Growth Diagnostic for the State of Oaxaca

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Isolation and its Role in the Low Productivity Trap

Rafael Rivera Sánchez, Angel Sarmiento Hinojosa
and Sebastián Serra Wright

Working Papers

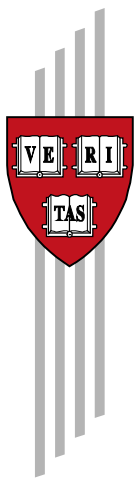Center for International Development
at Harvard University

Growth Diagnostic for the State of Oaxaca

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Rafael Rivera Sánchez

Angel Sarmiento Hinojosa

Sebastián Serra Wright

WORKING DRAFT

November 2017

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EXECUTIVE SUMMARY

Oaxaca is the second-poorest state in Mexico. It is also growing more slowly than the national average, leading to regional divergence. This paper seeks to diagnose the binding constraints that keep GDP growth in Oaxaca low.

There is significant variation in average monthly incomes within Oaxaca, with a 12x gap between the municipality with the highest salary and that with the lowest. Oaxaca has 570 municipalities, whereas given its population and the national average for people per municipality it should have 66. And it is very indigenous: 58% of the population speaks an indigenous language, compared to a national average of 15%. Oaxaca's product space, a measure of how many kinds of industries provide employment in the state, is very low and has seen very limited change since 2004. The state shares some similarities with other states in southern Mexico, such as Chiapas and Guerrero. All three share a limited manufacturing base which, even after signing NAFTA, remained flat as a proportion of state GDP. They also have a poverty rate nearly 3 times the national average.

Oaxaca is a large state with a rugged natural landscape. Its population is highly dispersed, relative to other states in Mexico. This makes infrastructure critical. However, widespread road construction between 2004 and 2014 does not seem to have made a difference to either growth rates or economic complexity at the municipality level, suggesting the infrastructure constraint is not binding. We believe, however, that mobility might be. Transportation costs as a proportion of wages are very high, and are further increased by costly road blockages. This limits the flexibility of the labor force and the aggregation of talent.

Low human capital can reduce the social returns to investment. Even though education is contentious in the state's politics, Oaxaca's education gap has been falling over time relative to the national average and its neighbors. This relative increase in years of education, however, has not been translated into economic development. We find that returns to education in the state are very similar to the returns to education in the rest of Mexico and higher than returns to education in Chiapas. We also note that the proportion of schooling undertaken in private institutions is in line with that in other states with higher quality of education. Finally, a Oaxaca-Blinder decomposition suggests that education does not explain wage differentials between Oaxaca and other states. All this evidence suggests that education is not a binding constraint to growth in Oaxaca.

Governance challenges increase the risk of investing in Oaxaca. For instance, over 75% of the municipalities in Oaxaca are governed through *Usos y Costumbres*. Only 153 of the 570 municipalities use a government-run election to determine their leader, and out of those, four did not elect a municipal president in the June 2016 election due to internal conflicts. 146 municipalities lack a police service. While *Usos y Costumbres* is a key part of the local social contract, it creates problems, such as in contract enforceability. It also limits migration in and out of the state. We also observe a negative correlation between *Usos y Costumbres* and local wages that is not explained by factors like indigenous origin.

We also explore access to finance as a constraint to GDP growth. While enterprise surveys confirm that high interest rates, and distance to banks are a problem, Oaxaca's microenterprises bypass these problems by borrowing from *cajas de ahorro* or local credit unions. However, most borrowing is destined for consumption rather than investment. We also observe that FDI flows into Oaxaca are very scarce. For these reasons, we believe the binding constraint in Oaxaca is not access to finance, but rather low returns to investment.

It is helpful to think whether there is an underlying syndrome that might explain the two binding constraints we identified: transportation costs and governance. One possible hypothesis is the isolation of people into very small communities that have very strong bonds within the community and very weak bonds outside of it. Oaxaca shows high variety in ethnic groups, languages, and government systems. On average, each municipality has 6,670 people, but there are 110 municipalities with less than 1,000 people. Elsewhere in Mexico, dispersed rural populations gradually converged into urban clusters around job opportunities. In Oaxaca, the process is not yet afoot because of a "productivity trap", in which low productivity means urban salaries do not cover the costs of transportation or permanent moves, and dispersion keeps productivity low by failing to concentrate employees. Cultural diversity has a side effect of encouraging spatial dispersion and isolation, and of having hundreds of different sets of "rules of the game" covering the state's population. Increasing the complexity of this economy requires breaking the trap by finding new business models (i.e., encouraging discovery) and coordinating economic activities.

Economic complexity analysis can point us to new industries that are feasible given Oaxaca's productive capabilities and the existing constraints we discussed. While Oaxaca's municipalities have among the least complex economies in the country, some industries stand out from our complexity analysis as potentially promising for Oaxaca. The end of the report singles out some industries for further analysis.

OAXACA'S ECONOMY IN CONTEXT

Oaxaca is the second-poorest state in Mexico. Its GDP per capita is less than half that of the average Mexican state, and around a fifth of Mexico City's. Together with its southern neighbors of Chiapas and Guerrero, Oaxaca has a development problem that has remained intractable for many decades.

FIGURE 1 – OAXACA'S GROSS DOMESTIC PRODUCT PER CAPITA IS AMONG THE LOWEST IN MEXICO

GDP per capita in 2014
Thousands of 2008 pesos
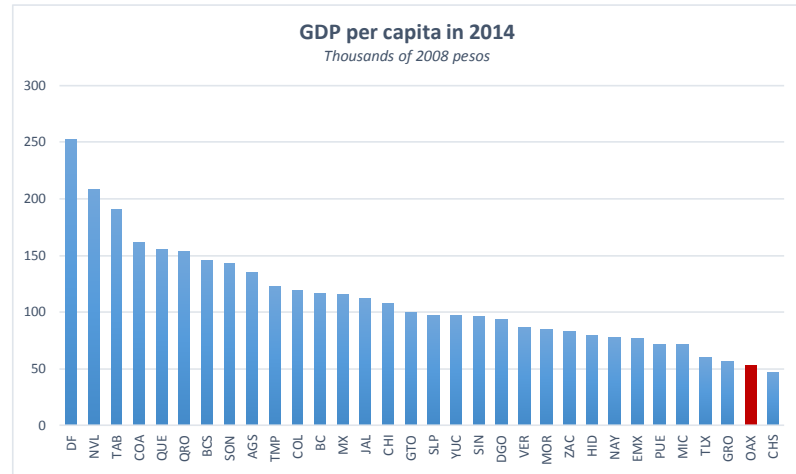
Oaxaca is also growing more slowly than the national average, leading to regional divergence. Along with its southern neighbors, Oaxaca has had GDP growth rates lower than the national average for over ten years. This divergence in growth is particularly worrying in light of the magnitude of the GDP gap today.

FIGURE 2 – OAXACA'S GDP GROWS SLOWER THAN THE REST OF MEXICO'S, WIDENING THE DEVELOPMENT GAP

GDP Growth per state
*2003 GDP = 100. Constant 2008 MXN*

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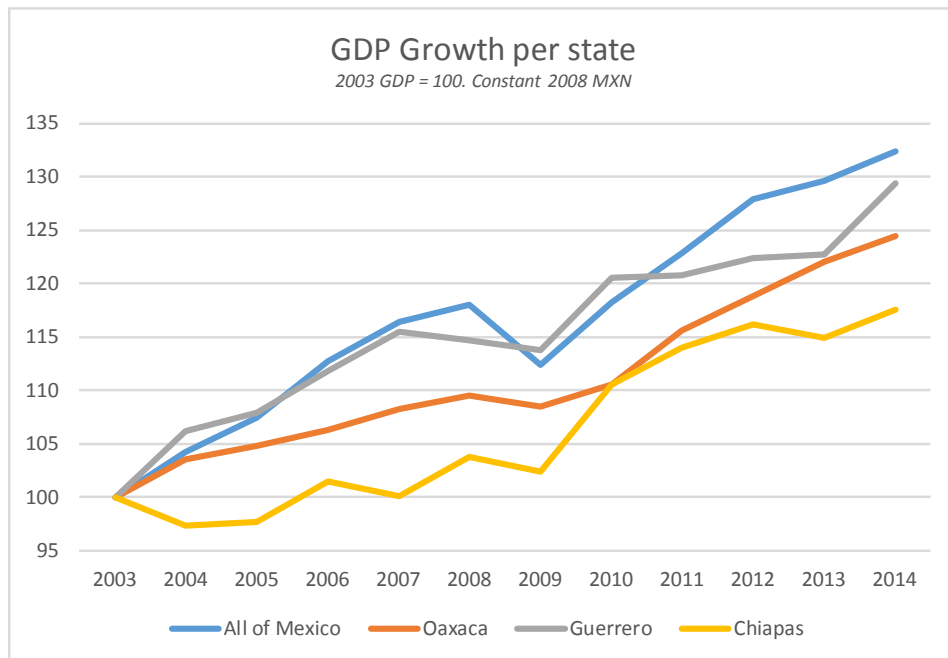
There is significant variation in average monthly incomes within Oaxaca. A resident in the Oaxacan municipality with the highest salaries earns over 12 times more[1] than someone in the municipality with the lowest salaries. Higher-income municipalities cluster in the center of the state, close to the capital of Oaxaca City, and in the state borders with the Pacific Ocean and the states of Veracruz and Guerrero. There is also an income concentration in the Isthmus of Tehuantepec corridor.

FIGURE 3 - WIDE INCOME DIVERGENCES ARE ALSO FOUND AMONG OAXACAN MUNICIPALITIES

Income per capita per municipality, 2014

Darker shades represent higher incomes
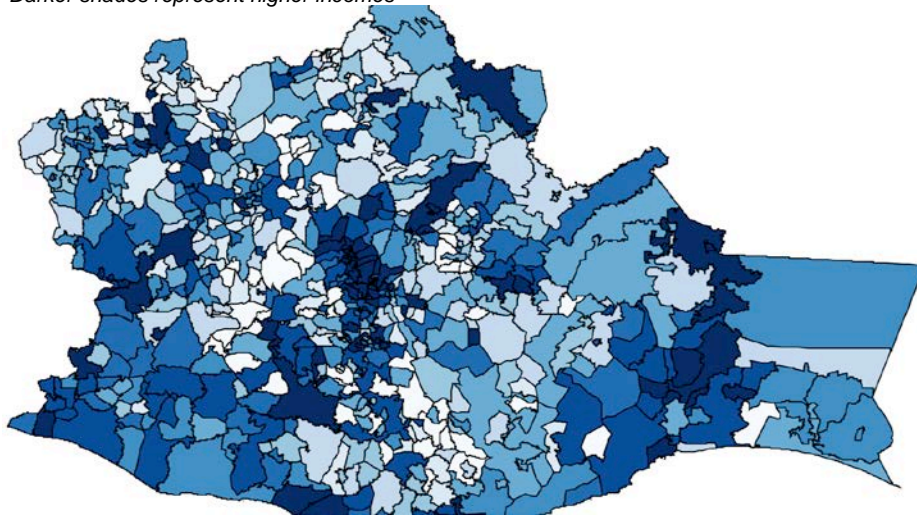
Oaxaca shares some similarities with other states in the south, like Chiapas and Guerrero.

All three states have an extremely limited manufacturing base. Only 9.1% of their GDP comes from manufacturing, a figure that has barely budged from the 1985 pre-NAFTA statistic[2]. These states export agricultural commodities like coffee and avocados, and lower value-added manufactures like textiles. We also find very high levels of poverty. 28% of Oaxaca's population lives in extreme

FIGURE 4 – SHARE OF MANUFACTURING IN REGIONAL GDP

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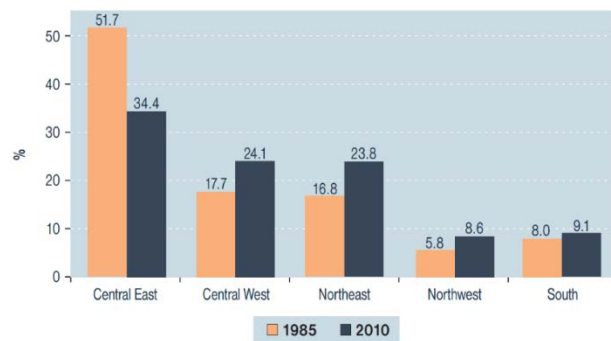
[1] "Original Analysis Based on the 2010 Population Census (INEGI)."
[2] Chart sourced from Mesquita Moreira et al., "Too Far to Export."

poverty, 2.8 times more than the national average. Poverty levels are similar in Guerrero and Chiapas.

In some respects, though, Oaxaca is unique. It has 570 municipalities, whereas given its population and the national average for people per municipality it should have 66. And it is very indigenous: 58% of the population speaks an indigenous language, compared to a national average of 15%.

