Individual & intra-household effects of universalizing access to subsidized food in Odisha

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Food price subsidies and undernutrition

- Food assistance program improve nutritional status and food security (Lintis and Barrett 2011). Rising income levels by themselves are may not (FAO, WFP & IFAD 2013).
- India has nearly 40% of the world’s food insecure
- India’s Public Distribution Scheme (PDS) is one of the largest food security program in the world.
- Like many other food security programs, the PDS has suffered from: i) rising costs of operation and ii) ineffective targeting and leakage (negligible non-poor benefit but eligible poor do not).
- PDS reform: extend food subsidies to non-poor & the previously excluded poor

Natural policy experiment in Odisha after 2008:
- (re-)introduced universal food price subsidy PDS introduced in 8 districts in the Kalahandi-Balangir-Koraput (KBK) region
- Targeted PDS continued in other 14 districts

What do(n’t) we know

- Impact of food price subsidies on nutrition is theoretically ambiguous. The income effect of subsidies can lead to purchasing better nutrition or less nutritious, costlier foods.
- Many empirical studies conclude that food price subsidies do not improve nutritional status or even have a negative impact as consumers use the weight effect of the subsidies to substitute towards more expensive but less nutritional foods (Behrman & Deolalikar 1989; Tarozzi 2005; Jensen & Miller 2011)

Evidence for India’s PDS on nutritional intake after PDS became targeted in 1997:
- Improvement in calories/nutrients/diet quality: NO (Kochhar 2005; Kaushal and Muchomba 2015)
- Improved health status as per nutrition survey (e.g. Chattisgarh).

What is new in this paper?

This paper is the first to:
1. examine the impact of universal food subsidies on nutrition in the poorest districts of one of the poorest Indian states using panel data to control for unobserved heterogeneity.
2. estimate the intra-household effects of food price subsidies, in any context.
3. estimate distributional impacts by quintile
4. use an outcome rather than input measure of health and well-being. Using consistent BMI Z-scores for all household members (Naschold 2017) allows us to assess the individual level health impact of PDS and the dynamics within the household.

Empirical strategy

- We estimate the impact of universalizing PDS in KBK districts in Odisha using difference-in-difference (DD) and triple difference estimators (DDD)

\[
BMD_{PDS} = \beta_0 + \beta_1 P_0 + \beta_2 P_{1997} + \gamma_0 \times T_0 + \gamma_1 \times T_{1997} + \gamma_2 \times P_0 \times T_0 + \gamma_3 \times P_{1997} \times T_{1997} + \delta \times D + \epsilon
\]

- D is a dummy variable=1, for evidence in KBK district
- P is a dummy variable=1, for after 2008

The DDD estimation contains two DD estimates: i. the difference in changes in between KBK districts vs non-KBK districts for the non-poor, and ii. the same as i) for the poor.

The DDD estimator (1)-(2) shows whether making PDS universal in KBK locations led to changes in the poor’s health that differ from changes in the health of the poor living in non-KBK locations.

• Robustness checks include: Propensity Score Matching DD; individual vs. household level panels; including all household members vs. only women & children measured in both rounds; quantile DD

The setting: Relevance of Odisha state

- (Among) the poorest state in India
- Worst poverty & starvation in KBK districts
- Odisha has been at forefront of PDS reform

The data

- India Human Development Survey: IHDS I 2005 and IHDS II 2011/12
- Contains height & weight for women and children in both round, and for select other HH members in round 2
- Use Individual- & household-level average-level panel

<table>
<thead>
<tr>
<th>Survey Round</th>
<th>BMI Z-scores</th>
<th>KBK Districts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.885</td>
<td>-1.220</td>
<td>-0.885</td>
</tr>
<tr>
<td>2</td>
<td>-0.870</td>
<td>-1.220</td>
<td>-0.870</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-0.875</strong></td>
<td><strong>-1.220</strong></td>
<td><strong>-0.875</strong></td>
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</tbody>
</table>

Results

- On average the change in BMI Z-scores in KBK districts was between 0.4 and 0.55 standard deviations larger than in non-KBK locations. (average treatment effect, see table below)
- Difference is statistically & nutritionally significant.

The DDD estimate shows that there were no significant differences in changes for the poor in KBK vs the poor in other districts.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>(1)</td>
<td>DD Panel</td>
<td>DDD</td>
<td>PSM kernel</td>
</tr>
<tr>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Diff-in-diff</td>
<td>0.420***</td>
<td>0.545***</td>
<td>0.401***</td>
</tr>
<tr>
<td>DDD</td>
<td>(0.127)</td>
<td>(0.135)</td>
<td>(0.116)</td>
</tr>
<tr>
<td># observations</td>
<td>5,831</td>
<td>3,632</td>
<td></td>
</tr>
<tr>
<td># of unique persons</td>
<td>5,833</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FH controls</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Robust standard errors in parentheses</td>
<td>*** p&lt;0.01, ** p&lt;0.05, * p&lt;0.1</td>
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</table>

Conclusions

- Food assistance and subsidy programs can improve nutritional outcomes and food security.
- This paper is the first to examine the effects of food policy reform on individual level health outcomes using panel data and a natural policy experiment.
- It finds that subsidies encourage better nutrition.

Universalizing access to subsidized food under the PDS in the poorest districts of the poorest state in India increased BMI Z-scores on average by up to 0.5 standard deviations.

- These benefits are strongest for better-fed individuals. This makes sense as universalizing PDS extended access to richer households (APL ration card holders).
- The impact on the most malnourished is weakest (quintile DD). Similarly there is no difference between the poor in treatment vs control districts (DDD).
- Universal PDS has reduced leakage and broadened political support. The PDS in KBK districts no longer excludes the significant minority of poor without ration cards and is likely more politically sustainable – even if the main nutritional benefits of universal access did not go to the poorest of the poor.

Practical relevance of findings: The 2013 National Food Security Act established legal rights to access PDS for 2/3 of rural Indians. While the above findings for Odisha cannot be generalized to less poor states, they are in line with (limited) related evidence from Odisha, Tamil Nadu and Himachal Pradesh.

Key References


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