DO INDIGENOUS PEOPLES BENEFIT FROM POVERTY PROGRAMS? EVIDENCE FROM MEXICO'S 2000 CENSUS*

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Resumen: En Latinoamérica los indígenas pertenecen a los sectores más pobres y con frecuencia se argumenta que las políticas sociales no los benefician. Asimismo, en los últimos años varios países han instrumentado nuevos programas que deberían beneficiar a los indígenas. En el presente estudio utilizamos datos del censo mexicano del 2000 para comprobar si los indígenas que viven en los estados de Chiapas, Guerrero y Oaxaca se han beneficiado de tres programas del gobierno: PROGRESA, FISM y PROCAMPO. Encontramos que estos han beneficiado más a los indígenas que al resto, ayudando a reducir la pobreza de forma sustancial.

Abstract: Indigenous peoples are among the poorest in Latin America, and it is often argued that social policies do not reach them. At the same time, several countries have implemented in recent years new programs for poverty reduction that should have benefited the indigenous. In this paper, we use data from Mexico's 2000 census to test whether indigenous peoples living in the southern states of Chiapas, Guerrero and Oaxaca benefit from three large government programs: PROGRESA, FISM, and PROCAMPO. We find that indigenous peoples are benefiting more than non-indigenous peoples from these programs, which are reducing poverty in a substantial way.

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1. Introduction

Estimates of the indigenous population in Latin America vary from 30 to 60 million people (e.g. Bello y Rangel, 2000; Stavenhagen, 1999). Due to its sheer size, Mexico has the largest indigenous population, followed by countries such as Guatemala, Ecuador, Bolivia, and Peru. There is no doubt that indigenous peoples are among the poorest in America, and it is often argued that social policies are not adequately tailored to meet their needs (e.g. Psacharopopulos and Patrinos, 1994; Wodon *et al.*, 2001). However, in recent years a number of Latin American countries have implemented new programs for poverty reduction. While these programs should have benefited indigenous peoples, there is little empirical evidence on the topic due to a lack of good data. In Mexico, for example, the National Income and Consumption Survey (ENIGH) used for poverty measurement does not have information on indigenous status or language.

In this paper, we use data from Mexico's 2000 census, which has information on language spoken, to test whether indigenous peoples indeed have benefited from such programs. We focus on the southern states of Chiapas, Guerrero, and Oaxaca, because these are the three poorest states in Mexico, and they also have a large indigenous population.

The census data enables us to assess who benefits from three large Government programs. The first program is Program for Education, Health, and Nutrition, PROGRESA, a cash transfer program implemented since 1997 and giving stipends to poor children in order to promote school enrollment, and support for health and nutrition (for details, see Skoufias, 2001, and Wodon *et al.*, 2002). The second program is Municipal Fund for Social Infrastructure, FISM a decentralized program promoting investments in the social infrastructure of poor areas since 1998 (for details, see Giugale and Webb, 2000). The third program is Program of Direct Payments to the Countryside, PROCAMPO a cash transfer program implemented in 1994 after the adoption of the NAFTA trade agreement to compensate farmers from potential losses following the liberalization of Mexico's rural economy. Although this program is not explicitly targeted to the poor, it does have large impacts on poverty (for details, see Cord and Wodon, 2001, and Sadoulet, Janvry and Davis, 2001). We find that overall, indigenous peoples are benefiting more than non-indigenous peoples from these programs, which are reducing poverty in a substantial way.

2. Transfers for the Poor in Mexico's Census

Per capita income in Mexico's census sample data files publicly available on the web is computed by summing up information on the following income sources: labor income, pensions, remittances from abroad, remittances from within the country, income from PROCAMPO or PROGRESA, and income from capital broadly defined. Unfortunately, the transfers from PROCAMPO and PROGRESA are captured through one question only combining the two sources of income, so that we cannot assess the impact of each program on poverty separately.