Oaxaca's product space is very limited, especially around complex products. We conducted analysis of Oaxaca's product space using Harvard CID's Economic Complexity methodology and the Atlas of Economic Complexity of Mexico, which illustrates complexity based on employment by sector. The non-grey bubbles below represent industries that provide employment in the state. The closer they are to the well-interconnected bubbles in the center, the more likely they are to be complex industries. Oaxaca has very few non-grey bubbles, and has not made any real progress since 2004.

FIGURE 5 – PRODUCT SPACE DIAGRAM FOR OAXACA IN 2014, WHERE NON-GREY BUBBLES REPRESENT INDUSTRIES WHICH PROVIDE EMPLOYMENT IN THE REGION
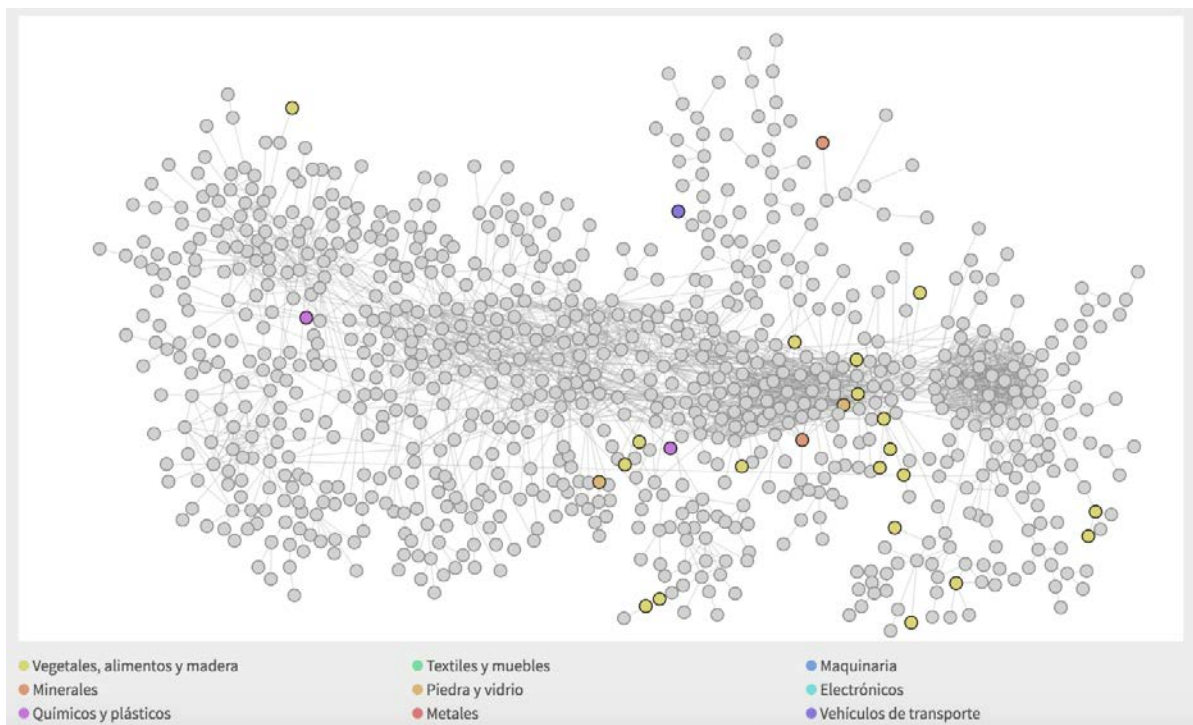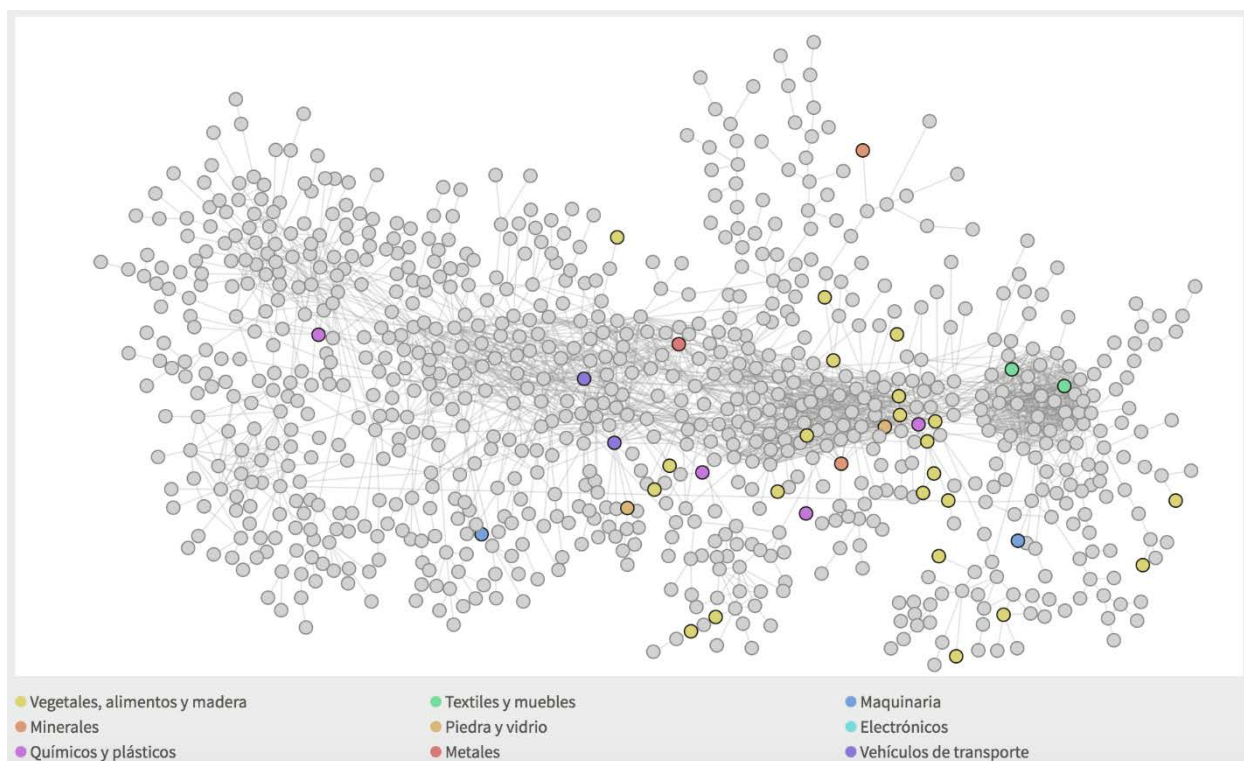

● Vegetales, alimentos y madera	● Textiles y muebles	● Maquinaria
● Minerales	● Piedra y vidrio	● Electrónicos
● Químicos y plásticos	● Metales	● Vehículos de transporte

FIGURE 6 - PRODUCT SPACE DIAGRAM FOR OAXACA IN 2004

Legend:
- ● Vegetales, alimentos y madera
- ● Textiles y muebles
- ● Maquinaria
- ● Minerales
- ● Piedra y vidrio
- ● Electrónicos
- ● Químicos y plásticos
- ● Metales
- ● Vehículos de transporte

The employment mix has consequently remained unchanged over the last ten years. Oaxacans mostly work in services, with the top employment sectors being retail of groceries and food preparation, and in primary activities like fishing and agriculture. There is a mismatch between employment and revenue generation. Activities like oil processing represent a large share of firm revenues in the state but a low share of employment, whereas retail of groceries is the main source of employment but it shows a low share of firm revenues.

In light of this context, we look at what **binding constraints keep Oaxaca's GDP growth below the national average, and prevent economic convergence.** We use the growth diagnostic methodology developed by Hausmann et al.[3]

The growth diagnostics methodology is a "*unified framework for analyzing and formulating 'growth strategies' which is both operational and based on solid economic reasoning*"[4]. It is based on the notion that constraints to economic growth are 'binding' in a certain country or region, and under its specific circumstances. Central to the methodology is the idea that some issues may be

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[3] Hausmann, Rodrik, and Velasco, "Growth Diagnostics."
[4] Ibid.

problematic and yet not be a binding constraint. For instance, a hypothetical country with skyrocketing inflation and severe nationwide electricity blackouts may notice it also has restrictive labor regulations. In the abstract, loosening labor regulations could be associated with economic growth. However, this country is unlikely to see a boom in investment and growth simply by loosening labor regulations, as the other issues keep most business activities unprofitable. Hence, for this country, labor regulations are not a binding constraint to growth.

This methodology works by systematically finding evidence on whether constraints are binding or not, and then finding a syndrome that explains how the particular circumstances of the country of region have allowed those constraints to persist over time.

The following sections analyze three "usual suspects" of binding constraints to growth and analyzes them in turn. The paper then analyzes the economic complexity of Oaxaca's industries, and finalizes by proposing a growth syndrome that fits with the evidence.

The first usual suspect we analyze is the geography and infrastructure of Oaxaca. Poor infrastructure and challenging geography can lower the social returns to investment and might explain why the state is lagging relative to the rest of Mexico.

Oaxaca is large state with a rugged natural landscape. The state is traversed by three different mountain systems: Sierra Madre del Sur, Sierra Madre de Oaxaca, and Sierra Transversal. Major cities are located in valleys surrounded by these mountain systems. These mountain systems create a natural regional isolation of these cities, as shown in the map below.

FIGURE 7 – OAXACA'S MAIN POPULATION CENTERS ARE SCATTERED ALL OVER ITS LARGE AND MOUNTAINOUS TERRITORY

Source: INEGI (2015)
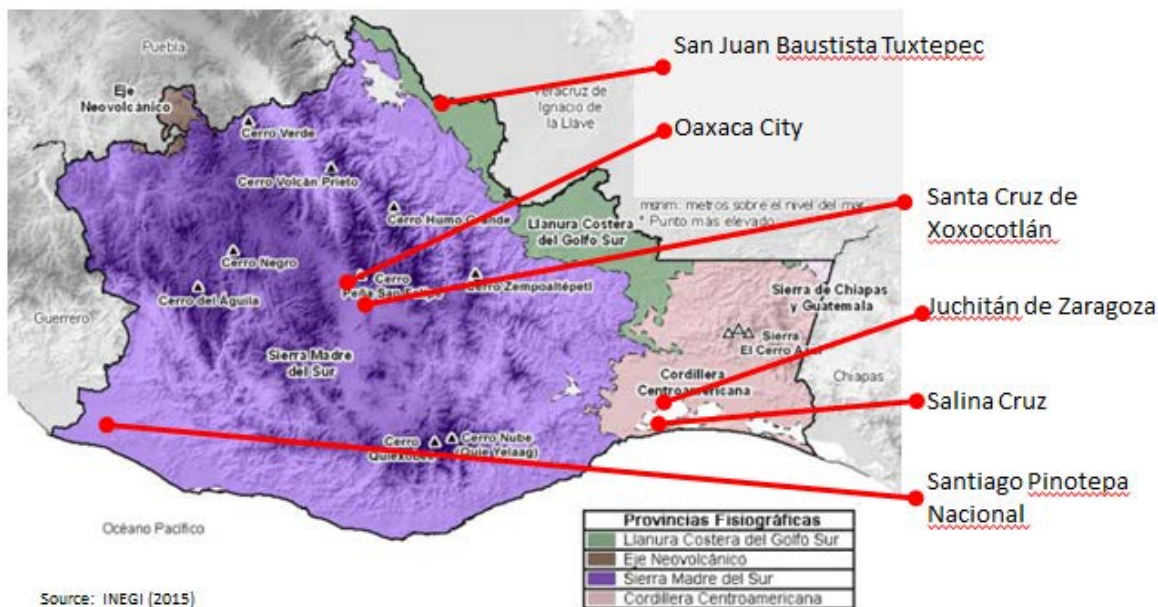
Oaxaca's population is highly dispersed, relative to other states in Mexico. We analyzed dispersion by constructing a Herfendahl Index of Concentration for Oaxaca and other states to quantify the population's dispersion[5]. As shown in the figure below, Oaxaca has a significantly lower concentration index score than any other state in Mexico, including Chiapas and Guerrero.

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[5] The index is calculated using a Herfendahl index. Specifically, we take the percentage of people per municipality ("s") for each state and them apply the follow formula Σs^2.

