Poverty dynamics and graduation from social protection: A transition model for Mexico’s Oportunidades programme

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ABSTRACT

Background: programme graduation and policy response to poverty dynamics are an unexplored field of research.

Objective: characterize poverty or eligibility dynamics in the context of the implementation of social protection programmes.

Design: the implementation of Mexico’s Oportunidades offers an empirical approach. We employ a three-round panel survey representative at the national level. We estimate poverty transition probabilities accounting for state dependence and attrition.

Results: our estimations indicate that 27.6 percent of ineligible participants could graduate from the programme. Recertification process should occur every 3.5 and 4.1 years in urban an rural areas respectively.

Conclusion: eligibility or poverty dynamics must not be ignored in the design and implementation of social protection (antipoverty) programmes.
CONTENT

1. Contextualisation and motivation.

2. Poverty and eligibility dynamics.

3. Existing poverty graduation strategy in Oportunidades.

4. Estimation of transition probabilities.

5. Data and results.

CONTENT

1. Contextualisation and motivation.

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Contextualisation and motivation

Cumulative numbers of transfer programmes in developing countries (BWPI database):
Contextualisation and motivation

Social Protection (SP): a response to conditions of poverty or deprivation. Composed of social assistance, non-contributory labour market policies and social insurance.

Conditional cash transfer programmes (CCTs): part of social protection, essentially in Latin America → Mexico’s Oportunidades is perhaps the most representative CCT.

Household or individual participation in SP may involve long term exposure: Oportunidades has been running from 1997 targeting households in poverty.

Over 16 years of participation: long term beneficiaries may experiment several spells of poverty and non-poverty or eligibility or ineligibility.

How SP programmes should respond when a beneficiary becomes ineligible is still unclear.
Contextualisation and motivation

Conventional components of a transfer programme

Targeting
- Mean test
- Categorical
- Proxy means test

Entry

Benefits
- In-kind
- Cash

Exposure to benefits
- Transient poverty
- Persistent poverty

Graduation
- From poverty
- From the programme
Contextualisation and motivation

Entry to SP: defined by targeting methods.
Exit/graduation from SP: still an unexplored field of research!

Google scholar metrics:
Contextualisation and motivation

Programme and poverty graduation:

- Programme graduation – results from 1. maximum duration rules; 2. absence of programme categorical eligibility (e.g. non-contributory pensions and early childhood nutrition programmes).

- Poverty graduation: household leaves poverty, becomes ineligible.

Focus of this research: poverty graduation insofar as programme graduation is not achieved.

→ Current response to non-poverty or eligibility: stop the programme if the household is not longer poor or eligible.

- No considerations on dynamics: graduated households in period $t$ might become eligible in period $t+1$. 
Contextualisation and motivation

What we do?

• We estimate poverty transition probabilities taking into account:
  1. State dependence: previous participation experience may drive future eligibility
  2. Attrition: participants are more likely to be retained in follow-up surveys. Non-random attrition produce biased estimates.
     → Main source of unobserved heterogeneity.
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Poverty and eligibility dynamics

Poverty and eligibility are synonyms in the context of the design and implementation of SP programmes.

→ Poverty is a necessary but not sufficient to eligibility: eligibility becomes relevant when there is a response to poverty. Poverty cannot be tackled if households or individuals are not identified.

→ Most SP are targeted.
  • Means tests: single income or consumption survey.
  • Proxy means tests: relevant when high informality rates prevent the verification of income. Predicts household or individual welfare (income or consumption).

→ In absence of targeting errors (inclusion or exclusion) poverty and eligibility are exactly the same. If targeting errors are constant, poverty and eligibility follow the same trend.
Poverty and eligibility dynamics


Figure 1. Poverty or eligibility trends.

![Diagram showing poverty or eligibility trends over time.](image-url)
Poverty and eligibility dynamics

Implications for SP programmes.

Figure 1. Poverty or eligibility trends.

Welfare

Poverty or eligibility threshold

Never poor

Occasionally poor

Descending

Usually poor

Escapee household

A

B

C

Always poor

Time
Poverty and eligibility dynamics

Implications for SP programmes.

• How to deal with descending or usually poor or eligible households?

