Fertilizer subsidies & voting behavior: Political economy dimensions of input subsidy programs

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Fertilizer subsidies in SSA

- **Stated objectives:**
  - Increase access to inputs, productivity, & production
  - Raise incomes, improve food security

- **Other objectives:**
  - “Do something” for rural poor (Jayne et al., 2010)
  - (Re-) Election: garner and maintain rural votes
1. Past election outcomes \( \rightarrow \) subsidized input targeting?

- **Tanzania**: HHs with elected officials more likely to get input subsidy voucher (Pan & Christiaensen, 2012)
- **Nigeria**: areas closer to state governor’s hometown get more subsidized fertilizer (Takeshima & Liverpool-Tasie, 2013)
- **Ghana, Kenya**: subsidized fertilizer targeted to opposition strongholds (Banful, 2011; Mather & Jayne, 2013)
- **Malawi, Zambia**: subsidized fertilizer targeted to supporters (Mason & Ricker-Gilbert, 2013)
- *Political economy not focus except for Banful (2011)*

2. Targeted input subsidies \( \rightarrow \) election outcomes?

- **Qualitative**: input subsidies instrumental in Mutharika’s 2009 landslide victory in Malawi (Chinsinga, 2012; Mpesi & Muriaas, 2012)
- **Little (no?) quantitative empirical evidence to date**: Do targeted input subsidies win votes ceteris paribus?
RQ1. How do past election outcomes affect HH-level targeting of subsidized fertilizer?

RQ2. How do changes in the scale/coverage of targeted fertilizer subsidies affect presidential election outcomes (share of votes won by incumbent)?

- Data constraints → model separately
Main contributions

1. RQ1 & RQ2: Draw on political science literature to guide model specification

2. RQ1: Past election effects on sub. fertilizer targeting
   - Panel data → control for unobserved heterogeneity (c.f. Banful, 2011)

3. RQ2: *Ceteris paribus* effects of fertilizer subsidies on voting patterns
Fertilizer subsidies and elections in Zambia

**RQ1:** Election outcomes ➔ subsidized fertilizer?
- Overview

**RQ2:** Subsidized fertilizer ➔ election outcomes?
- Detailed discussion

Conclusions & policy implications
Fertilizer subsidies & timing of elections

Movement for Multi-Party Democracy (MMD)

Benefits get hybrid maize seed & fertilizer at subsidized price (50-80% subsidy)

- Nov. 1996
- Dec. 2001
- Sep. 2006
- Oct. 2008

RQ1

Patriotic Front

- Sep. 2011
- RQ2

Source: MAL (2012)
Research Question #1:

How do past election outcomes affect HH-level targeting of subsidized fertilizer?
RQ1: Effects of past election outcomes on HH-level subsidized fertilizer targeting

- Reduced form CRE Tobit models of gov’t behavior
  - 3-wave nationally-representative HH panel (12,855 obs.)
  - Dep. var.: kg of subsidized fertilizer allocated to HH
  - Key expl. vars.: presidential/parliamentary election results (Banful, 2011)
    - (a) =1 if ruling party (MMD) won constituency
    - (b) | Percentage point spread MMD – lead opposition |
    - (a) × (b)
  - Other controls: HH, village, region characteristics, year effects
### RQ1: Results

**Dep. variable:** kg of subsidized fertilizer to HH

<table>
<thead>
<tr>
<th>Key explanatory variables</th>
<th>APE</th>
<th>Sig.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) MMD won (=1)</td>
<td>23.21</td>
<td>***</td>
<td>0.00</td>
</tr>
<tr>
<td>(b)</td>
<td>PP spread MMD – lead opp.</td>
<td>-0.09</td>
<td>0.30</td>
</tr>
<tr>
<td><strong>Interaction effect: (a) × (b)</strong></td>
<td>0.54</td>
<td>***</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Note: *** p<0.01, **p<0.05, *p<0.10. APE = average partial effect.

**MMD wins APE slightly smaller if use parliamentary (18.7 kg)**

- MMD rewards its base
- **Consistent w/ “core supporter/turnout” model**
  (Cox & McCubbin, 1986)
RQ2: Do fertilizer subsides win votes in Zambia?

