



Impact of HIV/AIDS-Related Mortality on Rural Farm Households in Zambia: Implications for Poverty Reduction Strategies

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Outline

- Why measure impacts?
- Prior Research
- Research questions
- Data and methods
 - Data
 - Attrition
 - Estimation model
- Summary of findings
- Conclusions & policy recommendations



Why Study this Issue?

- The evolution of rural economies and policy making in much of Africa cannot be understood without taking account of HIV/AIDS
 - HIV⁺ rates in S. Africa are highest in world
 - > 20% in 7 countries
 - Zambia is no exception
 - 16% according to DHS survey in 2002
 - 22% according to the Sentinel Surveillance Site data



.....Why important?

- If donors provided an additional \$1 billion to combat AIDS, how should it be allocated?
 - To ARV treatment?
 - To improved nutrition programs?
 - To agricultural & rural development?
 - To investment in vaccines?
 - To community-driven development programs?



Prior Research

- Macro-level studies: highly variable findings
 - Sachs: 35% decline in GDP growth; Others: no decline
 - only as accurate as their underlying assumptions about household behavioral responses
- Micro-level foundation -- remains very weak though rapidly improving
- With the exception of few panel studies most studies are:
 - based on small and non-random samples ,
 - highly qualitative
 - based only on *ex post household conditions*
- Do not explicitly test for the likely endogeneity of PA mortality



Research Questions

- Is PA mortality endogenous?
- What is the impact of PA mortality on Zambia rural farm households' welfare?*
- Does the impact differ by initial household characteristics?***

* HH composition, farm and crop production, livestock assets and off-farm income.

** Wealth status, landholding size, effective dependency ratio



Data

- Nationally-representative panel data of smallholder rural farm households in Zambia
- Central Statistical Office (May 2001 and May 2004)
- Comprehensive household socioeconomic information
 - Household demographic information including death and illness, farm and crop production, off-farm activities and income etc.



Attrition

- Of the 6922 HH interviewed in 2001, 5420 HHs were re-interviewed in May 2004 [78.3% attrition rate]
- Re-interview rate rises:
 - to 88.7% if we exclude SEAs not revisited
 - to 94.5% if we exclude attrition caused by absence of qualified respondent at the time of visit
- Potential concerns about attrition bias

- Testing for attrition bias:
 - Estimated reinterview model
 - $\text{Prob}(R_{it}=1)=f(X_{i2000}, \text{HIV}_{t-j}, E_{it}, \varepsilon_{it})$
- Attrited HHs had slightly younger HH heads (43 vs 45 years), smaller HH sizes, slightly smaller landholdings and values of assets and slightly higher rates of chronically ill adults in 2001.
- Systematic differences between attritors and non-attritors
- So use IPW to control for attrition bias



Model

- Adopted and extended the counterfactual (DID) approach used by Yamano and Jayne, (2004)
 - Control for initial (pre-death) household conditions that may influence the severity of the impacts
 - Explore the possibility that AIDS-related mortality is endogenous



.....Model

- $Y_{it} = \gamma_t + D_{it}\delta + \mu_i + \varepsilon_{it} \quad i=1, \dots, n \quad t=1, \dots, T \quad [1]$

- $\Delta Y_i = \gamma + D_i \delta + \Delta \varepsilon_i \quad i=1, \dots, n \quad [2]$

- $Y_{it} = \gamma_t + D_{it}\delta + X_i^0 * t\varphi + \mu_i + \varepsilon_{it} \quad [3]$

- $\Delta Y_i = \gamma + D_i \delta + X_i^0 \varphi + \Delta \varepsilon_i \quad [4]$

- $\Delta Y_i = \gamma + D_i \delta + X_i^0 \varphi + D_i * X_i^0 \eta + \Delta \varepsilon_i \quad [5]$



Empirical Model

- Add H-chronic illness [control for HH ex-ante adj.]
- Add P-provincial time dummies [control for area-specific time-variant effects which might be correlated with both D and Y]

$$\Delta Y_i = \gamma + D_i \delta + X_i^0 \varphi + D_i * X_i^0 \eta + H\psi + P\zeta + \Delta \varepsilon_i$$

- Y_i : HH size, HH composition (Men, women, girls, boys) land cultivated, area under cereals, HVC, roots and tubers, value of livestock (cattle and small animals), off-farm income
- D_i : Male head, female head/spouse, other males and other females
- X^0 : Landholding size, effective dependency ratio, wealth status



Estimation Strategies

- Test whether mortality variables are endogenous
 - Pooled sample (1) versus differenced model (2)
 - Instruments
 - Prior death (=1, 0 otherwise)
 - Age group * rainfall shocks
- If still endogenous in (2) use IV otherwise estimate OLS on differenced models.



