Towards a Prosperous and Productive Chiapas: Institutions, Policies, and Public-Private Dialog to Promote Inclusive Growth

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TOWARDS A PROSPEROUS AND PRODUCTIVE CHIAPAS:

Institutions, Policies, and Public-Private Dialog to Promote Inclusive Growth

Ricardo Hausmann, Timothy Cheston, Miguel Ángel Santos, and Carlo Pietrobelli*

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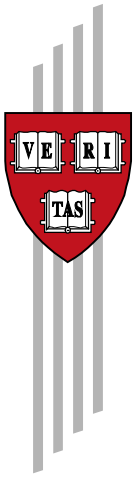


Working Papers

Center for International Development at Harvard University

* The opinions expressed in this publication are those of the authors and do not necessarily reflect the viewpoint of the Inter-American Development Bank, its Executive Director, nor of the countries it represents.

Contents

I. Introduction

Chiapas is not only the poorest state in Mexico, it is also the state that has grown the least over the previous decade. Contrary to the predictions of neoclassical theory, instead of converging to the rest of Mexico, Chiapas has seen the income gap widen consistently. This reality is at odds with the amount of resources that have been invested in the region since 1994, and the improvements in education and infrastructure that have been registered since then.

With the goal of better understanding the factors associated with Chiapas´ backwardness and formulating recommendations for a new development strategy, the Center for International Development at Harvard University has partnered with the Inter-American Development Bank and the Mexican Ministry of Finance and Public Credit (Spanish initials, SHCP). A multidisciplinary team of 12 experts has focused for 10 months on studying various aspects of the productive, political, and social dynamic in Chiapas. Five baseline research reports have resulted from this collaboration: Institutional diagnosis,[1] Economic complexity,[2] Growth diagnosis,[3] Poverty profile,[4] and a pilot on productive dialogs an indigenous community of Chiapas (Cruztón, Chamula).[5] This article summarizes the main findings from these studies and spells out the resulting policy recommendations.

There is not a single Mexico, nor there is one single Chiapas. What this host of studies has discovered during its five field visits throughout the state is that the income differences observed between Mexican states reproduce as in a fractal to the interior of Chiapas. These differences in turn reflect differences in many other areas, including geography, demographics, ethnicity, and the economy. Therefore, efforts at shaping a development strategy for the state should consider the distinct shades of difference in its subregions. Depending on the varying capacities and knowledge, obstacles, geographies, and cultures, each strategy will have to evolve along its own path.

Our analysis are based on a data set that covers the state level, metropolitan areas, and municipalities in Chiapas, which has been made available for the first time through the Atlas Mexicano de Complejidad Económica [Mexican Atlas of Economic Complexity]. This project was developed in tandem with our research in Chiapas and was opened to the public by means of an online tool.[6] The Atlas is the product of a collaboration between SHCP, the National Digital Strategy Coordination Office of the Mexican President's Office, and the Center for International Development at Harvard University. The idea of the

[1] Campante and Solé (2015).
[2] Hausmann, Cheston, and Santos (2015).
[3] Hausmann, Espinoza, and Santos (2015).
[4] Santos, Hausmann, Levy, Espinoza, and Flores (2016).
[5] Santos, Dalbuoni, Lusetti, and Garriga (2015)
[6] complejidad.datos.gob.mx

Mexican Atlas of Economic Complexity is to map existing productive capacities in terms of exports and economic activities at the subnational level, and to identify specific expansion trajectories and product diversification for each region. Consequently, our research in Chiapas is the first based on the statistics and visualizations on that on-line tool. It was designed as a showcase of the tool's potential for crafting productive development policies (PDP) tailored to each region.

The Atlas associates large differences in income to large differences in knowledge accumulation and productive capabilities. The income per capita in Tuxtla Gutiérrez, the capital of Chiapas, is higher than the average for Mexico, and over eight times higher than in Aldama and Mitontic, its poorest municipalities. A development strategy for Chiapas should take into account that its geography hosts some very poor regions, where subsistence agriculture predominates, along with major cities that have the most famous retail stores in the country. Leveraging on existing productive capabilitis, our complexity profile for Chiapas[7] has identified varying opportunities for productive diversification for the four main population centers in Chiapas: Tuxtla Gutiérrez, Tapachula, San Cristóbal de las Casas, and Comitán de Domínguez. The main notion is that each of these four cities offers different knowledge and capacities, that can be used to gradually move towards other, related products and services of greater complexity and value added. We have chosen these places for illustrative purposes, but the approach can be extended to other, smaller metropolitan areas of Chiapas, such as Reforma, Palenque, and Ocosingo.

Our hypothesis is that modern production methods, tightly linked to the growth and development process, require a host of complementary inputs that are absent throughout the territory of Chiapas. Our diagnosis attempts to identify which are the main obstacles to growth, and formulate a strategy so that this set of inputs can become available.

From a development standpoint, Chiapas possesses an intrinsic value that goes far beyond its ethnic diversity and troubled past. Since the emergence of the Zapatista Army of National Liberation in 1994, the state has received a significant amount of resources from the federal government. A wide variety of social programs has been launched with the purpose of meeting various types of social deficits in its more marginalized population. The schooling gap that separates Chiapas from the rest of Mexico has considerably narrowed, from more than a three-year gap for the cohort born in 1965, to just under two years for the most recent cohorts. Major improvements have also occurred in infrastructure, including highways, bridges, and airports. Nevertheless, the income gap between Chiapas and the rest of Mexico continues to grow, suggesting that none of these factors was the principal bottleneck.

[7] Hausmann, Cheston, and Santos (2015).

In our work, we have attempted to take advantage of the internal dispersion in Chiapas to identify key obstacles in each of its different regions. Essentially, some places in the state have managed to accumulate and combine the diversity of capabilities and knowledge that are required by modern methods of production. These regions have a dynamic characterized by greater productivity and higher wages than most disperse sections of Chiapas, which depend on subsistence agriculture and social transfers. These latter sections are caught in a trap of low productivity.[8]

Modern methods of production never reached the poorest and remotest regions of Chiapas, which explains why productive capabilities and knowledge did not develop there. At the same time, no incentives exist to acquire new knowledge that could be used in industries that do not exist. In any case, and even though the migration rate of Chiapas residents is the lowest in Mexico (in both rural and urban settings), the few who overcome these disincentives and manage to acquire a minimum level of training generally emigrate to other areas that have sufficiently complex economies that demand and compensate their abilities. Therefore, we noticed that migrants from Chiapas tend to earn the same as workers with similar levels of education and experience in their destiny locations. The problem does not lie at the individual level, i.e. there is nothing wrong with the people of Chiapas. The problem most likely has to do with features of the place.

This situation has led to a chicken-and-egg dilemma: no one wants to invest in acquiring productive capabilities if there are no companies that need them, and no company wants to set up in a place where productive capabilities are lacking. This presents us with a coordination problem that could be resolved by means of an innovative institutional mechanism that promotes effective public-private dialog—one of the most glaring shortages in Chiapas.[9] Mistrust and jealousy reign in the state, and there is no effective institution for meetings or productive dialogs where the public and private sectors can participate equally.

This inability to solve coordination problems and provide the inputs required for modern production has thrown a good portion of the social investment made in the state in arid land. Education has improved, but there is no economy capable of benefiting from and paying for these capabilities. The main roads and highways identified as priority transport routes were built over a decade ago, or they are in process, but there is no public transport system enabling rural locales to take advantage of the greater complexity of the nearby urban economies. Thus, a dual work-wage equilibrium has been instated, with very little work and low wages in the rural environment coexisting with considerable bonuses for the trades and more work opportunities in urban areas.

To overcome the chicken-and-egg dilemma and spark growth, Chiapas needs to resolve its coordination and connectivity problems, and gradually promote greater complexity. The idea is that the main urban centers in Chiapas that have a more diverse accumulation of capabilities and knowledge should become development poles that could incorporate rural communities nearby.

[8] Hausmann, Espinoza, and Santos (2015).
[9] Campante and Solé (2015).

One of the main challenges that Chiapas faces is its dispersed population: 51% of its inhabitants live in rural areas (fewer than 2500 inhabitants, according to the INEGI[10]), compared to 23% in the rest of Mexico. In addition, barely 19% of the population lives in areas with over 100,000 inhabitants (versus 48% in Mexico). So the percentage living in rural areas is more than twice, and the percentage of urban development less than half, than elsewhere in Mexico. Consequently, in some cases, these communities could be linked and integrated into the growth and development process of urban areas.

For rural communities located far from the cities, gradual improvements in farming methods currently being used could be the only option. However, if one thing can be expected from more advanced agricultural technology is the freeing of labor, which returns the emphasis to the development process in urban centers and the strategy for linking rural communities to this process. In addition to analyzing the productive ecosystem, detecting most binding constraints to growth, and solving the lack of coordination, this process should lead to rethinking other areas of social policy, such as housing or public transportation.

Chiapas is at a crossroads. Despite its current low productive complexity, our analysis reveals that its four largest cities are among those with the greatest potential of Mexico. Tapachula, with its Special Economic Zone (Spanish initials, ZEE) in Puerto Chiapas, its flat surface area and good road connectivity, is by far the city with the greatest potential for conquering products and industries of greater complexity. Los Altos, with its greater availability of cheap labor, is the city that poses the greatest challenges and at the same time, offers the greatest opportunities. On the one hand, it has an abundant cheap labor supply that could be used to develop labor-intensive industries like the ones that are retreating from other regions of Mexico, victims of their own success. On the other hand, this prospect requires a creative, innovative solutions to existing coordination problems that have kept private investment at bay.

This report contains recommendations for policies that would take advantage of these opportunities. The second section describes the growth trajectory in Chiapas. The third and fourth sections analyze the usual suspects for the lack of growth in Chiapas, divided into individual characteristics (education, indigenous ethnicity) and location characteristics (credit, infrastructure). Section five outlines the basics of economic complexity theory, and develops its main indicators for the context of Chiapas. The sixth section identifies opportunities for productive diversification in export goods and services for the four main population centers in Chiapas. The seventh is devoted to reviewing the lessons learned from the Yazaki case, one of the few exporters of non-primary commodities in Chiapas. Section eight contains our policy recommendations, and section nine offers some conclusions and final reflections.

[10] [National Institute of Statistics and Geography].

II. Growth trajectory in Chiapas

Over the past decade,[11] Mexico has posted one of the lowest per capita growth rates in Latin America (1.3% compound annual rate, only higher than Guatemala and Haiti). Within this context, the gross domestic product of Chiapas has grown much less than the national average (0.2%); even less when we exclude oil and gas. The average growth rate of the non-oil per capita gross domestic product (GDP) in Chiapas is negative (-0.2%), a significant contrast with the rest of Mexico (1.8%), and even with Guerrero and Oaxaca, the two next poorest states in the country (1.4%).

This explains why the gap separating Chiapas from the rest of Mexico has been widening. While in 2003 the non-oil per capita gross domestic product in Chiapas was 21% of the figure for the Federal District and 46% of the national average, in 2013 it barely reached 16% and 40%, respectively. During this time, Mexico's performance showed a pattern of divergence, with the wealthiest states in the north growing at higher rates than the neediest states on the south. The increasing gap in terms of income and growth rates is mirrored in poverty levels. Chiapas is also the poorest state in Mexico, regardless of how it is measured: Whether you use a multidimensional method (78.5%) or wages (78.1%), poverty in Chiapas far exceeds the national average (46.1% and 51.3%).[12]

The large income differentials observed among Mexico's federal entities are repeated in a fractal pattern towards the interior of Chiapas. While Nuevo León in 2013 had a per capital GDP 4.4 times greater than Chiapas; Tuxtla Gutiérrez, the capital of Chiapas, posted a per capita income greater than the federal average, 8.5 times greater than the average in Aldama and Mitontic, its poorest municipalities. This reality barely hints at the world of differences observed in the interior of Chiapas. Therefore, to answer the question of why is Chiapas poor, we need to go beyond the national factors that usually come to mind when we think about the process of growth and development, such as the legal framework, the exchange rate regime, tax policy, the banking system. These are common to all Mexican states. In fact, for the past 10 years, the poor performance in Chiapas has gone hand in hand with the country's stable macroeconomic environment. Moreover, Chiapas has one of the lowest state unemployment rates (3%), much lower than the national average. The reasons behind Chiapas' backwardness must also be able to explain the fact that urban agglomerations with high per capita income levels coexist within the state with others where subsistence agriculture predominates, and people marginalized from the benefits of modern life depend on social programs and government transfers to survive.

[11] We are referring to the decade 2003-2013.
[12] Source: CONEVAL.

III. The usual suspects: individual characteristics

In our search for the most binding constraints to economic growth in Chiapas, we have adapted the Growth Diagnostics framework (Hausmann, Rodrik, and Velasco, 2005) to the particularities of a subnational context. The statistical work was combined with intensive field experience. We analyzed the potential factors behind the lack of greater productive investment in Chiapas and evaluated their corresponding impacts. The results allowed us to determine not only the most important factors hindering growth in Chiapas, but also those which are not. Our conclusion is that the main obstacles are found at the level of location, not the individual. It's not the people of Chiapas, it's Chiapas.