✓ Graduation without consideration on eligibility dynamics ignores the fact that beneficiaries are likely to become eligible in the future.

✓ Escapee and occasionally poor households are identified for poverty and programme graduation.


• Mideplan (2009): 30 percent of the households that had graduated from poverty came back into eligibility.
1. Contextualisation and motivation.
2. Poverty and eligibility dynamics.
3. Existing poverty graduation strategy in *Oportunidades*.
4. Estimation of transition probabilities.
5. Data and results.
Existing poverty graduation strategy in Oportunidades

**Oportunidades** (Opportunities)
- Has become important reference of SP. Adopted in several developing countries. Even in New York City, known as Opportunity NYC.
- Delivers income transfers in cash conditional on education and health checkups of children in extreme poor households.

- **Targeting and selection**: household with earned income below the food poverty line (known as Minimum Welfare Line – MWL).
- Having children or youth members under 22 years of age.
- Women in reproductive age.
- Living in poor villages.
**Existing poverty graduation strategy in Oportunidades**

Poverty graduation follows the following rule:

1. A household is recertified three years after enrolment. Proxy means test is updated.

2. If predicted income is greater than the MWL but lower than the Capability Line (CL) the household is routed through the *differentiated support scheme*.
   - CL: food poverty line + average spending on health and education.
   - Differentiated support scheme: everything except transfers for elementary education.

3. If predicted income is greater than the CL, then the household is abruptly withdrawn from the programme.
Existing poverty graduation strategy in Oportunidades

Figure 1. Transfers level and income.

Transfers

MWL

PSCVL

Income
CONTENT

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Estimation of transition probabilities

Several methodological choices:

1. Vulnerability to poverty: strong assumptions on predicted welfare status (expected income, consumption, utility or insure risk). State dependence ignored.

2. Hazard proportional models: in some cases we do not know when poverty starts and when does it end.

3. Transition probabilities: Markovian model that takes into account state dependence and attrition.

Estimation of transition probabilities

A three equations system in a Markovian setting:

- Probability of being eligible at baseline $t-1$.

$$p_{it-1}^* = \beta' X_{it-1} + u_{it-1} \text{ with } u_{it-1} = \mu_i + \delta_{it-1}$$

- Retention probability at $t$.

$$r_{it}^* = \psi' W_{it-1} + \nu_{it} \text{ with } \nu_{it} = \eta_i + \xi_{it}$$

- Probability of being eligible at $t$.

$$p_{it}^* = [(P_{it-1})\gamma'_1 + (1 - P_{it-1})\gamma'_2]z_{it-1} + \varepsilon_{it} \text{ with } \varepsilon_{it} = \tau_i + \zeta_{it}$$

And predicted entry rates

$$e_{it} = Pr(P_{it+1} = 1 | P_{it} = 0) = \frac{\phi_2(\gamma'_1z_{it-1} - \beta' X_{it-1}, \rho_2)}{\phi(-\beta' X_{it-1})}$$
Estimation of transition probabilities

Parameters are estimated by a non-linear likelihood equation:

\[
\log L_i = P_{it-1} R_{it} \log \left[ \phi_3 \left( k_i \gamma_1 z_{it-1}, m_i \psi' w_{it-1}, q_i \beta' X_{it-1}; k_i m_i \rho_3, k_i q_i \rho_2; m_i q_i \rho_i \right) \right] \\
+ (1 - P_{it-1}) R_{it} \log \left[ \phi_3 \left( k_i \gamma_2 z_{it-1}, m_i \psi' w_{it-1}, q_i \beta' X_{it-1}; k_i m_i \rho_3, k_i q_i \rho_2; m_i q_i \rho_2 \right) \right] \\
+ (1 - R_{it}) \log \left[ \phi_2 \left( m_i \psi' w_{it-1}, q_i \beta' X_{it-1}; m_i q_i \rho_i \right) \right]
\]

Non-linearity makes it difficult to obtain the estimated parameters.

- Computationally demanding.
- We estimate the equation by simulation following Gourieroux and Monfort (1996) by running 250 replications.
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Data and results

We use the Mexican Family Life Survey (MxFLS).

