



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Up in Smoke?: Tobacco Production's Effect on Childhood Stunting in Malawi

Benjamin Wood
University of Illinois, Urbana-Champaign
bdwood2@illinois.edu

*Poster prepared for presentation at the Agricultural & Applied Economics Association's 2011
AAEA & NAREA Joint Annual Meeting, Pittsburgh, Pennsylvania, July 24-26, 2011*

*Copyright 2011 by Benjamin Wood. All rights reserved. Readers may make verbatim copies of
this document for non-commercial purposes by any means, provided that this copyright notice
appears on all such copies.*

Up in Smoke?: Tobacco Production's Effect on Childhood Stunting in Malawi

Benjamin Wood, PhD Candidate

Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign (bdwood2@illinois.edu)

Research Question:

How does cash crop adoption affect children's health?

Research Method:

- Casual model of adoption effects
- Predicted probabilities used as optimal instrument (Wooldridge)
- Two step GMM instrumenting for the cash crop adoption decision

Smallholder Adoption Constraints:

- Production:
- Minimum tobacco sales requirement for tobacco floors
 - Credit constraints preventing best farm practices

- Consumption:
- Volatile & relatively high recent maize prices

World Bank identified relationship between tobacco production & higher levels of stunting

Measuring Stunting



Measuring height for the IHS III, May 2010 (taken by presenter)

First Stage Probit

Predicting tobacco adoption:
 $P(D_i|z) = \Phi(\delta_1 z_1 + \delta_2 z_2)$

Optimal predicted probabilities instrument
 $P(D_i = 1 | z)$

Two Step GMM

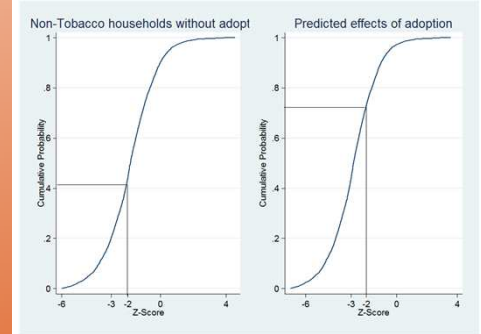
Moment Conditions:
 $E \left[\begin{matrix} 1 & \text{lagged maize price}' \\ 1 & \text{lagged \# '98 tobacco farmers}' \end{matrix} (y - x\beta) \right] = 0$

GMM criterion function:
 $\min_{\beta} (\sum_i z_i u_i)' \widehat{\Sigma}^{-1} (\sum_i z_i u_i)$

Dependent variable, z score

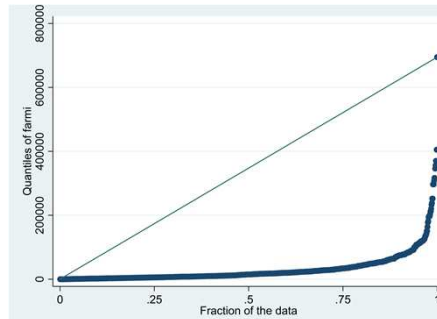
Results

- Average treatment effect reduces z-scores by 1 standard deviation
- If non-producers adopted, stunting increases

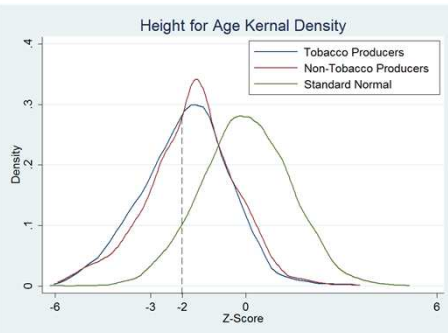


Estimated Average Treatment Effects of Adoption

Farm Income Distribution



Stunting



- Internationally long-term nutritional health indicator
- Large sample 2004-5 World Bank/Malawian Statistics Department Integrated Households Survey II (IHS)

Ideal Model

$y_i = \delta_0 + \delta_1 X_i + \delta_2 D_i + u_i$
 y_i : z score of children 6-60 months old
 D_i : burley adoption dummy
 X_i : Vector of observable control attributes

Endogeneity of D_i ,

Instruments from 1998 IHS I

- Average maize price by district
- Number of tobacco growing households by district
- Weak Instrument F-statistics of 359 & 254, both with p-values of 0
- C statistic of 0.172 and a p-value of 0.678 supports error term orthogonality

Variable	Adoption
# of Tobacco Farmers by 1998 district	0.00129*** (0.000189)
Maize price in 1998 by 1998 district	0.141*** (0.0416)
Observations	5,740
*** 0.001, ** 0.01, * 0.05	

GMM Results

Variable	Images TIEFs		
	OLS	Maize Only	Both IV
Tobacco Producer	-0.154*	-0.446	0.980***
Male	0.208***	0.210***	0.215***
Mother's Educ, high	0.153*	0.161*	0.176**
Bed Nets, always	0.205***	0.198***	0.185***
Permanent Floor	0.181**	0.175**	0.163**
Farm Income 2 of 5	0.0124	0.0133	0.0148
Farm Income 3 of 5	0.00367	0.0155	0.0372
Farm Income 4 of 5	0.0525	0.0989	0.184*
Farm Income 5 of 5	0.0924	0.229	0.479***
Regional Maize Price	-0.00893	-0.0113	0.0155*
Central Region	-0.279**	-0.298**	0.329**
Observations	5,740	5,740	5,740

Conclusions

- Tobacco adoption causes lower children's health outcomes
- Lower health outcomes appear concentrated in low income tobacco producers
- Policymakers should incentivize food crop production for the poorest households

Acknowledgments

Dr. Carl Nelson
 Dr. Kathleen Beegle, Dr. Talip Kilic, Dr. Phil Garcia,
 Dr. WonAh Yoon, Eeshani Kandpal, Yusuke
 Kuwayama, and Héctor Núñez
 University of Illinois AYRE Graduate Student Travel
 Grant