Results

- Is PA mortality endogenous?
- Impact of PA mortality on various hh outcomes
- Does impact differ by initial (pre-death) characteristics?

Is PA mortality endogenous?

- Pooled models: PA mortality is indeed endogenous
- Differencing of unobservable time invariant household characteristics largely solves endogeneity problem
 - Offer some support for the estimates of earlier studies using FE, RE and DID but not explicitly testing for endogeneity.
- So study reports results from OLS on differenced models

Impact of PA Mortality

Outcome variables (%Δ)	D ^{MH}	D ^{FH}	D ^{OM}	D ^{OF}
HH size (number)	-0.63*	-0.80*	-0.98**	-0.62*
Land cultivated	-0.20*	-0.01	-0.08	-0.04
Area under cereals	-0.11*	-0.09+	-0.08*	-0.00
Area under tubers	-0.03	-0.01	0.03	-0.05*
Area under HVC	-0.03+	-0.01	-0.02	-0.01
Value of Crop output	-0.11	-0.04	-0.11	-0.08
Value of cattle	-0.34+	-0.08	-0.25	-0.24
Value of small animals	-0.62*	-0.32+	-0.06	-0.39*
Off-farm income	0.07	-0.19	-0.12	0.05



Does Impact Differ by Wealth Status?

Outcome variables (%Δ)	Male Head Mortality	
	Poor	Non Poor
HH size (number)	-0.71	-0.09
Land cultivated	-36%	-73%
Area under cereals	-22%	-51%
Value of crop production/Ha	-13%	+42%
Value of small animals	-47%	-72.4%



Does impact differ by initial land size?

Outcome variables (%Δ)	Male head death	
	25 th %ntile	75 th %ntile
Land cultivated	-63.7%	-49.5%

- Surprising result because *a priori* one would expect the reverse to happen.
 - 68% of HH experiencing male head death and having landholding size in the 25th percentile were poor

.....Does impact differ by initial land size?

Outcome variables (%Δ)	Female head/spouse death	
	25 th %ntile	75 th %ntile
Off-farm Income	-40.8%	+15.3%

- This result suggests that the deceased female head/spouse was central in sourcing income off the farm among households with limited land resources.

Conclusion & Policy Implications

- Results do not support the homogeneous conceptualization of “afflicted households,” especially in the context of:
 - proposals for targeted assistance,
 - technology development, and other programs/policies.



.....Conclusion & Policy Implications

- Gender and household position of the deceased appear to condition the impact
 - the impact of adult mortality appear to be most severe for households:
 - experiencing male HH head than any other kind of adult death
- Initial poverty does not seem to exacerbate the impact of mortality on cultivated area.



.....Conclusion & Policy Implications

- Government and interested donor agencies may assist afflicted households through:
 - agricultural extension programs and skill training to reach poor households headed by widows in order to strengthen their capacity to cope with the loss of PA male head.
 - Creation and/or strengthening community-based networks to assist poorer households experiencing mortality of household heads and spouses.



.....Conclusion & Policy Implications

- Results suggests the need to target households whose capital base is affected by AID-related illness so as to boost their food security and farm productivity
 - initiate more programs such as the 'Heifer project' targeted to poor households experiencing male head of HH mortality.
 - encourage cultural changes that empower widows who need not be pushed into poverty further by assets redistribution after their husband's death.



Caveats and limitations

- Need more evidence on whether controlling for time-invariant unobservables through differencing adequately accounts for the likely endogeneity of household PA mortality.
- Study measured short-run effects of PA mortality between 2001 and 2004 on a few aspects of Zambia rural farm households.
 - studies need to be designed to measure full long-run effects of PA adult death. [track affected households over a long time frame].



.....Caveats and limitations

- Control group may be tainted, since every household in communities hard-hit by HIV/AIDS may nevertheless be “affected” e.g.:
 - by taking in orphans,
 - intra-household resource transfers to afflicted households
- So future studies may need measure the effects of mortality on rural welfare other than at the household level.



THANK YOU



% of HH with prior PA mortality by response status

Response Status	# of HH	# of HH with Prior PA death	% of HH with Prior death by response status
Completed	5419	564	77.8
Refusal	14	1	0.1
Moved out of SEA	707	71	9.8
HH dissolved	390	55	7.6
Non-contact	362	31	4.3
HH skipped & not interviewed	30	3	0.4
Total	6922	725	100