

## **Why NAFTA Did Not Reach the South**

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### **Abstract**

This note is part of a larger effort to study the economic performance of the states of Chiapas, Guerrero and Oaxaca. This broader effort, “The Southern States Development Strategy” project, is being led by our colleagues, Marcelo Giugale (Lead Economist for México, Colombia, and Venezuela of the World Bank) and Gillette Hall (Economist, Human Development Sector, The World Bank). We find that during 1993-2000 (and during 1990-2000) the Southern States of Mexico, namely Guerrero, Oaxaca and Chiapas, lost ground relative to the rest of the country in terms of their Gross Domestic Product (GDP) per capita. This divergence was due mainly to trends in labor productivity. It is likely that transport and communications costs are key, although they are not necessarily the only culprits. We also find that economic growth across Mexican states during 1990-2000 was driven by several policy-sensitive variables. Finally, we speculate about the role played by other state-level characteristics related to the quality of governance and social instability, which afflict the Southern States of the Mexican Republic.

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## **1. Introduction**

In January 1994 the North American Free Trade Agreement (NAFTA) was implemented by the United States of America, Canada, and Mexico. The general objective of the three governments was to create an expanded market for the goods and services produced in their territories. However, the benefits of NAFTA and trade liberalization more generally seem to have concentrated in the Northern and Central States of Mexico, while the Southern States experienced lower relative economic growth.

In this note we review empirical findings that suggest that relative incomes in the Southern States have not significantly improved since the implementation of NAFTA. Based on the theoretical and empirical literature, we assess alternative explanations of why these States have not benefited from NAFTA, which along with the empirical findings, might inform policy discussions about what can be done to raise the speed of economic growth in these States. This analysis is useful for understanding poverty levels across Mexican states, because improvements in economic growth are associated with increases in the income per capita, which reduce poverty rates if the distribution of income within Mexican states is unaffected by their growth rates. This study includes a more detailed note of the sources of poverty across Mexican states that links poverty levels to income levels and other characteristics.

In brief, we find that during 1993-2000 (and during 1990-2000) the Southern States of Mexico, namely Guerrero, Oaxaca and Chiapas, lost ground relative to the rest of the country in terms of their Gross Domestic Product (GDP) per capita. Moreover, this divergence was due mainly to trends in labor productivity. This outcome is consistent with certain views about how international trade affects the location of production in favor of regions that are closer to both the main consumption markets and the source of intermediate goods used in the production of final goods, in this case the United States. That is, it is likely that transport and communications costs are key, although they are not necessarily the only culprits of the growing economic differences between the Southern States and the rest of the Mexican economy, especially the States along the northern border. However, this is not the end of the story. We also find that economic growth across Mexican states during 1990-2000 was driven by several policy-sensitive variables. It seems that infrastructure

development, especially access to telecommunications, was associated with faster growth rates. It is noteworthy that Chiapas and Oaxaca have the lowest telephone densities in Mexico, and Guerrero is ranked 25 out of 32. The share of public employment in total employment was associated with lower growth rates. In this respect, these Southern States do not have above-average shares of public employment, but increasing these shares will not necessarily improve their economic performance. Also, states with higher levels of education in 1990 grew faster than laggard states, and Chiapas, Oaxaca, and Guerrero had the lowest levels of educational attainment in the whole country. Finally, we also discuss some additional issues that seem to have limited the potentially positive effects that NAFTA could have had on the Southern States, since it offered expanded markets in products, such as non-traditional agriculture and forestry, in which these states could have gained market shares. Although we cannot provide a definitive answer to why these sectors have not developed, we strongly suspect that institutional problems related to the quality of governance in these states hampered these potential sources of economic dynamism. Hence our main conclusion is that the Southern States did not benefit from NAFTA because they were not prepared to reap the benefits of free trade. That is, NAFTA did not reach the South due to obstacles to economic development that afflict the Southern states, such as insufficient infrastructure and access to telecommunications services, and social instability and governance. But the content of the trade agreement did not condemn this region to the pains of underdevelopment. On the contrary, there is much to do in terms of public policies that will reduce the disadvantages of these States in terms of education, infrastructure, and institutions. Any regional or state-level actions in these areas that aim to promote regional development could consider the relationship between these policies and the available factors of production in these States that are not mobile, such as land, natural resources (such forests), and climate.<sup>2</sup> There is also room to improve the Federal Government's system for allocating funds for primary education across Mexican states.

The next section of this note briefly reviews the general effects that NAFTA had on the Mexican economy. Section three reviews alternative explanations about how international trade can affect income differentials within countries in general. Section four presents the main empirical findings of work commissioned for this study on the sources of

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<sup>2</sup> Labor is a mobile factor of production and is worth contrasting with fixed factors such as land. Education of people can help raise the living standards of persons, but not necessarily of regions, because labor can migrate. See sections 4 and 5 for further discussions of these issues.

economic divergence across Mexican states during 1960-2000. Section five provides estimates of the impact of various policy-sensitive variables on economic growth across Mexican states during 1990-2000.. Section six examines qualitative evidence about potential obstacles faced by the South that reduced the gains from NAFTA for this region. The final section concludes by summarizing the main policy implications of the analysis.

## **2. The North American Free Trade Agreement**

In 1986 Mexico joined the General Agreement on Tariffs and Trade (GATT), which marked the beginning of the end of a closed economy. From 1986 to the implementation of NAFTA in January 1994, Mexico continuously reduced its protection of domestic industries. By 1989, when NAFTA negotiations started, the Mexican economy was almost completely open, with only the exceptions of the automobile industry, the telecommunications industry, and other industries where a strict governmental control still prevailed.<sup>3</sup> In practice, NAFTA represented the institutionalization of an economic policy that had started more than ten years before. Nevertheless, at the time, Mexico had strong incentives for joining NAFTA, such as the expectation of increased foreign direct investment and productivity growth, which were expected to produce better employment opportunities for Mexican workers in terms of higher wages.<sup>4</sup>

When it was first implemented, NAFTA became the largest free trade zone by area and affected 406 million people with more than \$11 trillion in production of goods and services. According to statistics from a recent official report (USTR, 2001), from 1993 to 2000, Mexico's exports to the United States and Canada grew 238 percent. From 1994 to 2000, NAFTA enjoyed great success at increasing trade between the three countries; trade increased from \$297 billion to \$676 billion, an increase of over 128 percent. Within NAFTA there is currently \$1.8 billion in trilateral trade each day. In addition, the average growth rate of investment in Mexico was 12.5% from 1996 to 2000 compared with 7.9% in

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<sup>3</sup> For an extensive analysis of the process of market liberalization in Mexico, see Ianni (1999).

<sup>4</sup> As discussed in Aroca and Maloney (2002), these effects were also expected to reduce the incentives for labor migration from Mexico into the United States. The evidence presented by these authors strongly indicates that this, indeed, might have happened.

from 1989-1993.<sup>5</sup> FDI flows amounted to 81.7 billion dollars in 1994-2000, a level that is 228% higher than the 24.9 billion dollars observed in 1987-1993.

With regards to employment growth, the same report states that during the first seven years of NAFTA, overall employment grew twenty-eight percent, resulting in 2.7 million new jobs in Mexico. Over half of all jobs created in Mexico since NAFTA's inception were in the export sector (mainly manufactured goods). Mexican export-oriented manufacturing industries pay wages almost forty percent higher than other manufacturing industries in Mexico (USTR, 2001). However, these are only aggregated data. In the next section we review alternative explanations about NAFTA's impact at the regional level within Mexico.