No! But reducing poverty, inequality, & unemployment does.
RQ2: Effects of fertilizer subsidies on district-level share of votes won by the incumbent

Conceptual framework

- **Conventional wisdom in Zambia**: fertilizer subsidies effective tools for gaining rural votes

- **Poli. sci. literature on voting in Zambia & SSA**
  (Bratton et al., 2011; Posner & Simon, 2002; many others)
  - Demographics (ethnicity, gender, age, rural vs. urban)
  - Economic voting (overall economy – income levels/poverty rates, inequality, unemployment)
  - Own economic situation, private goods from government (e.g., subsidized fertilizer)

- **Reduced form model of voting behavior** (Cerda & Vergara, 2008)
RQ2: Effects of fertilizer subsidies on district-level share of votes won by the incumbent

**Empirical model:** Unobserved effects fractional response (district-level***)

- Proportion dependent variable, panel data

\[
E(sMMD_{dt} \mid subfert_{dt-1}, v_{dt-1}, e_t, c_d) = \\
\Phi(\alpha + \beta subfert_{dt-1} + v_{dt-1} \delta + e_t + c_d)
\]

- \(d\) (district) = 1, … , 72; \(t = 2006, 2011\)
- \(sMMD\): share of votes won by incumbent president
- \(subfert\): scale/coverage of fertilizer subsidy program
  - % of smallholder HHs receiving OR mean kg/smallholder HH
  - OR total district allocation (MT)
- \(v\): vector of demographic and economic controls
RQ2: Effects of fertilizer subsidies on district-level share of votes won by the incumbent

Estimation strategy

- **CRE pooled fractional probit** (Papke & Wooldridge, 2008)
- Concerned about **endogeneity** of $subfert (t-1)$
- **Control function** approach (Rivers & Vuong, 1988; Papke & Wooldridge, 2008)
  - **Instrumental variable**
    - % of smallholder HHs cultivating 2+ ha ($t-2$)
    - Strong IV (positive, $p<0.005$)
    - Should be uncorrelated with error term after control for other factors (incl. income/poverty, demographics, unobs. het.)
  - **Fail to reject exogeneity** ($p>0.50$)
RQ2: Effects of fertilizer subsidies on district-level share of votes won by the incumbent

Data

- 2-wave district-level panel (144 obs.)
- Election results: Electoral Commission of Zambia
- Subsidized fertilizer: HH survey data, Min. of Ag.
- Various secondary data sources (GRZ)
RQ2: Results
Dep. var.: share of district votes won by incumbent

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<th>APE (pct. pt. increase)</th>
<th>Sig.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsidized fertilizer variables</td>
<td>Not. sig.</td>
<td></td>
<td>p&gt;0.50</td>
</tr>
<tr>
<td>Unemployment rate (%)</td>
<td>-10.0</td>
<td>***</td>
<td>0.00</td>
</tr>
<tr>
<td>Poverty rate (%)</td>
<td>-2.7</td>
<td>***</td>
<td>0.01</td>
</tr>
<tr>
<td>Gini coefficient (0-100 scale)</td>
<td>-2.5</td>
<td>***</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Note: *** p<0.01, ** p<0.05, * p<0.10. Bootstrapped standard errors (500 replications).

- **Subsidized fertilizer**: no stat. sig. effect
- **Economic variables**: stat. sig. & large in magnitude
- **Robustness check**: no evidence of subsidized fertilizer effects *through* economic variables
Conclusions

1. MMD used subsidized fertilizer to reward loyalty

1. Fertilizer subsidies had no effect on MMD’s share of votes in 2006 & 2011 elections

2. ↓ poverty, inequal., & unemploy. wins votes
Policy implications

1. Is politically-motivated subsidy allocation a problem? If so, how to \(\downarrow\) it? e.g., rules-based, transparent, & audited allocations

2. Politicization may be \(\downarrow\) achievement of stated objectives. Could depoliticizing \(\rightarrow\) ‘more bang for the buck’ w.r.t. access to inputs, productivity, food security, incomes?
3. Up\textsuperscript{ing} effectiveness of subsidies as poverty- & inequality-reduction, employment-creation tools = \textit{good politics}! (e.g., target the poor, e-voucher to crowd-in private sector/create jobs)

4. >30\% \text{ag spending} \rightarrow \text{fertilizer subsidies. Shifting some funds to investments that } \downarrow \text{poverty, inequality, and/or unemployment} = \textit{good politics}! \ (e.g., roads, irrigation, electrification, ag R&D, improved extension, health, education, etc.)
Thank you for your attention! Questions?

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