relevant for growth. The existing disparities suggest that there is an opportunity for the implementation of central public policies aimed at building local capacities for development, seeking the reduction of local components of inequality. Aspects such as human capital, public investment and export promotion might be considered. It seems that human capital policies can have a greater effect in closing disparities among regions in the Mexican context, but other policies cannot be dismissed given that building local capacities requires a great deal of time and a coordinated and well focused regional policy.

A first concern is that Mexican planners must decide whether they want to pursue national growth and efficiency or decrease inequalities among regions, in this latter case giving priority to growth in poor regions and to spatial equity. Contradictory objectives lead to diffuse policies. The Zapatista guerrilla movement in Chiapas, the least developed region, shows that regional differences may play an important role in national political and economic stability. Second, planners need to decide if they want to affect long-term growth, which is the aim of development policies focusing on the provision of factors, such as infrastructure, education, etc. Third, it may be important to focus on a reduced, strategically planned and coordinated set of actions, in order to avoid losing sight of their true priorities, and thus hampering the allocation and monitoring of resources. In this sense, much more work is needed in order to establish priorities and coordination between policies.

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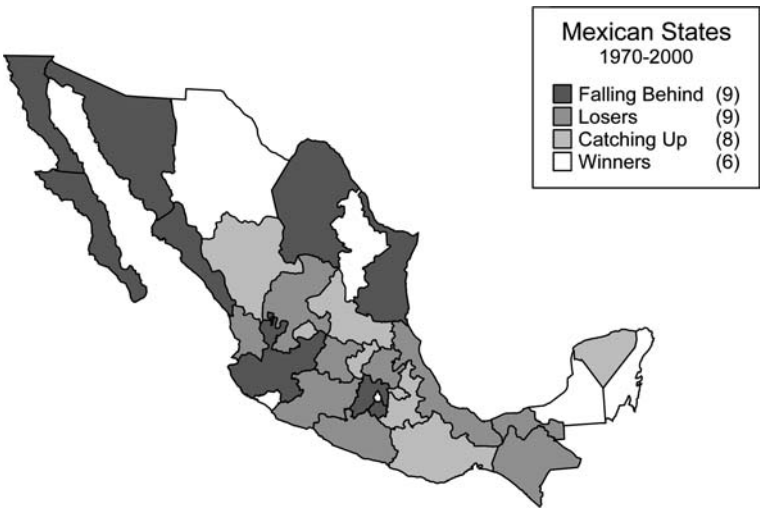
Annex 1

This Annex presents the changes in the distribution of growth for three periods (the reasons are explained in the text), not only considering growth in a period but also the initial per capita GDP. In addition, growth rates for the period are presented. Regions with higher than the average growth and higher than the average initial per capita GDP can be classified 'winners'. Regions with lower than average initial per capita GDP but higher than the average rates of growth are classified as 'catching-up'. Regions which are below average in both variables are 'losers'. Regions with higher than average initial per capita GDP but lower than the average rates of growth can be classed as 'falling-behind'.

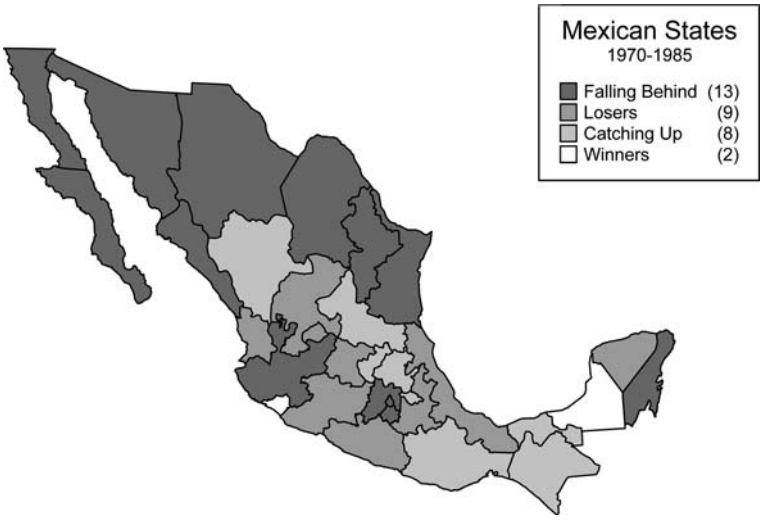
Table A1. Within distribution changes and rates of per capita GDP growth