1. Education

Low educational levels are linked to some extent with low income in Chiapas, but they are not enough to explain the magnitude of the wage gap, nor its evolution. To say that education levels are not the main cause of delay in the poorest state in Mexico goes against conventional wisdom. Ultimately, Chiapas is the least educated state in Mexico. Working Chiapas residents have an average of 8.1 years of education, compared to 9.7 in the rest of Mexico. This average includes 13% of the work force without education (versus 5% nationally), 21% who did not finish primary school (double the national average), while 23% did not complete middle school (20% national average).[13] In other words, much of the difference in schooling is concentrated at the lowest education levels. The results of the ENLACE [14] test reveal that Chiapas performs among the worst states in Mexico in Spanish, while in mathematics it is above the national average. So why do we say that education is not the main obstacle to growth?

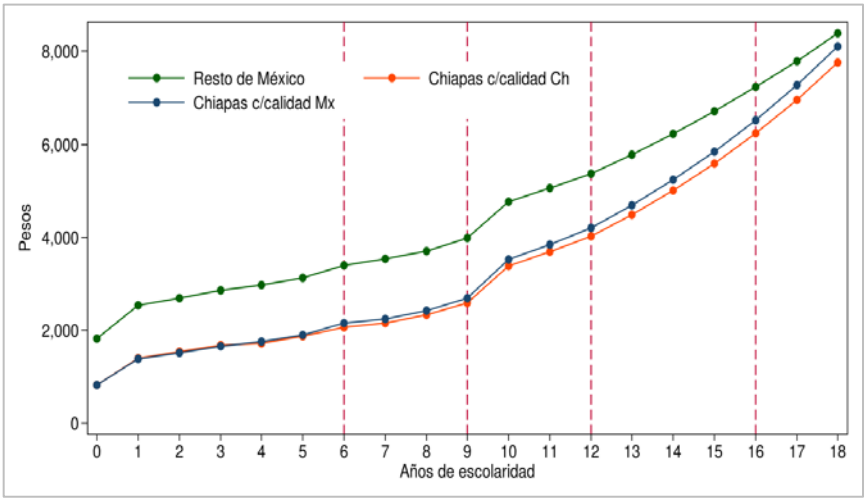
First, the size of the education gap bears no relation to the wage gap. A worker in Chiapas has an average of 8.1 years of schooling, and 22.5 years of experience, compared to 9.7 years and 21.5 years in the rest of Mexico. Given that experience levels are similar, it is questionable to conclude that the 1.6 additional years of schooling are sufficient to explain that on average, a Mexican worker earns 68.7% more than a Chiapas worker.

[13] The statistics were calculated based on the 2010 Housing and Population Census, and apply to the population aged 12 and up who are economically active.

[14] The ENLACE test is a standardized test of Spanish and mathematics that the Ministry of Public Education administered in 2006 and 2013 to the last four grades of primary school and the final grade of middle school. From 2009 to 2013, the test was also administered to all grades of middle school.

Second, for all education levels, wages per worker are much lower in Chiapas compared to the rest of Mexico (Figure 1). For example, to earn the same as a worker with six years of schooling in the rest of Mexico, someone from Chiapas would have to study at least 10 years. There must be something about the place, beyond characteristics of the individual, that explains why workers with the same number of years of education earn consistently less in Chiapas. These results hold even when we correct for differences in the quality of education, as measured by the results of the ENLACE test (blue line in Figure 1), which has a greater impact for the higher numbers of years of schooling (in particular, from 12 onwards).

Figure 1. Returns on education

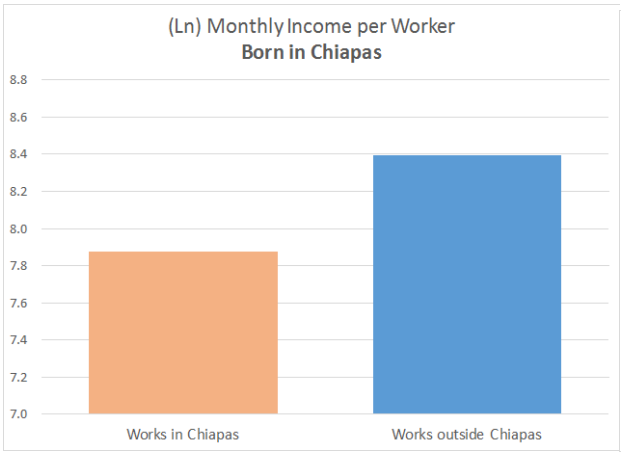


Source: 2010 population census, author calculations

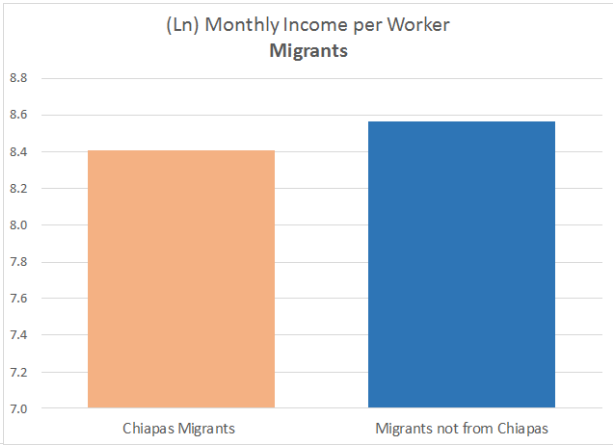
At last, education alone does not explain why Chiapans who emigrate are able to earn on average wages very similar to those of similar workers in the rest of Mexico. As panels a) and b) in Figure 2 show, the 68.7% premium that workers in the rest of Mexico exhibit (compared to workers from Chiapas) disappears when they are compared to Chiapas immigrants. Even when we correct for the possibility that emigration is a self-selection process for the most capable, education does not explain why wage differences between Chiapas immigrants and immigrants from the rest of Mexico make up barely one fourth of the initial difference (barely 17.2% between immigrants, compared to 68.7% between workers).

Figure 2. Migrants: Chiapas vs. Rest of Mexico (unconditional average)

Panel a) Chiapas workers vs. rest of Mexico



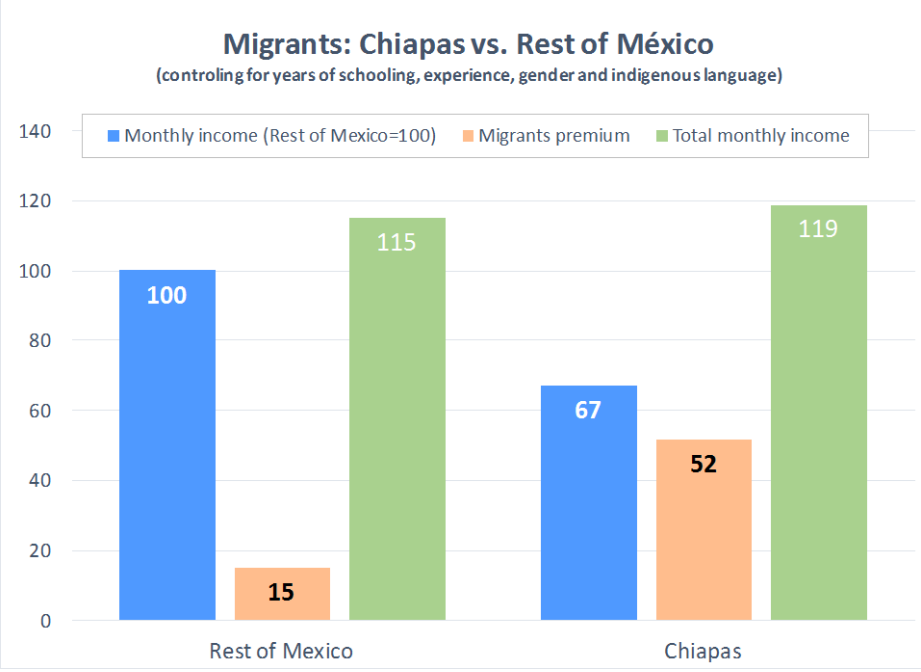
Panel b) Chiapas Migrants vs. Other Mexican Migrants



Source: 2010 population census

Moreover, when we analyze wage differences between migrants controlling for factors such as years of schooling, experience, gender, and indigenous language (monolingual indigenous), we find that Chiapas migrants earn slightly more than those coming from the rest of Mexico (Figure 3). That is to say that education can hardly be driving the wage gap, when Chiapas migrants earn higher wages than migrants from the rest of Mexico, with similar years of schooling, gender, and indigenous background.[15]

Figure 3. Migrants: Chiapas vs. Rest of Mexico (conditional)

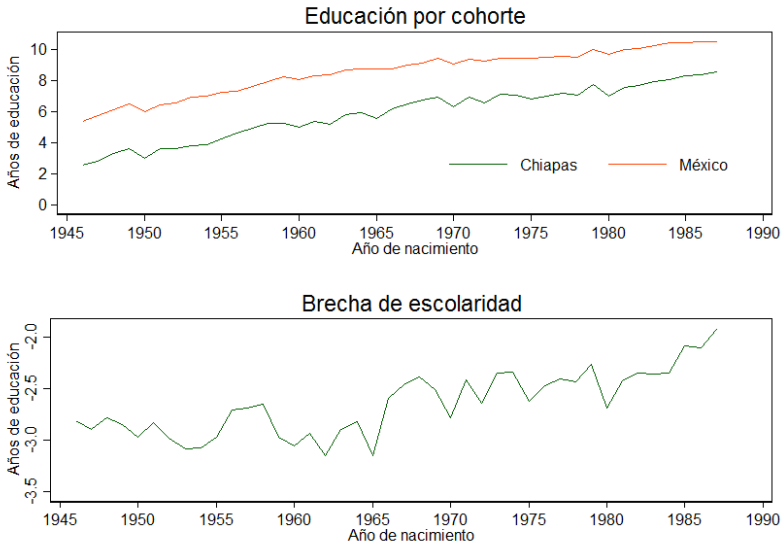


Note: Monthly wage per job, maintaining schooling, education quality, experience, gender, and indigenous background constant.
Source: 2010 population census, author calculations

[15] Appendix I contains various specifications that were used to reach this conclusion and the corresponding outcomes.

Even without considering its impacts on economic growth, investment in education is one of the pillars of a prosperous society and can be considered a goal on its own. Yet education does not appear to be the most binding constraint to growth in Chiapas. In fact, differences in years of schooling between Chiapas and the rest of Mexico have been narrowing significantly since the cohort born in 1965 (Figure 4). During this same period, while the education gap was narrowing, the wage gap continued to grow.

Figure 4. Education gap by cohort: Chiapas vs. Rest of Mexico



Source: 2010 population census

2. Indigenous population

Our analysis of the factors associated with wage gap in Chiapas did not produce significant evidence to support the hypothesis that indigenous population in Chiapas is one of the main barriers to growth. The challenge with the methodology here is to differentiate individual characteristics (member of an indigenous ethnic group, or being indigenous monolingual) from the characteristics of the place where these communities are settled (they tend to be concentrated in rural areas).

In an attempt to solve this problem, we used two types of analysis, based in both cases on the data derived from the 10% sample from the 2005 and 2010 population censuses. First, we used a Tobit model to study individual factors associated with wage levels in Chiapas and the rest of Mexico. According to the results (Appendix I), being indigenous-monolingual is associated with significantly lower wages in the rest of Mexico, but there is no evidence in favor of the hypothesis that indigenous-monolingual workers in Chiapas suffer significant negative incremental effects.

Second, we performed a Oaxaca-Blinder decomposition to identify the factors associated with wage differences between workers from Chiapas and the rest of Mexico, including characteristics of both

place and individuals.[16] In this case (Appendix II), differences between the number of indigenous monolinguals in Chiapas and in the rest of Mexico barely explain a small fraction of the income differential, much less than the effect of the type of municipality (rural or urban) where the individual lives.

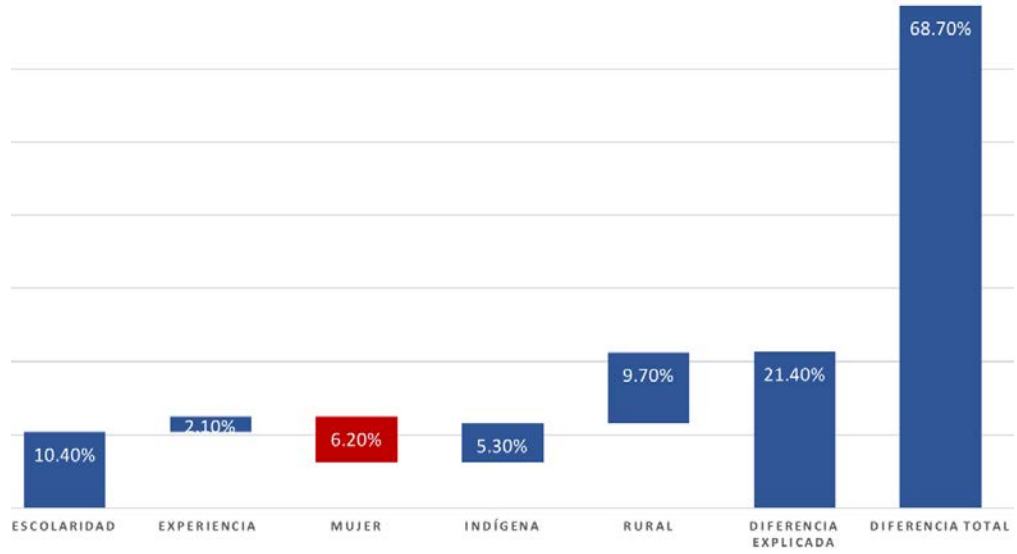
Our conclusions are aligned with other contributions in the literature, which report that belonging to an indigenous ethnic group, while associated with lower family incomes, is not statistically significant when you control for other types of assets (de Janvry and Sadoulet, 1996) or other types of location (de Janvry and Sadoulet, 1997; World Bank, 2005).