### **3. Trade liberalization and relative incomes within countries**

There are two interesting ways of thinking about the impact of international trade on the relative incomes of regions within countries. In one scenario, trade liberalization changes the relative prices of goods in the domestic economy. Therefore, some sectors will benefit from this change and others will lose. The regional effects of these price changes can, in turn, be traced to regions as long as there are some factors of production, such as land, or even industry-specific labor skills and machines, cannot be readily moved to the winning sectors. For example, if the production of capital goods enjoys high levels of protection (such as high import tariffs, quotas, or even import prohibitions) then trade liberalization hurts the profitability of this industry. If the machines used for the production of these goods cannot be adapted to produce other goods, then labor productivity and wages initially fall in this sector and labor migrates to regions that have winning sectors. The reverse is true for sectors that experience an increase in relative prices: labor productivity and wages initially rise in those sectors and attract new workers. Eventually, regions with losing industries will experience declines in the proportion of labor in the region with respect to other states but wages and labor productivity across regions will be equalized by the migration of workers. The scientific literature supporting this type of effect was pioneered by Mussa (1976) and Neary (1978).

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<sup>5</sup> We exclude 1994-1995 due to the balance of payments crisis that occurred during those years.

Alternatively, the impact of increased international trade on the distribution of income across regions could be complicated by transport and communications costs (broadly defined) and what economists call “increasing returns to scale.” The basic idea is that transport and communications costs affect the profitability of firms or industries. For example, the ability to deliver final goods to large consumer markets and/or the ability to purchase machinery or equipment necessary for producing final goods will affect the profitability of firms. Moreover, the unit costs of delivering final or intermediate goods can decline with the volume of goods being sold when there are gains (or spillovers) from locating near other firms. These gains can come from learning from other firms’ production or management techniques, or from the sharing of a common labor pool that is trained on the job and thus has developed skills that are necessary for efficient production. Thus average costs of final goods can fall with the expansion of export markets and increased imports of machinery (or any other intermediate good) in certain geographic locations where economic activity might tend to agglomerate (as a consequence of the economies of scale and transport and communications costs). Consequently, if these forces are at work, then economic divergence across Mexican states should be driven mainly by divergence in labor productivity. The scientific literature supporting this type of explanation is reviewed by Venables (2001).

In sum, the classical explanation of the impact of international trade liberalization on the geography of economic activity within Mexico predicts that economic divergence is driven by movements of labor across regions, with little or no divergence in labor productivity in the medium term. In contrast, the modern explanation of the impact of trade on the geography of economic activity predicts that divergence is largely due to increasing differences in labor productivity. The following section examines the evidence regarding the relative contributions of demographic factors and labor productivity to the distribution of economic activity across Mexican states.

#### **4. Convergence of GDP per capita and its components**

In this section, we explore the evolution of state GDP per capita during the period 1960-2000 by decomposing it into demographic, labor market and productivity components. That is, a state’s production per person is the result of the production by each

employed worker. In turn, the number of employed workers is a fraction of the number of workers that want to be employed, who are a fraction of the adult population (or working-age population). Finally, the adult population is a fraction of the total population. Consequently, with information about GDP, employment and demographic information we can analyze the contribution of these various elements to a state's GDP per capita. This analysis is presented below.

In arithmetic notation, the decomposition of GDP per capita is:

$$\frac{Y}{N_{it}} = \left( \frac{Y}{L_{it}} \right) \cdot \left( \frac{L}{EAP_{it}} \right) \cdot \left( \frac{EAP}{WAP_{it}} \right) \cdot \left( \frac{WAP}{N_{it}} \right) \quad (1)$$

where  $Y$  is GDP,  $N$  is population,  $L$  is the economically active population that is employed (so  $Y/L$  is GDP per worker or productivity),  $EAP$  is economically active population (so  $L/EAP$  is the employment rate),  $WAP$  is working age population (so  $EAP/WAP$  is the participation rate).

Equation (1) can be re-expressed in logarithms as:

$$y/n_{it} = y/l_{it} + l/eap_{it} + eap/wap_{it} + wap/n_{it} \quad (2)$$

From this expression we can decompose differences over time and across states in order to account for the contribution of demographic variables ( $wap/n$ ), labor market structure and participation ( $l/eap$  and  $eap/wap$ ), and differences in productivity ( $y/l$ ) to the GDP per capita regional variance in Mexico.

Using the decomposition in (2), we can attribute differences in GDP per capita across states, at a given moment in time, to demographic, labor market or productivity differences. Specifically, we calculate the following:

$$y/n_{it} - y/n_{bt} = y/l_{it} - y/l_{bt} + l/eap_{it} - l/eap_{bt} + eap/wap_{it} - eap/wap_{bt} + wap/n_{it} - wap/n_{bt}$$

where underscore b stands for a base state against which the comparison is done. In this case, we chose the Federal District (DF), as it is the entity with the highest GDP per capita.

Table 1 shows the average difference per decade for all states and also excluding Campeche, Chiapas and Tabasco.<sup>6</sup> The average difference with the richest entity in GDP per capita fell from 1960 to 1980, but then increased in the last two decades. The very large increase in the average difference in GDP per capita from 1980 to 1990 was a result of a large increase in the average difference in productivity ( $y/l$ ), and smaller ones in the participation rate ( $emp/wap$ ) and the proportion of working age population ( $wap/n$ ). The smaller increase in the average difference in GDP per capita from 1990 to 2000 is a result of a significant increase in the differences in  $y/l$ , compensated by reductions in the average difference in  $emp/wap$  and  $wap/n$ .

At any point in time, the variable that explains the largest part of average differences is  $y/l$  (84% of the difference in  $y/n$  for the whole period), with  $wap/n$  in a distant second place (12% of the difference). In addition, the evolution of productivity has been unfavorable from a convergence point of view during the last two decades, given the increase in the average difference, while the evolution of differences in  $emp/wap$  and  $wap/n$  during the last decade has been favorable. Presumably, given demographic patterns, it would be expected that these two variables will continue to evolve in favor of inter-regional convergence in the future.

The study by Esquivel and Messmacher (2002), which contained the results discussed above, presents further statistical evidence that supports that main conclusions of these data. Namely, most of the divergence of economic activity across Mexican states during the period of trade liberalization is due to increasing differences in labor productivity, while labor participation and demographic variables favored convergence. This evidence is consistent with the predictions of the explanations that incorporate transport costs and increasing returns to scale. From a policy viewpoint, this evidence thus supports policies that attempt to reduce the “costs” of distance from the major markets, especially the United States.

At this point it is worth mentioning that this evidence cannot support policies aiming to reduce transport costs between the Southern States and the unimportant consumer and intermediate-goods markets of Central America, because, as explained in Section 3 above, the labor productivity differentials are supposed to be driven by the agglomeration

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<sup>6</sup> Due to data distortions caused by changes in the assignment of oil production by PEMEX to different states, we examine the data without Campeche, Chiapas and Tabasco. Oil production represented a large proportion of GDP in these states in several periods of time.

of industries near important consumer markets such as on the border with the United States or around the Distrito Federal. In addition, it is worth mentioning that Aroca, Bosch, and Maloney (2002) show that divergence after trade liberalization was not a phenomenon strictly driven by economic dynamism in the North and increasing stagnation as one moves to the South. Rather, there are areas of economic dynamism in Central Mexico (e.g. Michoacán, Queretaro, Zacatecas) and even in the South East (e.g., Quintana Roo in the late 1980s, Yucatán later in the 1990s). That is, states that are quite far from the border can also grow. Likewise, there are states of slow economic activity immediately to the South of the border states (e.g., Sinaloa). Hence hope is not foregone for the regions in the South. The following section explores directly the possibility that infrastructure and other policy-sensitive variables are behind the increased economic divergence in Mexico during 1990-2000, years characterized by the deepening of trade liberalization and the negotiation and implementation of NAFTA.<sup>7</sup>

## **5. Why did some states grow faster than others during 1990-2000?**

It is standard practice in the analytical work on economic growth to examine potential determinants of growth in a set of geographic entities using econometric techniques (see the textbook by Barro and Sala-I-Martin 1995). This approach had been previously applied to the case of Mexico by Esquivel (1999a) and Messmacher (2000). Here we use the same standard approach but we attempt to focus on a small set of variables that are related to policy decisions.

