Market participation decisions and market choices: A case study of Bolivian potato farmers

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### Introduction

- Potato production is vital for impoverished households in the Bolivian Andes.
- Potato sales represent 79.5% of crop revenue and 49.5% of total household revenue.
- Market participation can be an useful tool to lift small-scale farmers out of semi-subsistence farming and escape poverty.
- Identifying obstacles to market participation and factors to promote participation in higher-valued markets is necessary to increase farmers’ income and welfare.

![Bolivia map with market locations](image)

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### Research questions

1. What is needed to simulate small-scale farmers market participation and volume sold?
2. What is needed to improve marketing performance?

### Methods

Simultaneous system of 3 equations with selectivity and a recursive equation:

\[
\begin{align*}
Y_1 &= f(x_1, x_2, x_3, x_4, x_5 | \gamma) + \mu_1 \\
Y_2 &= f(x_1, x_2, x_3, x_4 | \beta) + \mu_2 \\
Y_3 &= f(y_2, y_1, x_2, x_3, x_4, x_5 | \delta) + \mu_3
\end{align*}
\]

- \(x_1\) = Fixed transaction costs
- \(x_2\) = Proportional transaction costs
- \(x_3\) = Determinants of household supply of potato
- \(x_4\) = Determinants of household demand for potato
- \(x_5\) = Household characteristics
- \(\gamma\) = Access to liquidity

### Conceptual framework

- **Y_1**: Market participation
- **Y_2**: Quantity sold
- **Y_3**: Optimal market choice

![Conceptual framework diagram](image)

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### Data

- Survey data: 354 potato farmers
- Data on agricultural activities, market participation, household characteristics, etc.
- Geo-referenced household location
- GIS data for road network, elevation, soil, etc.
- Market participation and quantity sold
- 317 households sold an average of 4914 kg (581) of potato
- **Optimal market choice**:
  - Optimal marketing strategies are: 1) Santa Cruz, 2) Cochabamba, 3) Punata/Tirapeque/Santa Cruz
  - 36 households selected an optimal marketing strategy

### Results

<table>
<thead>
<tr>
<th>Market participation</th>
<th>Quantity sold</th>
<th>Optimal market choice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed transaction costs</strong></td>
<td>NA</td>
<td>Radio ownership increases the probability of market participation by 6.5%</td>
</tr>
<tr>
<td><strong>Proportional transaction costs</strong></td>
<td>NA</td>
<td>Radio ownership increases the probability of selecting an optimal marketing strategy by 3%</td>
</tr>
<tr>
<td>Selling an additional 1,000kg of potato increases the likelihood of selecting an optimal marketing strategy by 1.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Determinants of household supply of potato</strong></td>
<td>Insignificant</td>
<td>An additional hectare in farm size increases quantity sold by 872 kg, respectively</td>
</tr>
<tr>
<td><strong>Household characteristics</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Primary education of the household head reduces the probability of selecting an optimal marketing strategy by 4.6% compared to no education.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Quantity sold</strong></td>
<td>NA</td>
<td>An additional child decreases the probability of market participation by 1.3%</td>
</tr>
<tr>
<td><strong>Optimal market strategy</strong></td>
<td>NA</td>
<td>Primary education of the household head increases the probability of selecting an optimal marketing strategy by 0.2% respectively</td>
</tr>
<tr>
<td><strong>Selecting an optimal marketing strategy</strong></td>
<td>NA</td>
<td>An additional 1,000 lbs in livestock ownership value increases the likelihood of selecting an optimal marketing strategy by 1.1%</td>
</tr>
<tr>
<td><strong>Access to liquidity</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

### Conclusions

- Reducing the costs of obtaining price information (additional price broadcasting, cellular use, training) could raise producers welfare.
- Improving transportation alternatives and road quality in the study area could increase quantity sold and facilitate sales in more lucrative markets.
- Policies aimed at increasing market surplus, such as technical assistance, could generate additional sales and raise producers welfare.
- Credit programs, easing liquidity constraints, could help farmers adopt more profitable marketing strategies.

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**Reference:**