An interesting contrast that illustrates our findings can be seen in the Chiapas municipalities of Zinacantán and Bejucal de Ocampo. Zinacantán has a predominantly indigenous population (83.4%), while the indigenous population in Bejucal de Ocampo is negligible (0.8%). In addition, Bejucal de Ocampo has education levels much higher than those in Zinacantán (4.1 years of schooling vs. 2.1). In contrast to what would be expected according to the conventional view, the inhabitants of Zinacantán are wealthier than the inhabitants of Bejucal de Ocampo. The individual characteristics of their inhabitants (indigenous background, years of schooling) do not determine productivity in these towns, or at least not as much as one characteristic specific to their location: connectivity. Bejucal de Ocampo is located 126 kilometers by road from the closest city with over 50,000 inhabitants (Tapachula), whereas Zinacantán is 11 kilometers away from San Cristóbal de las Casas. These differences determine the patterns of the exchange of goods, services, and know-how for each of these places with the exterior, which leads to very different economic structures and productivity levels. The indigenous population of Zinacantán has been able to move beyond maize harvesting, and today operate a vigorous trade in growing flowers and making handicrafts that sells in the markets of San Cristóbal. Bejucal de Ocampo, however, has scant interaction with the economy of Tapachula, and its inhabitants are involved in subsistence farming which, along with social programs, allows them to survive (barely) without trading outside the municipality.

In summary, we did not find significant evidence indicating that either of the usual suspects at the individual level, education or indigenous origin, are the most binding constraints to growth in Chiapas. In fact, all the usual suspects combined are able to explain less than one third of the wage gap between Chiapas and the rest of Mexico (Figure 5). The drivers of low wages, low growth, and high poverty rates in Chiapas must be sought elsewhere. Since it is not the Chiapans, the problem must be Chiapas. The key to understand the wage gap must be found in characteristics of place that determine its low productivity.

[16] Santos, Hausmann, Levy, Espinoza, and Flores (2015).

Figure 5. Contribution of usual suspects to explanation for wage differences by worker between Chiapas and the rest of Mexico



Source: The data are from the microdata of the INEGI 2010 Housing and Population Census sample. Percentages in the figure match the characteristics coefficient in the Blinder-Oaxaca decomposition (Santos, Hausmann, Levy, Espinoza, and Flores, 2015).

IV. The usual suspects: characteristics of place

The results in the above section indicate that the main barriers to growth in Chiapas are not found at the individual level. In this section, we explore some of the usual suspects involving characteristics of place: shortcomings in the credit markets and infrastructure.

1. Access to credit

According to our analysis, there is no evidence that shortcomings in the credit markets are the main causes of the lack of growth in Chiapas. The cost of credit in Chiapas is among the lowest in the country for all sizes of companies. Moreover, the real interest rate in Chiapas, taking into account inflation in the state, is among the lowest in the country by differences that vary from 0.7 (microenterprise) to 1.9 percentage points (large enterprise).

As in the rest of Mexico, interest rates in Chiapas have been decreasing in the last five years, without this trend being accompanied by a surge in growth. All the evidence we have analyzed indicates that the low levels of private credit observed in Chiapas are associated more with the low productivity of the economic activities performed there, than with bottlenecks or deficiencies in the supply of financing.[17]

[17] For a more detailed analysis of access to credit in Chiapas, see Hausmann, Espinoza, and Santos (2015).

2. Infrastructure

Infrastructure in Chiapas, or the lack thereof, is one of the factors most commonly cited when identifying the main obstacles to growth. Representatives of the regional executive branch, the business sector, public workers, academics, and everyday citizens usually stress that for Chiapas to grow, a massive investment in infrastructure must be deployed. The physical geography of Chiapas, crossed by two mountain ranges from the northeast to the southeast, and its different climate regions, represent a challenge for surveying and maintaining its infrastructure. However, none of our analyses (based on the electric grid and the road network) resulted in significant evidence supporting the hypothesis that the shortcomings in this type of infrastructure were the main factor associated with lack of growth.[18]

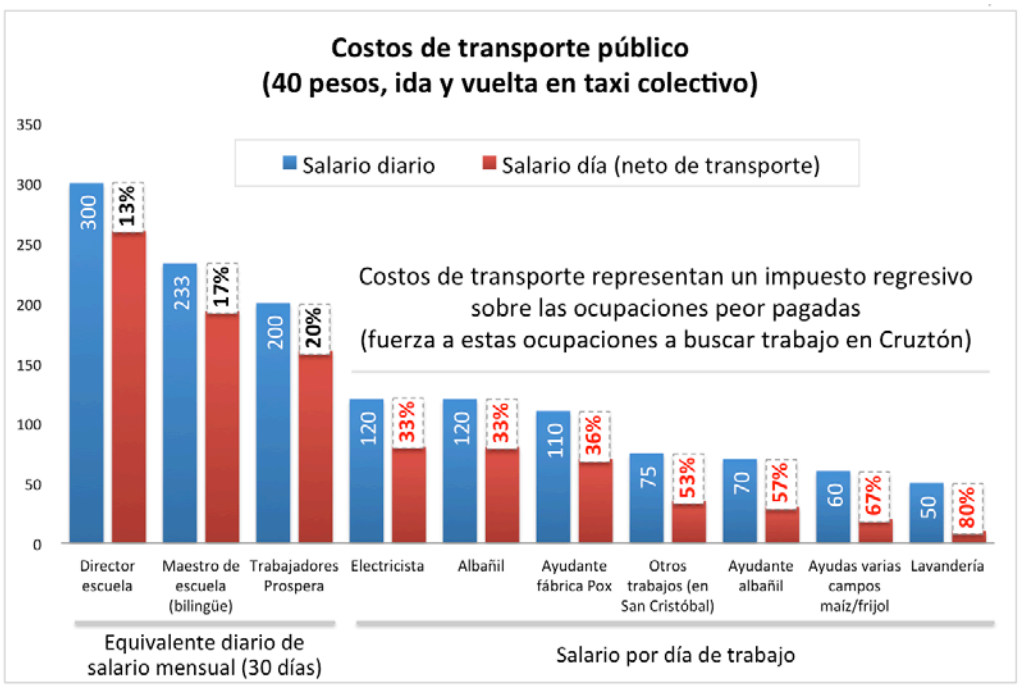
When we consider the area and the number of people in the state, Chiapas appears better than the average for Mexico in percentage of paved roads and four-lane highways. Also, moving cargo to and from Chiapas is more expensive because Chiapas is farther away, but there is no evidence of additional premiums per kilometer as a result of relative deficiencies in the quality of road infrastructure. Fifteen years ago, Dávila, Kessel, and Levy (2002) identified the "radiality" of the Mexican highway system as one of the main problems for the southern economies. They therefore proposed a series of investments to enhance the main coastal roads and estimated savings in terms of distance, time, and costs. By the end of 2013, most of these projects had materialized. And yet, while external connectivity improved, it did not translate into greater convergence of Chiapas to the Mexican average. The opposite was true.

While we did not find evidence that the infrastructure used to transport goods to markets outside Chiapas is a tier-one obstacle, we did find many difficulties associated with the internal mobility of people, which depends, among other things, on the public transportation infrastructure. The costs of transportation between the main population centers of Chiapas and the neighboring communities act like a very high tax on expected wages, inhibiting access to the urban labor market.

During our field work, we observed numerous manifestations of this phenomenon. In Cruztón, a town of 1,500 inhabitants in the municipality of Chamula located just 11 kilometers from San Cristóbal de las Casas, the only available public transport is a private shared taxi that costs 40 pesos daily round-trip. This represents a fixed cost for access to the labor market that has a greater impact on those who would earn a lower wage. For someone who expects to earn more than 200 pesos a day (teachers, school principals, or PROSPERA employees), the transportation cost represents less than 20% of the expected wage (Figure 6). For a laundrywoman or construction assistant, whose expected wage is less than 80 pesos, this represents over 50% of gross wages. In effect, the costs of labor mobility act like a regressive tax that make employment opportunities inaccessible.

[18] Idem.

Figure 6. Cruztón, Chamula: Daily wages and transportation costs



* Asumiendo que todos se deben trasladar

Source: Interviews in Cruztón, Chamula. See Santos, Dal Buoni, Lusetti, and Garriga, 2015.

Another illustrative example is Yazaki, a wire harness assembly export plant providing over 3000 jobs in the state.[19] The company has no trouble shipping its product by land to northern Mexico and the United States, but it is limited by the availability of cheap labor and the logistics of workers´ transportation. Yazaki operates its own transportation system, that covers a 30-kilometer radius from its main headquarters in Tuxtla Gutiérrez. Going around to pick workers in rural areas is more profitable than paying a higher wage and letting workers use the existing transportation systems.

Given these transportation costs, Yazaki preferred to grow by dividing up its production process and developing new, smaller plants in various areas of Chiapas, instead of increasing the size of its plant in Tuxtla Gutiérrez. The fact that it went from one plant in 1997 to five in 2015, shows that it is more efficient for them to move the jobs to where the workers live, rather than to move the workers to the jobs.[20]

Cruztón and Yazaki show that for many Chiapas residents in rural areas, the cost of transportation to work represents an obstacle to their integration into a more complex and productive labor market, forcing them to work in activities that exist in the area where they live.

[19] For more details on the Yazaki case study, see section VII.

[20] Working on the production line at Yazaki requires only a primary education, being able to read, distinguish colors, and take a six-day training course.

In summary, except for the problems detected in labor mobility, none of the usual suspects is able to explain the backwardness in Chiapas. During the past decade, progress has been made in education (years of schooling), credit, and infrastructure, yet the income gap between Chiapas and the rest of Mexico for the average worker has increased by six percentage points. The constraints binding the economic performance of Chiapas must be somewhere else.

V. Economic complexity in Chiapas

Adam Smith taught us that the division of labor is closely linked with economic progress. It allows us to achieve things as a team that no one member could do individually. The division of labor allows a society to learn more things, not because each person knows a lot, but because each person knows different things. Modern technology takes place in organizations that require types of knowledge that are both very different (information systems, production engineering, taxation, marketing, sales) and complementary. A bad design cannot be replaced by a better accounting information system. Thus, growth in productive capabilities goes hand in hand with the variety of things that members of a society know.

When one area, whether it is a town, a municipality, a city, a state, or a country, has more diverse productive capabilities among its population, it affords the area two things: greater diversity of economic activities and more complex activities. The complexity of an economic activity comes from the diversity of capabilities and knowledge required to make that activity possible.

Studies on economic complexity have shown that it is an important determinant of income for an area. Places are wealthy not only because of the individual characteristics of each of its members, but because of the type of teams and productive techniques that can be implemented, given the diversity of its members. In the same way, these studies have shown that complexity tends to increase gradually through diversification into activities that are nearby or adjacent, in terms of knowledge and productive capabilities, to the pre-existing activities.

In our research on productive structures in Chiapas, we measured economic complexity in two ways: total of economic activities in the area and exports. Exports, the number and value of goods and services produced in one area that can be sold to the residents of other areas, play a very important role in the process of development. All places need things that they do not know how to make, and in order to import them, they must exchange them for things that they do produce. The prosperity of a given country or region hinges precisely on the extent to which there are economic activities that guarantee these exchanges will occur.

Unlike nontradable activities, export activities for an area must be good enough to convince outside customers, who have a variety of other options. In other words, the price-quality ratio must be attractive. One way to boost this relationship is by improving quality and productivity. Another is wage reductions. The greater the productivity and quality of export activities, the greater the compensation they will be able to afford while continuing to remain competitive. If the rate of employment in the export

sector is significant – as it is in most places where incomes do not depend on natural resources – this sector's capacity to pay good wages is what determines the compensation for the area's inhabitants. Consequently, it is in everyone's interest to improve the size and quality of the export sector.

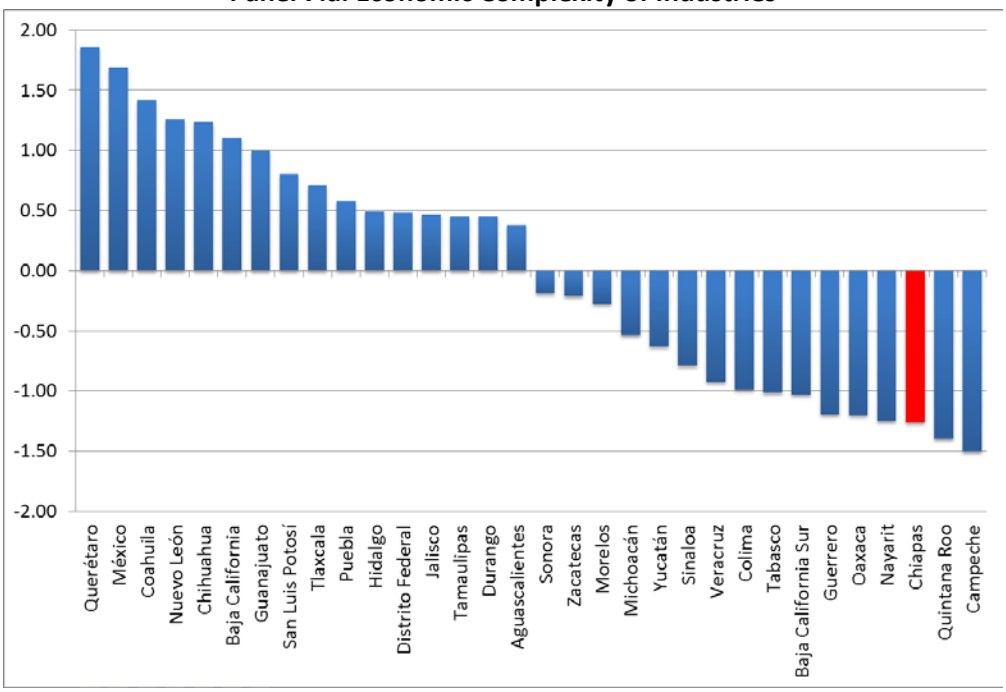
Chiapas is at once the poorest state in Mexico, and one of the least complex, both by productive structure and exports. Its low income levels are consistent with the low economic complexity index of its economic activities and exports (Figure 7). In terms of economic activity (panel a), Chiapas is the third least complex state in Mexico. Note that in this case, the definition of revealed comparative advantage used to construct the economic complexity index refers to Mexico, so that the states are aligned around zero.[21] In the case of economic complexity of exports (panel b), although the order changes, Chiapas is still third from the bottom. Here, the revealed comparative advantage (RCA) is defined with reference to the representation of export products in the world export basket. The fact that most of the Mexican states are located above zero signals that their exports are more complex than the average of the world economy.