Hence we want to explain the rate of growth of state GDP per capita during 1990-2000 (at constant prices of 1993). As mentioned, this is the period when trade liberalization and NAFTA must have been felt. Also, it is a period that is sufficiently long so that the cumulative growth rate during this whole period could reflect medium-term phenomena, rather than just short-lived conditions such as the economic crisis of 1995.

What are some factors that might help explain why some states grew more than others? We have already discussed the potential role of infrastructure in reducing transport costs. Hence one set of key explanatory variables are indicators of the level of development of transport and communications infrastructure, which are measured by the kilometers of

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<sup>7</sup> It is likely that NAFTA had “anticipated” economic effects that predated the actual implementation of the agreement – see De Ferranti et al. (2002, Chapter 4), and Freund and McClaren (1999).

paved highways per worker and telephone density.<sup>8</sup> We also used the distance from the U.S. border as an additional explanation of economic growth to assess the argument that being far from the U.S. was an impediment to growth.<sup>9</sup>

It is conventional wisdom that the level of education of the adult population might be related to the rate of growth. Hence we also examine the impact of educational attainment in the year 1990 as an explanation of growth rates during the subsequent period 1990-2000. In this way we can be sure that growth did not cause the level of education, and also we follow the existing scientific literature in this regard. We also experimented with literacy rates of the adult population instead of the years of schooling.

It is often argued that poor states grow slower because they receive insufficient public resources to finance their growth. It could be argued, for example, that private capital markets do not provide sufficient financing for the development of lagging regions due to various types of obstacles to private financing related to insufficient information about the quality or capacity to payback loans by firms operating in those areas. However, it is also possible that large public sectors can be a drain on economic growth by distorting the local labor markets (e.g., raising wages above what private enterprises can pay) or by raising the costs of capital that would otherwise have gone to the private sector (i.e., the so-called “crowding-out” effect of public expenditures). To assess these alternative arguments we look at the impact of the size of the public sector, measured as the share of public employment in total employment, on the growth rates of Mexican states.

The relevant scientific literature suggests that we need to control for the initial level of GDP per capita. If this variable has a negative effect on subsequent growth, the standard interpretation is that richer states grew slower than the poor states, after controlling for the other aforementioned characteristics. This would imply that there is evidence of so-called “conditional convergence.” In other words, if the poor states were otherwise identical to the rich states, they would tend to grow faster.<sup>10</sup>

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<sup>8</sup> The coverage of paved roads could be measured with respect to the surface area of each state. However, this measure might also be imprecise due to the fact that we would need to know the surface area of economically meaningful territory. In any case, when we used the ratio of paved roads or highways over surface area of each state, the results are virtually identical to the ones discussed herein.

<sup>9</sup> The distance from the U.S. border was measured in two alternative ways: (1) by the distance from the major city in each state to the closest major city near the border, plus the distance of the latter to the border itself; and (2) by the geographic distance from the capital city of each state to the closest major U.S. city.

<sup>10</sup> In theory, this catch-up effect could be due to the existence of diminishing returns to scale. That is, richer states have higher capital per person (i.e., more machines per person) and further increases in capital (machines) per person would be associated with smaller and smaller increases in output per person.

Finally, in order to assess whether the states of interest – Guerrero, Oaxaca, and Chiapas – had other characteristics that hampered their prospects for development, we also analyzed a variable that identifies these states (a dummy variable that takes the value of one for these states and is zero otherwise).

Table 2 reports some of our results, based on standard statistical techniques. The first two columns report results based on Ordinary Least Squares (OLS), and the third and fourth columns report results from an alternative technique, Median Regressions, which are less sensitive to “strange” observations or “outliers”. It shows evidence of conditional convergence; the initial GDP per capita has a negative and statistically significant coefficient in all four columns. Hence it seems that poor states do grow faster only if they have similar policies as the rich states.

The other explanatory variables, except the variable that identifies the Southern States (Chiapas, Oaxaca, and Guerrero), also seem to be important for growth, and are generally statistically significant. As expected, telephone density has a positive effect on growth. However, estimates using paved roads and paved roads with two lanes per worker (or over surface area) revealed that these variables were negatively correlated with growth during the period.<sup>11</sup> Hence there is no evidence suggesting that building more roads will lead to higher growth in the future. This result might be due to the existence of economically unnecessary infrastructure that does not serve a useful purpose for existing economic activity. Consequently, as discussed further below, we need to evaluate the existing infrastructure capacity in each state in a comprehensive manner that considers the economic structure as well as the relationship between the existing network of roads and existing seaports.

The results concerning the role of distance from the U.S. border (not reported here) indicate that this variable was not a statistically significant impediment to economic growth in most exercises, although the coefficient is always negative.<sup>12</sup> These results are consistent with the estimates by Aroca et al. (2002) about the fact that it is possible to grow rapidly while being far from the U.S. market. However, when the distance variables were

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<sup>11</sup> These OLS results did not change when the Distrito Federal, which has low paved roads per worker due to high population density and had relatively high rates of growth, was removed from the sample.

<sup>12</sup> We estimated four models with the two distance variables discussed above in footnote 9. Two regressions were estimated via OLS and two via Median Regressions. In only one of these four models the distance variable was significant at the 10% level. However, several of the other explanatory variables were also not

introduced, the statistical significance (but not the direction of the estimated effects) of the other explanatory variables were driven down. This evidence indicates that the states located farther from the United States also suffer from low levels of education and infrastructure, which hamper their growth prospects.

The level of education at the beginning of the period has no statistically important impact on growth in the OLS estimates. This result might be due to the fact that human capital can migrate to dynamic regions, and thus this variable does not have any discernable impact on the State in which they were calculated in 1990. However, when literacy rates were used instead of educational attainment, the estimated coefficient was positive and statistically significant. Moreover, the estimates based on Median Regressions forcefully show that educational attainment does matter. It is also possible that the correlation between telephone density, initial GDP per capita, and initial education makes the identification of the impact of education rather difficult.

Although this does not mean that labor mobility is not an important consideration for designing regional development policies, there are other potential benefits of education that might benefit the South even if educated workers migrate. For example, worker remittances to their original communities can be an important source of funds for development of the region, as well as improving incomes and the level of well-being of family members left behind. There is substantial anecdotal evidence of organizations of Mexican migrants in the U.S. transferring funds to their places of origin not only to their families but to their communities. These resources are often used to improve local infrastructure, such as schools.<sup>13</sup> It is likely that this also occurs to some extent with migration within Mexico.

In addition, Fajnzylber et al. (2002) use international data to show that income inequality breeds violent crime, and thus it is possible that education in the South might reduce social conflict and instability even if human capital relocates to other regions of the Republic. The basic intuition of this argument is that education offers alternative economic opportunities for residents of the South who might be tempted to participate in crime and

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significant in these specifications. These results are due to the correlation between the distance variables and the other explanatory variables.

<sup>13</sup> “In 2000, Zacatecano groups in the United States invested \$6m in new roads, schools, churches, water systems and parks”, *The Economist*, 2002, Making the Most of an Exodus. Local authorities have facilitated this process by supplying public funds to match those provided by the migrant organizations. See Taylor

other illicit high-paying activities. Section 6 below further discusses issues related to the migration of workers within Mexico and the role of social instability in hampering the development of the Southern States. Given these arguments and the aforementioned evidence, the policy conclusions in the last section of this note assess (based on Esquivel 1999b) the Federal Government's system for allocating funds to states for primary education.