FIGURE 8 – OAXACA'S POPULATION IS MORE DISPERSED THAN THAT OF ANY OTHER STATE IN MEXICO *(SELECTED STATES SHOWN FOR COMPARISON)*
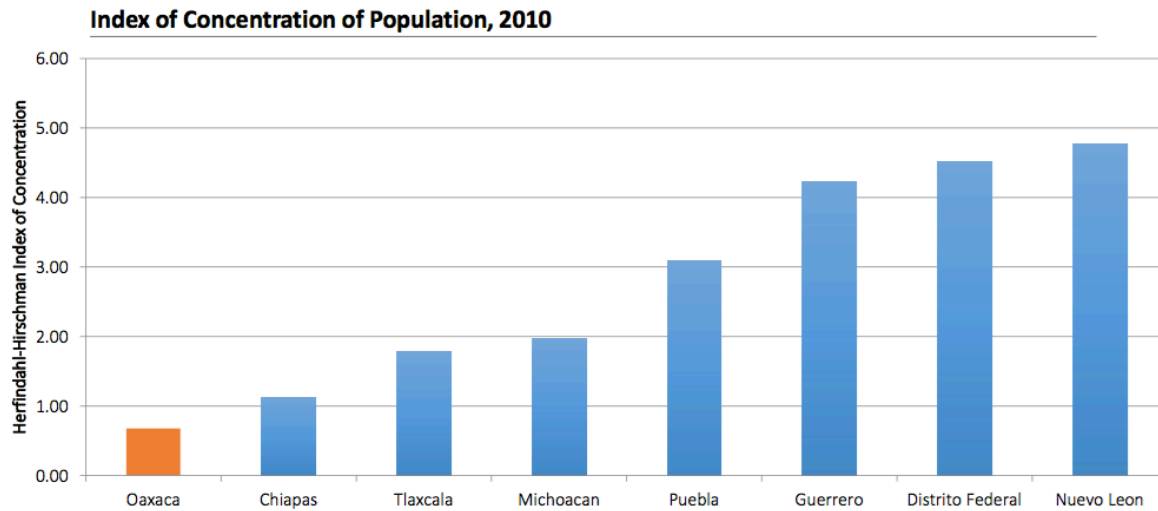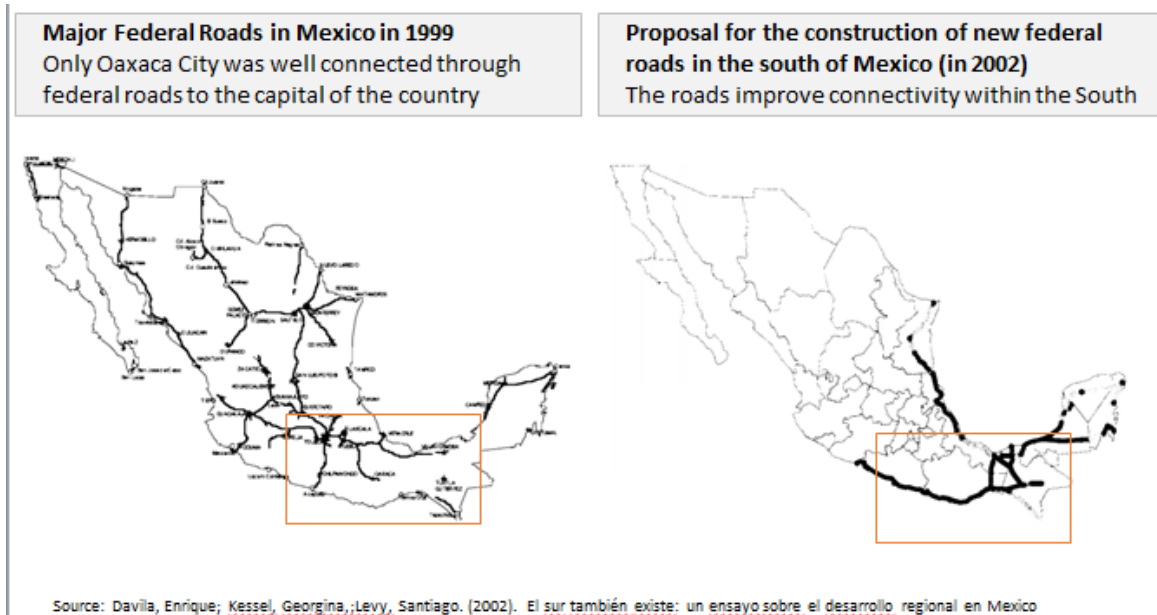

These two realities – the naturally divided geography of the state and the high degree of dispersion of the population – make it particularly important to understand how infrastructure works in the state. Without proper infrastructure, it is unlikely that communities can achieve the necessary connectivity and scale to drive economic growth. Historically, the ruggedness of the terrain and dispersion of the population led the South to have a sparser road and rail network than the rest of the country. In an influential 2002 paper, Enrique Dávila, Georgina Kessel, and Santiago Levy suggested that poor infrastructure might be a constraint to growth in the state, and proposed the creation of new federal roads in the south of Mexico, primarily Oaxaca, to connect the region with more developed states[6]. The map below shows these proposed roads. The proposed roads would connect the Isthmus region with the coastal areas of Oaxaca (Oaxaca City was already connected to Mexico City with a federal road at the time the paper was written). Dávila, Kessel, and Levy argued that the proposed roads would improve connectivity in the state[7].

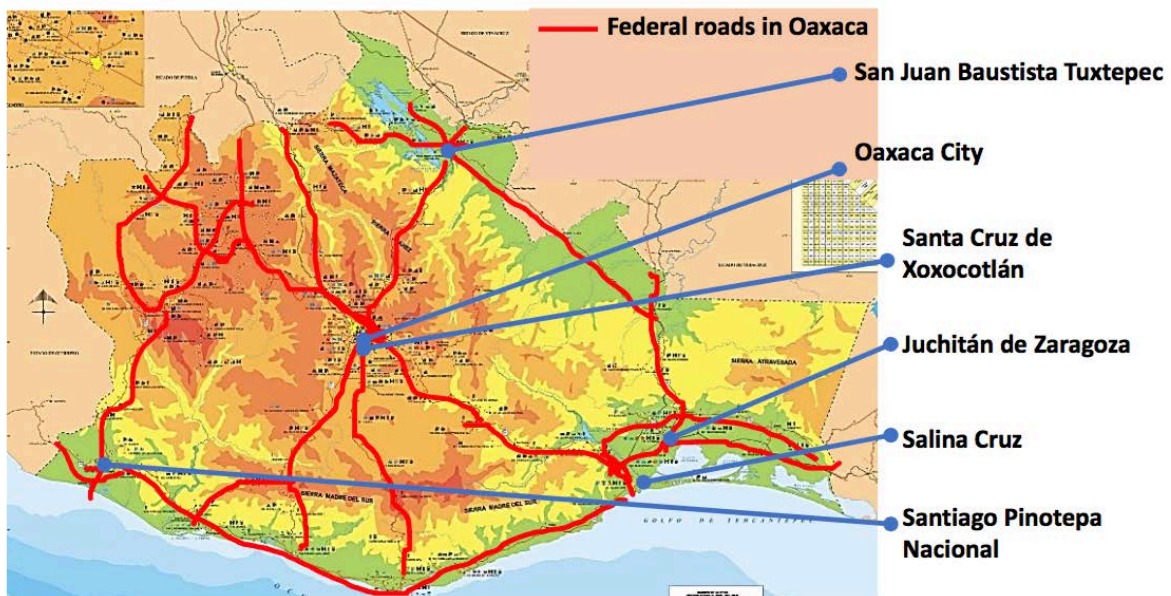
[6] Dávila, Kessel, and Levy, "El Sur También Existe."
[7] Ibid.

FIGURE 9 – NEW FEDERAL ROADS PROPOSED BY DÁVILA, KESSEL AND LEVY

Major Federal Roads in Mexico in 1999
Only Oaxaca City was well connected through federal roads to the capital of the country

Proposal for the construction of new federal roads in the south of Mexico (in 2002)
The roads improve connectivity within the South

Source: Davila, Enrique; Kessel, Georgina, ;Levy, Santiago. (2002). El sur también existe: un ensayo sobre el desarrollo regional en Mexico

As shown in the map below, the proposed roads have all been built since 2002. We can use this fact to determine whether a lack of infrastructure has been a binding constraint to growth in the state. Specifically, we look at the Economic Complexity Index of each municipality in the state in 2004, when the proposed roads did not exist, relative to 2014, when all the roads had been built.

FIGURE 10 – FEDERAL ROADS IN OAXACA AS OF 2015

Federal roads in Oaxaca
- San Juan Baustista Tuxtepec
- Oaxaca City
- Santa Cruz de Xoxocotlán
- Juchitán de Zaragoza
- Salina Cruz
- Santiago Pinotepa Nacional

Source: INEGI (2015)

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If the lack of infrastructure had been a constraint to growth, we should expect to see a difference in the Economic Complexity Index between 2004 and 2014. Assuming the roads were the binding constraint to growth, with their construction, more economic activity would have come to the state and this would be reflected in the Economic Complexity Index. However, although we do observe that municipalities with these roads are more complex in 2014, we find little changes between 2004 and 2014, as shown in the maps below. This would suggest that infrastructure is not a binding constraint to growth in Oaxaca.

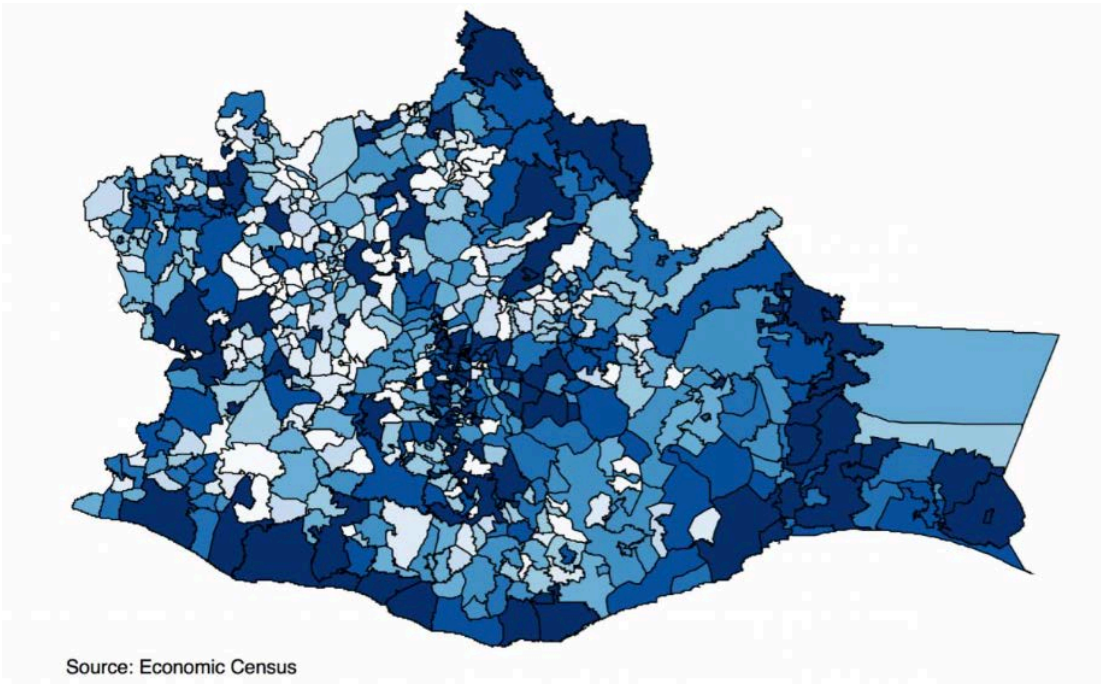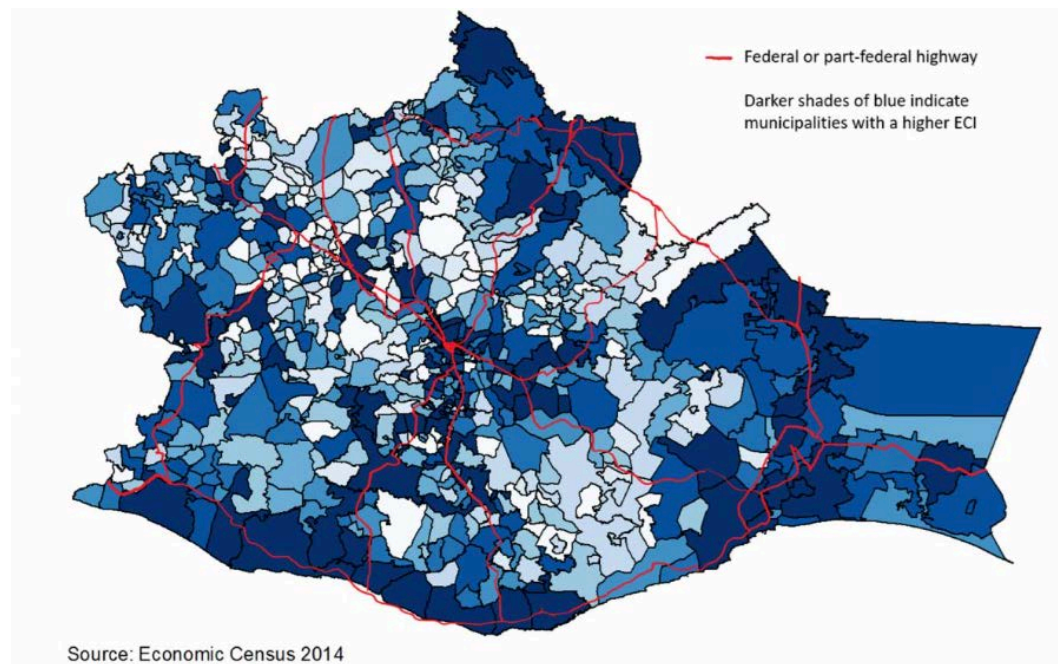**FIGURE 11 –** ECONOMIC COMPLEXITY BY MUNICIPALITY IN OAXACA IN 2004