- Panel dataset with three rounds: 2002 (I), 2005 (II) and 2009 (III).
- The survey is representative at national level with 8 thousand households and 35 thousand individuals.
- Several modules on household composition, consumption, income, employment, household dynamics.
- We replicate household eligibility to Oportunidades under current rules and income methodology.
Data and results

Poverty is calculated in reference to **disposable income** following international standards.

According to INEGI disposable income is composed of:

- Labour earnings.
- Property income.
- Transfers from public and private agents.
- Estimated value of house rent for house owners.

- We do not include transfers from Oportunidades.
- Estimated value of house rent was not reported in 2002.
  - We brought the value for unattributed households in 2005.
  - Only 3 percent of households left an own house between 2002 and 2005.
  - Reported value in 2005 was deflated to 2002 housing prices.
Data and results

The CL was set:
• At 987.72 and 1,027.35 Mexican pesos for urban and rural areas, respectively, in 2002.

Table 1: Average income and proportion of households below the PSCVL

<table>
<thead>
<tr>
<th>Survey round</th>
<th>MxFLS-I</th>
<th>MxFLS-II</th>
<th>MxFLS-III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average per capita income</td>
<td>5,040</td>
<td>5,843</td>
<td>6,836</td>
</tr>
<tr>
<td>Proportion below CL</td>
<td>0.374</td>
<td>0.302</td>
<td>0.322</td>
</tr>
<tr>
<td>Average per capita income - Urban</td>
<td>6,158</td>
<td>7,015</td>
<td>8,046</td>
</tr>
<tr>
<td>Proportion below CL - Urban</td>
<td>0.296</td>
<td>0.221</td>
<td>0.245</td>
</tr>
<tr>
<td>Average per capita income - Rural</td>
<td>3,275</td>
<td>3,945</td>
<td>4,561</td>
</tr>
<tr>
<td>Proportion below CL - Rural</td>
<td>0.496</td>
<td>0.433</td>
<td>0.423</td>
</tr>
</tbody>
</table>

Source: Mexican Family Life Survey-I, II and III.
Note: Values in Mexican pesos at current prices for each year.
## Data and results

### Eligibility transition matrix:

<table>
<thead>
<tr>
<th>Eligibility defined by CL</th>
<th>Eligibility at $t$ (MxFLS-I to MxFLS-II)</th>
<th>Eligibility at $t$ (MxFLS-I to MxFLS-III)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ineligible</td>
<td>Eligible</td>
</tr>
<tr>
<td>Sample with unattrited sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ineligible</td>
<td>82.3%</td>
<td>17.7%</td>
</tr>
<tr>
<td>Eligible</td>
<td>67.2%</td>
<td>32.8%</td>
</tr>
<tr>
<td>All</td>
<td>78.2%</td>
<td>21.8%</td>
</tr>
<tr>
<td>Eligibility at $t-1$ (urban)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample with attrited sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ineligible</td>
<td>72.1%</td>
<td>15.5%</td>
</tr>
<tr>
<td>Eligible</td>
<td>52.0%</td>
<td>25.5%</td>
</tr>
<tr>
<td>All</td>
<td>66.1%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Sample with unattrited sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ineligible</td>
<td>67.8%</td>
<td>32.2%</td>
</tr>
<tr>
<td>Eligible</td>
<td>46.4%</td>
<td>53.6%</td>
</tr>
<tr>
<td>All</td>
<td>57.2%</td>
<td>42.8%</td>
</tr>
<tr>
<td>Sample with attrited sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ineligible</td>
<td>64.6%</td>
<td>30.6%</td>
</tr>
<tr>
<td>Eligible</td>
<td>43.9%</td>
<td>50.7%</td>
</tr>
<tr>
<td>All</td>
<td>54.3%</td>
<td>40.6%</td>
</tr>
</tbody>
</table>

Source: Mexican Family Life Survey-I,II and III.
Data and results

Eligibility dynamics of unattrited households:

<table>
<thead>
<tr>
<th>Dynamics</th>
<th>MxFLS-I</th>
<th>MxFLS-II</th>
<th>MxFLS-III</th>
<th>Urban households</th>
<th>Rural households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never eligible</td>
<td>Non-poor</td>
<td>Non-poor</td>
<td>Non-poor</td>
<td>49.8%</td>
<td>36.9%</td>
</tr>
<tr>
<td>Descending household</td>
<td>Non-poor</td>
<td>Poor</td>
<td>Poor</td>
<td>2.8%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Occasionally eligible</td>
<td>Non-poor</td>
<td>Poor</td>
<td>Non-poor</td>
<td>7.8%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Occasionally/descending</td>
<td>Non-poor</td>
<td>Non-poor</td>
<td>Poor</td>
<td>12.2%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Always eligible</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>9.6%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Escapee household</td>
<td>Poor</td>
<td>Non-poor</td>
<td>Non-poor</td>
<td>11.7%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Usually eligible</td>
<td>Poor</td>
<td>Non-poor</td>
<td>Poor</td>
<td>3.6%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Usually/escapee</td>
<td>Poor</td>
<td>Poor</td>
<td>Non-poor</td>
<td>2.7%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

Source: Mexican Family Life Survey-I,II and III.
Data and results

Eligibility transitions are estimated including baseline covariates:

**Physical characteristics**
- Type of dwelling
  - Sole House sharing walls
- Floor material
  - Firm cement
- Walls material
  - Concrete, partition, brick, block
- Roof material
  - Concrete/partition/brick/block
- Source of drinking water
  - Tap water inside the dwelling
- Type of toilet
  - Latrine

**Other household members**
- House has electricity
- Telephone landline
- Own paid house
- Sewage service
- House surrounded by residues
- Persons per bedrooms
- Household Head
  - Age
  - Male = 1
  - Years of education
- Spouse age
- Spouse years of education
- Mean household age
- Mean household years of education
- Max. years of edu. of household members
- Number of children under 6 yo
- Number of children under 15 yo
- Mean children age
- Dependency ratio*
- Pregnant in the household
- Member with chronic illness
- Children attend school
Data and results

Eligibility transitions are estimated including baseline covariates:

*Assets*
- Household owns other house
- Bicycle
- Vehicle
- Electric appliances
- Washing machine
- Agricultural machinery
- Cows
- Horses
- Pigs or goats
- Poultry

*Shocks in the last five years*
- Household member died
- Household member suffered accident
- Household member lost employment
- Household was victim of natural disaster
- Household lost a crop
Data and results

Predicted entry and exit rates:

<table>
<thead>
<tr>
<th>Eligibility defined by CL</th>
<th>Population</th>
<th>Ineligible in 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entry rate &gt; 0.5</td>
<td>38.0%</td>
<td>34.0%</td>
</tr>
<tr>
<td>Exit rate &gt; 0.5</td>
<td>33.2%</td>
<td>28.9%</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entry rate &gt; 0.5</td>
<td>47.4%</td>
<td>44.8%</td>
</tr>
<tr>
<td>Exit rate &gt; 0.5</td>
<td>22.2%</td>
<td>26.7%</td>
</tr>
</tbody>
</table>

Source: Mexican Family Life Survey-I, II and III. Note: (1) Entry and exit rates calculated by predicted transition probabilities

We can define ineligibility duration as $1/e_{it}$

According to this:
- Recertification should take place every 3.5 years in urban areas.
- Every 4.1 years in rural areas.
Data and results

Predicted entry rates:

![Predicted entry probabilities - Ineligible in 2009]

- Predicted entry probabilities: Mx$2,086, Mx$1,511
- Mexican peso in 2009
- Transition probability
- Urban, Rural
Data and results

We propose a graduation line (GL):

Figure 1. Transfers level and income.
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Concluding remarks

- This paper has provided an analysis of the implications of eligibility dynamics (as a consequence of poverty dynamics) in the context of the implementation of Mexico’s Oportunidades programme.

- To date, most transfer programmes respond to upward mobility by dropping beneficiaries without consideration on the socioeconomic dynamics that they may follow.

- Our results suggest that graduation should take place when a sustained eligibility exit trend is observed.

- Our analysis does not provide answers on the type of policy strategies that may help beneficiaries to find a permanent way out of eligibility. Instead, we highlight the relevant conditions that Oportunidades could consider before graduating programme participants.
THANK YOU!
GRACIAS!