An interesting result is that the share of public employment had a negative effect on economic activity. Figure 1 shows the simple correlation between these two variables – it is negative. It seems that this negative correlation might be due to some observations that appear to the lower right of the chart. However, the estimates that are less likely to be disproportionately influenced by strange observations, the Median regressions, also show that this variable had a negative effect on economic growth although it not statistically significant in the fourth column of Table 2, after controlling for other unobserved characteristics of the Southern States. This is due to the fact that these states did not have a excessively large public employment shares when compared to other states, but still growth relatively little during the time period of interest. We conducted further exercises to see whether any of the previous results changed if we took out “strange” observations or “outliers.” To do this we first followed the procedure suggested by Hadi (1992, 1994) for detecting outliers in samples with multiple variables like ours. We then re-estimated our regressions without the states identified by this procedure as being outliers, namely Quintana Roo and Campeche, both of which had low growth during 1990-2000 and relatively high levels of public employment. The results with the smaller sample of the remaining 30 states were not qualitatively different from those reported above. In particular, the negative effect of public employment on economic growth was still observed. Similar results were obtained when we dropped two other states, Campeche and Tabasco, whose data might not be accurate due to the production of oil by PEMEX in those states. Thus we are somewhat confident that these results are not due to strange observations, even if they are only suggestive due to numerous other potential weaknesses of the estimates related to omitted variables and the possibility of reverse causation mentioned earlier in reference to telephone density.

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(2002) for a review of the scientific literature on the impacts of human capital migration on rural development.

To be sure that the aforementioned explanations of the observed differences of growth rates across Mexican states are not misleading, we conducted additional exercises in which we controlled for the share of manufacturing production over total state GDP in 1990. As discussed in Section 6 below, the Southern States have never had a high share of manufacturing production, and for the country as a whole some manufacturing industries (and some services) grew quite rapidly during the decade of the 1990s. The performance of manufacturing relative to natural resource or agricultural industries could have been due to changes in the relative prices. For example, the international price of coffee began to decline in the late 1980s. In any case, our statistical analyses indicated that the qualitative nature of the OLS results presented in Table 2 are not affected by the inclusion of the manufacturing share of production. However, in the relevant Median Regressions, the inclusion of the share of manufacturing production affected the sign of the education and public employment variables, although none of them were statistically significant. This influence of manufacturing production on the estimated effect of education and public employment could be due to a positive correlation between education and manufacturing production (which is 0.5), and negative correlation with the share of public employment (which is, coincidentally, -0.5). In other words, manufacturing production seems to be concentrated in states with either high levels of education and/or low levels of public employment. It is likely that the high mobility of new capital combined with the relative irreversibility of past investment make capital-intensive activities particularly sensitive to the initial economic environment in a state, and thus manufacturing is implicitly capturing things such as the rule of law, instability, crime or excessive intervention by the state.

Thus far we have established that during the years of trade liberalization and NAFTA, GDP per capita across Mexican states tended to diverge primarily due to divergence in labor productivity. This trend was consistent with explanations that focus on transport and coordination costs and increasing returns to scale. We also presented suggestive evidence indicating that hope for the Southern States is not lost; there is some evidence of conditional convergence and some key policy-sensitive variables help explain the patterns of economic growth observed across Mexican states during 1990-2000. In particular, communications infrastructure (measured by telephone density) is more likely to have been positively associated with economic activity than paved roads or highways. Also, there is no evidence in support of the idea that increasing the size of the public sector can

be a force for economic convergence, and thus for poverty reduction and long-term employment creation.

After all this, we believe that there are still numerous remaining questions concerning why NAFTA and trade liberalization did not have a more positive impact on the Southern States. After all, they still have competitive labor costs relative to the Northern and Central States of the republic (see Hanson 2002 for a review of the evidence), they have natural resources, including great potentials for a dynamic forestry industry, and significant potential for developing non-traditional agriculture. Common sense dictates that the South could have benefited from liberalization's impact on the relative prices of these goods, since Mexico's protection structure prior to liberalization benefited heavy manufacturing industries, such as automobiles and other capital goods. The following section takes a qualitative approach and examines a few issues that might be related to the South's relative decline.

## **6. Why didn't labor intensive and other industries develop in the South?**

The Southern States of Mexico are relatively rich when compared to their Northern counterpart in terms of natural resources, which makes them prone to the development of farming and stockbreeding activities as well as of tourist and certain manufacturing industries such as industrialization of food products. In addition they have a comparative advantage in terms of labor costs, which makes the overall costs of production be relatively lower than other states. Given these characteristics, labor intensive industries, natural resources, forestry, and agriculture should have proliferated in the Southern States after the implementation of NAFTA.

In his study on regional inequality, Messmacher (2000) finds that at the national level the evolution of production indexes by economic sector has been dramatically different between the periods 1990-1994 and 1995-2000. Those sectors with highest growth rates during the second half of the 1990s are transportation, storage, communications, as well as manufacturing. Given that during the eighties financial and insurance services and real estate activities was the sector growing at the fastest rate, the author suggests that NAFTA contributed mainly to the expansion of the transport and communications sector as well as to the accelerating growth rate of the manufacturing sector. Figure 2 shows the

growth of production indexes for different sectors in Mexico, from 1980 to 1999. The graph shows that agricultural, cattle and fishing industries did in fact grow but at a lower rate than manufacturing activities. However, even though the growth of labor intensive manufacturing production has been fast after NAFTA at the national level, the evolution of production indexes by economic sector by state suggests that this is not the case in the Southern States.

In terms of the states' contribution to the Mexican GDP, that of the Southern States – Chiapas, Guerrero, and Oaxaca -- decreased from 5.33% in 1993 to 4.94% in 1999, as shown in Table 3. However, most of this decline was due to the fall in their share of national manufacturing production, which fell from 2.03% in 1993 to 1.68% in 1999. But the labor-intensive industries of textiles and apparel did not experience a relative decline in these states. In fact, the data in Table 2 shows that only Chiapas experienced a decline of its share of this industry, while both Guerrero and Oaxaca increased their corresponding shares. As a group, the share of textile and apparel manufacturing rose from 0.72% in 1993 to 0.81% in 1999. With regards to the primary sector, the situation was much less severe than manufacturing. However, as Davila, Kessel and Levy (DKL, 2000) point out, given the richness of natural resources in the South, these sectors should have been even more dynamic after trade liberalization. In any case, the evidence points out that trade liberalization and NAFTA did not cause a significant decline in labor-intensive manufacturing in the Southern States, rather they had very low shares of national manufacturing production, even of labor-intensive goods, prior to the implementation of NAFTA. Thus the trade agreement cannot be blamed for the inability of these States to attract those industries. The blame should be sought somewhere else.

In a recent study, Gerber (2001) argues that the assumption that low wages are the main determinant of industry location decisions has several shortcomings. In general, the assumption fails to explain the location decisions of firms given the structure of wages within Mexico as well as their geographic concentration. In addition, when firms base their production decisions on the availability of low wage labor, they are generally very sensitive to changes in their overall cost structure and not just labor costs.

Several complementary explanations can help understand the lack of development of labor intensive industries and agricultural activities in the South. Among these are

remaining trade barriers in the U.S for products from the Southern States, the much discussed transport costs and the lack of human capital, historical agricultural policies, and finally, the relative social instability of the region. In what follows we briefly analyze the validity of these hypotheses.

### ***6.1. Remaining trade barriers in the U.S.***

In its Article 102, NAFTA states as one of its main objectives the elimination of barriers to trade in goods and services. However, the elimination of barriers was not automatic for the vast majority of the goods and services. Possible remaining trade barriers for goods produced in the Southern States in Mexico could be discouraging not only exports from that region to the U.S. but also the development of labor and land intensive industries. Trade barriers imposed by the United States are mainly of three kinds: import tariffs, sanitary and phytosanitary, and technical barriers. In what follows, this section explores the past and current trade restrictions imposed on those goods that have relatively higher production indexes in the South of Mexico, such as fresh fruit and vegetables, and forestry, in order to assess whether existing tariffs may be a factor that impedes the development of these industries in the South.