Source: Economic Census

FIGURE 12 - ECONOMIC COMPLEXITY BY MUNICIPALITY IN OAXACA IN 2014

Source: Economic Census 2014

Although infrastructure is not a binding constraint, we believe mobility might be. There are limited transportation options in Oaxaca. Even if two towns are connected with a road, the cost of transportation is high. The most common form of inter-city transportation is a shared taxi, where a group of six people can share a taxi together to another town. The next table shows the cost of a round trip from Oaxaca City to another city in the state in these shared taxis. As seen, even a short 30-minute trip can take up to 35% of the wage of a worker.
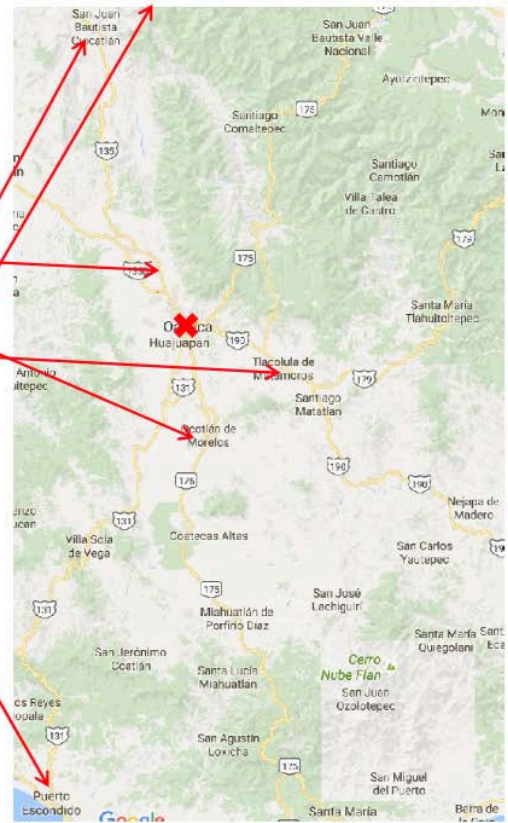
Costs of round-trip travel from Oaxaca City to...

Town	Prices (MXN)	Travel time	As % of minimum wage
Etla	$24	30 min / 20 km	35%
Ocotlán	$56	53 min / 44 km	82%
Tlacolula	$60	47 min / 33 km	88%
Cuicatlán	$140	2 hr 8 min / 121km	205%
Huautla	$190	4 hr 49m / 240 km	278%
P. Escondido (resort)	$300	6 hr 23m / 252 km	439%

Type of transport:

Six passenger shared taxi

High transportation costs limit the flexibility of the labor force. At these prices, it is rational for a worker not to pursue labor opportunities in neighboring towns. For employers, the inability to attract labor reduces their incentive to locate in any given municipality. With 3.8 million people in the state, each municipality has on average only 6,670 people. In fact, 110 municipalities have less than 1,000 people[8]. The high transportation costs limit the population's mobility and reduce opportunities for conglomeration, making it very difficult for a business to achieve or benefit from scale.

Mobility is made even more costly by road blockages. Teachers at some point have blocked all major roads in Oaxaca in the past three years. Since 2013, the teacher's union (CNTE) has organized marches in Mexico City and Oaxaca to protest major educational reforms[9]. The

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[8] Censo de Poblacion y Vivienda (2010). INEGI: http://www.beta.inegi.org.mx/proyectos/ccpv/2010/
[9] Oaxaca's teacher movement: https://www.commondreams.org/views/2016/06/27/oaxacas-teachers-movement-not-thwarted-state-terror

following map shows the roads that were blocked by the CNTE in the first half of 2016. Roads are blocked in places that obstruct access to major cities such as Oaxaca City, Salina Cruz, Pinotepa Nacional, or Teotitlán de Flores Magón[10]. Teachers are not the only group that blocks roads in the state. It has now become common for any group (NGOs and indigenous groups, among others) to block roads in protest of different policies or situations.

FIGURE 14 – MAJOR ROADS BLOCKED BY THE CNTE IN 2016

Source: La Jornada (2016)
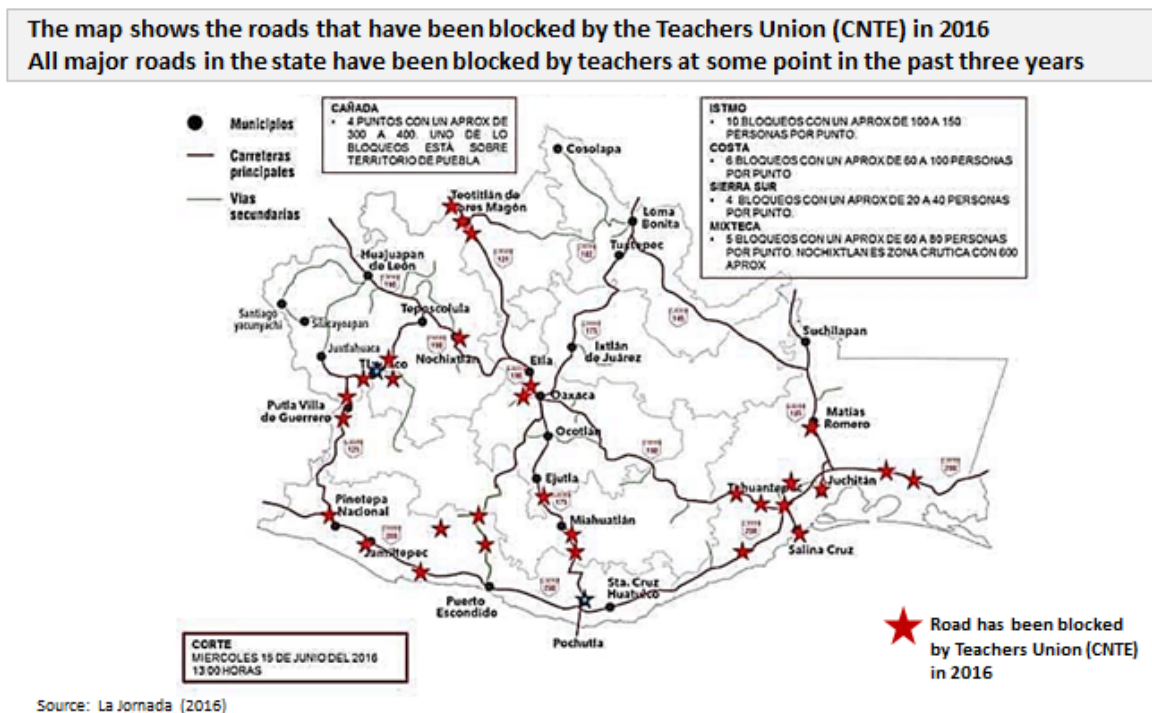
Blockages in roads are an impediment to growth and might explain why new infrastructure has not resulted in more economic development. For workers, the unpredictability of blockages reduces the incentives to work in other towns. A worker might not afford to spend additional hours commuting to work when roads are blocked. For firms, blockages increase the costs of transportation due to the additional hours that drivers need to spend on the road, and make it difficult for firms to deliver products on a timely basis with certainty.

We find a clear example of this in Truss, a high-end fashion company that manufactures and exports bags and accessories from Oaxaca. The company needs to deliver its products on a timely basis to ensure it meets the highly demanding delivery conditions of the fashion industry.

_____

[10] Bloques de CNTE en Oaxaca: http://www.jornada.unam.mx/ultimas/2016/06/17/federales-desalojan-bloqueo-de-la-cnte-en-carretera-en-oaxaca-1

As a result, Truss often ships out of Oaxaca by air despite being able to ship its products at costs up to 30% lower if it used a land and air-truck combo[11].

We conclude that while infrastructure itself is not a constraint, limited mobility because of limited transportation options and blockages may be a binding constraint to growth. High mobility costs limit the inflow and flexibility of both capital and labor. Businesses face higher operating costs in the state than in other states, resulting in limited capital investment in Oaxaca. Workers also have little incentive to go work in larger cities or towns because getting there is too costly and time consuming.

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[11] Gramegna et al., "TRUSS: Innovating Artisan Bag Value Chains in Mexico."

The second usual suspect we look at is human capital. Like infrastructure and geography, low human capital can lower the social returns to investment. Education is a hot political topic in Oaxaca, and a strong contender for the primary reason why the state does not grow.

The history of education in Oaxaca is a complicated one and worth reviewing for context. Classes have been disrupted most years over the last three decades. Starting in 1990, CNTE, a teacher union that emerged in 1979 in the south of the country as an alternative to the national teacher union (SNTE), has controlled education in the state. In 2006, CNTE made an alliance with APPO (Asamblea Popular de los Pueblos de Oaxaca), a group opposing the government and especially the governor. APPO declared itself the "governing body of Oaxaca" and staged a siege of Oaxaca City with barricades. Tourism and economic activity collapsed. In 2013, President Peña Nieto passed an educational reform requiring teacher evaluations and restricting CNTE's control over teacher pay disbursement and hiring and firing of teachers. Since then, CNTE has responded with demonstrations and blockades in Oaxaca and elsewhere in the country. In the wave of demonstrations in 2016, CNTE sieged Oaxaca City, blocked the road connections to the rest of the country and access to the oil refinery in Salina Cruz, and was involved in confrontations with security forces that led to multiple deaths[12].

Oaxaca's education gap has been falling over time relative to the national average and its neighbors. Despite the relative increase in years of education, and resulting reduction in the state's education gap, we have not seen a change in the economic development of Oaxaca, suggesting education is not the binding constraint to growth.

[12] "Six Killed in Mexico Teachers Protest."

FIGURE 15 - SCHOOLING BY YEAR OF BIRTH FOR OAXACA RELATIVE TO MEXICO AND OTHER STATES
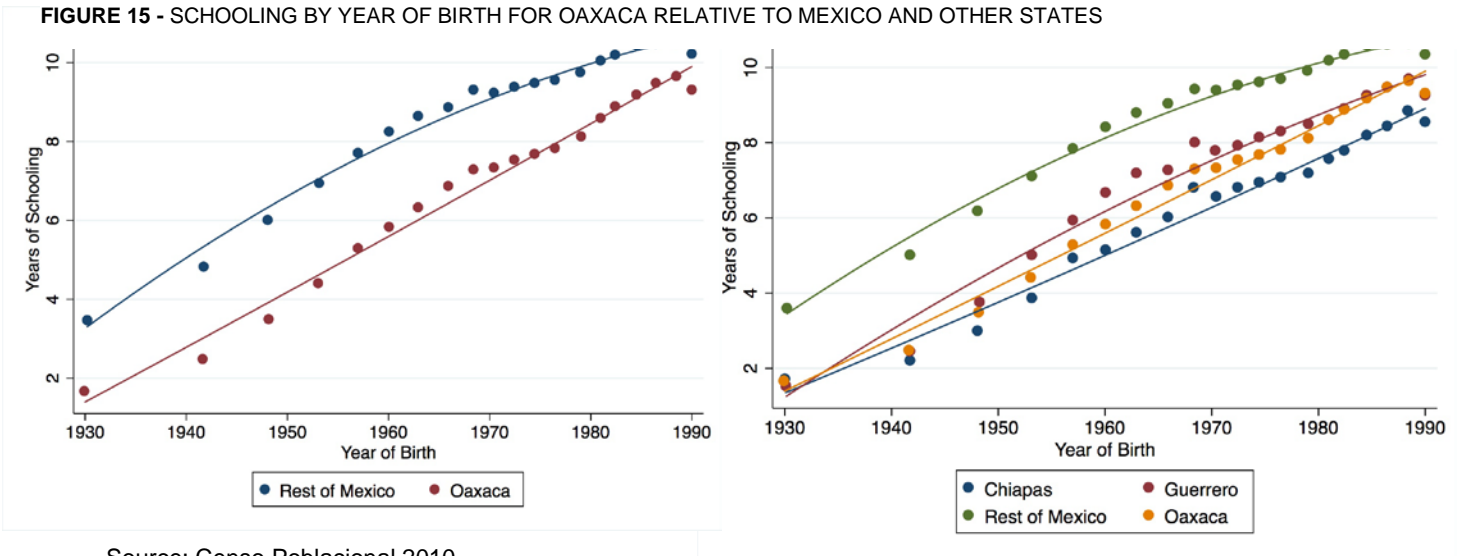
Source: Censo Poblacional 2010

We also find that returns to education in the state are very similar to the returns to education in the rest of Mexico and higher than returns to education in Chiapas. The figure below plots a Mincer regression to calculate the returns to education. This again suggests that education in the state is not a binding constraint.

