Do Fertilizer Subsidies Improve Food Security & Well-being? Evidence from Malawi



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Future of Food & Nutrition Conference, Tufts University
04/10/2010

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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 : Subsides= 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

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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**
  (Xu et al. 2009, Ricker-Gilbert & Jayne 2009)
- **Production/Yield Effects**
  (Ricker-Gilbert, Jayne & Black 2009)
- **Policy Papers on Impacts – Conflicting conclusions**
  (Sanchez et al. 2009, Harrigan 2008, GRAIN 2010)

III. Our Contribution

<u>Policy</u>

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

<u>Methodological/Empirical</u>

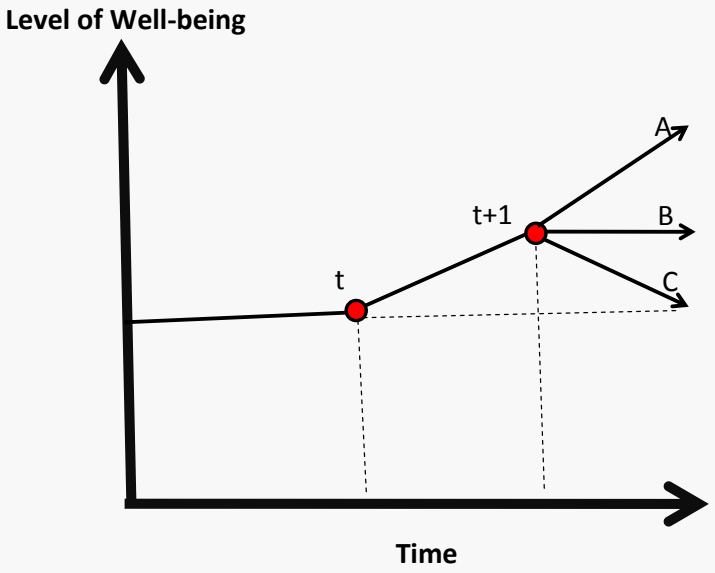
Measuring dynamic effects with panel data

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)

$$Y_{it} = \beta_0 + \beta_1 Subfert_{it} + \beta_2 Subfert_{it-j} + \beta_5 Land_{it} + \beta_6 HH\_characteristics_{it} + \beta_7 Year_{it} + \beta_8 Region_i + C_i + V_{it}$$

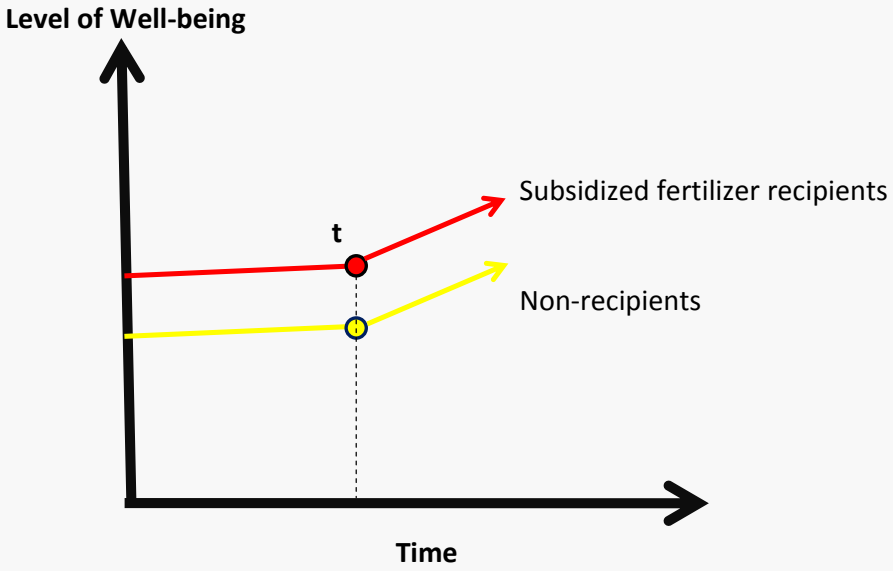
For HH (i) at time (t)

Blue indicates dummy variable

Test Ho_1: $\beta_1 = 0$ Contemporaneous benefit

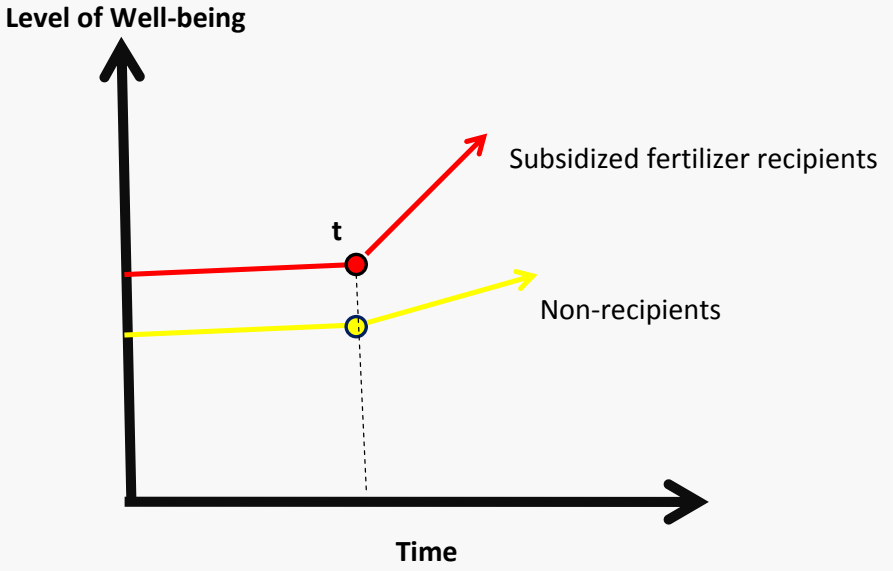
Test Ho_2: $\beta_2 = 0$ Long term benefit

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

	Top 28% of Subsidy Recipients	Bottom 72% of Subsidy Recipients	HH that did not receive the subsidy
# of HH in Group	258	655	297
Mean Kg of Sub Fert Received	231	92	0
Mean Value of Assets	14,477	9,813	8,607
Landholding in HA	1.54	1.17	1.11
% Female Headed HH	23	31	32
% of HH earning Ganyu Wages	34	47	52
Mean Annual Earnings from Ganyu	12,953	8,750	9,046
Year's HH head has lived in Village	33	32	27

IX. Results
Well-being Effects

Fertilizer Subsidy Impact on Assets (Livestock & Durables)

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

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

IX. Results
Well-being Effects

Fertilizer Subsidy Impact on Food Security

Was HH Food Consumption Adequate (binary)?	Error term correlation ignored	Correlation with C_i controlled
Explanatory Variables		
(Ho1) Subsidized fertilizer t	0.000	0.000
Subsidized fertilizer t-1	0.001	0.001
Subsidized fertilizer t-2	0.000	0.000
Subsidized fertilizer t-3	0.000	0.000
(Ho2) Overall F-test of 3 lags	**0.004**	**0.004**

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

IX. Results
Well-being Effects

Fertilizer Subsidy Impact on Subjective Life Satisfaction

How Happy are you with your life? (1 to 5)	Error term correlation ignored	Correlation with C_i controlled
Explanatory Variables		
(Ho1) Subsidized fertilizer t	0.000	0.000
Subsidized fertilizer t-1	0.002	0.002
Subsidized fertilizer t-2	0.000	0.000
Subsidized fertilizer t-3	0.0001	64.68
(Ho2) Overall F-test of 3 lags	**0.003**	**0.000**

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

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!

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