In addition to the above income sources, we can use the census data to estimate the transfers received by municipalities through FISM, and, under certain assumptions the funds allocated within municipalities to households. This section presents the FISM allocation formula in the Fiscal Coordination Law. The formula is based on a weighted average of five indicators capturing unmet basic needs for income, education, housing, sanitation, and energy. The overall poverty index for household $j(IGP_j)$ is defined by the Law as:

$$IGP_j = 0.4616 * P_{1j} + 0.1250 * P_{2j} + 0.2386 * P_{3j} + 0.0608 * P_{4j} + 0.1140 * P_{5j}$$

Denoting income per capita for household j by y_j, the income basic needs gap measure P_{1j} is defined as:

$$P_{1j} = \begin{cases} \frac{419.76 - y_j}{419.76} & \text{if} \quad y \leq \$419.76 \\ \frac{419.76 - y_j}{(419.76)(18)} & \text{if} \quad \$419.76 < y_j < \$4,197.60 \\ -0.5 & \text{if} \quad y_j \leq \$4,197.60 \end{cases}$$

If y_j is below the poverty line of \$419.76 Mexican pesos per month, P_{1j} is the traditional poverty gap. A household with no income at all gets a value of one for P_{1j}. If income is higher than the poverty line, the household gets a negative value for P_{1j}, which may offset other unmet basic needs in IGP_j. The potentially negative contribution of P_{1j} to IGP_j is capped at -0.5.

For education, all individuals in the household at or above 14 years of age should have completed at least their primary education (6 years of schooling). For children below 14 years of age, a table in the Law indicates how many years of education should have been reached

for each age. If an individual cannot read or write and is at least 10 years old, a value of zero is assigned for that individual's education. Formally, if A_{ij} denotes the age of individual i in household j and E_{ij} denotes his/her years of schooling, the education gap at the individual level is computed as:

$$B_{ij} = \begin{cases} 1 - NE_{ij} & \text{if} \quad NE_{ij} \leq 1 \\ \frac{1-NE_{ij}}{7.334} & \text{if} \quad NE_{ij} > 1 \\ 0 & \text{if} \quad NE_{ij} = 0 \\ & \text{and} \quad A_{ij} < 9 \end{cases} \qquad \text{with}$$

$$NE_{ij} = \begin{cases} E_{ij} & \text{if} \quad A_{ij} \leq 8 \\ \frac{E_{ij}}{Max\{6, A_{ij}-8\}} & \text{if} \quad 9 \leq A_{ij} \\ 0 & \text{if } illiterate \\ & \text{and} \quad A_{ij} > 9 \end{cases}$$

At the household level, denoting by e_j the number of individuals for whom education gaps are estimated (this is done only for individuals older than 6), the education gap P_{2j} is the average of the education gaps for individual members:

$$P_{2j} = \frac{\sum_{i-1}^{n} B_{ij}}{e_j}$$

For housing, dwellings should have one bedroom for each set of three individuals, so that P_{3i} for housing unit j is:

$$P_{3j} = \begin{cases} 1 - DE_j & \text{if} \quad DE \leq 1 \\ -DE_j/150 & \text{if} \quad DE_j > 1 \end{cases} \qquad \text{with}$$

$$DE_j = \frac{Number\ of\ bedrooms^{*}3}{Number\ of\ individuals}$$

For sanitation, P_{4j} is equal to -0.5 if the household has public sanitation. A septic installation yields a value of 0. A latrine yields 0.5. Using a river, a lake, or the sea yields a value of 0.7. Households with no sanitation at all get a value of 1.

Finally, the energy and cooking gap P_{5j} is 0 if the household has electricity or gas. Using petroleum yields a value of 0.5. Using wood or coal yields a value of 0.9.

Denoting by n_j household size, and squaring IGP_j to place more weight on the very poor, the so-called *Masa Carencial* MCH_j of household j is:

$$MCH_j = \begin{cases} IPG_j^2 * n_j & \text{if} \quad IPG_j > 0 \\ 0 & \text{if} \quad IPG_j \leq 0 \end{cases}$$

Denoting by N_m the number of households in municipality m, and by M the number of municipalities in a given state, the share of state funds devoted to each municipality is defined in the Law as:

$$PM_m = \frac{\sum_{j=1}^{N_m} MCH_j}{\sum_{m=1}^{M} \sum_{j=1}^{N_m} MCH_j}$$

Since state level allocations for FISM are known, we can estimate the allocations to municipalities using this formula. To estimate allocations at the household level, we assume an equal per capita or per household allocation within each municipality, no leakages in the funds, and a value for households of the projects implemented with the funds equal to their cost. Then, we add to the income per capita observed in the census data the value of FISM transfers. While these may be considered heroic assumptions, they are good enough for what concerns us here, namely whether indigenous and non-indigenous households are likely to benefit in the same way from FISM (there are no *a priori* reasons to believe that the potential administrative leakages in the local use of the funds and the value for households of the projects implemented should differ between municipalities according to whether they have a majority of indigenous or non-indigenous households.)