FIGURE 16 – RETURNS TO EDUCATION BY NUMBER OF YEARS OF SCHOOLING
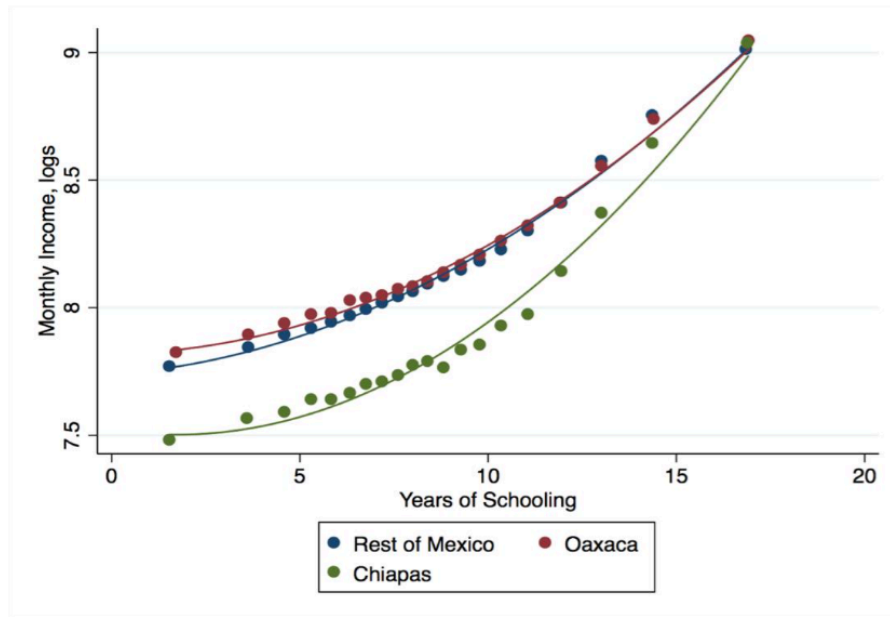
Controlling for experience, indigenous, female, rural and ECI
Source: Censo Poblacional 2010

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It may be that the constraint to education in Oaxaca is one of quality, not quantity. The two results discussed above – a reduction in the schooling gap and the high returns to education in the state – account for human capital by looking at years of schooling. In fact, there is some evidence that education quality in Oaxaca severely lags that of the rest of the country. The figure below shows results of the *Prueba Enlace*, a national evaluation exam taken by students, in 2013.

FIGURE 17 – PROPORTION OF GRADE SCHOOL STUDENTS RATED "GOOD" OR "EXCELLENT" IN THE 2013 ENLACE NATIONAL EXAM, BY STATE
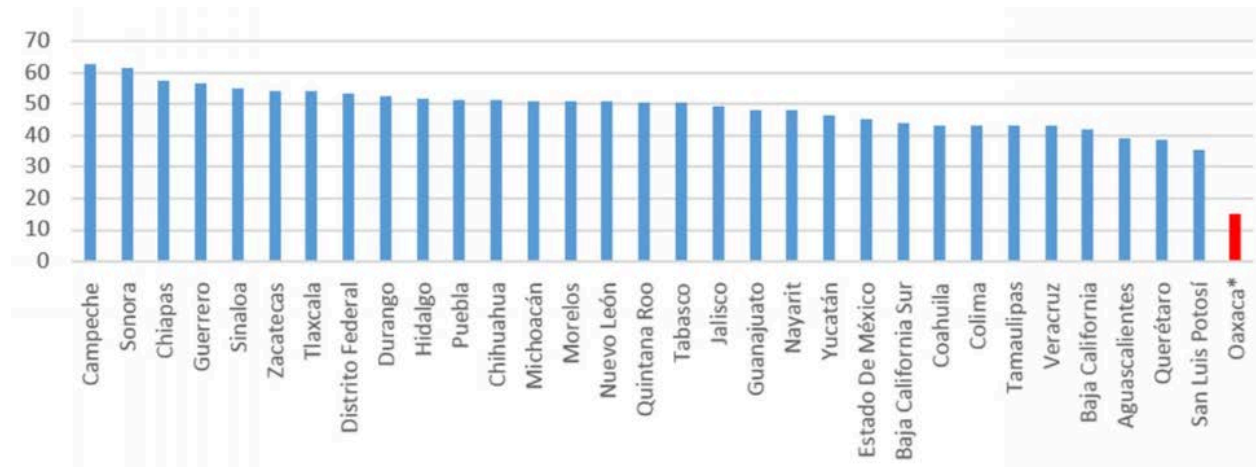

Source: Secretaría de Educación Pública

It is worth noting that the powerful teacher union in the state (CNTE) prevented almost all students in the state from taking the text. As a result, the results for Oaxaca represent only one percent of the state's students. Nevertheless, the results are dramatic and are worth exploring further.

To do so, we look at demand for private schooling in Oaxaca. We would expect that if education quality is a constraint to growth in the state, people should be looking for ways to bypass this constraint by sending their children to higher quality private schools that are not controlled by the CNTE, controlling for the state's lower income level. However, this does not happen. The figure below plots income per capita versus percent of private schooling for all states in Mexico. As we can see, the percent of private schooling in the state is in line with that in other states with higher quality of education.

FIGURE 18 – PROPORTION OF OAXACAN GRADE SCHOOL STUDENTS ENROLLED IN PRIVATE EDUCATION
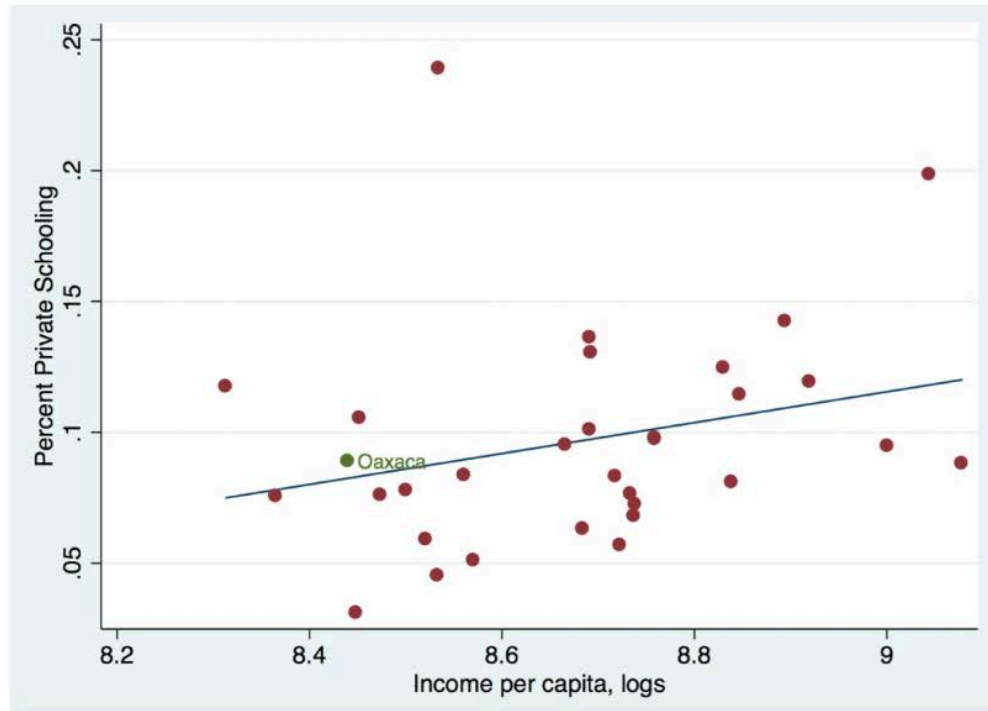

Source: Censo de Escuelas, Maestros y Alumnos de Educación Básica y Especial 2013

Although imperfect, this analysis suggests that education, even when accounting for quality, is not a binding constraint to growth. To take our analysis one step further, we perform a Oaxaca-Blinder decomposition [13] of Oaxaca. A Oaxaca-Blinder decomposition is an econometric technique that identifies the drivers behind differences in wages between two regions. In our case, we compare Oaxaca with the Rest of Mexico.

There is a 28.8% wage gap between Oaxaca and the rest of Mexico. We use the Oaxaca-Blinder decomposition to look at what factors explain this difference. In particular, we use census data to determine how much of the wage gap is determined because of a person's education, experience, gender, indigenous status, rural status, whether they live in a municipality governed under *Usos y Costumbres* (more on this in the next section)*,* and the economic complexity of the municipality where they live.

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[13] This technique is named after their creators, and is unrelated with the state being studied.

FIGURE 19 – OAXACA-BLINDER DECOMPOSITION COMPARING OAXACA'S WAGES WITH THOSE OF THE AVERAGE MEXICAN STATE
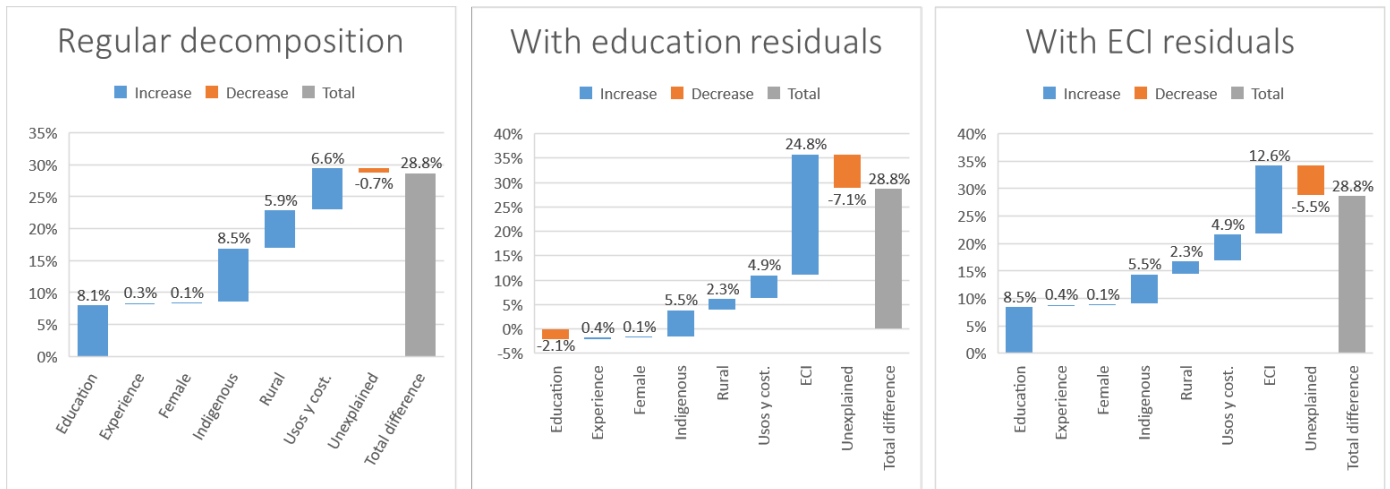
We use the same methodology as used by Dan Levy and Ricardo Hausmann in their 2016 Working Paper[14]. The graph on the left above shows that education explains about 8.1% of the 28.8% wage gap. However, as discussed in Levy and Hausmann's paper, the Economic Complexity Index (ECI) and education are endogenous to one another and distort the percentages. To get around this, we want to use the residuals of ECI and education to get a range of the possible effect of education in explaining the wage gap. When we use education residuals we see that the contribution of education is actually negative 2.1%, and when we use ECI residuals, education only goes up to 8.5%. The discrepancy in the range of the outcomes based on which residuals are used suggests that education is not particularly important in explaining the difference in wages between Oaxaca and the rest of Mexico. This supports our previous claims that education is not a binding constraint to growth in the state.

Given the instability around education in the state, it would be natural to believe that access to education is a constraint to growth in Oaxaca. However, while we agree that the education issues in Oaxaca are severe, our analysis leads us to the conclusion that education is in fact not a binding constraint: a swift, dramatic increase in the quality of education in Oaxaca would not lead to faster rate of economic growth.

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[14] Levy et al., "Why Is Chiapas Poor?"

USUAL SUSPECT 3: GOVERNANCE AND CONTRACT ENFORCEABILITY

We now explore whether governance issues and contract enforceability make it hard for individuals and firms to reap the benefits of their investment. We move on from whether there are low social returns to investment to whether there is low appropriability of returns in the state. Without certainty that an investment will be protected, firms and individuals will have little incentive to invest, a clear hindrance to economic growth and development in the state.

Governance challenges increase the risk of investing in Oaxaca. As mentioned in the introductory sections of this paper, Oaxaca is divided into 570 municipalities, resulting in very small governing units. One such challenge is the system of *Usos y Costumbres*, in which the government accounts for the rich cultural diversity in the state by allowing communities to use traditional processes for decision-making that override certain laws. Over 75% of the municipalities in Oaxaca are governed through *Usos y Costumbres.* This is much higher than any other state in the country, including Chiapas, as is shown in the figure below.