#### *6.1.1. Tariffs.*

Even if some labor intensive goods benefited from a total elimination of custom duties since 1994 (mostly textiles and apparel goods, with some exceptions), for most goods the schedule for tariff elimination agreed in NAFTA shows a progressive elimination of their customs duties, with the majority of goods being duty-free by the year 2008. Although the majority of agricultural produces, such as coffee and unprocessed cotton enter duty free, some products of the Southern States are still subject to tariffs. Table 4 shows some examples. Most goods will be free of import taxes in 2003. The rest will be duty-free in 2008. On the other hand, other labor and land intensive goods, mostly minerals such as salt, sulfur, earth and stone, are all duty free since the mid nineties. So are most forestry and wood products. Therefore, it is not clear that remaining import tariffs in the U.S. is the cause of the lack of dynamism in these industries.

#### *6.1.2 Non-tariff barriers.*

Existing non-tariff barriers to trade may be limiting the growth potential of the agricultural and manufacturing industry in the South. In particular, NAFTA established some sanitary and phytosanitary standards aimed at the protection of human, animal or plant life or health, as well as technical barriers. Technical barriers refer to those rights and obligations relating to standards-related measures under the *GATT Agreement on Technical Barriers to Trade* and all other international agreements, including environmental and conservation agreements. They are standards relating to the protection of consumers and the environment.<sup>14</sup> All sanitary, phytosanitary and technical standards are, in general, those recommended or imposed by international standards and guidelines and are implemented by each country. The extent, if any, to which any of these barriers are responsible for the lack of development of agricultural industries in the South, is an empirical question, which should be addressed by a comprehensive and deeper analysis, which goes beyond the scope of this note. If such standards have been applied in a discretionary fashion by Mexico's NAFTA partners, then they constitute legitimate grounds for further negotiations. But if they have been implemented with legitimate scientific and medical concerns, then the burden falls on Mexican producers and the national systems for controlling product quality. This is an issue that deserves further scrutiny.

## ***6.2. Transport costs and infrastructure***

As was discussed in Section 3, high transport costs can be an important factor that can impede trade and economic growth. This fact can be a disadvantage to the South, although the evidence discussed above suggests that other factors have played an important role. Moreover, even if transport costs work against the South due to the low quality of infrastructure (as opposed to a lack of infrastructure relative to the number of workers or surface area), these states have other advantages in terms of low local production costs, and it is not clear why the latter should not outweigh the former.

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<sup>14</sup> The sanitary or phytosanitary measures are based on scientific principles or on a risk assessment in accordance to the international standards and guidelines of the *Codex Alimentarius Commission*, the *International Office of Epizootics*, the *International Plant Protection Convention*, or the *North American Plant Protection Organization*, while technical standards include those of the *GATT Agreement on Technical Barriers to Trade*, the *International Organization for Standardization*, the *International Electrotechnical Commission*, the *World Health Organization*, the *Food and Agriculture Organization*, and the *International Telecommunication Union*. (North America Free Trade Agreement, 1994).

DKS (2000) analyze the current rail and road transportation infrastructure of Mexico. They highlight a lack of infrastructure linking the Southern States (not just Chiapas, Guerrero and Oaxaca) and the Northern border and the high investment, maintenance, and operation costs that are necessary to transport goods from the South to Mexico City. Particularly, States such as Oaxaca and a large part of Guerrero are disconnected from the current transport network, and the lack of coastal roads along the Gulf of Mexico and the Pacific Ocean makes it necessary for the production of the South to have to go through Mexico City before heading north. The lack of transport infrastructure in the South is partly the result of investment decisions that were made by past governments, which significantly favored the Central States, especially the Distrito Federal and the Estado de México.

DKS conduct several valiant simulations using the Krugman and Venables model (1995) which show that the South can only be an investment option for manufacturing industries under a close or semi-close economy, given their comparative advantage in labor costs. They find that further reductions of tariffs between Mexico and the U.S. favor the location of industries in the North of Mexico because of the possibility of supplying the American market from a closer geographic location actually overcompensates the lower production costs of the South. In other words, DKL conclude that given the current transport network in Mexico, NAFTA reduced the comparative advantage of the South vis-à-vis the North, a situation that can only be reversed if, *ceteris paribus*, transportation costs from the South to the U.S. are significantly reduced. However, this did not happen, as was made evident by the data on production shares in manufacturing. In fact, Table 5 shows that standard indicators of comparative advantage in general manufacturing and the labor-intensive industries of textiles and apparel did not change significantly between 1993 and 1999 in the states of interest. In other words, it is unlikely that NAFTA is to blame for the South's lack of comparative advantage in manufacturing; this condition dates back to the pre-NAFTA period.

Yet the hypothesis that high transportation costs due to inadequate infrastructure are responsible for the lack of development in the South is very attractive. Even if most Southern States do lack infrastructure, the infrastructure networks of the South need to be analyzed carefully before committing more resources for building and paving roads; recall

our statistical evidence that more roads and highways will not necessarily lead to faster growth in Mexican states. In addition, analysts should consider the way in which the seaports system is connected to the road and railway networks. We recognize that infrastructure specialists should further evaluate the usefulness of the abovementioned infrastructure in terms of its existing capacity for dealing with commercial freight transport (see the note on infrastructure requirements that is part of this study), but the point is that we should not build new infrastructure without having a clear evaluation of why the existing capacity is not used or is underutilized. Building new infrastructure will not necessarily bring with it new business opportunities or economic growth.

### ***6.3. Human capital, migration and foreign investment***

It is tempting to argue that low and poor quality educational attainment in the Southern States are factors deterring economic progress in that region. Gerber (2002) finds that about 20% of industry employees in the maquila industry are technicians or administrators and that even some assembly workers are required to have job skills associated with a level of training or work experience beyond that necessary to perform simple repetitive tasks. While primary education may suffice for these jobs, secondary is preferred. De Ferranti et al. (2002) also point out that several studies find that Mexican firms with greater access to technology have, overall, a higher demand for skilled workers. In particular, maquilas demand relatively higher levels of skill than that possessed by the workforce, on average.

All this is fine, and we certainly want to argue that from the viewpoint of raising long-term productivity in Mexico as whole, we want to provide high quality education to as many people as possible (see the note on education that is part of this study). However, improving education in the Southern States will not necessarily lead to the economic development of the territories of the South States. The main reason is that human capital can move. Aroca and Maloney (2002) analyze the effects of foreign direct investment (FDI) and trade due to NAFTA on the patterns of migration within Mexico. As has been observed in the literature (Venables, 2001) one of the main effects of FDI is that it generates beneficial spillovers to the rest of the economy.<sup>15</sup> Likely channels through which FDI

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<sup>15</sup> The spillovers can arise from demonstration effects, direct linkages between FDI and local firms and labor market turnover of trained workers.

works are the wage and unemployment rates. If FDI creates positive externalities (which lead to the agglomeration of industries as discussed in section 3 above), then workers migrate to those states where FDI is relatively high, in order to seek a better salary. This could explain the concentration of manufacturing industries in the Northern and Central States, where FDI is greater. In Mexico, per capita FDI is mostly concentrated along the northern border with the U.S. and in Mexico City, where it ranges from 1,812 to 4,315 dollars per capita, while all Southern states, with the exception of Quintana Roo have FDI that ranges from 1 to 122 dollars per capita (Aroca and Maloney, 2002).

Aroca and Maloney find that FDI does have a significant effect on internal migration through labor market variables (wage and unemployment), but it also seems to have strong independent effects. When FDI increases in the state of origin the probability of migrating significantly decreases. Their results show that the probability of migrating from one state to another is highly elastic with respect to changes in the relative wages of states of origin and destination and the changes in the price of housing, but the level of wages in the state of origin are associated with increases in the probability of migration. This is due to the fact that migration is costly, and, since individuals, especially poor individuals in Mexico, do not have access to credit, then increases of wages in the home state beyond a certain point allow individuals to migrate to regions where wages are even higher.