Individual characteristics (years of schooling, indigenous ethnicity) and place characteristics (infrastructure, credit) are relevant insofar as they are based on a productive ecosystem with sufficient capabilities and knowledge to generate wealth. From our point of view, the main problem in Chiapas is that its economy is of very low complexity, it is able to produce very few things that can be sold beyond its borders, and those things are not very complex. The low complexity in turn is a disincentive to investment in the necessary knowledge and capabilities for increasing complexity, which results in an equilibrium of low productivity and complexity, creating a vicious circle.

[21] In this case, zero would be the average complexity for Mexico (Hausmann, Cheston, and Santos, 2015).

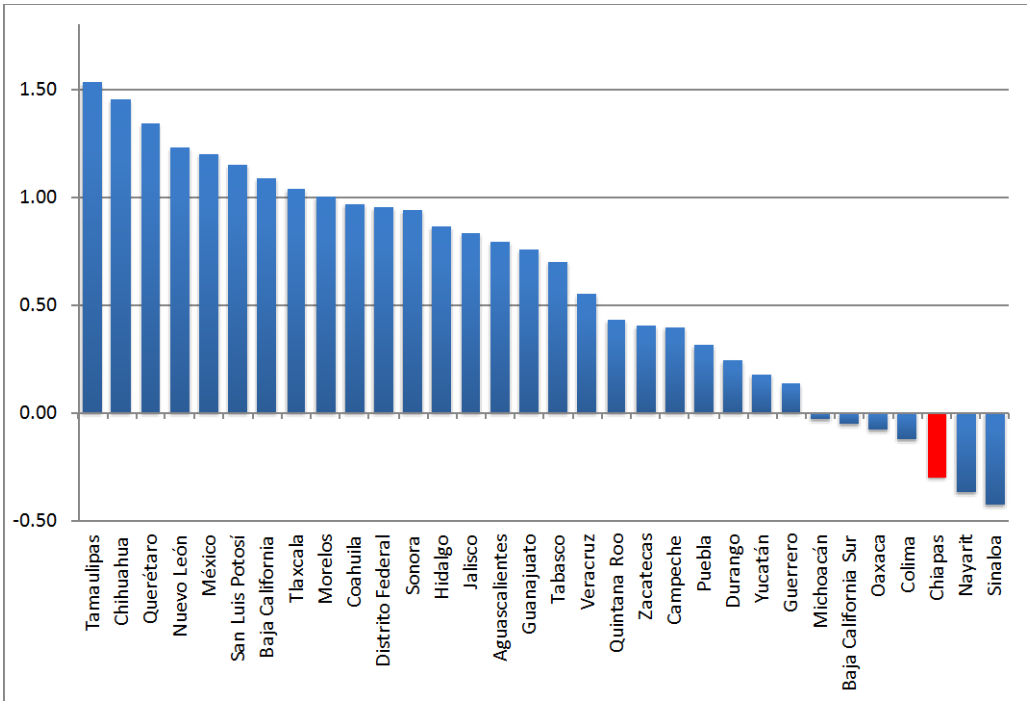
Figure 7. Mexico: Economic Complexity Index by State

Panel 7.a. Economic Complexity of Industries



Source: microdata from the 10% Population Census sample (2010); Hausmann, Cheston, and Santos (2015).

Panel 7.b. Economic Complexity of Exports



Source: complejidad.datos.gob.mx; Hausmann, Cheston, and Santos (2015).

Chiapas suffers from the dual syndrome of having a low amount of exports per capita and a concentration of low-productivity exports, essentially in the primary sector. Just six products (coffee, bananas, dates, sugar, tobacco, and electrical equipment) account for 92% of total non-oil exports. These have also replaced secondary sectors with relatively greater sophistication, such as wood and metal manufacturing. The population of Chiapas is composed of a rural majority (51% versus 23% in the rest of Mexico). The female labor participation rate is the lowest in the country with barely 22% (national average is 33%). Chiapas has the highest proportion of primary workers in the country (60% in primary and trade) and few workers in manufacturing and services (31%), unlike the rest of Mexico (14% in the primary sector and 55% in manufacturing and services).

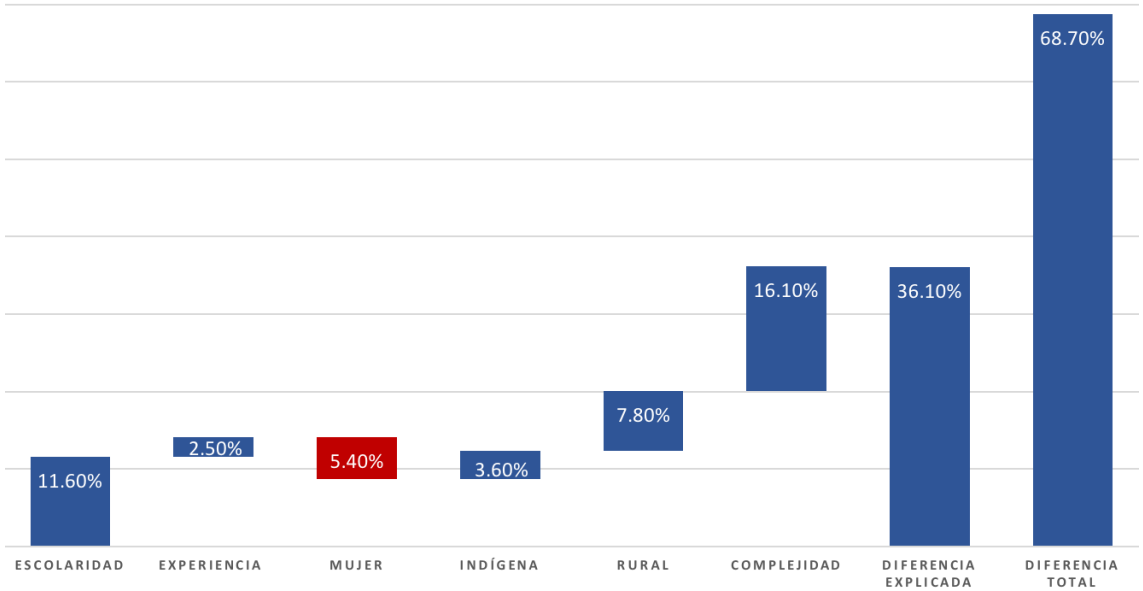
In summary, Chiapas knows how to make very few things, and those few things are the ones that most states are able to make. It is a set of primary commodities whose production methods advance more slowly than those of more complex goods with higher value added. As a result, Chiapas not only has little productive capabilities, but it is also relatively more difficult for Chiapas to acquire new capabilities. In this context, the incentives for acquiring more years of education are low, because the productive ecosystem has no way of employing them and therefore, compensate them accordingly. By the same token, the yields on the investment made in road infrastructure is low, because there is not a steady and healthy flow complex goods and services traveling on these arteries towards the north, or even to the United States.

When the economic complexity index (for the municipality where the worker is employed) is included in the analysis of income differences by job between Chiapas and the rest of Mexico (Figure 8) two interesting things happen. First, total explained gap increases considerably: from 31.1% (Figure 5) to 52.5% (Figure 8). Second, the coefficient of the economic complexity index is much greater than any of the other individual factors, including education.[22]

Our conclusion is that Chiapas is caught in a low-productivity trap. Modern production systems require a number of complementary inputs that have not become spontaneously available in Chiapas. In this context, productive diversity and private investment are low, because the returns on investment are also very low. At the same time, the low levels of private investment prevent the emergence of a supply of complementary inputs, giving rise to a coordination problem similar to the chicken-and-egg dilemma. Chiapas lacks business models, complementary inputs, and specific productive knowledge that do exist and drives wages up in the rest of Mexico.

[22] On the dual causation of education and the complexity index, and possible ways to correct and differentiate its effects, see Santos, Hausmann, Levy, Espinoza, and Flores (2015).

Figure 8. Contribution of the usual suspects to the explanation of income differences by worker between Chiapas and the rest of Mexico



Source: Data used come from the INEGI 2010 Housing and Population Census sample microdata. Figure percentages represent the coefficient of the characteristics in the Blinder-Oaxaca decomposition (Santos, Hausmann, Levy, Espinoza, and Flores, 2015).

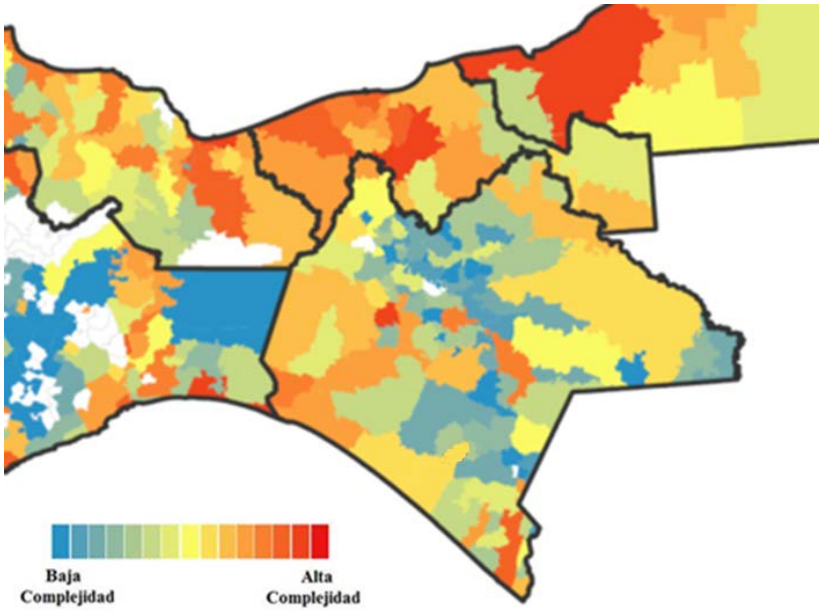
VI. Opportunities for productive diversification in Chiapas

True structural transformation and the secret to development consist of expanding the base of productive knowledge of a place, and then making the most out of them by gradually diversifying into the production or provision of more complex goods and services.

Not all economic activities are equally probable in all places, because places differ widely on their productive capabilities. That is a fact that can be substantiated at all aggregations levels, reproducing as in a fractal as we move into smaller units of analysis. In terms of median income per capita, the United States is five times wealthier than Mexico. Within Mexico, the wealthiest state is five times wealthier than Chiapas. And within Chiapas municipalities, the wealthiest, Tuxtla Gutiérrez, is eight times wealthier than its two poorest municipalities, Aldama and Mitontic. The same income disparity between municipalities of Chiapas occurs in the disparity of its economic complexity (Figure 9).[23] These conditions justify the use of a municipal focus. For illustrative purposes, within the context of this study we developed a complexity analysis for the four urban centers with the greatest population concentration, diversity, and sophistication in Chiapas (Tuxtla Gutiérrez, Tapachula, San Cristóbal, and Comitán), identifying products with high potential and greater complexity that require capacities similar to those already in place.

[23] For more details, see Hausmann, Cheston, and Santos (2015).