FIGURE 20 – PROPORTION OF MUNICIPALITIES IN OAXACA STATE RUN UNDER THE *USOS Y COSTUMBRES* SCHEME
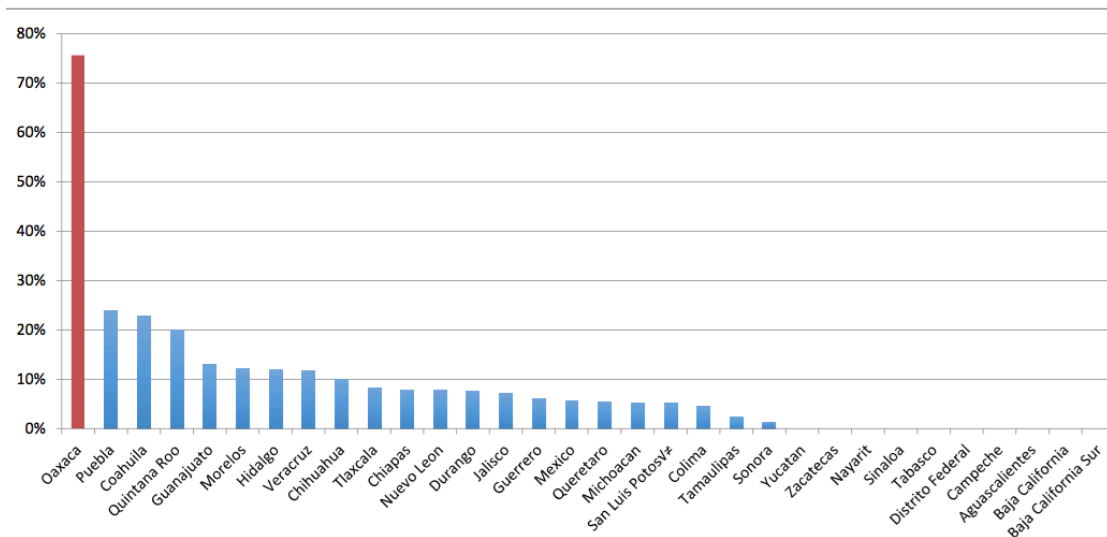

SOURCE: INEGI

Only 153 of the 570 municipalities use a government-run election to determine their leader, and out of those, four did not elect a municipal president in the June 2016 election due to internal conflicts. 146 municipalities lack a police service.

We test two pathways by which *Usos y Costumbres* rule could affect the economic development of the state. The first is that by design, *Usos y Costumbres* makes it more difficult for people to migrate in and out of communities. Migrating into communities is hard when there is a legal distinction between insiders and outsiders, giving specific rights to insiders. Migrating out of communities is also harder, as *Usos y Costumbres* rules often require locals to complete tasks locally or place outright fines on people who leave their community.

As shown in the figure below, Oaxaca has a problem attracting domestic migrants. The low level of migration into Oaxaca is worrisome as migration is critical to acquire the know-how to develop new industry and economic activity[15].

FIGURE 21 – OUT-OF-STATE MIGRANTS AS A PROPORTION OF THE POPULATION, AND PROPORTION OF THE STATE'S WORKERS WHO MIGRATED OUT, BY STATE
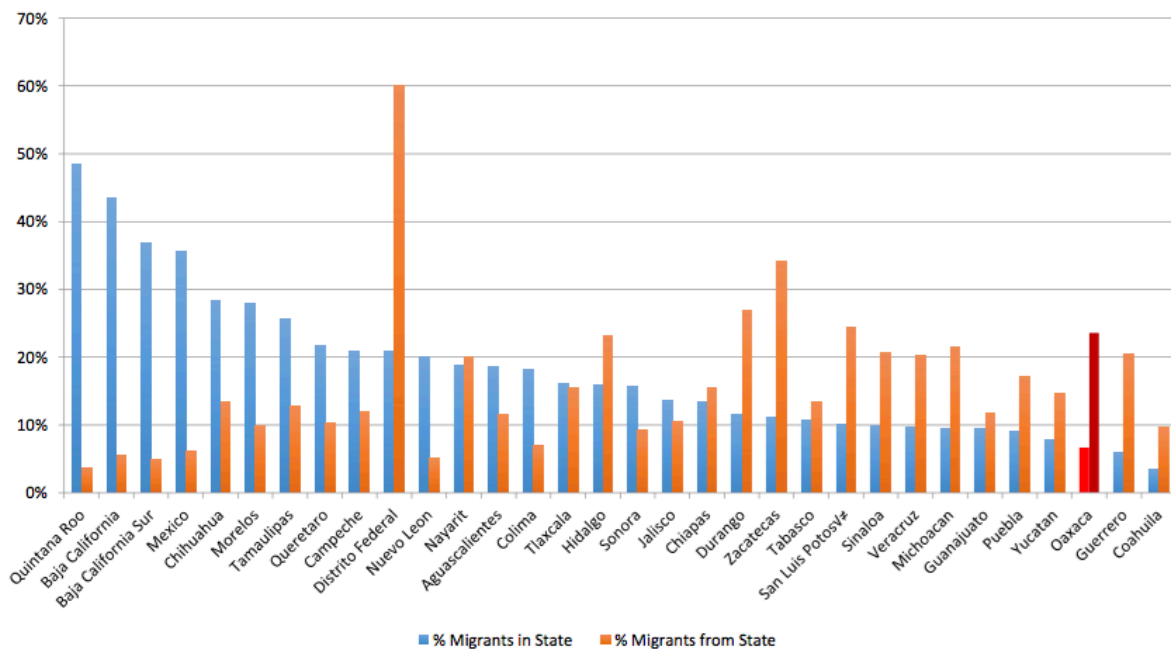

The second mechanism through which *Usos y Costumbres* could negatively affect the economic development of the state would be through contract enforceability. *Usos y Costumbres* communities tend to emphasize communal over private property, thereby reducing incentives for individuals and firms to invest in a community. They can also have dispute resolution mechanisms that do not follow national law. This could be one of the reasons Oaxaca is one of

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[15] "Economic Development and the Accumulation of Know-How."

the states in Mexico that faces the most problems around contract enforceability. The figure below shows an index of contract enforceability built by the Instituto Mexicano de la Competitividad using three variables: time to enforce a contract (when it is enforced) from initial pledge to final payment; total cost of procedure; total number of government interactions that the user must complete to enforce the contract.

**FIGURE 22 –** TIME AND COST TO ENFORCE CONTRACTS (INDEX)
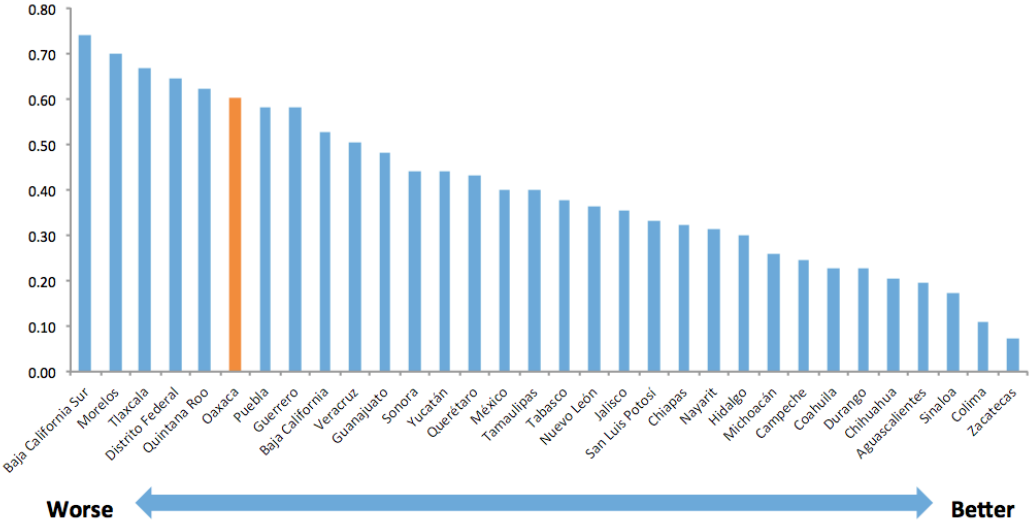
Source: Instituto Mexicano de la Competitividad (2014)

The most prevalent example of the problems faced by firms trying to invest in Oaxaca around contract enforceability can be seen in the wind energy industry's efforts to develop assets in the state. Oaxaca has some of the best wind and terrain for wind energy development in the world, in a coastal region known as La Ventosa. In spite of the superior wind resource in the region and of appropriate infrastructure conditions locally, several international firms have either cancelled investment projects or relocated them to other states due to issues related to communal land ownership, local conflicts over the distribution of benefits and employment, or outright rejection of the projects by the community's decision-making bodies.

Finally, although we cannot argue that there is a causal link between a municipalities income per capita and whether it is governed through *Usos y Costumbres*, we do find a statistically significant negative association between the two.

FIGURE 23 – MUNICIPALITIES IN OAXACA RUN UNDER THE USOS Y COSTUMBRES SCHEME, AND INCOME PER CAPITA BY MUNICIPALITY
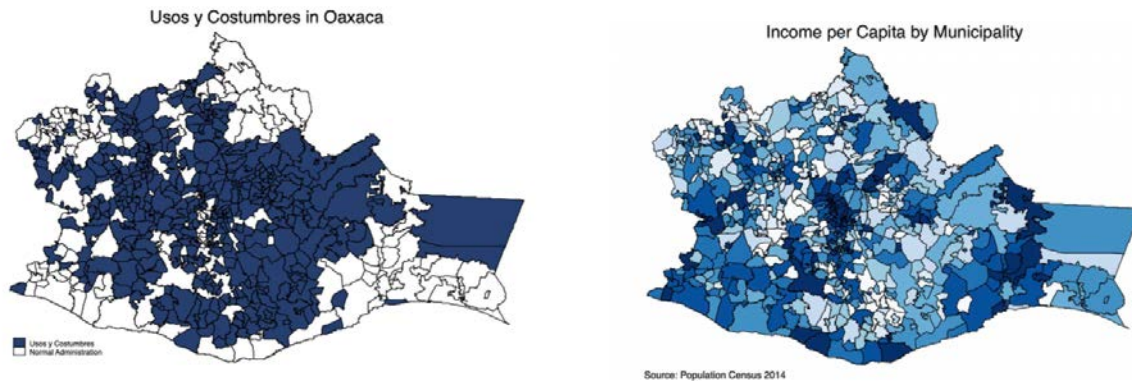
Most of these municipalities are in the central, more mountainous region of the state, as shown in the map to the left. We also know, that the wealthier municipalities in the state are along the coast, around Oaxaca City, and along the Isthmus of Tehuantepec corridor. We also verified that this correlation is statistically significant.

Our analysis shows that, governance challenges, likely related to the prevalence of *usos y costumbres*, are a possible binding constraint to growth. Without certainty on the rules of a particular municipality with regard to contract enforceability, individuals and firms will have no incentives to invest in the state.

The final suspect we explore is whether access to finance is limited due to its cost or availability. Without access to proper financing, firms will struggle to have the capital necessary to invest in new projects and drive growth.

Interest rates in Oaxaca are 33% higher than in the rest of Mexico, suggesting cost of credit might be a binding constraint to growth in the state. The figure below shows credit rates for all states in Mexico. The average lending interest rate in Oaxaca is 8.2%, the second highest in the country. The national average is 6.1%. Interest rates in Oaxaca are higher than in neighboring states like Guerrero (6.1%), Tabasco (5.3%), and Chiapas (5.9%).[16]

FIGURE 24 – NOMINAL INTEREST RATE ON LENDING
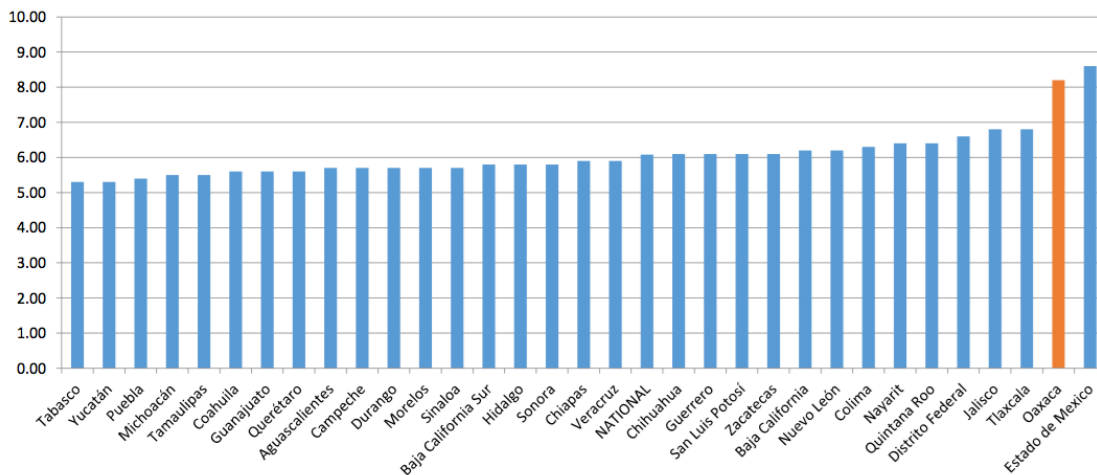
Source: Instituto Mexicano de la Competitividad (2014)

Enterprise surveys confirm that high interest rates, and distance to banks, are a problem. We show the results for all states in Mexico in the figure below. 41.0% of companies reference high interest rates as the reason why they did not get a loan, compared to the national average of 32.4%. In addition, 2.3% of companies argue that distance to banks is the main reason why they did not get a loan. Although this percentage is low, there is no other state with such high percentage of complaints about distance to a bank.