	Categories			Rates of growth (%)		
State	1970–1985	1985–2000	1970–2000	1970–1985	1985–2000	1970–2000
Border						
Baja California	F	W	F	0.97	1.41	1.19
Coahuila	F	W	F	1.83	1.14	1.49
Chihuahua	F	W	W	1.91	3.11	2.51
Nuevo León	F	W	W	1.75	1.30	1.52
Sonora	F	W	F	0.85	0.65	0.75
Tamaulipas	F	W	F	1.71	1.10	1.42
Centre North						
Aguascalientes	L	C	C	2.30	3.24	2.77
Baja California Sur	F	W	F	0.56	1.25	0.90
Colima	W	W	W	3.31	0.15	1.73
Durango	C	L	C	3.41	−0.06	1.68
Jalisco	F	W	F	2.01	0.23	1.12
Nayarit	L	L	L	2.18	−1.62	0.28
San Luis Potosí	C	C	C	3.07	0.96	2.02
Sinaloa	F	L	F	1.18	−0.14	0.52
Zacatecas	L	L	L	2.87	−0.27	1.30
Centre						
Distrito Federal	F	W	W	1.85	2.66	2.25
Guanajuato	L	L	L	1.73	0.27	1.00
Hidalgo	C	L	L	3.52	−0.59	1.47
México	F	F	F	1.22	−1.01	0.11
Michoacán	L	C	L	2.22	0.58	1.40
Morelos	F	C	F	1.95	0.64	1.29
Puebla	L	C	C	2.40	1.34	1.87
Querétaro	C	W	C	3.90	1.48	2.69
Tlaxcala	C	L	C	5.14	−1.48	1.83
Veracruz	L	C	L	1.39	−1.31	0.04
South						
Chiapas	C	L	L	3.86	−2.63	0.61
Guerrero	L	C	L	2.47	0.44	1.45
Oaxaca	C	L	C	4.27	−0.55	1.86
Quintana Roo	F	W	W	2.26	3.26	2.76
Yucatán	L	C	C	1.75	1.66	1.71
Oil						
Campeche	W	F	W	15.33	−8.14	3.60
Tabasco	C	F	L	7.23	−5.70	0.76

W = winner; F = falling-behind; L = loser; C = catching-up.



Map 1. Within distribution changes 1970–2000



Map 2. Within distribution changes 1970–1985

Table A1 and Maps 1, 2 and 3 shows the evolution of such categories. What can be seen in general is that regions that were catching up in the period 1970–1985 (close to trade) became losers in the period 1985–2000 (trade opened), while regions falling behind in the first period, mostly the border states, became winners in the second period. The latter regions not only have the advantage of being close to the USA, but also have greater endowments in terms of human capital. Such a sharp division in periods is important for analysis and policy implications, and then this time division is used in the analysis of conditional convergence rather than undertaking the whole period 1970–2000.

Map 3. Within distribution changes 1985–2000

Annex 2

Agriculture	Share of the agricultural sector in the GDP of the region at the beginning of the period. Data were collected from the INEGI's database on regional accounts (various years).
Dy	Average annual rate of growth of per capita GDP in the period. Calculated with data for each state's GDP from the Statistical Annexes to the Presidential Address to the Nation, various years (Poder Ejecutivo Federal) and the INEGI Economic Database, available at www.inegi.gob.mx Data for population were extracted from the Population Census edited by INEGI, and the Statistical Annexes cited above.
G	Average annual rate of growth of per capital public investment in the period. Public investment comprises social and economic infrastructure investment. Data were taken from the Statistical Annexes to the Presidential Address to the Nation (various years).
H_0	The share of the occupied workforce in medium-skilled occupations at the beginning of the period. Data were taken from the Population Census and the mid-term counts edited by INEGI. The category includes supervisor/foremen, administrative workers, supervisors, clerks, dependants, traders, personal and security workers.
$Kpriv_0$	Log of the stock of fixed assets per worker in the manufacturing, extractive and gas and electricity industries at the beginning of the period. Data are from the Economic Census, edited by INEGI, for the years 1970 and 1985. The value taken corresponds to the value of assets minus depreciation.
Kpub0	Log of per capita stock of economic infrastructure. Data for the stock were provided by Rodriguez-Oreggia (2002), who built a stock of public infrastructure using a perpetual inventory method for the Mexican states.
Oil	Dummy variable with value of 1 for Campeche and Tabasco and 0 for all other states.
y_0	Log of the per capita GDP in the initial year of the period. Data were obtained as in variable Dy.