In any case, this evidence on the elasticity of migration, indicates that education might help people increase their incomes in the Southern States, plus the evidence discussed earlier concerning the sources of divergence across Mexican states (which is consistent with explanations based on economies of scale and agglomeration effects), should be suggestive enough to convince readers that education, while good for individuals, might not necessarily lead to the development of the South. This evidence needs to be weighed against the other statistical evidence that showed that educational attainment (and literacy rates) in 1990 were positively associated with economic growth in the 1990s. To ensure that educational improvements are tied to regional development, the educational efforts need to be linked to immobile factors of production that are abundant in the South, such as land, natural resources, natural beauty (tourism). Perhaps secondary or post-secondary technical education in forestry, natural resources or agriculture -- that is, an

increase in human capital that would be complementary to fixed factors -- would help make educated workers stay in their states and increase their wages at the same time. How such programs should be designed is beyond the scope of this note, but it is worth analyzing in the future. In any case, education with migration might still bring positive effects for regional development by promoting a larger flow of financial resources to these areas as well as reducing social instability in the Southern States, as mentioned earlier in this note.

#### ***6.4. The ejido, property rights and agricultural distortions in Mexico***

As observed by de Janvry et al. (2001), rural communities or *ejidos* in Mexico play a very important role in determining the use of natural resources. *Ejidos* are a post-revolutionary creation of the State, and were originally created to exploit the land in a cooperative way and always under the supervision of the government. Before the land reforms of 1992, constitutional restrictions forbid the selling or renting of *ejidos* and the vast majority of the land's usufruct was divided among the *ejido* households. Likewise, all decisions regarding the exploitation of the land had to be reached through consensus by *ejido* members and always under the presence of a representative of the federal government. The South is a region that is appropriate for the production of extensive agriculture and extensive plantations, such as plantations of coffee, banana, sugar, non-traditional agriculture, and forest products. This type of agriculture is best developed by economic agents that have large financial resources due in part to the minimum efficient size needed by the plantations, the climate and phytosanitary risks, as well as the long gestation periods for some forestry products. The required fixed investments can be large. Therefore, the division of the land in *ejidos* and the lack of rights to sell or rent the *ejidos* did not provide incentives for extensive agriculture to develop in the whole country, and this especially harmed the South.

Since 1992 the *ejido* households became the owners of the land, and now have the right to sell or rent their share of the *ejido*. Using data from surveys of *ejido* communities before the land reform program and after, de Janvry et. al (2001) observed that the response to land reforms has been very heterogeneous across communities. While some have been able to improve their levels of cooperation, those with more than 50 members have not. In the latter, the low prevailing levels of cooperation have contributed to rapid private appropriation of the land, which can have the advantage of supporting extensive grazing

and forestry resources. However, the main problem with the majority of ejidos is still that it is difficult for extensive agricultural industries to negotiate long term contracts for land exploitation, for all ejido owners need to agree with the contract.

DKL also analyze the effects of property rights and different public policies over hydrocarbons and water on the Southern States development. The southern region is rich in petroleum and natural gas (Campeche) and water that could be used to generate electricity (Chiapas). Even if the South contributes a significant share of the sectoral GDP of mining, petroleum, electricity, gas and water, all the income derived from the exploitation of these resources goes to the federal public sector, which hinders the spillover of income in the Southern region. DKL (2000) also find that the regional distribution of federal investments has benefited the development of hydro-agricultural infrastructure mainly in the North of Mexico. In effect, since the 1940's, large investments were made in the Northern states to fully exploit their water supply and agricultural capacity, especially in desert zones. Ditches and spray irrigation channels were built, which not only provided water but also the necessary infrastructure for power generation. Moreover, part of the strategy for developing agriculture in the North was to fix "guarantee" prices for northern agricultural products, which inhibited the development of agriculture in the South. Northern states became great producers of cereals, crops and cattle. Today, more than half of the 3.3 million hectares of irrigation land are in the North, 38% in the central states and only 9.4% in the South (that is, the whole geographic South!). In addition, large subsidies to electricity for electrical pumping have been implicitly granted in electrical tariffs to the Northern states. The amount of this subsidy in 1999 was almost twice the amount of subsidies granted by the main program for rural development (Alianza para el Campo) in the whole country.

#### ***6.6. Social instability.***

Even before the Chiapas' outburst of 1994, the Southern States (especially Guerrero, Oaxaca and Chiapas) have been known for their social instability. These states are among the poorer states in Mexico, mostly agricultural, with high ethnic diversity, religious tensions and strong identification to local groups versus national or state groups. There are persistent problems of land ownership between individuals and communities and strong political conflicts have developed in the last decades. These states currently have some presence of guerilla-type organizations (EZLN in Chiapas, EPR in Guerrero and

Oaxaca). Although there are no specific assessments of the impact that this unstable environment has on foreign and domestic investment in the Southern States, it is reasonable to assume that the impact is negative and that new investment projects since NAFTA have been strongly discouraged from being located in the region.

In the South Pacific coast, especially in Oaxaca and Guerrero, social instability is also probably linked to drug production (marihuana and poppy), as the area has been, in the last decades, an important producer of illicit drugs. In fact, its role has increased during the 1990's, as more surveillance in the Caribbean and the pressure on Colombian drug producers and dealers has increased the importance of the Mexican production.<sup>16</sup> Although no official documents assessing the magnitude of this problem could be found, it is well known that drug lords and cartels control those territories where drugs are produced, and that the government has very little power over those lands.

Both the presence of guerrilla groups and illicit drug production land might be important factors that industries take into account when deciding their location. While drug smuggling is clearly prominent in the North of Mexico, the fact that the fixed factors of production in the South, especially land, are captured by illegal activities that increase the risks of doing business based on the exploitation of those resources might be an additional impediment for the development of legal economic activities in the Southern States. It is unclear whether the illicit activities have produced any tangible economic benefits to the region, since the illicit nature of those activities makes them unlikely to develop economic linkages with other industries and services.

## **7. Conclusions**

In this note we reviewed two logical explanations of why trade liberalization and NAFTA might have hampered the ability of the Southern States to catch-up with the rest of Mexico, especially the states located along the U.S. border (such as Coahuila, Nuevo León, Sonora, and Tamaulipas) and Central states (such as Aguascalientes, Distrito Federal, Michoacán, Querétaro, Puebla, San Luis Potosí, and Zacatecas). The evidence indicates that most of the divergence was due to increases in the differential of the growth of labor productivity. This fact is consistent with explanations that focus on the role of transport and communications costs and economies of scale, because the latter are associated with lower

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<sup>16</sup> DEA report of activities (1998).

total costs of production per unit of output, which are in turn reflected in cross-state differences in labor productivity. However, this does not mean that the South is condemned to backwardness forever. In fact, many states that are relatively far from the US-Mexico border fared quite well during the 1990s. Moreover, our estimates indicate that policy-sensitive variables, especially access to telecommunications services, education and , explain an important share of the variations of economic activity across Mexico. However, increasing the size of the public sector in the South is unlikely to be a solution, and it could be counterproductive.

In terms of infrastructure, the transport network needs to be evaluated further, but it is likely that further efforts at expanding the coverage of telecommunications in the South might help accelerate economic convergence. Distance from the United States may matter, but our results clearly indicate that it does not condemn the Southern states to ever-lasting poverty. What it does imply is that they need improvements in other policy sensitive variables, such as telecommunications and education, that would compensate for this effect. For a more detailed discussion about the infrastructure needs of the Southern States, please refer to the analysis in the note on this topic that is part of this overall study. The relevant technical and policy issues related to telecommunications are further discussed in the section on rural infrastructure.