3. Empirical Results

Table 1 provides estimates of the five indicators of unmet basic needs (income, education, housing, sanitation, and energy) for indigenous and non-indigenous households in Chiapas, Guerrero, and Oaxaca. These are the three poorest states in Mexico. Located in the south of the country, they all have large indigenous populations, which is why we focus on these states here. Information on the main indicators used for estimating unmet basic needs is also provided.

Apart from high levels of unmet basic needs in each state as a whole, the table reveals that there are striking differences between indigenous households and non-indigenous households. The per capita income of non-indigenous households is two to three times as large as the per capita income of indigenous households, and correspondingly, the income basic needs gap P_1 is much larger among indigenous

households. Individuals above 6 years of age among indigenous households have on average 3 to 4 years of schooling, versus 5 to 6 years for non-indigenous households. Literacy rates among individuals over 10 years of age are also much higher among non-indigenous households, so that overall, the education gap for indigenous households is twice the gap observed for non-indigenous households. In sanitation and in energy, the differences between the indicators of unmet basic needs for indigenous and non-indigenous households are even larger. Only in housing (number of bedrooms available per household and housing gap) are the differences less striking.

Table 2 provides standard poverty measurements for the three states, which are based on a comparison of the per capita income level of households to the poverty line of $419.76 Mexican pesos per month per person (these measurements differ from P_1 as defined above; in table 2 we rely on the standard headcount, poverty gap, and squared poverty gap indices as proposed by Foster, Greer and Thorbecke, 1984). The measurements are computed including and excluding Government programs. The measurements observed from the Census include the PROCAMPO and PROGRESA transfers. Poverty measurements without excluding these transfers are provided as well. Finally, we provide poverty measurements assuming that what is spent at the municipal level through FISM generates a corresponding benefit, and thereby a reduction in poverty, for households. This is done under two different scenarios: an equal per capita allocation within each municipality, and an equal allocation for each household (this will be less pro-poor since poor households tend to be larger).

In all three states, the observed reduction in poverty obtained with PROCAMPO and PROGRESA is larger for indigenous households than for non-indigenous households, essentially because the transfers they receive are also larger. Similarly, the reduction in poverty assumed as a result of the FISM transfer is larger for indigenous households, again because the municipalities in which they live receive larger transfers through FISM. Thus, the recent efforts at targeting social programs (especially PROGRESA and FISM, PROCAMPO is not targeted) to the poor in Mexico appear to have had substantial benefits for indigenous peoples, at least in the southern states of Chiapas, Guerrero, and Oaxaca.

4. Conclusion

Indigenous peoples living in the southern states of Chiapas, Guerrero and Oaxaca in Mexico tend to be very poor, and it has some-

times been argued that they do not fully benefit from Government programs aiming at fighting poverty. Using data from Mexico's 2000 census, we have shown that indigenous peoples in the three states under review do benefit from three large Government programs, namely PROGRESA, FISM, and PROCAMPO. In fact indigenous peoples benefit more than non-indigenous peoples from some of these programs. While this represents good news, the gaps in income and other indicators of well being between indigenous and non-indigenous households remain very large, even after taking into account the impact of the three programs.

