I. Introduction

“Malawi Shows Obama’s Goal for African Self-Reliance is Possible”
-Bloomberg News: July 19, 2009

Fertilizer Subsidies = provide fertilizer to farmers below commercial market price to grow staple crops.

Other Countries
• Kenya
• Tanzania
• Uganda
• Zambia

• Malawi: Subsidies= 15% of Gov. Budget in 2009

• Zambia: Subsidies= 20% of Gov. Budget in 2008
I. Introduction
Goal of Fertilizer Subsidies Is to increase food security and well-being for small producers.

Ways to Measure Improvements in Well-being

• Improvements to subsidy recipients over time
• Spill over effect to well-being of the community

This study focuses on the dynamic effects of how subsidy recipient’s well-being changed over time.

Outline

1. Introduction
2. Previous Literature
3. Our Contribution
4. Background on Malawi Subsidies
5. Conceptual Framework
6. Hypotheses
7. Methodology
8. Data
9. Results
10. Future Work/Conclusions
II. Previous Literature

Focus on farm-level impacts from subsidy

- **Displacement**

- **Production/Yield Effects**
  (Ricker-Gilbert, Jayne & Black 2009)

- **Policy Papers on Impacts – Conflicting conclusions**

III. Our Contribution

**Policy**
First to use HH panel data to move subsidy debate beyond farm level issues to look at household issues

**Methodological/Empirical**
Measuring dynamic effects with panel data
IV. Background
Fertilizer Subsidy Allocation in Malawi

• Distributed regional level based on area under cultivation

• Methods for local coupon allocation had the potential to vary across villages.
  – Village leaders & distribution committee
  – Need to understand who was targeted?

V. Conceptual Framework
(Jacobson et al. 1993; Feder et al. 2003; Kirimi 2008)
VI. Hypotheses

1. Ho$_1$: Fertilizer Subsidies have no contemporaneous effect on well-being

2. Ho$_2$: Fertilizer Subsidies have no dynamic effect on well-being

VII. Methodology

A model of well-being ($Y$)

\[ Y_{it} = \beta_0 + \beta_1 \text{Subfert}_{it} + \beta_2 \text{Subfert}_{it-j} + \beta_5 \text{Land}_{it} + \]
\[ \beta_6 \text{HH_characteristics}_{it} + \beta_7 \text{Year}_{it} + \beta_8 \text{Region}_{i} + \]
\[ C_i + V_{it} \]

For HH (i) at time (t)

Blue indicates dummy variable

Test Ho$_1$: $\beta_1 = 0$  Contemporaneous benefit
Test Ho$_2$: $\beta_2 = 0$  Long term benefit
VII. Methodology
Dealing with $C_i$ (time constant unobservables)

Fixed effects (linear) or Correlated Random Effects can deal w/ different intercept problem provided unobservable slopes are the same.

VII. Methodology
Dealing with $V_{it}$ (time varying unobservables)

Must Use IV methods to deal with different slopes caused by unobserved changes over time.
VIII. Data
Three waves of household level panel data

- First survey collected during 2002/03 & 2003/04 season
  - Subsidy scaled up during 2005/06 season
- Second survey collected during 2006/07 season
- Third survey collected during 2008/09 season
- Fertilizer recall questions asked for years between survey
- Nationally representative
- 1,210 HH made all three waves of panel.

IX. Results

Characteristics of Household Who Received and Did Not Receive Fertilizer Subsidy in 2009

<table>
<thead>
<tr>
<th></th>
<th>Top 28% of Subsidy Recipients</th>
<th>Bottom 72% of Subsidy Recipients</th>
<th>HH that did not receive the subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td># of HH in Group</td>
<td>258</td>
<td>655</td>
<td>297</td>
</tr>
<tr>
<td>Mean Kg of Sub Fert Received</td>
<td>231</td>
<td>92</td>
<td>0</td>
</tr>
<tr>
<td>Mean Value of Assets</td>
<td>14,477</td>
<td>9,813</td>
<td>8,607</td>
</tr>
<tr>
<td>Landholding in HA</td>
<td>1.54</td>
<td>1.17</td>
<td>1.11</td>
</tr>
<tr>
<td>% Female Headed HH</td>
<td>23</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>% of HH earning Ganyu Wages</td>
<td>34</td>
<td>47</td>
<td>52</td>
</tr>
<tr>
<td>Mean Annual Earnings from Ganyu</td>
<td>12,953</td>
<td>8,750</td>
<td>9,046</td>
</tr>
<tr>
<td>Year’s HH head has lived in Village</td>
<td>33</td>
<td>32</td>
<td>27</td>
</tr>
</tbody>
</table>
## IX. Results
### Well-being Effects

### Fertilizer Subsidy Impact on Assets (Livestock & Durables)

<table>
<thead>
<tr>
<th>HH Assets in Malawian Kwacha</th>
<th>Error term correlation ignored</th>
<th>Correlation with $C_i$ controlled</th>
<th>Correlation with $C_i$ and $V_{it}$ controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ho1) Subsidized fertilizer t</td>
<td>1.61</td>
<td>-8.41</td>
<td>-64.88</td>
</tr>
<tr>
<td>Subsidized fertilizer t-1</td>
<td>4.29</td>
<td>52.94</td>
<td>125.14</td>
</tr>
<tr>
<td>Subsidized fertilizer t-2</td>
<td>1.16</td>
<td>8.77</td>
<td>-64.66</td>
</tr>
<tr>
<td>Subsidized fertilizer t-3</td>
<td>15.15</td>
<td>64.68</td>
<td>127.78</td>
</tr>
<tr>
<td>(Ho2) Overall F-test of 3 lags</td>
<td>20.59</td>
<td>108.85</td>
<td>188.25</td>
</tr>
</tbody>
</table>

Red indicates subsidized fertilizer statistically significant at 10% level or lower

### Fertilizer Subsidy Impact on Food Security

<table>
<thead>
<tr>
<th>Was HH Food Consumption Adequate (binary)?</th>
<th>Error term correlation ignored</th>
<th>Correlation with $C_i$ controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ho1) Subsidized fertilizer t</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Subsidized fertilizer t-1</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Subsidized fertilizer t-2</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Subsidized fertilizer t-3</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>(Ho2) Overall F-test of 3 lags</td>
<td>0.004</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Red indicates subsidized fertilizer statistically significant at 10% level or lower
IX. Results
Well-being Effects

Fertilizer Subsidy Impact on Subjective Life Satisfaction

<table>
<thead>
<tr>
<th>How Happy are you with your life? (1 to 5)</th>
<th>Error term correlation ignored</th>
<th>Correlation with $C_i$ controlled</th>
</tr>
</thead>
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<tr>
<td>Explanatory Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ho1) Subsidized fertilizer t</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Subsidized fertilizer t-1</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>Subsidized fertilizer t-2</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Subsidized fertilizer t-3</td>
<td>0.0001</td>
<td>64.68</td>
</tr>
<tr>
<td>(Ho2) Overall F-test of 3 lags</td>
<td>0.003</td>
<td>0.000</td>
</tr>
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X. Future Work & Conclusions

Future Work
• Test more well-being indicators
• Measure spillover effects

Conclusions
• Recipients and non-recipients different
• Subsidies have some dynamic effect on food security
• When error term correlation is controlled, subsidies have no significant effect on assets accumulation or happiness over time.
Thank you for your time!