Do Shocks have a Persistent Impact on Consumption? The Case of Rural Malawi

Running Title: "The Persistence of Shocks"

Abstract

This paper uses rural Malawian data to study the persistence of the impact of two idiosyncratic shocks (sickness and death) and two covariant shocks (floods and drought) on household per capita consumption. Little work has been done in this area, but understanding the long run effects of shocks, and the extent to which households can insulate themselves against these shocks is important in understanding how households in developing countries remain in a poverty trap. The results indicate that drought and sickness have important short term effects on consumption level, but do not have significant persistent effects. Flooding has a positive long run impact on consumption due to the fact that many households benefit from the increased rainfall. This suggests that rural Malawian households are able to shield themselves from the persistent negative impacts of these shocks on consumption levels but are unable to self-insure against the short run impact.

[150 words]

Keywords: Health Shocks; Drought; Consumption; Malawi; Africa

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1 Introduction

Uninsured shocks can have a persistent impact on consumption levels in developing countries. Covariant shocks such as droughts or floods affect the entire community, and, if uninsured can lead to households being caught in a poverty trap in two ways. Firstly, in order to minimise risk, low income households choose to plant crops which are resistant to weather shocks, but have lower yields than the higher risk crops planted by wealthier members of the community. Dercon (1996) finds that in Tanzania, the crop portfolio of the richest group of smallholders yields 25% more per adult per unit of land than the poorest group but yields riskier. Secondly, households are often forced to sell productive assets following such shocks. This reduces the efficiency of agricultural work and potentially reduces future output (Fafchamps et al., 1998).

In addition to altering their crop portfolios, households in agricultural economies have developed other coping mechanisms in response to the risk of shocks including risk pooling through gift exchange. However, risk pooling amongst local communities is most effective for idiosyncratic shocks such as sickness. Insuring against weather shocks requires risk pooling with individuals living in places with different weather patterns to those of their home district. Rosenzweig and Stark (1989) find that households in rural India attempt to diversify risk spatially by sending their daughters to marry into villages where weather patterns are as uncorrelated as possible with those of the home village, given the constraint of travel expenses.

Analysing health shocks, Harrower and Hoddinott (2005) and De Weerdt and Dercon (2006) are unable to reject the hypothesis that health shocks in Mali and Tanzania respectively are fully insured through risk pooling, whilst Asfaw and von Braun (2004) find that food consumption is insured against health shocks in Ethiopia but non-food consumption is not. Barrera and Pérez-Calle (2005) find that health shocks have a negative impact on consumption growth in Columbia, and that urban households are not as good as rural ones at pooling risk.

Despite these (imperfect) risk pooling mechanisms designed to protect households against idiosyncratic and covariant shocks, these can have a persistent impact on consumption levels of a household. Using data from rural Ethiopia, Dercon et al. (2005) study the impact of shocks on 2004 consumption levels in. They find that drought and illness of a household member during the five years previous to the survey decreased household consumption in 2004 by 19% and 9% respectively. When these shocks are entered separately depending upon whether they occurred between 1999-2001 or 2002-2004, the authors find that drought occurring between 1999-2001 decreased current (2004) consumption by 13% whilst a health shock decreased current consumption by 14%. These shocks were therefore not adequately insured either through risk pooling or through self-insurance (savings).

This paper contributes to the literature by expanding upon this little researched topic. I perform similar tests to Dercon et al. (2005) using Malawian panel data collected between 2000 and 2002. This is one of only a few such tests and the first using Malawian data.

2 Data

The Complimentary Panel Survey (CPS) was undertaken by the Centre for Social Research in Malawi with technical assistance from the International Food Policy Research Institute (IFPRI). Four rounds of interviews were conducted and I focus on the 2355 rural observations for whom weather shocks are an important issue and financial infrastructure is most severely lacking.

[Table 1 about here]

Households reported recent idiosyncratic shocks. In cases in which a member had left the household since the previous round, they reported the reason for their absence allowing us to construct a dummy variable indicating whether or not a household had suffered from a recent death. Drought and Flood indicator variables were constructed using reports from Famine Early Warning System

Network reports for Malawi, and are equal to 1 if a household lives in an area which suffered from a flood or drought since the previous round, and 0 otherwise. Table 1 shows that around 3% of households reported suffering from a death; nearly 2% suffered from drought, and around 6.5% from flooding. Over half of all households suffered from a health shock.