Education is a tricky issue, due to the fact that human capital can migrate. While it is desirable that all Mexicans gain access to quality education, such efforts might not lead to economic dynamism in the territories of the Southern States, although they would certainly help lift people out of poverty wherever they might choose to live (see the note on poverty that is part of this volume). Hence potential educational efforts that link education with the immobile factors of production should be considered and evaluated. If the objective is to increase the productivity of the labor factor as well as that of the agricultural industry in the south, then the investment in human capital needs to be done by providing specific training in those areas where it is most needed, such as natural resources management and agro-technology. In addition, providing quality general education to current residents of the Southern States might have positive effects in terms of reducing income inequality even if human capital relocates into other states, which in turn might help alleviate social tensions in the South. Nevertheless, our empirical evidence indicated that educational achievements (literacy and the number of years of education of the adult

population) were positively associated with economic growth during the years of trade liberalization. It is very likely that the benefits of free trade were disproportionately distributed in favor of the regions or states that initially had higher levels of education. This finding is consistent with the microeconomic evidence that shows that trade liberalization in several Latin American countries, including Mexico, benefited skilled labor (see De Ferranti et al. 2002, Chapter 5).

One policy area related to education that is worth pursuing is related to the *Fondo de Aportaciones para la Educación Básica y Normal* (FAEB). This is a Federal program that was implemented with the intention of providing funds to upgrade the quality of education in the states. Esquivel (1999b) analyzed this program. If the program were to compensate poor states by providing more resources for education, it should be expected that states with more students per school or more students per teacher should actually receive more funds. Table 6 shows some of Esquivel's evidence about how these funds are actually allocated across states. The evidence is not encouraging. The funds seem to be allocated in the opposite direction – states with lower school resources per student actually get fewer funds than the richer states. Reforming this program might be a good place to start in order to increase the education funds for the Southern States. Of course, no amount of resources are likely to improve the quality of education in these states if the educational systems are not fundamentally transformed, as discussed the note on education that is part of this study.

Nevertheless, there are several other potentially important policy implications that can be derived from our previous discussion. Recent legislative efforts to reform the ejido should eventually help create economic opportunities in the South. However, social instability and illicit economic activities might be limiting the potential dynamism of some land-intensive industries.

In addition, non-tariff barriers such as product standards imposed by Mexico's NAFTA partners need to be evaluated in order to understand whether these are legitimate or illegitimate barriers. In any case, the national and state authorities should evaluate the quality control and distribution systems in order to inform producers about how to achieve quality standards that meet scientific and medical criteria.

Whether the effects of NAFTA on the Southern States' relative income were positive or negative is an empirical question. Our analysis indicates that it is unclear

whether NAFTA had any direct impacts on the Southern States, while it is undeniable that it had positive effects on the Northern States. However, the fact that the South did not experience significant income growth rates relative to the North after NAFTA does not necessarily imply that trade liberalization and NAFTA *per se* had direct negative effects on the Southern region, because during the decade of the 1990s there were numerous Mexican states that are also far from the U.S. but that managed to grow at a rapid pace. Our contention is that the South did not benefit from NAFTA because it was not prepared to reap the benefits of free trade, which might have rewarded states with higher levels of human capital, infrastructure, and lower levels of state intervention in the local economies. Our hope is that we have convinced our readers that the economic future of the South rests in the hands of policymakers and it was not condemned by trade liberalization.

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**Table 1**  
**Difference between the logarithm of a variable for a given state and the DF**  
**Averages**  
i) All states

	y/n	y/l	l/emp	emp/wap	wap/n
<b>1960</b>					
Average	-0.986	-0.870	0.005	-0.050	-0.070
Std. Deviation	0.444	0.440	0.009	0.050	0.046
<b>1970</b>					
Average	-0.857	-0.675	0.011	-0.080	-0.113
Std. Deviation	0.400	0.375	0.013	0.046	0.042
<b>1980</b>					
Average	-0.811	-0.652	-0.006	-0.027	-0.126
Std. Deviation	0.399	0.388	0.007	0.050	0.043
<b>1990-1993*</b>					
Average	-1.040	-0.832	-0.001	-0.064	-0.143
Std. Deviation	0.426	0.343	0.007	0.072	0.051
<b>1999-2000*</b>					
Average	-1.049	-0.961	0.014	0.013	-0.116
Std. Deviation	0.430	0.408	0.005	0.057	0.045
<b>Average over the period</b>	<b>-0.791</b>	<b>-0.665</b>	<b>0.004</b>	<b>-0.035</b>	<b>-0.095</b>

\*The data on y/n and y/l correspond to 1993 and 1999.

ii) Without Campeche, Chiapas and Tabasco

	y/n	y/l	l/emp	emp/wap	wap/n
<b>1960</b>					
Average	-0.976	-0.860	0.004	-0.052	-0.067
Std. Deviation	0.453	0.450	0.009	0.049	0.047
<b>1970</b>					
Average	-0.836	-0.651	0.010	-0.082	-0.113
Std. Deviation	0.409	0.380	0.013	0.048	0.042
<b>1980</b>					
Average	-0.845	-0.685	-0.007	-0.029	-0.125
Std. Deviation	0.364	0.347	0.007	0.048	0.045
<b>1990-1993*</b>					
Average	-1.031	-0.828	-0.001	-0.061	-0.140
Std. Deviation	0.406	0.314	0.007	0.075	0.052
<b>1999-2000*</b>					
Average	-1.030	-0.945	0.014	0.014	-0.114
Std. Deviation	0.413	0.385	0.005	0.050	0.045
<b>Average over the period</b>	<b>-0.786</b>	<b>-0.662</b>	<b>0.003</b>	<b>-0.035</b>	<b>-0.093</b>

\* The data on y/n and y/l correspond to 1993 and 1999

**Table 2. Potential Determinants of Growth of GDP per Capita, 1990-2000**

Explanatory variables	Estimated impact: The effect of 1% increase in the corresponding variable on the cumulative GSP growth rate per capita, 1990-2000			
	(1) OLS	(2) OLS	(3) Median Reg.	(4) Median Reg.
Initial GDP per Capita, 1990 (in natural logarithm)	-0.15** (-2.35)	-0.15** (-2.32)	-0.14** (-3.95)	-0.12** (-2.09)
Initial education (years of schooling of population over 15 years of age), 1990	0.24 (1.38)	0.22 (1.09)	0.27** (3.40)	0.27* (1.86)
Telephone density, 1990	0.08* (1.93)	0.08* (1.91)	0.05** (2.86)	0.05 (1.39)
Public employment (log of share of total employment), 1990	-0.12** (-2.13)	-0.12* (-1.98)	-0.07* (-1.97)	-0.09 (-1.54)
States of Oaxaca, Guerrero, and Chiapas (dummy variable)	Not included	-0.01 (-0.02)	Not included	-0.021 (-0.33)
Number of observations	32	32	32	32
Adjusted R-squared (OLS) / Pseudo R-squared (Median Reg)	0.31	0.28	0.21	0.21

\*\* = significant at 5%; \* significant at 10%. T-statistics in parentheses.

**NOTE:** A constant was also included in the regressions, but its coefficients are not reported. Numerous additional specifications in OLS and Median Regressions were estimated using the following explanatory variables: (a) literacy rates instead of years of education; (b) two alternative measures of distance from the United States instead of and in addition to the SS dummy; (c) paved roads and double-lane highways over surface area or per worker instead of telephone density; (d) with the share of manufacturing GDP over total GDP in 1988; and (e) with urbanization rates. Please see text for a discussion of the alternative results.

**Table 3. The Contributions of the Southern States to Economic Activity, 1993 and 1999 (percentages)**

State	1993			1999		
	Share of National GDP	Share of National Manufacturing	Share of National Textiles and Apparel	Share of National GDP	Share of National Manufacturing	Share of National Textiles and Apparel
Chiapas	1.79	0.48	0.19	1.73	0.33	0.14
Guerrero	1.87	0.45	0.41	1.68	0.39	0.53
Oaxaca	1.67	1.10	0.12	1.53	0.96	0.14
<b>TOTAL</b>	<b>5.33</b>	<b>2.03</b>	<b>0.72</b>	<b>4.94</b>	<b>1.68</b>	<b>0.81</b>

Source: Authors' calculations based on data from INEGI.