Figure 9. Economic Complexity of Chiapas Municipalities



Increasing the agricultural productivity for the majority of Chiapas inhabitants who live in rural areas is needed, but it will not solve the problem of the labor surplus. Chiapas has an enormous potential for increasing the productivity and the returns on its farming activities. Introducing new, high-value crops, new technologies and seeds into production, and new organizational methods for greater agricultural productivity, opens up the possibility of significantly increasing the incomes of rural Chiapas inhabitants. However, an agricultural revolution is not a job strategy. First of all, there are cultural limitations in indigenous communities to establishing and forming cooperatives that go beyond the family sphere (Appendix III).[24] Second, an increase in current agricultural productivity in Chiapas will trigger a reduction in employment, augmenting the labor surplus. The surplus will enable a larger portion of the work force to devote itself to other economic activities, including manufacturing. Chiapas needs an economic strategy aimed at conquering new urban activities and generating new jobs to start narrowing the income gap. Urban centers offer the potential for metropolitan areas to move towards specialization in new activities. Our vision of development in Chiapas is based on three premises:

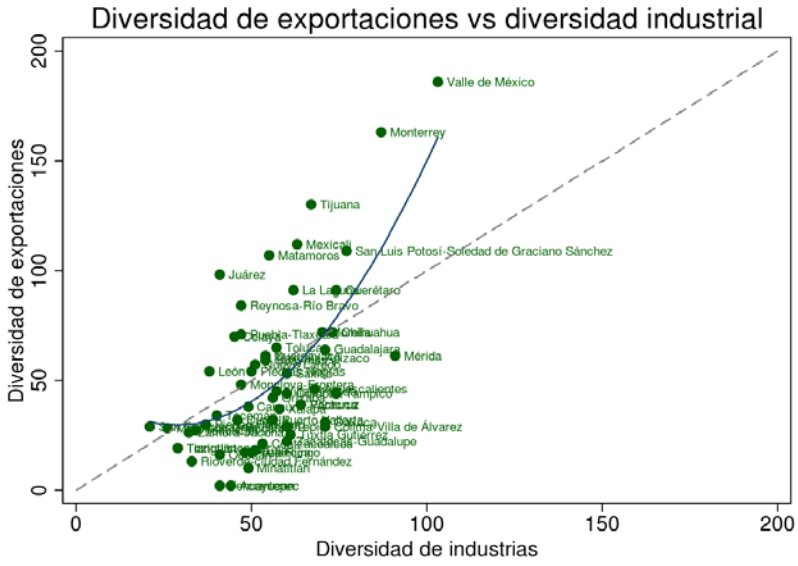
- ***Growth in Chiapas will come from productive diversification, not specialization:*** **Firms specialize,** countries diversify. Chiapas should not limit itself to adding value to its raw materials. Generating new jobs requires active facilitation to spread modern forms of production throughout the state. Manufacturing jobs offers two benefits: these jobs operate in the higher-productivity sectors, and they are found in the most dynamic world markets. Focusing on highly productive urban employment promotes the growth of well-paid jobs in new manufacturing sectors.

[24] Santos, Dal Buoni, Lusetti, and Garriga (2015).

- ***Chiapas needs to start imitating, rather than innovating:*** One feasible development strategy for Chiapas consists of learning to do things that the rest of Mexico already knows how to do. Some regions within the country, victims of their own success, are losing their wage competitiveness and moving towards more complex products that are less labor-intensive, and more knowledge-intensive. That is a desirable and opportune trend for these regions, that opens an extraordinary set of opportunities for Chiapas, which is farther down the complexity scale in Mexico. Taken together, both Chiapas and Mexico could obtain significant potential benefits from moving more labor-intensive production from high-equilibrium wage regions in the north towards the south.

- ***Gradual diversification in two stages: domestic and international.*** In its own trajectory towards productive diversification and development, Chiapas will gradually start to increase the diversity and complexity of its employment, augmenting the net income resulting from trade with the rest of Mexico. According to our research, this industrial diversification precedes export diversification (Figure 10). The only possible exception to this rule may be Tapachula, due to the existence of the future ZEE in Puerto Chiapas. Within the policy context surrounding the creation of the special zone, the region could consider attempting larger leaps in terms of capabilities and knowledge in order to accelerate the process of export and productive diversification. In any case, whether at slow or top speed, the path to a prosperous economy is incremental, and it depends on existing capabilities to promote the approach to new adjacent industries in terms of knowledge but with greater complexity, first on the domestic level, and then globally.

Figure 10. Mexico: Export Diversity and Industrial Diversity



We identified potential products for the four main urban centers, requiring capabilities similar to those already existing and offering better strategic benefits in terms of complexity.[25] We summarize the main possibilities for each urban area separately, and the challenges each must overcome in order to conquer them. The identification of opportunities should be interpreted as a road map, not as a process of picking up winners. This definition should be the foundation of an iterative analysis process to effectively validate the inclusion of opportunities, and to determine possible barriers that might be inhibiting their emergence, specific capabilities still lacking, public goods, or other market failings.[26]

- ***Comitán de Domínguez.*** This city should focus on resolving logistics barriers associated to social conflicts in order to capitalize on its potential as a high-level tourist destination, and develop a light industry base of prepared foods and handicraft production. Like many places in Chiapas, Comitán is facing a crisis of viability (caused by the multiple stumbling blocks), that mirrors in its exports: none of them depend on good logistics. The industries with the greatest potential are concentrated in four areas: high-value farming, prepared foods (tobacco, seasonings), light industry (jewelry, rubber bands), and production of handicrafts for the home.

- ***San Cristóbal de las Casas.*** San Cristóbal is in a good position to take advantage of skills developed in the production of handicrafts, and redeploy them to the manufacture of more sophisticated textiles. It has been recognized as the cultural capital of Chiapas, and is an international tourist treasure. However, per capita tourist spending in Chiapas is the second lowest in Mexico. A range of potential tourist services might be developed to improve the quality of tourism and increase average daily spending (translation and photography services, language schools). Our analysis identifies that San Cristóbal has a high potential in metal backings, and food and beverage manufacturing. However, the greatest potential for building a new export base in San Cristóbal is one centered on handmade textiles, given the number of skilled artisanal workers. These industries include complex textiles that earn more with greater work detail (for example, borders and openwork on curtains and white goods), the use of sophisticated materials, and furs.

[25] The Economic Complexity report goes into more detail on the theory and methodology of economic complexity (Hausmann, Cheston, and Santos, 2015). The development of exports can be explained by the concept of proximity of two export products, which is based on the conditional probability that one place is able to produce and export a product competitively, since it already exports another.

[26] See the recommendation for the Chiapas Productive Development Agency (Section VII).

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- ***Tuxtla Gutiérrez.*** To tap the potential of Tuxtla Gutiérrez requires reconverting its large service sector – that today meets the demand created by public spending in the state capital – to a more diverse manufacturing base. The main candidates for spurring this productive transformation are the fur and textiles sectors, food processing, and some production-line equipment-making. Tuxtla is in a somewhat contradictory position. On the one hand, the strong concentration of labor in public administration and a large services and trade sector (fueled by public spending) result in minimum participation in manufacturing (just 3.2%) in formal employment, and very low exports. On the other hand, due to its small base in the modern sectors such as equipment, chemicals, textiles, foods, and wood, Tuxtla has the highest complexity in Chiapas. Based on these existing capabilities, the sector with the greatest potential is production-line manufacturing, which includes scientific instruments, motorcycles and parts, and other manufactures (signs, casting molds). An analysis of services sector potential once again highlights the lack of urban transportation systems to connect neighboring communities to industrial zones.

- ***Tapachula***. Of all the regions in Chiapas, Tapachula is the one offering the greatest potential for expanding its export base into products with greater complexity. The region provides most of the state's exports, and hosts the recently created ZEE of Puerto Chiapas and its industrial park. All these features open up the possibility of welcoming new, related, more-complex productive capabilities. We have identified the potential of plastic products (paints and films), and metallurgy (watches and welding equipment) as excellent opportunities for productive transformation by means of the ZEE. A great opportunity exists to position Tapachula as the central processor of food and beverages, and in high-value agriculture and the manufacture of vegetable products. Other subsectors such as electric sockets and glazier's putty possess high complexity earnings, while representing high-value products with markets that are expanding worldwide.

VII. The camel and the hippo syndrome: The Yazaki case study

One of the main findings of the series of investigations that underlie this report is the weakness of connections in Chiapas with the outside world. The quality and intensity of these connections are what define whether a place is poor or wealthy. These connections may be of four types: (i) sales of goods and services; (ii) labor migration (labor services and access to labor markets); (iii) fiscal transfers; and (iv) private transfers (remittances).

Successful economies, at both the regional and national level, follow the same pattern of connection with the outside world: strong external flows of goods and services (exports and imports), together with the influx of migrant labor and net outflows of taxes and transfers. Chiapas operates in exactly the opposite mood: net importer of goods and services, exporter of skilled workers, with massive

inflows of public transfers and remittances. Because they produce little that they can sell outside the community, towns in Chiapas receive few resources, which accentuates their dependence on transfers from the government.[27] Without a more significant export presence, Chiapas will remain unable to afford imports that improve its living standards.

The Yazaki case study is illustrative of both the chicken-and-egg dilemma and the need of state intervention to successfully address it. Yazaki was established in Chiapas in 1994, the year of the Zapatista uprising. The intervention that made it possible was based on a combination of public provision of basic capacities via the federal government, and the transfer of productive knowledge from Nuevo León. Twenty years later, Yazaki has five plants in Chiapas employing more than 3,000 workers, including engineers who graduated from Chiapas universities, and have gradually replaced the original managers coming from northern Mexico.

The Yazaki case is illustrative of the camels-and-hippos idea: depending on the type of production that does or does not exist in a place, it is possible to identify which factors are abundant and which factors are more scarce. Camels are plentiful in the desert because they are adapted to survive with a relative lack of water. Hippos, however, are the opposite. Wherever there are hippos, we can assume that water is not missing. [28]

After the government intervention that brought Yazaki to Chiapas, the company continued to expand. Its growth is not the result of improvements in highway infrastructure, or in the reduction in the years-of-schooling gap. Yazaki followed an expansion strategy consisting of dividing its production process into smaller stages, that could in-turn then be located in areas where abundant, idle labor existed. Yazaki's production process, a relatively easy-to-break production line with some stages requiring exclusively manual processing, enabled growth by overcoming the binding constraint (availability of cheap labor).

Yazaki's expansion is also an indicator that cheap labor abounds in Chiapas. It is only a matter of having modern production systems located in areas where a vast supply of labor with relatively good education levels exists. The distribution of Yazaki plants within the state underlines a second obstacle: the uncertainty of operating in the highlands and Eastern Chiapas where *ejidos*, a communal land ownership system, predominates. Yazaki's five current plants (two in Tuxtla Gutiérrez, one each in Ocosocoautla, Huixtla, and Frontera Comalapa) as well as the two being planned (Tapachula and Cintalapa) are located along the Pacific coast, or to the south, close to the Guatemalan border. Despite the abundance of labor in the highlands, the company did not consider this zone in its expansion plans. Social conflict, road blockades, and other interruptions might affect the ability to function and appropiate the returns on their investment. Also, there is an additional difficulty associated to purchasing land in a zone where *ejidos* are the norm. This latter set of factors is another important growth constraint in the poorest parts of Chiapas.

[27] Government transfers produce effects similar to those identified in the economic literature on the Dutch disease: making the relative costs of tradable goods more expensive, steering economic activity towards nontradable sectors. They also increase the reservation wage of workers, reducing the labor supply.
[28] Hausmann, Klinger, and Wagner (2008).

VIII. Recommendations

Recommendation 1: Increase the effective job supply by addressing the labor mobility problem with public transportation interventions

One of the main obstacles to growth and economic integration in the poorest areas of Chiapas is the lack of a public transportation system that allows residents to fully benefit from the major infrastructure investment made over the past 20 years. The lack of public transport has many negative effects on the patterns of growth and employment in Chiapas. First, it restricts access to the labor market, even in towns nearby major urban centers. Wage premiums in urban centers offsets the cost of transport from rural villages only for people with a high school education. The others, the vast majority, cannot take advantage of the higher equilibrium wages of the cities, because the daily costs of shared private taxi rides exceed the differences in equilibrium wages.

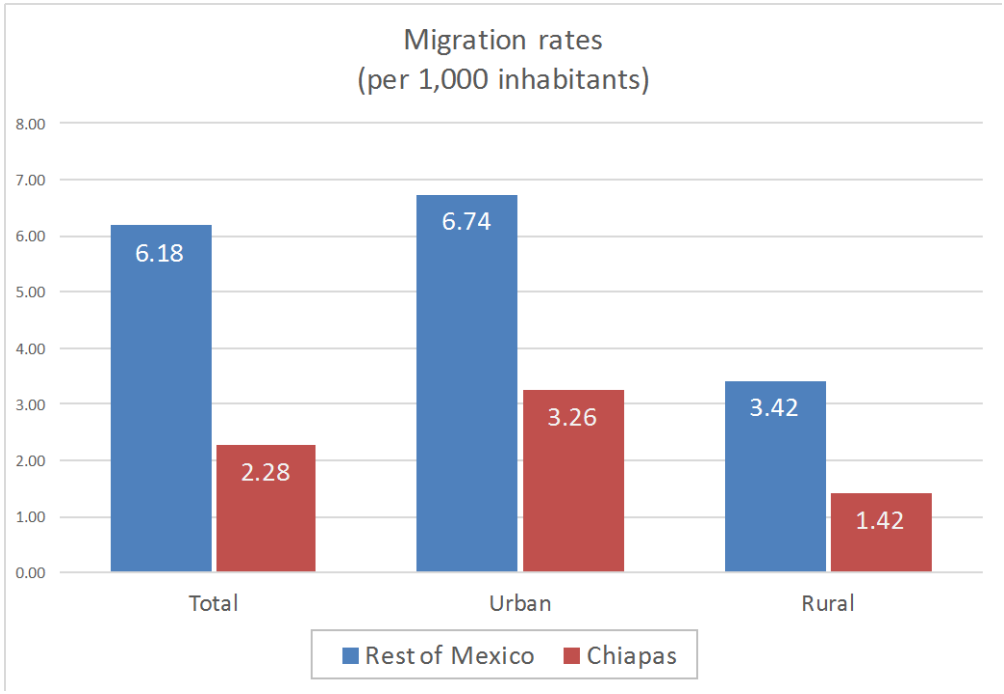
Second, the high costs of transport also maintain the inhabitants of the rural zones closest to the cities isolated from more productive and more modern economies. As a result, they are forced to work in activities of very low productivity in their respective communities, often geared toward personal consumption. Population growth, combined with the *ejido* land ownership system, has resulted in increasingly smaller productive lots that hinder the ability to generate production surpluses. All these, together with the cultural disinclination of indigenous communities to form associations to produce beyond the family circle (see Appendix II),[29] has effectively condemned them to survive through a combination of subsistence agriculture and social programs.

