542: Nutrition smoothing: Does access to towns and cities protect children against poor health conditions at birth?
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Introduction

• Motivation
  • Weather shocks are linked to health outcomes, especially at birth
  • Seasonal fluctuations are predictable, but associated with outcomes
  • Could access to markets and services help people smooth shocks?

• Context
  • The Democratic Republic of Congo (DRC) has extremes of:
    • deprivation, with severe and widespread growth faltering
    • spatial diversity, often long roadless distance to towns
    • seasonality, with no seasons at equator but dry winters in N&S

• Identification
  • Random birth timing determines exposure to seasonality
  • Latitude determines whether there is seasonal variation at all
  • Location determines distance to the nearest town or city

• Potential significance
  • Identifying the worst times and places can guide prevention
  • Transport infrastructure itself may be a powerful remedy
  • Natural experiments like seasonality can reveal mechanisms

Methods

We designed a natural experiment using the quasi-random component of birth timing to identify exposure to seasonal risk.

• Data:
  • 2007 and 2013 Demographic and Health Surveys for the DRC; maps of towns and roads from Africover (FAO 2013); Climate data to identify regions with & without seasonal fluctuations (World Bank 2013).

• Analysis:
  • Triple difference-in-differences analytical strategy;
  • Aggregated observations into dichotomous categories;
  • Incorporated maternal and community fixed effects;
  • Conducted various robustness checks, including falsification tests.

Analytical design and hypothesized effects over triple d-in-d
(region x birth timing x market access)

Region has a distinct rainy season?
= farther from the equator)

Child born in or after rainy season?
=Jan-Jun if lat.<0, Jul-Dec otherwise)

Household is closer to town?
=distance to town in km)

Hypothesized status:
Vulnerable to seasonal variation
Not vulnerable to seasonal variation
*Protected**Affected***Unexposed

Note: Asterisks indicate hypothesis of significantly worse child nutrition relative to other groups in the same row. For *, the identifying assumption is that birth timing occurs randomly between seasons (tested). For **, the identifying assumption is that seasonal risk factors would have been similar in the absence of towns (untestable).

Acknowledgements: This work was supported by a U.S. Borlaug Fellowship in Global Food Security, and the American Society for Nutrition/Mars Inc. Predoctoral Fellowship Award for 2014. The authors would also like to thank Joseph Cummins, Dean Spears, and seminar participants at the Delhi School of Economics for helpful input and comments.

Results

Average treatment effect (ATE)/Difference-in-differences regression estimates

<table>
<thead>
<tr>
<th>variable</th>
<th>units/type</th>
<th>Alive Seasons</th>
<th>Alive No Seasons</th>
<th>HAZ Seasons</th>
<th>HAZ No Seasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Binary</td>
<td>-0.117***</td>
<td>-0.126***</td>
<td>0.029</td>
<td>-0.293***</td>
</tr>
<tr>
<td>Jan.-June</td>
<td>Binary</td>
<td>-0.127**</td>
<td>0.079</td>
<td>-0.097</td>
<td>0.063</td>
</tr>
<tr>
<td>Jan.-June*Remote</td>
<td>Interaction</td>
<td>0.128*</td>
<td>-0.025</td>
<td>-0.329**</td>
<td>-0.188</td>
</tr>
</tbody>
</table>

Observations: N = 17,217, 17,297, 4,224, 4,211

Discussion:

• Our spatial difference-in-difference approach uses underlying variation in latitude, distance to towns, and distribution of birth timing.
  • Controlling for mother and community fixed effects and a variety of robustness tests, we find that rural children who live closer to towns have less impact of their birth timing on their subsequent heights and risk of death.
  • The protective effect of market access could involve a variety of mechanisms including both consumption smoothing and access to health services or other assistance.
  • Health interventions can act on our findings to target services on more remote children born in the less healthy season
  • Results also reinforce the importance of rural infrastructure and rural-urban linkages

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