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[16] Instituto Mexicano de la Competitividad (2014). Índice the competitividad estatal: http://imco.org.mx/indices/#!/
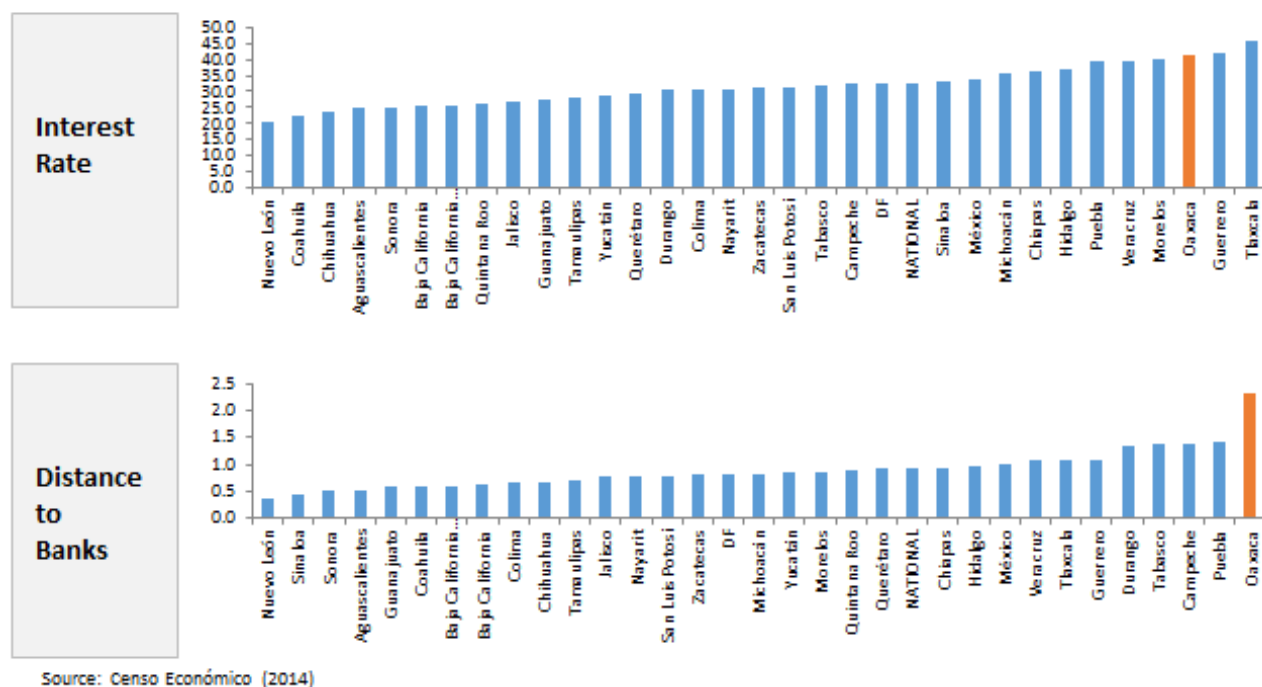
Source: Censo Económico (2014)

Oaxaca's microenterprises seem to have found a way to bypass the problems around access to credit and distance described above. Surprisingly, 19.9% of micro enterprises in Oaxaca requested a loan in 2014, which is above the national average of 15.8%. The main sources of credit for microenterprises are *Cajas de Ahorro* or Credit Unions. 47% of microenterprises got a loan from this type of entity. As shown in the figure below, more microenterprises get a loan from *Cajas de Ahorro* (47.0%) than from banks (26.0%), family or friends (13.6%), or suppliers (8.7%).

FIGURE 26 – CAJAS DE AHORRO AS PART OF THE OAXACAN CREDIT LANDSCAPE

Microenterprises have more access to credit than the national average
Most of the credit comes from *cajas de ahorro* (credit unions)

Source: Censo Económico (2014)
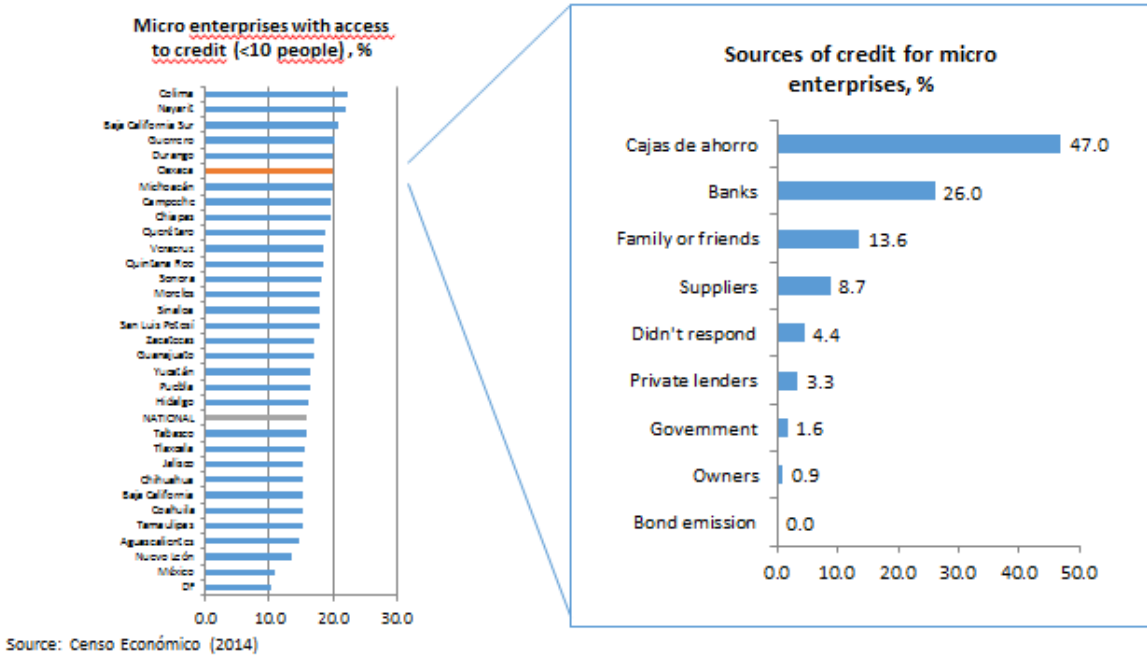
Cajas de Ahorro are fairly unique to Oaxaca and are growing fast. Revenues grew at 20.6% per year from 2004 to 2014, while bank revenues only grew 7.5% in the same period. Also, *Cajas de Ahorro* employ 70% more people in the state than traditional banks. There are 152 credit unions in the state, some with multiple branches. These credit unions are dispersed throughout the state in small towns, often serving very isolated communities. The following map shows the branches of Caja Popular Mexicana, Mexico's largest *Cajas de Ahorro*. As can be seen in the map, the company's branches are in highly isolated areas.

**FIGURE 27** - BRANCHES MANAGED BY CAJA POPULAR MEXICANA
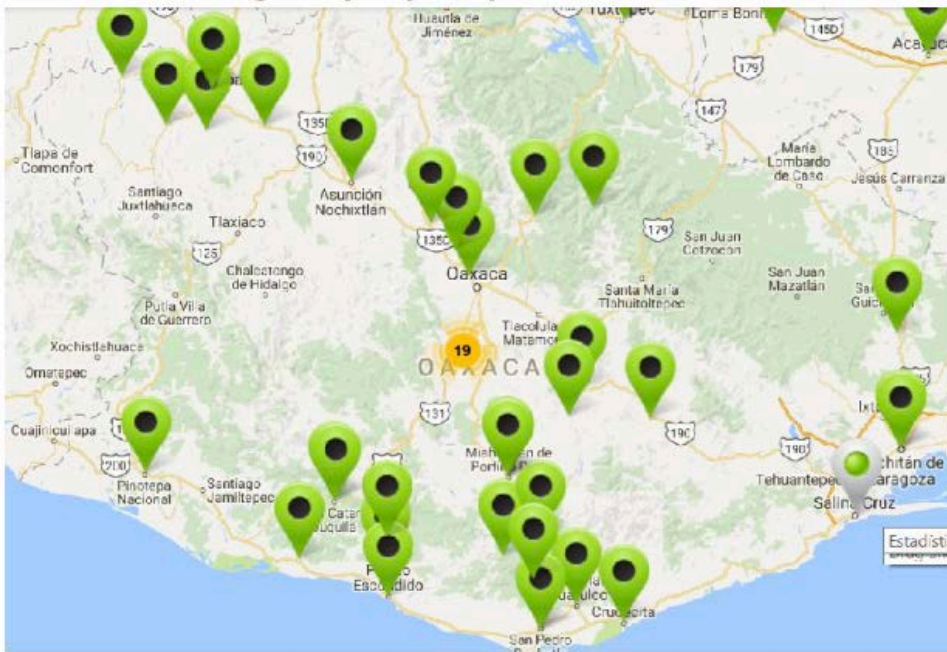
1 Cajas with more than $700,000 in assets *and* depositors' insurance.
Sources: www.cpm.coop, CONDUSEF.

We also find that these credit unions are typically set up as mechanisms through which members of the same community can lend to one another. A lot of these credit unions use the name of the community or the name of the ethnic group to identify themselves (ie., Caja Solidaria Tilcajete, Caja Solidaria Union Yucucui, Caja Solidaria Xuun ÑUU, and others).

The prevalence of these *Cajas de Ahorro* in Oaxaca could be an example of agents bypassing the constraint of access to credit. However, further analysis suggests financing availability and costs are not a binding constraint. First, we find that enterprises do not use finance for productive purposes. Only 35.1% of enterprises use the funds acquired through loans to acquire inputs, increase working capital, produce capacity, or replace depreciated equipment. As shown in the figure below, this percentage is very low when compared to other states in the country. Most of the loans granted in Oaxaca are used for personal purposes or to pay previous debt.

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FIGURE 28 – PERCENTAGE OF FIRMS SURVEYED WHICH USED CREDIT TO ACQUIRE INPUTS, INCREASE PRODUCTION CAPACITY, OR REPLACE DEPRECIATED EQUIPMENT
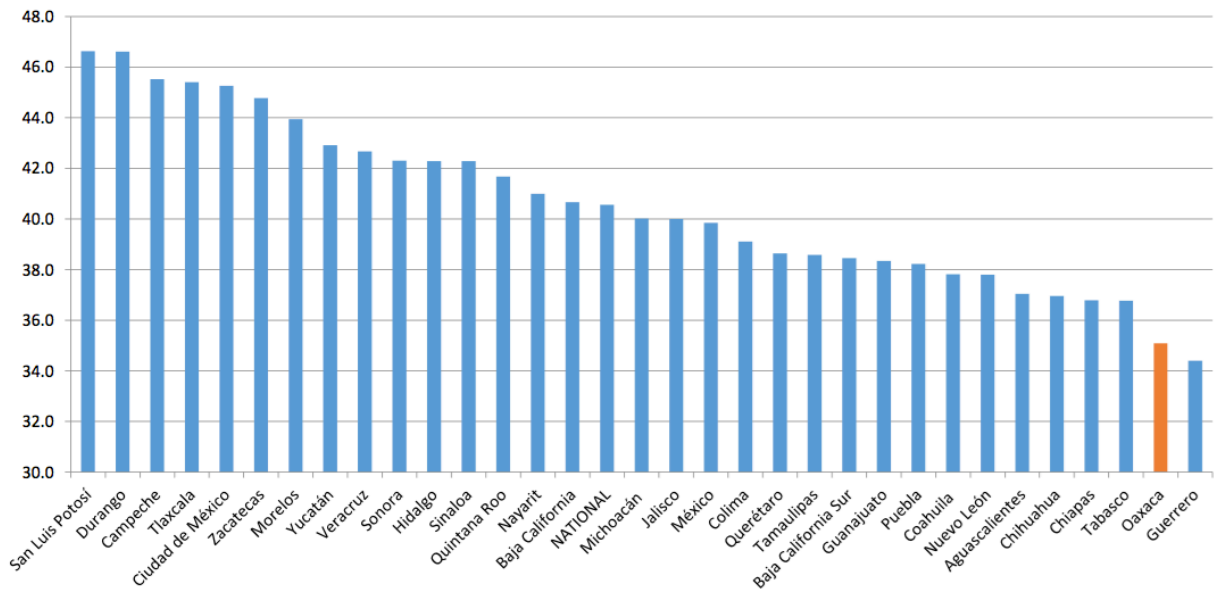
Source: Censo Económico (2014)

Second, international companies with access to capital outside of the state, do not invest in Oaxaca, suggesting that availability of credit is not a binding constraint. The figure below shows this by comparing foreign direct investment by state in Mexico. This suggests that there must be other elements in the environment (high costs of transportation, poor property rights, poor governance) that lower returns to investment in Oaxaca.