The creation of a public transportation system that allows inhabitants of surrounding locations to join the economy of the main urban centers could have a greater impact in Chiapas than in the rest of Mexico. Although it is the poorest state, emigration rates are barely one third of rates in the rest of the country (Figure 11). In our field experience, we identified two characteristics that may contribute to this phenomenon. Number one, the *ejido* ownership system that predominates in Chiapas hinders the transfer of rural housing and raises the opportunity costs of potential migration. Number two, in most poor, rural, indigenous towns in Chiapas, Uses and Customs (*Usos y Costumbre*) prevail. While they may differ from one place to another, in various cases we have seen hefty fines levied to emigrants. These are imposed to the emigrant's family, and not complying with stated payment could mean the loss of the property assigned to the family group and even expulsion from the community.[30] Whatever the reasons, the fact is that the countryside in Chiapas seems to offer a combination of income linked to subsistence farming activities and social assistance programs, which contrast with the risk profile for migrating to urban areas. This might explain why, even though the Chiapas countryside has some of the poorest municipalities and towns, the emigration rate there is barely one third of the rate in similar places in the rest of the country.

[29] Santos, Dal Buoni, Lusetti, and Garriga (2015).
[30] Idem.

For the most remote communities in Chiapas, in the steepest zones of its mountain ranges and in the southeast, in the Lacandon Jungle, this fact represents a very considerable restriction on its development. The difficulty in attracting modern production systems to such remote areas, coupled with its low propensity to emigrate, leave very few options open. For the other communities, the ones that surround the main urban centers, a transportation system could open up the possibility of working in the country and joining the modern economy in the city. This recommendation could have a very significant impact, since 46% of Chiapas' population lives within a 30-kilometer radius of its four main cities: Tuxtla Gutiérrez, San Cristóbal de las Casas, Tapachula, and Comitán de Domínguez.

Figure 11. Migration rates: Chiapas vs. Rest of Mexico



Source: 2005 and 2010 population census.

Recommendation 2: Promote the creation of an industrial park in Los Altos

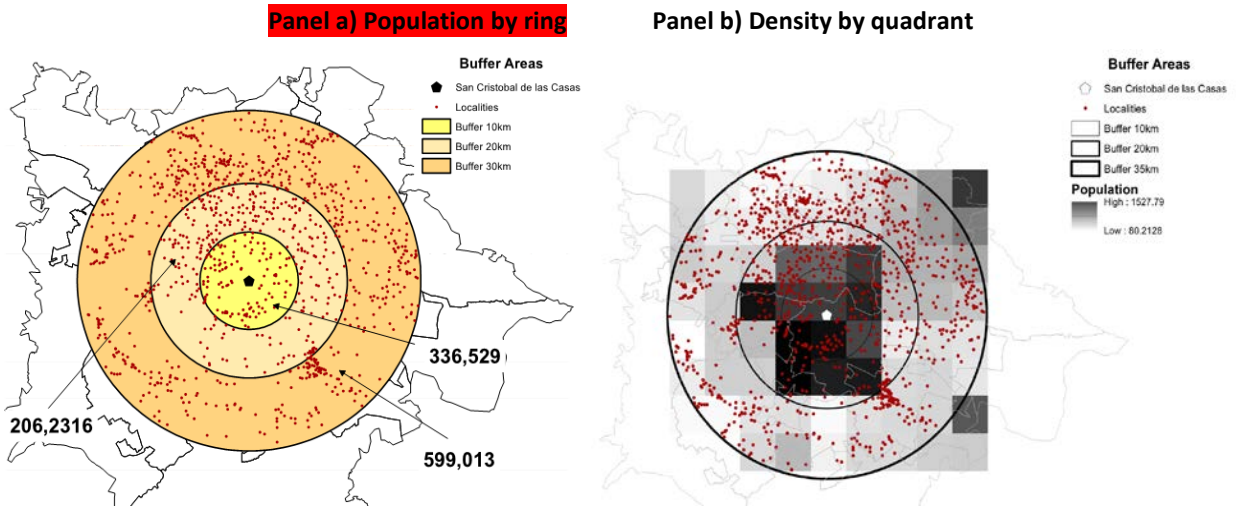
Based on our findings regarding the low propensity to migrate of poor indigenous communities in Chiapas, and the limitations on labor availability in its main urban centers, we suggest a solution whereby the mountain goes to Mohammed, since Mohammed has little or no inclination to go to the mountain.

The key lies in attempting to solve the coordination and capability problems that have thwarted the appearance of modern production systems in areas with abundant idle labor in Chiapas (Los Altos, see Figure 12), by bringing jobs closer to where unemployed workers are. In this area, in addition to restrictions to migration, there are other hurdles related to availability of land and legal certainty. We suggest a solution involving some form of association with the communities neighboring these lands, where the State rents the lands from them while also offering them opportunities for guaranteed

employment without having to migrate. Various labor-intensive enterprises with modern systems and production lines could be attracted to this zone, which could be an agro-industrial park adjacent to the indigenous communities in Los Altos. The federal and state governments should focus on resolving the main barriers that have inhibited investment, guaranteeing the provision of public goods, lands, legal certainty, and other capabilities lacking in this region.

Identifying obstacles and subsequently defining and implementing priority initiatives could follow the methodology that has already been successfully tried in various projects aimed at strengthening agglomerated firms and clusters (Casaburi, Maffioli, and Pietrobelli, 2014). These efforts aim at supporting the positive effects of agglomerated economies through the creation of incentives to overcome the coordination failures already discussed. Specifically, these programs attempt to develop and strengthen the ties between firms, state authorities and communities by information exchanges, development of a shared, participatory diagnosis of the barriers faced by the sector, coordination of actions, and identification of the essential public and collective goods required. For example, this could mean providing or subsidizing local public inputs such as technology extension centers and business services, test labs, specialized consultancies for technology transfers to the area, training centers, etc. In these experiences, public financing is typically included by means of private cofinancing. Besides reducing coordination costs between stakeholders, it is a catalyst for additional public and private investment. Analysis of recent evidence has shown that these programs can significantly improve the exports, employment, and productivity of firms (Maffioli, Pietrobelli, Stucchi, 2016). These arrangements can potentially help in overcoming the chicken-and-egg dilemma, igniting the spark required to start-off the modernization of Chiapas and its gradual ascent on the ladder of economic complexity.

Figure 12. San Cristóbal de las Casas: population density



Recommendation 3: Reformulate housing policy

Given the importance of urban agglomerations in the development process, the government should facilitate the migration of Chiapas families to urban centers by means of its housing policy. The housing policy is often an afterthought in the development process. Migrants are considered the source of housing demand, and the lack of housing requires political interventions. However, people do not demand houses, they demand habitats, i.e. the possibilities for connection and inclusion that surround housing environments. The first item is a physical object, the second is the result of overlaying physical networks (highways, electricity, water, sanitation), economic systems (transportation, distribution, retailers, labor market), and social networks (education, health, safety, family, and friends). The challenge is not to build houses, but rather to build environments that include the necessary networks for promoting productive inclusion. New housing is often built on the lowest-cost land, which in turn is cheaper because it lacks network connections. Instead of promoting inclusion, this practice worsens social segregation.

An effective housing policy requires finding a supply and demand balance. The government's housing policy is very focused on formal employment (INFONAVIT[31] is financed by a payroll tax.) This represents an additional disincentive to formal employment; thereby recreating the chicken-and-egg dillema. This is particularly problematic in Chiapas, due to the restrictions on sales imposed by the communal property system. Many Chiapas residents cannot migrate or join the formal economy because they do not have housing, and they do not have housing because they are not able to join the formal economy. It is a question of facilitating migration and increasing the housing supply with all its physical, economic, and social networks, while incentivizing demand through vouchers, which are more likely to result in habitats. This focus produces outcomes that are quite different from that promoted by the construction industry, which often ends up increasing the supply of unconnected housing.

[31] Mexican workers housing fund.

Recommendation 4: Create a productive development promotion agency to attract new business models to Chiapas[32]

Chiapas lacks effective public-private coordination for solving the numerous coordination failures that are intrinsic to the productive development process. The existence of more complex firms depends on the simultaneous interaction of multiple networks (physical, economic, and social) on various levels (such as highways, distribution systems), that carry with them major knowledge flows and enable the accumulation of the necessary capabilities. The public sector has a fundamental role in the provision of public goods. Chiapas has seen major investment and improvments in physical infrastructure networks,[33] so the main obstacle does not lie there. One of the most binding constraints lies in the lack of institutional coordination, in the failure of mechanisms to attract, promote, and organize economic activities.

In this context, the state government has tried to handle productive development policy, albeit indirectly. It has no lack of resources and programs centered on productive development policy. One analysis found over 50 support programs for microenterprises in Chiapas. Moreover, several secretariats of the regional cabinet are involved in the productive development policy, such as the Secretariat of the Economy, which manages the Economic Development working group, or the Secretariat of Labor which executes the State Productivity Commission, and the Secretariat of Planning involved in monitoring the State Development Plan.

The lesson of Chiapas is that very few of the large companies operating in the state have been created without public support.[34] The revolving door of secretaries of the economy these past few years, plus the instability of having six governors in the 1990s, created an environment of uncertainty regarding public support for the establishment of new investments and firms in Chiapas. The private sector continues to be very fragmented, with little coordination among the various business sectors. The few existing private consortia have little or no interaction with the government. The geographic agglomeration of economic activity is not very significant either, and it is not being developed due to coordination failures. No such coordination is even noticeable between nearby firms.

[32] For more details on the justification, principles, and functions of the agency, see Campante and Solé (2015).
[33] The institutional framework for the productive development policy in Chiapas cannot be understood outside its social conflict and Zapatista rebellion. Enormous sums of money were spent on social programs and infrastructure in order to pacify the areas of greatest conflict, and the right to self-determination and autonomy were recognized in many communities. The extreme geographic dispersion in Chiapas is even more notable for its presence of highways, schools, and clinics, including in the farthest-flung reaches. At the same time, this massive spending changed the relationship of these communities with the government, now based on social transfers and a patronage system. The continuing conflict using road blocks and the creation of speed bumps in the communities surrounding Comitán and San Cristóbal reflect the ongoing use of resistance to obtain more transfers.
[34] Yazaki, one of the largest employers in the state, is the result of a political will to pursue economic activity in Chiapas at the heart of the Zapatista revolution. Among the initial supports were wage subsidies for workers during training periods, and facilities for purchasing land from the head office in Tuxtla Gutiérrez.

This environment justifies the creation of a new institutional mechanism. We do not mean adding another layer to the institutional architecture of the public sector, but fundamentally integrating the private sector in a new relationship with the State. The problem is not so much the lack of State participation in productive development, as it is the overlapping and fragmentation of various secretariats that causes a passive role and duplication in program execution. This prevents the rise of a productive ecosystem, which will not generate itself spontaneously. The challenge of productive development policy is not simply to have a policy; it is rather one of proper implementation. Chiapas faces familiar challenges that require a new institutional structure and focus.

Chiapas requires a new institutional solution with a direct leadership role in the productive development policy. This mechanism could take multiple legal and organizational forms, all of which should aim at solving coordination problems by means of promoting a new interaction with the private sector. For example, following the experience of other countries and regions (Bellini et al., 2014) it could take the form of a "Chiapas Productive Development Agency." The agency could be a totally new entity, or it could strengthen and integrate the experience of existing institutions, such as the State Productivity Commission (Comisión Estatal de Productividad, CEP), the Science and Technology Council of Chiapas (Consejo de Ciencia y Tecnología de Chiapas, COCYEC), etc. Below is a list of the basic features that such an institutional solution should have. For the purposes of simplicity, we will call this solution an "agency," without meaning to imply any one specific solution.