**Table 4. U.S. Import Tariffs for Mexican Exports, Selected Goods**

<b>Description of good</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Chocolate and other food preparations with cocoa (cents/kg)	9.7	7.3	4.9	2.4	Free	Free	Free	Free	Free	<b>Free</b>
Fresh Lettuce (cents/kg)	1.7	1.3	0.8	0.4	Free	Free	Free	Free	Free	<b>Free</b>
Fresh broccoli, cauliflower, and asparagus (%)	6	4.5	3	1.5	Free	Free	Free	Free	Free	<b>Free</b>
Fresh onions, garlic, leeks (cents/kg)	1.5	1.1	0.7	0.3	Free	Free	Free	Free	Free	<b>Free</b>
Fresh and dried citrus fruit (cents/kg)	0.8	0.6	0.4	0.2	Free	Free	Free	Free	Free	<b>Free</b>
Fresh tomatoes (cents/kg)	4	3.9	3.9	3.9	Free	Free	Free	Free	Free	<b>Free</b>
Fresh melons and papayas (%)	21	18.6	16.3	14	11.6	9.3	7	4.6	2.2	<b>Free</b>
<b>Fresh pineapples, avocados, figs, guavas and mangoes (cents/kg)</b>	<b>3.3</b>	<b>2.4</b>	<b>1.6</b>	<b>0.8</b>	<b>Free</b>	<b>Free</b>	<b>Free</b>	<b>Free</b>	<b>Free</b>	<b>Free</b>

Source: U.S. NAFTA for Mexico Staged Tariff Reductions by Product. United States International Trade Commission.

**Table 5. Revealed Comparative Advantage (RCA) in Manufacturing, 1993 and 1999**

State	1993	1999
<b>General Manufacturing</b>		
Chiapas	0.27	0.19
Guerrero	0.24	0.23
Oaxaca	0.66	0.63
<b>Textiles and Apparel</b>		
Chiapas	0.11	0.08
Guerrero	0.22	0.30
Oaxaca	0.07	0.08

Notes:  $RCA_{i,s} = (VA_{i,s} / GSP_s) / (\sum VA_{i,s} / \sum GDP_s)$ , where VA is value added, subscript “i” stands for industry and “s” for state. GSP is Gross State Product; GDP is Gross Domestic Product. If  $RCA > 1$ , then the state has a comparative advantage in that industry. These states did not have and still do not have a comparative advantage in manufacturing.

Source: Authors’ calculations based on data from INEGI.

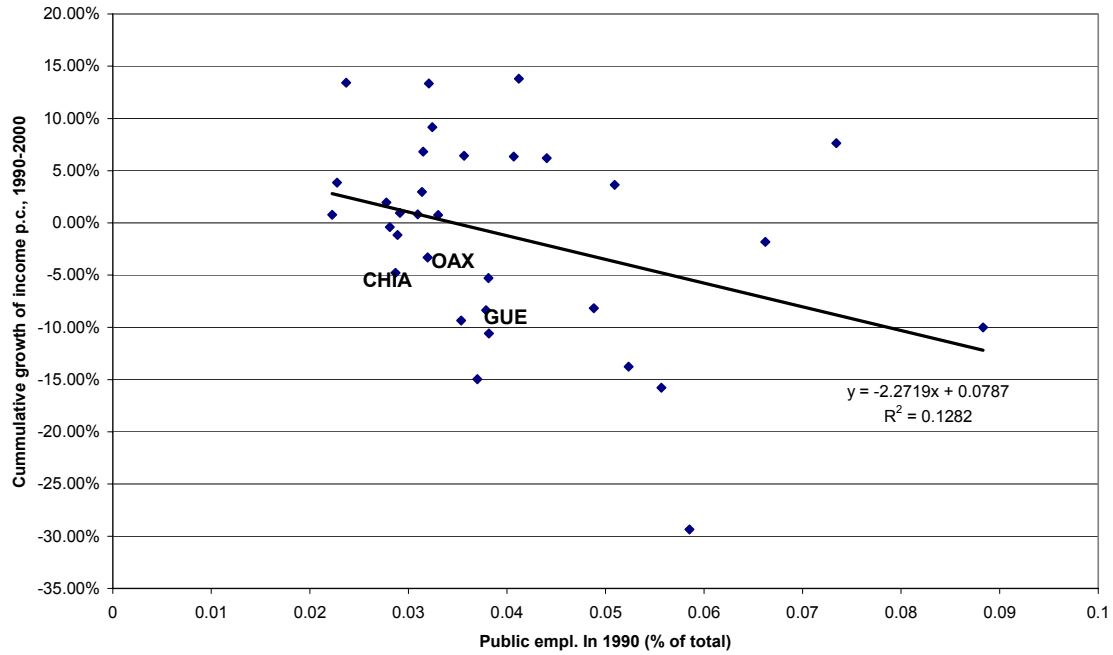
**Table 6. The Distribution of FAEB Resources and Correlations with Educational Quality Indicators: They Can Be Assigned More Equitably!**  
(Dependent variable: FAEB Resources per Capita, 1999)

Explanatory Variable	Estimated Correlation
Students per school	-2.3** (-1.98)
Students per teacher (primary school)	-48.1*** (-2.23)
Observations	31
t-statistics in parentheses. *** = significant at 1%; ** = significant at 5%.	

Source: Esquivel (1999). Notes: A constant was included in the regressions presented in Esquivel (1999). Each bi-variate regression was estimated separately. The Distrito Federal does not receive FAEB funds, thus the number of observations is 31.

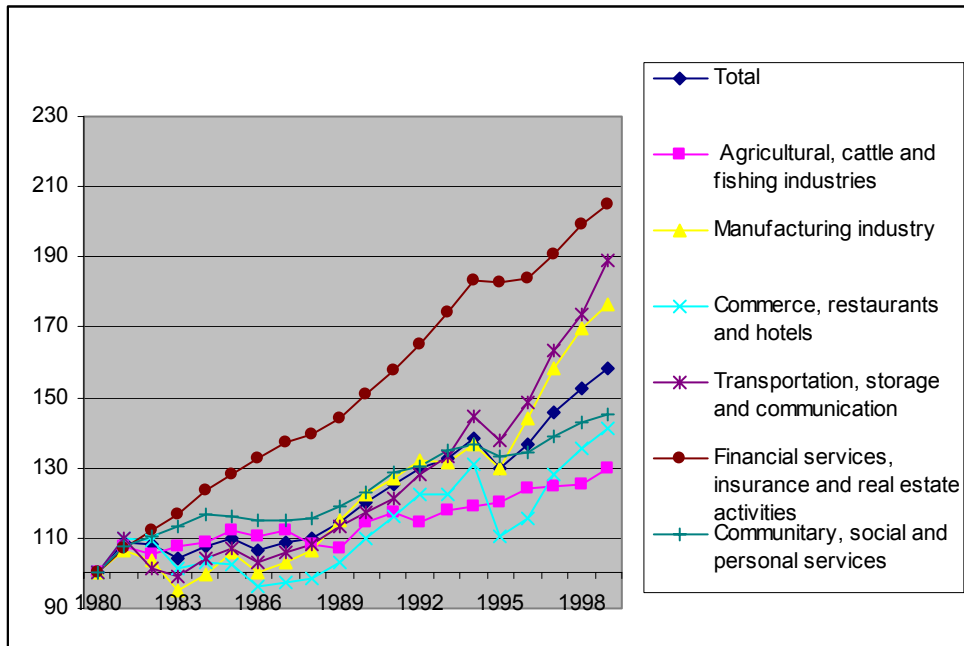
Figure 1.

**Relationship between Growth (1990s) and Public Employment in Mexican States:  
More is not necessarily better.**



Source: Authors' calculations based on data from INEGI.

Figure 2. Production Indexes by Economic Sector, 1980-1999



Source: Messmacher, 2000.