FIGURE 29 – DOLLARS OF FOREIGN DIRECT INVESTMENT PER '000 USD OF GDP
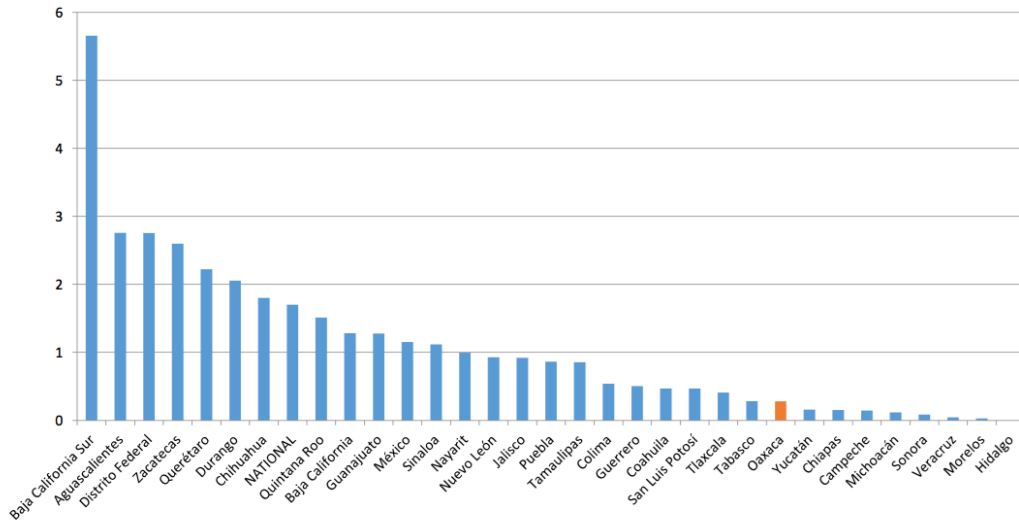
Source: Instituto Mexicano de la Competitividad (2014)

We do not think credit availability is a binding constraint to growth in the state. This is evidenced by the fact that most companies do not use credit for productive purposes, that firms that need it can access finance through Cajas de Ahorro, and that foreign companies, which do not depend on local credit markets, do not invest in Oaxaca.

Our analysis of the "usual suspects" identified two possible binding constraints to growth in Oaxaca. First, we identified geography and infrastructure as constraints due to the high cost of mobility. Second, we identified governance challenges and contract enforceability as constraints as they inhibit migration and investment.

It is helpful to think whether there is an underlying syndrome that might explain these two binding constraints. One possible hypothesis is the isolation of people into very small communities that have very strong bonds within the community and very weak bonds outside of it.

Oaxaca shows high variety in ethnic groups, languages, and government systems. Oaxaca has 18 ethnic groups whose people speak 17 languages. This has led to a very real isolation of people. Population density in the state is 40.5 inhabitants per squared kilometer; however, most municipalities have fewer than 20 inhabitants per squared kilometer. On average, each municipality has 6,670 people, but there are 110 municipalities with less than

FIGURE 30 – DOMINANT ETHNIC GROUPS BY OAXACAN REGION

1,000 people. Elsewhere in Mexico, dispersed rural populations gradually converged into urban clusters around job opportunities. In Oaxaca, the process is not yet afoot because of a "productivity trap", in which low productivity means urban salaries do not cover the costs of transportation or permanent moves, and dispersion keeps productivity low by failing to concentrate employees.

Cultural diversity has a side effect of encouraging spatial dispersion and isolation. Oaxaca is known for its large diversity in ethnic groups, languages, and government systems in the region. Oaxaca has eighteen ethnic groups and seventeen languages. While this cultural richness is one of the state's most fascinating features, it does have certain negative side effects. For instance, there is a relative lack of trust and high frequency of conflict among different communities. The two largest ethnic groups, the Mixtec and Zapotec peoples, have a history of rivalry dating back to before the Spanish conquest. The divisions between the Mixtec and the Zapotec persist even

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in California, where Oaxacan immigrants have created separate advocacy and community groups[17].

Isolation obstructs economic activity by keeping the population in smaller, more isolated, more rural communities, or in isolated groups even within urban areas[18]. Smaller economic units reduce know-how transfer and its aggregation in multi-person firms. Isolation reinforces a low productivity trap in which few known activities provide attractive economic returns. The complicated enforcement of micro rights and relatively high levels of conflict and corruption further decreases the attractiveness of investments in these states. Increasing the complexity of this economy requires breaking the trap by finding new business models (i.e., encouraging discovery) and coordinating economic activities.

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[17] Kearney, "Transnational Oaxacan Indigenous Identity."
[18] This section is drawn from Sarmiento Hinojosa, "Special Economic Funds: Expanding Special Economic Zones beyond Spatial and Industry Boundaries for the Development of Mexico's South."

Economic Complexity analysis, originally put forward by Hausmann et al[19], provides a powerful framework to study an economy's current and potential production capabilities. This framework refines the traditional economic understanding of inputs, suggesting that rather than interchangeable "capital" and "labor", products require both a variety of inputs and a set of non-tradable capabilities. Insofar as some products require more and rarer inputs and capabilities, these are "more complex" and less commonly seen as part of the output of a given country or region.

Areas with a higher degree of economic development tend to be able to produce more complex goods. Hidalgo and Hausmann point out that "as people and firms specialize in different activities, economic efficiency increases, suggesting that development is associated with an increase in the number of individual activities and with the complexity that emerges from the interactions between them."[20]

Economic complexity analysis can point us to new industries that are feasible given Oaxaca's productive capabilities. As part of this research, we used employment data by sector from the Mexican Economic Census to create an Economic Complexity profile for Mexico, allowing us to characterize the complexity of Oaxaca's economy relative to that of the rest of the country. This serves both as a diagnostic and as a pointer to industries that, in spite of the development issues that we covered in the preceding sections, could potentially succeed in the state.

Oaxaca's municipalities have among the least complex economies in the country. The figure below illustrates Oaxacan municipalities in green and the rest of the country's in red. We observe that the green dots cluster to the left, suggesting that the industries that employ Oaxacans are of relatively limited complexity, i.e., they are present in many other parts of the country. These are unlikely to provide high-paying jobs. We also observe the dots cluster in the lower part of the diagram, below 1 in the Complexity Outlook Index. This suggests that the industries currently present in the State are not promising in terms of unlocking attractive new industries in the future. This profile is typical of economies in which employment is focused on primary activities like small-

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[19] Hausmann et al., *The Atlas of Economic Complexity*.
[20] Hidalgo and Hausmann, "The Building Blocks of Economic Complexity."

scale agriculture. It is important to note, however, municipalities like Oaxaca City with a higher Economic Complexity Index (ECI) of around 2.5 and a Complexity Outlook Index (COI) of 3.5.
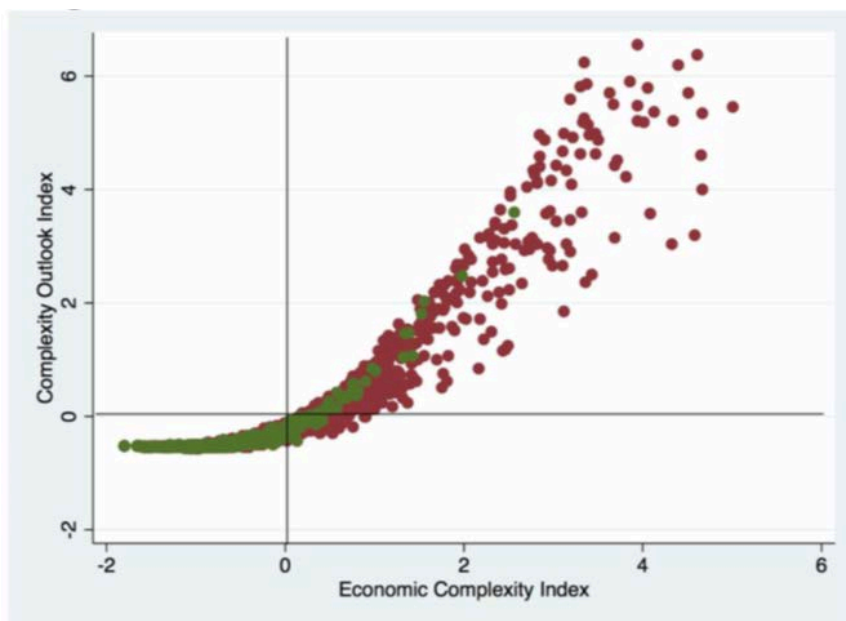
Source: Economic Census 2010

Some industries are singled out by complexity analysis as potentially promising for Oaxaca. Complexity analysis can be used to rank all the economic activities currently not present in a municipality by two measures: "opportunity gain", which describes how attractive an industry is in terms of learning that could open up future lucrative industries, and "product density", which describes the distance between the capabilities needed for this new industry and those needed to make what the municipality already produces. For instance, in Oaxaca, the production of parts for aerospace industries is high opportunity gain, because it would open the doors to industries like airplane assembly or car part making, but low density, because the existing industries in the state are completely unrelated to aerospace.

The following chart maps out all industry-municipality combinations not yet present in the State. Unfortunately, the top-right corner of industries that are both feasible and promising is empty. However, we singled out a set of industry-municipality combinations with very high feasibility, which we labeled "quick wins", and a set of promising industry-municipalities where the feasibility is not too low.
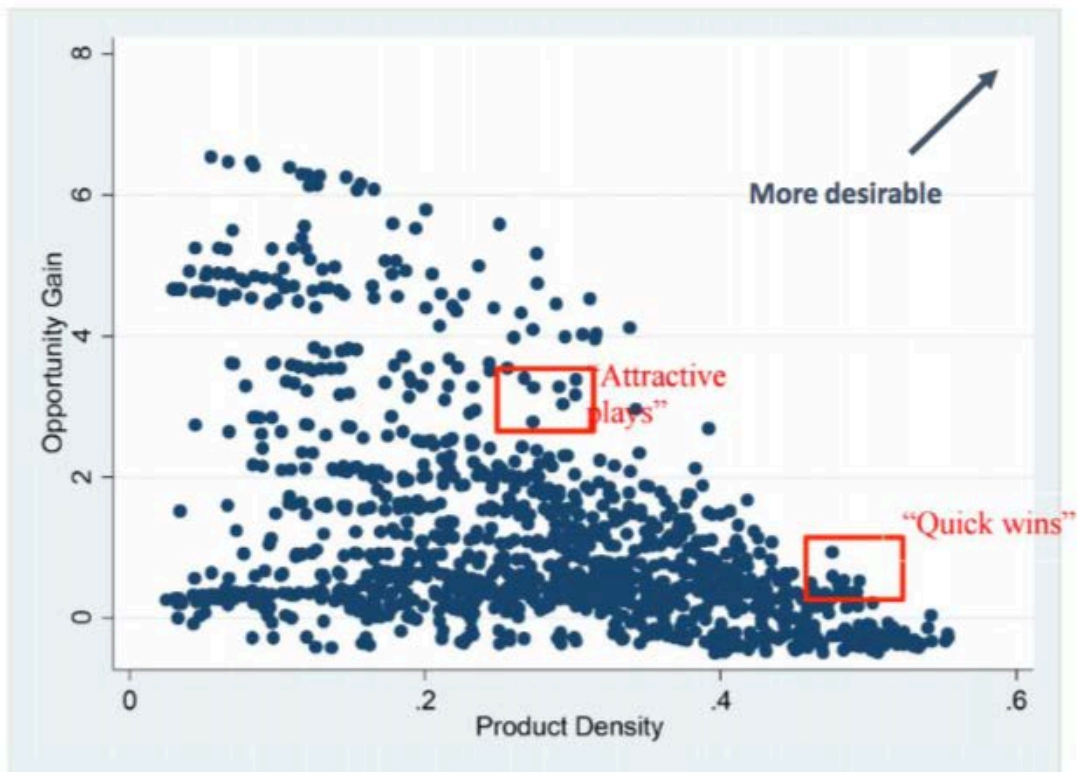
The following chart lists out a selection of the industry-municipality combinations in each of the two red boxes:

FIGURE 33 – INDUSTRIES SINGLED OUT AS PROMISING FOR OAXACA GIVEN ECONOMIC COMPLEXITY ANALYSIS

Sectors	Municipality of Focus	Type
Dairy item production	Huajuapan	Quick win
Beverages industry	Huajuapan	Quick win
Commerce of uncut cloth and interior decoration items	San Pedro Mixtepec	Quick win
Wooden product manufacture	Pinotepa Nacional	Quick win
Furniture production	Tlacolula	Quick win
Tourism	**Oaxaca City**	**Attractive play**
Petrochemical Industry	**Salina Cruz**	**Gov't Dependent**

While it is out of the scope of a growth diagnostic to "select" industries out of the options from this boxes or to identify strategies to develop them, this could be pursued by further research.

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