The agency should be responsible for attracting new, high-growth companies to Chiapas. Once they are established, the agency should resolve the market shortcomings that prevent from appropriating the gains of productivity. The analysis of economic complexity offers the analytical rigor, clarity, and impartiality to identify possible high-growth sectors for the urban centers of Chiapas. The challenge is to transform this potential into a direct, experimental focus to analyze the viability of each suggested industry, develop the required capabilities, and attract the necessary firms and investment to make them a reality. The challenge is institutional. Solving the coordination failings depends in large measure on fixing their institutional framework. We propose a framework for the agency based on five basic principles:

- ***Focus on providing public, mutual, and site-specific goods and services:*** One of the defining features of the success of the productive development policy is to determine the scope of its policy mandate.[35] The institutional diagnosis of Chiapas reveals that the proposed agency should focus on providing public goods (vertical policies in the provision of public inputs) that are key for the appearance of new, more complex firms. The agency should concentrate on supplying the key collective inputs for its operation, including support in identifying new business opportunities that

[35] In general, policies can be vertical (applied to certain sectors on a selective basis) or horizontal (applied to all sectors in a specific market activity). The other axis of the policy framework is the type of intervention: whether public inputs are being supplied (a good or service with collective benefit for private production) or the supply is based on the market (altering corporate behavior by impacting their profit equation). These two axes address different market failings that create different levels of adaptation of political intervention. Each one creates different spaces for capture or rent-seeking or by requiring missing public capacities. For a discussion of these topics specific to Latin America, see Crespi et al., 2014.

potential "pioneering" companies would find it difficult to discover on their own. In this area, temporary, specific subsidies and matching donations or guarantees can offer better solutions than general incentives in the tax structure. The authorities should try to focus on those activities with greater effects on the spread of knowledge to other sectors of the economy. However, these are some of the most complex policies in support of productive development. They typically involve much discretion on the policymakers´side, which might give rise to rent-seeking behavior.[36] The above economic complexity analysis possesses the analytical clarity to create systematic ways of evaluating new economic sectors. The role of the agency is to combine this analysis with its power to bring together and facilitate the ecosystem of a business and public support infrastructure to create and strengthen complex firms in areas of high potential. One key instrument could be defining competitive sectoral strategies, which combines analysis and a participatory process of structured public-private coordination with proactive searches, iteration, and learning.[37]

- ***Attract promising industrial leaders:*** One important goal of the agency is to actively seek new firms in promising sectors. The strategy should prioritize those initiatives that have been strategically validated, and will impact companies that are more inclined to embark on projects entailing structural change, concentrating on productivity and employment. The government's role is to bring together industrial leaders in promising sectors, propose coordinating institutions, and promote an appropriate ecosystem that allows for attracting new strategic businesses with greater complexity. The lesson from successful states in Mexico is that large companies, not small ones, drive a huge proportion of the net employment gains. These large companies mainly come from outside. In other words, modern production means are not native to the place; instead, they evolve by being introduced from outside. The government's role is not to provide all the missing inputs for the new, high-potential industries and hope for the creation of a company in the sector. Their role is to bring together existing leading firms and invite them to establish operations in Chiapas, while continuing to resolve coordination failings actively and iteratively in practice. The public sector should exploit the demonstration effect—it should show external businesspeople how other businesspeople in a similar sector having the same fears and risks about opening a factory in Chiapas, have successfully established and thrived in the state. The key lies in replicating the successes of ProMéxico in Chiapas, through an agency that promotes the location of firms in Chiapas from elsewhere in Mexico and abroad that bring new productive know-how.

[36] This debate highlights the need for the agency to always begin with the diagnosis, to identify the lack of public goods due to market deficiencies. The next challenge is to resolve how to provide those collective goods once they are identified. The agency must consider the risks of the free-rider problem, which are prevalent in Chiapas, including in the communities that produce the same product (e.g., posh liquor in Cruztón). The agency should consider two policy innovations: cofinancing and minimum revenue guarantees. Cofinancing requires beneficiaries to have some skin in the game as a condition (however minimal) to make sure that the productive collective inputs are requested only where benefits outweigh the costs. Minimum revenue guarantees seek to place a profitability floor on investments. When all beneficiaries invest and the project generates returns above this floor, the guarantee is never used and no public costs are incurred.

[37] Casaburi, Maffioli, Pietrobelli, 2014.

- ***Foster a new relationship with the private sector:*** Creation of an agency will fashion a new relationship with the private sector, while at the same time minimizing the risks of capture and rent-seeking. The public sector has only part of the information necessary for identifying market shortcomings and their possible solutions. The policy process, therefore, should include multiple levels of interaction with the private sector. The organization of the agency should ensure that the private sector is represented in the government bodies and also in implementation of sectoral initiatives.[38] The agency should have a technical unit specialized in priority sectors, with specific capabilities and knowledge within the public sector. These technical units should have a hand in the constant interaction with companies in order to understand their challenges, global trends, and success models in those sectors.[39] These technical units should guide the small companies in forming cooperatives to penetrate export markets by achieving quality standardization and obtaining the necessary certifications. In this regard, the experience of programs that support productive agglomerations and clusters can offer interesting lessons (Casaburi, Maffioli, and Pietrobelli, 2014). Vetting and assessment of the agency's policy proposals should be provided by a series of independent third parties who at times have opposing interests, in a strategy of "trust, but verify," and with incentives tied to measurable, predefined milestones. Although the main goal is to export, a complementary and extremely important objective would be to provide intermediate goods and services to international buyers and leading large companies in the value chain that would be moving there. This implies the availability of local capabilities to produce according to quality, compliance, and reliability requirements, as well as international standards and certifications (Pietrobelli and Staritz, 2013).

- ***Encourage political autonomy with a relatively small budget:*** The agency requires a new institutional space to free itself from the history of frictions with the private sector and counterproductive duplication among public agencies. In addition, the legal framework of the agency should be relatively autonomous. This is fundamental for fostering the necessary trust in the private sector that the implementation of policies will remain independent from political-electoral cycles. This framework would also allow for the separation of the institutions in power and the bulk of agency operations, represented by its technical teams. At the same time, the agency needs to cooperate with public agencies to inform the process of provision of public goods. This balance between autonomy and cooperation can be achieved in an institution such as an independent agency. It maintains the same strategic guidelines and objectives set forth throughout the political cycle, but allows the institutions' executives some degrees of freedom.[40] Institutions that demonstrate the best operating fitness are those that finance their operating structure via

[38] For more details, see Campante and Solé (2015).
[39] See the examples presented in World Bank, 2011.
[40] See Navarro et al., 2016, on the need for autonomy and coordination in institutions that support innovation.

three complementary funding sources: memberships of the companies that participate voluntarily, public resources, and income from participation in projects for enterprise groups.[41]

- ***Stress proactive, iterative operation processes geared toward vitalizing industries:*** The current productive development policy is highly passive, heavily bureaucratic, and does not provide a critical spaces for learning. The 2013-2018 Chiapas State Development Plan, for example, includes 47 guidelines (or "public policies") translated into 333 strategies, 75 of which are economic in nature. Chiapas has no lack of economic strategies, but the plan is not associated with a set of specific indicators and not focused on results or accountability. We propose a simple participatory methodology: use the rigorous analysis of economic complexity with the identification of lacking collective goods provided by the agency's technical groups, with the participation of the private sector. This mechanism would furnish a new flexibility for designing programs that address the idiosyncratic needs of sectors and enterprise groups, provided that they are independently validated from a technical perspective. The source for these missing collective goods could be the secretariats and other entities, but the agency would be responsible for the strategic and participatory identification of needs, coordination among private and public actors, and identification of financing and delivery of the collective goods.

A proactive productive development policy depends on a culture that encourages continuous learning programs: experimentation, evaluation, and adjustment. Learning is solidified through systematic, impartial assessment. Once the process is up and running, assessments allow the teams to learn which elements work in which contexts and can redefine the program. This requires the creation of a clear, transparent, and visible tracking indicators for each policy intervention. The idea is that learning and iterative experimentation enable the agency's technical teams to acquire new capabilities and experience in implementing the productive development policies. With this knowledge, the technical teams should go from having broad intuitive understanding of the policies for each sector, to a tailored application of the proper policies for each sector and location.

[41] The quality of the agency will depend on the creation of three kinds of capabilities: technical, for specialized professionals to lead the analysis and adoption of policies; organizational, to spearhead the sphere of experimentation, evaluation, and learning, and help find resources and offer strategic planning; and political, to coordinate between public entities and protect the agency from political interference. With this configuration, the impact of moderate public resources could multiply.

BOX – Example of a new public-private relationship to support competitiveness

In the 1990s, after the adoption of strict environmental regulations throughout Europe, firms in the tannery cluster in the city of Igualada, Catalonia, faced a profound crisis that threatened their livelihood. Because they had to comply with federal commitments to reduce pollution, they faced a significant increase in their production costs and competition from producers in countries with lower labor costs. The business owners in the sector joined together and approached the Department of Industry of the regional government, initially to ask for subsidies and protection. In response, the government refused to subsidize the industry and began a process of public-private dialog that combined the search for a solution to face the short-term threat with identification of a strategy to improve production technologies in the sector. With technical support financed by the government, they managed to define a participatory strategy between local business owners and the government. As a consequence, an industrial waste water cleaning facility was created, financed jointly by the cluster firms. In time, some of them became manufacturers of shoes with traditional leather soles to suppliers for the major international luxury brands. The public-private dialog was headed by local government to improve the industry's long-term development potential.

This example suggests how a solution was able to be reached to a specific problem in a productive sector by uniting the relevant stakeholders, collectively identifying possible solutions, and defining a new strategy orchestrated along with the local government. The local government also supported the private sector initiative by providing the land for construction, rezoning land, and amending wastewater legislation to ensure compatibility with the new facility.

Source: World Bank, 2011.

IX. Conclusion

Nine thousand years after the first inhabitants walked on it, 200 years after its independence, and two decades after the Zapatista rebellion, the fundamental question continues to be: Why is Chiapas poor? Our investigation has uncovered a sort of productivity trap. According to this concept, modern production factors never reached Chiapas, inhibiting the development of further knowledge and capabilities, and restricting the state to the production of a few primary goods of little complexity and low value added.

State intervention is fundamental to overcome the coordination problems that have prevented modern production systems from taking root in Chiapas. Ultimately, there is potential for Chiapas to move towards more complex industries, based on the capabilities that already exist in various places throughout the state. In this report we identified products and industries that offer the best opportunities for productive diversification, in the four most advanced cities of Chiapas. But identifying the potential and having adjacent knowledge is not a sufficient condition for realizing these opportunities. The experience of Chiapas and the widening gap separating it from the rest of Mexico, in the very midst of significant improvements in education and infrastructure, demonstrates that without solving the problems of coordination, it will be difficult to light the spark of modernity and growth in Chiapas.

The case of Yazaki, and its expansion over the 22 years since it arrived in Chiapas, are a living testimony to the possibilities the state can uncover if it can solve the coordination problems that thwart private investment, modern production systems, and the introduction and transmission of new capabilities and know-how. With this goal in mind we crafted a host of productive development policies geared to stimulating diversification in economic activity.

Our recommendation is based on harnessing the agglomerations of knowledge that already exist in the main urban centers, to tackle new productive sectors with greater value added and complexity. To meet this challenge, a public-private structure must be created to iteratively solve the coordination problems and provision of public goods that these high-potential sectors require. The public transport systems and the housing policy are mechanisms for integrating the population living near urban centers into the new productive dynamic, while breaking up the bottleneck we found in the availability of labor in the major cities.

The key to mobilizing and capitalizing the enormous potential we have found for different sectors in Chiapas does require introducing a fundamental change in the content of the public-private dialog. Productive transformation demands overcoming mutual distrust, lack of dialog, and dominance of a welfare policy, to embrace actions geared toward fostering the development of a productive ecosystem and conquering sectors of greater complexity as a tool for promoting inclusive growth.

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Appendix I. Factors associated with income by job: Chiapas vs. Rest of Mexico (Tobit)

	(Ln) Ingresos mensuales por trabajador					
	(1)	(2)	(3)	(4)	(5)	(6)
Años de escolaridad	0.093***	0.093***	0.093***	0.058***	0.057***	0.056***
	0.000	0.000	0.000	0.000	0.000	0.000
Experiencia	0.030***	0.030***	0.030***	0.031***	0.031***	0.031***
	0.000	0.000	0.000	0.000	0.000	0.000
Experiencia^2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	0.000	0.000	0.000	0.000	0.000	0.000
Mujer	-0.262***	-0.262***	-0.267***	-0.288***	-0.289***	-0.293***
	0.000	0.000	0.000	0.000	0.000	0.000
Monolingüe indígena	-0.285***	-0.283***	-0.273***	-0.312***	-0.309***	-0.301***
	0.000	0.000	0.000	0.000	0.000	0.000
Nacido en Chiapas	-0.288***	-0.356***	-0.432***	-0.316***	-0.405***	-0.628***
	0.000	0.000	0.000	0.000	0.000	0.000
Migrante	0.164***	0.151***	0.151***	0.169***	0.151***	0.151***
	0.000	0.000	0.000	0.000	0.000	0.000
Migrante_Chiapas		0.365***	0.350***		0.447***	0.436***
		0.000	0.000		0.000	0.000
Años de escolaridad_Chiapas			0.007***			0.016***
			0.000			0.000
Mujer_Chiapas			0.126***			0.118***
			0.000			0.000
Monolingüe indígena_Chiapas			-0.09			-0.057
			-0.173			-0.365
Prueba ENLACE (español)				0.203***	0.207***	0.205***
				0.000	0.000	0.000
Prueba ENLACE (matemáticas)				-0.119***	-0.122***	-0.120***
				0.000	0.000	0.000
Prueba ENLACE (español)-Chiapas						0.087***
						0.000
Prueba ENLACE (matemáticas)_Chiapas						-0.012
						-0.734
Constante	7.180***	7.181***	7.185***	7.344***	7.347***	7.354***
	0.000	0.000	0.000	0.000	0.000	0.000
Sigma-constante	0.715***	0.714***	0.714***	0.662***	0.661***	0.661***
	0.000	0.000	0.000	0.000	0.000	0.000
N	2,463,463	2,463,463	2,463,463	1,699,774	1,699,774	1,699,774

p-values en paréntesis: * p<0.05, ** p<0.01, ***p<0.001

Note on methodology:

Data used in the chart come from microdata in the 10% sample of the INEGI 2010 Housing and Population Census. The final sample used is composed of the population older than 12 and younger than 99 stating that they had worked at least one hour as their activity status. We also took into account only those individuals who reported positive monthly income from work. The resulting final sample contains 2,463,463 observations. Likewise, given that the sample is censored for values above 999,998, in order to minimize possible bias in the distribution of incomes, we decided to use the Tobit regression model instead of the usual OLS [ordinary least squares].