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Table 1

State-level Masa Carencial in Chiapas, Guerrero, and Oaxaca, 2000 census

	Chiapas		*Guerrero*		*Oaxaca*	
	Indigenous peoples	*Non-indigenous*	*Indigenous peoples*	*Non-indigenous*	*Indigenous peoples*	*Non-indigenous*
Per capita income	252.7	771.8	305.1	842.1	408.9	751.8
P_1 (income gap, %)	75.7	41.0	70.3	36.0	62.3	36.3
Years of schooling (age 6+)	3.0	5.1	3.1	5.5	4.0	5.6
Literacy, %	61.0	82.0	55.0	83.7	71.9	86.7
P_2 (education gap, %)	37.0	20.0	37.0	16.2	27.2	14.2
Bedrooms per household	1.5	1.7	1.4	1.6	1.5	1.7
P_3 (housing gap, %)	32.2	21.3	33.4	20.0	26.1	16.0
Lack of sanitation, %	70.0	27.0	82.0	40.0	65.0	41.0
P_4 (sanitation gap, %)	71.1	11.4	84.1	32.0	65.2	31.6
Access to electricity, %	74.0	87.0	61.0	89.0	78.0	89.0
P_5 (energy gap, %)	19.5	8.7	31.2	7.2	17.1	6.0
Masa Carencial	34.2	19.8	35.0	19.6	28.7	18.4

Source: Authors' estimation using public use sample data files for Mexico's 2000 census.

Table 2

Impact of Programs on Poverty in Chiapas, Guerrero, and Oaxaca, 2000 census

	Without PROCAMPO PROGRESA	Observed with Census	With FISM (Capita)	With FISM (Households)	Without PROCAMPO PROGRESA	Observed with Census	With FISM (Capita)	With FISM (Households)
	Chiapas indigenous				Chiapas non-indigenous			
Headcount	89.9	88.6	85.9	85.4	63.0	62.2	59.6	59.5
Poverty Gap	73.1	68.7	52.1	53.0	41.0	38.9	31.8	32.2
Squared Poverty Gap	64.7	58.5	35.2	36.9	32.8	29.9	21.2	21.7
Aver. income (per capita)	220.8	252.7	330.3	328.2	728.5	771.8	813.5	814.2
Aver. income, poor only	78.7	94.3	165.1	159.3	146.4	157.5	195.7	192.9
Aver. trans. (per capita)	32.0	-	77.6	75.5	43.3	-	53.7	42.4
Aver. trans. poor only	16.1	-	70.8	65.0	9.3	-	38.1	35.3

Table 2
(continued)

	Without PROCAMPO PROGRESA	Observed with Census	With FISM (Capita)	With FISM (Households)	Without PROCAMPO PROGRESA	Observed with Census	With FISM (Capita)	With FISM (Households)
	Guerrero indigenous				Guerrero non-indigenous			
Headcount	83.6	83.0	78.8	78.2	50.0	49.4	46.5	46.4
Poverty Gap	66.9	63.5	44.3	45.5	33.4	31.7	24.7	25.1
Squared Poverty Gap	59.4	54.3	28.2	30.3	27.7	25.5	16.5	17.1
Aver. income (per capita)	277.8	305.1	394.2	391.7	828.4	842.1	886.8	887.2
Aver. income, poor only	78.7	92.5	172.9	165.1	131.1	140.9	185.3	181.2
Aver. trans. (per capita)	27.3	-	89.1	86.6	13.7	-	44.7	45.1
Aver. trans. poor only	13.7	-	80.5	72.7	9.8	-	44.4	40.3

Table 2
(continued)

	Without PROCAMPO PROGRESA	Observed with Census	With FISM (Capita)	With FISM (Households)	Without PROCAMPO PROGRESA	Observed with Census	With FISM (Capita)	With FISM (Households)
	Oaxaca indigenous				Oaxaca non-indigenous			
Headcount	76.5	75.7	73.0	72.6	52.1	51.5	49.5	49.5
Poverty Gap	59.0	55.6	43.0	43.6	34.7	33.1	27.4	27.7
Squared Poverty Gap	51.6	46.7	29.4	30.5	28.7	26.5	19.1	19.4
Aver. income (per capita)	385.0	408.9	471.9	471.3	735.9	751.8	787.5	788.0
Aver. income, poor only	96.2	111.5	172.3	167.9	140.3	150.2	187.3	185.2
Aver. trans. (per capita)	23.9	-	63.0	62.4	15.9	-	35.7	36.2
Aver. trans. poor only	15.3	-	60.9	56.4	9.9	-	37.1	35.0

Source: Authors' estimation using public use sample data files for Mexico's 2000 census.