In the first specification (1) we performed a classic Mincerian regression, to which were added the variables of sex (if it was a woman), indigenous monolingualism, if it was a migrant (defined as those people who reside in a different state from the one where they were born), and a dummy variable indicating if the individual was born in Chiapas. The second specification adds the interaction of the dummy for birth in Chiapas with the interaction for migrant, in order to be able to detect whether migration has a differentiated effect on Chiapas natives. As we can see, Chiapas migrants receive a very high bonus for migrating, which more than offsets the initial disadvantage of having been born in Chiapas.

Under a logic similar to the one used in the second specification, specification 3 investigates whether the other control variables also have differentiated effects on wages in Chiapas. We discover that both years of schooling and sex are significant, although the coefficient of the first is small. However, we found no significant effect of indigenous language signaling any differentiated effect.

Specifications (4) and (5) repeat (1) and (2), but controlled by an indicator of quality of education. While we do not have information on the quality of teaching that the people currently in the labor market had, we do have the results of the students' ENLACE tests.[42] Thus, we decided to use these test results for the year 2010 to approximate the quality of education in Mexico and Chiapas, under the assumption that the differences in quality have been maintained over time.

The indicator was created based on the results of the test by municipality. Firstly, for each school-grade we created a composite index that weights the percentage of students in each of the four categories, which includes values ranging from 0 (if 100% of the students fall

[42] The ENLACE test is administered by the Ministry of Public Education to all preuniversity education levels: primary (last four grades), middle school (all three grades) and high school (final grade). The main subjects covered are Spanish and mathematics.

into the "insufficient" range) to 3 (if 100% of the students fall into the "excellent") range,[43] which was then averaged for each municipality-grade and state-grade.[44] Secondly, we assigned each worker the average of the ENLACE test for his municipality-grade.[45] In the case of workers who emigrated, we assigned them the average of the ENLACE test in their state of birth, for their level of education. For workers with no education we assigned a value of zero, and for those with higher education we assigned the value for the last year of high school. We observe that the scores in Spanish are positively associated with incomes, unlike the scores for math.[46] Lastly, specification (6) adds to regression (5) the interactions between the dummy for Chiapas and both education variables. We see that in Chiapas, there is a greater relationship between the Spanish score and income than in the rest of Mexico, but not in mathematics.

[43] The information published by the Ministry of Public Education includes the average score for each school in each subject (math and Spanish), and the distribution of students assessed in each of four categories: "insufficient," "basic," "good," and "excellent." Because the high school database includes only the distribution, we decided not to exclude it and to create the indicator described herein.

[44] Because the ENLACE test was not given to the first and second grade of primary school nor to the first and second year of high school in 2010, we assigned the index for the third grade of primary to the first two years and the index for the third year of high school to the first two high school years.

[45] The Ministry of Public Education publishes the results of the ENLACE test in Spanish and math separately. We used the simple average of the indicators for both subjects.

[46] This result is not intuitive and may be due to the scant information in our quality measure, as developed in Hausmann, Espinoza, and Santos (2015).

Appendix II. Factors associated with differences in income by worker: Chiapas vs. Rest of Mexico (Oaxaca-Blinder Decomposition)

	(1) Coeficiente de	Descomposición	(2) Error Estándar	(3) Coeficiente de Descomposición	(4) Error Estándar
Diferencia log(ingreso)	0.523		0.015	1.687	0.025
Blinder-Oaxaca					
Características	0.228		0.013	1.256	0.016
Coeficientes	0.344		0.012	1.411	0.017
Interacciones	-0.049		0.010	0.952	0.009
Características					
Escolaridad	0.151		0.007	1.163	0.008
Experiencia	0.001		0.001	1.001	0.001
Mujer	-0.013		0.001	0.987	0.001
Lengua Indígena	0.034		0.006	1.034	0.007
Localidad Rural	0.055		0.006	1.056	0.006
Coeficientes					
Escolaridad	-0.061		0.009	0.941	0.008
Experiencia	0.014		0.008	1.014	0.008
Mujer	-0.027		0.002	0.973	0.002
Lengua Indígena	0.019		0.009	1.020	0.010
Localidad Rural	0.038		0.009	1.039	0.009
Constante	0.360		0.018	1.434	0.026
Interacciones					
Escolaridad	-0.012		0.002	0.988	0.002
Experiencia	0.001		0.000	1.001	0.000
Mujer	-0.007		0.001	0.993	0.001
Lengua Indígena	-0.013		0.006	0.987	0.006
Localidad Rural	-0.019		0.005	0.981	0.004

Note on methodology:

In this exercise we applied a Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca 1973). This technique is widely used to decompose the differences in averages across two groups in a variable of interest as a function of the differences in averages of the regressors. One of the most common uses has been the analysis of wage gaps between men and women or between ethnic groups. In this case, we used the technique to analyze income differences between Chiapas and the rest of Mexico.

The Blinder-Oaxaca decomposition attempts to provide an intuitive explanation of what would happen statistically if the residents of Chiapas were given the same average characteristics (the same average levels of years of schooling, quality of education, experience,

percentage of women, percentage of people speaking only an indigenous language, and percentage of people who live in rural areas) as those of inhabitants of the rest of Mexico, and if they were given the same returns in wages associated with these characteristics.

The table represents the decomposition results expressed in two different ways: in additive components in logarithms (columns 1 and 2) and percentages (columns 3 and 4). The first horizontal group shows the main decomposition of the wage gap into three components: characteristics, coefficients (representing returns in income associated with these characteristics), and interactions between the characteristics and the coefficients. The characteristics row shows what would happen to Chiapas workers if we gave them the same characteristics as those existing in the rest of Mexico. The coefficients row shows what would happen if we gave them the same returns associated with these characteristics, and the interactions row represents what would happen if we gave Chiapas workers the same characteristics and the same returns associated with these characteristics.[47] The second group shows the results of decomposing the three components into their corresponding subcomponents, for each of the characteristics associated with workers' income.

[47] In the case of column 1, these 3 components add up to 0.523 (which represents the difference in the logarithms of the income), while in column (3), when you multiply these components you get 1.687 (which represents the fact that the average income of workers in the rest of Mexico is 68.7% higher than in Chiapas.

Appendix III. Factors limiting coordination in rural areas of Chiapas

There are two place factors (not individual factors) that tend to limit the economic opportunities in some majority indigenous communities: trust, and property rights in the *ejidos*. In rural areas, *ejidos* are the norm. They make it difficult to transfer rural housing and they raise the opportunity costs of potential migration. Uses and customs impose burdensome fines for emigration, and nonpayment of the fines causes loss of the property assigned to the family, and even expulsion. These two factors prevent development and international emigration. The incomes associated with subsistence agriculture and transfers from PROSPERA and other social programs outweigh the risk profile for migration to urban areas. Although farmers in Chiapas own some of the highest-quality land in the country, they are incapable of making the change to high agricultural productivity due to the multiple challenges of coordinating production to reach the market. Acquiring additional lands for production, not to mention selling the land itself, pose even bigger problems in the *ejido* system.[48]

We organized a case study to understand the dynamics of the economic complexity in rural zones, in the majority indigenous community of Cruztón, near San Cristóbal. The disorganization in rural zones does not offer alternative cooperation mechanisms. There is a lack of diversity in productive knowledge. Everyone produces posh, a drink high in alcoholic content that no one in the community produces differently from anyone else. An analysis of the social trust network of women in Cruztón found low levels of trust in the community: no one was mentioned as a community leader for more than three women out of the 50 women interviewed (Figure III). The community showed high levels of mistrust towards foreigners, together with a very dispersed identification of leaders within the community, because they did not unite around a trusted leader. These low levels of trust in the community organization also reflect challenges in coordinating production. Members of the community expressed a lack of desire to innovate in productive techniques, or to share these techniques with others, for fear

[48] Even individual family plots continue to be of insufficient sizes to escape poverty. Following productive practices that include leaving part of the land uncultivated every few seasons becomes difficult for fear of community expropriation. Not only are land incentives lacking for high-productivity farming, there is no coordination of production, logistics, and other public goods, including training of outside experts in technical skills. This does not mean it is impossible in Chiapas. The Miguel Alemán *ejido* demonstrates the potential for coordinating *ejido* lands on a large scale to export bananas. However, this coordination was driven by need. The damage caused by Hurricane Barbara would have jeopardized families' livelihoods if they did not unite. Additionally, it was the result of a large investment by Chiquita to guarantee phytosanitary measures and international standards. Foreign direct training successfully raised the technical capabilities of the products in a surprisingly short time. Lastly, the Miguel Alemán *ejido* is celebrated for being the exception, but it is also far from being the rule in Chiapas, where property rights create unique demands, which are even greater in the coordination to achieve success.

of imitation and not being able to appropriate the benefits of innovation. Nonspecialized productive knowledge helps to prevent the creation of incentives for innovation and partially explains the low community trust. Most people in Chiapas, including those in Cruztón, lack alternative forms of broader coordination. They do not know what they do not know. They do not understand the needs of external consumers. Modern means of production have not reached Cruztón, because they do not develop spontaneously in areas with little productive knowledge diversity. Increasing incomes in Cruztón requires the introduction from outside of new forms of cooperation (for example, social enterprises or clusters and associations of enterprises) and new productive knowledge, or the integration of the community into the production agglomeration of San Cristóbal, fewer than 12 km from Cruztón.

Figure III.1. Women's social networks in the community of Cruztón: Name a community leader whom you trust

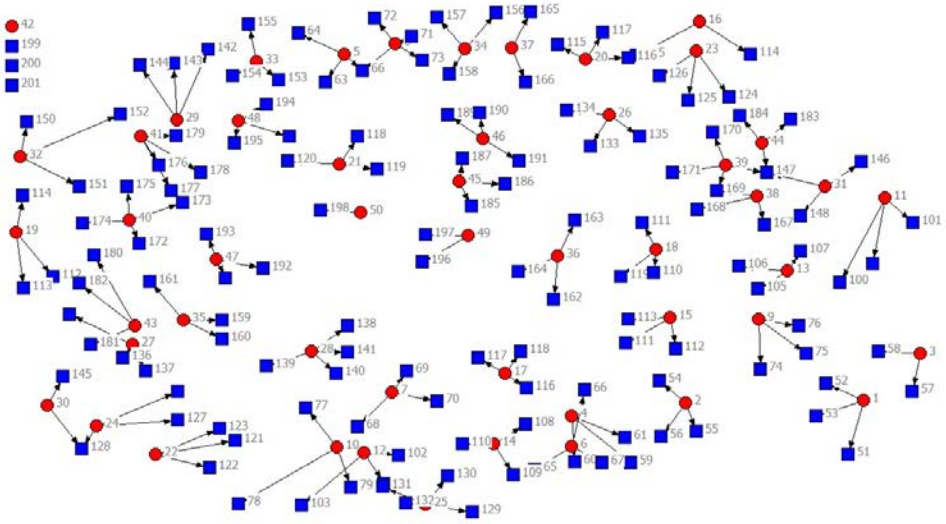
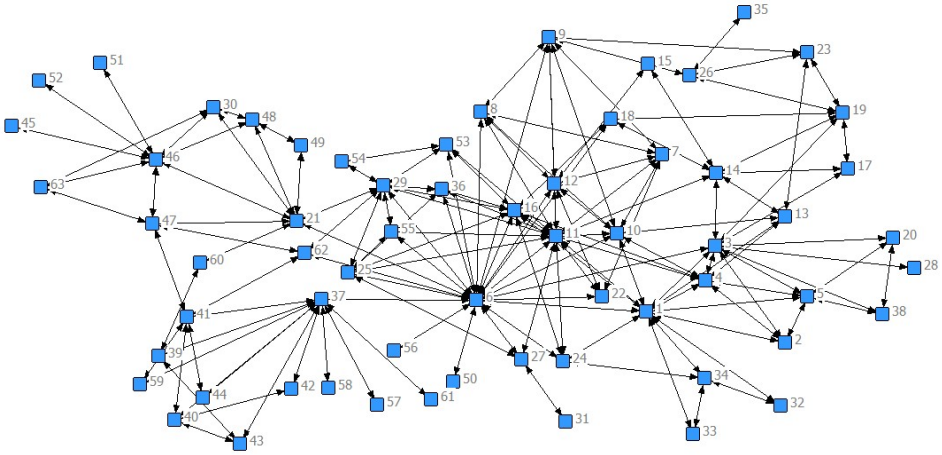


Figure III.2. Comparison with a community in Argentina



The communal property rights of *ejidos* represent an additional challenge to coordination. Despite the fact that many people in Chiapas own some of the richest lands in the country, they are unable to change to high agricultural productivity due to the many challenges posed by coordinating production to reach the market. Purchasing additional lands for production, and selling the land itself, are more of a problem in the *ejido* system. Following productive practices, such as leaving part of the land fallow every few seasons, becomes more difficult for fear of communal expropriation. The de-incentivizing effects that communal lands have on individual effort are well documented. Nevertheless, even individual family plots continue to be insufficient to escape poverty. High-yield production demands coordination, not just in production to achieve economies of scale, but in distribution, sales, logistics, transportation, and other superimposed networks. This does not mean that it is impossible in Chiapas. In fact, the Miguel Alemán *ejido* and others show the potential for coordinating *ejido* lands to reach the necessary size to have profitable exports of bananas. Yet this coordination was driven by two very specific factors. First, by the need that arose due to the damage from Hurricane Barbara, which endangered the subsistence mechanisms and livelihoods of families. Second, by the training and investment by the multinational Chiquita, to ensure phytosanitary measures and other controls to meet international export standards. Foreign direct investment managed to raise coordinating capability and technology in a surprisingly short amount of time. Lastly, the Miguel Alemán *ejido* is celebrated for being the exception, but it is also far from being the rule in Chiapas.