3 Model and Econometric Results

The econometric model is based on Dercon et al. (2005) and results are presented for ordinary least squares (OLS), and instrumental variable (IV) versions. I estimate:

$$\ln c_{t,v}^{h} = \alpha + \beta_1 S_{t,v}^{h} + \beta_2 S_{t-1,v}^{h} + \delta_1 S_{t,v} + \delta_2 S_{t-1,v} + \varphi X^{h} + \varepsilon_{t,v}^{h}$$

where $c_{t,v}^{h}$ is the current consumption level at time t for household h in village v. $S_{t,v}^{h}$ and $S_{t-1,v}^{h}$ indicate household level shocks at time t and t-1 respectively and $S_{t,v}$ and $S_{t-1,v}$ are community shocks. Control characteristics including round and regional dummies, X, are included, ε is the error term. All estimations correct for unobserved heterogeneity using White (1980), and for potential clustering (Deaton, 1997, 3rd ed. pp.99-100). I also control for the age, sex, education and marital status of the household head and whether s/he was born abroad. In addition, I control for household size, income, access to credit and employment status as well as assets. Results are presented in Table 2.

[Table 2 about here]

Like Dercon et al. (2005), our results indicate that recent health shocks have an impact on current consumption. The OLS results indicate that health shocks actually increase consumption level. It is possible however that ability to cope with a shock is correlated with likelihood of suffering from the shock, resulting is an endogeneity

problem. I therefore instrument health shocks using lagged per capita income and number of household members aged over 55.

In the IV regression, recent health shocks have a negative impact on current consumption levels. This is in line with Dercon et al. (2005). However, the lagged health shock dummy is insignificant. This suggests that households in rural Malawi must bear the short run costs of health shocks, but in time, are compensated for persistent effects through risk-pooling mechanisms or self-coping strategies. It is likely though that one of the coping strategies is short term consumption reduction.

Drought shocks are negative in both models, and turn significant in the IV model. Recent droughts therefore have a negative impact on current consumption. Like health shocks however, the lagged shock is not significant suggesting that households are able to insulate themselves from the persistent impact of droughts.

Recent floods do not have a significant impact on consumption levels in either model specification. However past flooding does appear to have a persistent and *positive* impact on current consumption level. This might appear counterintuitive but is in line with Irac and Minoiu (2007) and Dercon and Krishnan (2000) who find that weather shocks impact positively on consumption. In addition, our variable reports flooding at district level. It is likely that some households suffered from this but that other households, at the periphery of the flooding zone actually benefited from the increased rainfall. Their harvest and therefore consumption would increase in periods following this shock, causing the lagged flooding indicator to exhibit a positive impact on consumption levels.

Under risk pooling, we would expect to observe a flow of remittances from households which benefited from increased rainfall to those which suffered. Unfortunately our data do not permit us to distinguish between these two groups, and this is left for future research.

Certain control variables deserve brief discussion. The results confirm the fact that female headed households tend to have lower

per capita consumption levels than the average. Increased education is associated with higher per capita consumption, as is increased non-livestock asset ownership. Accessing outside finance in the form of credit or remittances unsurprisingly increases consumption. Coefficients on age and age squared are respectively positive and negative, helping to confirm the lifecycle consumption model (without perfect consumption smoothing). Finally, larger household size is associated with lower per capita consumption.

4 Conclusion

This paper has used a simple econometric method to test for the persistent impact on consumption of two idiosyncratic shocks (sickness and death) and two covariant shocks (floods and droughts).

The results indicate that, in Malawi, health shocks and droughts have a short run negative impact on per capita consumption levels, but no persistent impact. This could be because households are forced to reduce their immediate consumption, but are compensated through risk sharing mechanisms with time. Self insurance through savings is unlikely due to the short run negative impact of the shock.

Flooding has no immediate impact, but a positive longer run impact, as many households in the flooding zone actually benefit from increased rainfall.

Our results are therefore not in accordance with Dercon et al. (2005) on which this study is based. These authors find persistent negative impacts for drought and health shocks in rural Ethiopia. Rural Malawian households appear to be able to insulate themselves better from the persistent effects of the idiosyncratic and covariant shocks studied.

5 Bibliography

Asfaw, A. and J.von Braun (2004), “Is Consumption Insured against Illness? Evidence on Vulnerability on Households to Health Shocks in Rural Ethiopia”, *Economic Development and Cultural Change*, 53-1, pp.115-129.

Barrera, F. and F.Pérez-Calle (2005), “Consumption smoothing: Empirical evidence from Colombia and Nicaragua”, *Working Paper*, Fedesarrolo.

Deaton, A. (1997), *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*, World Bank, Wahsington, D.C., Third Edition, pp.99-100.

Dercon, S. (1996), "Risk, Crop Choice and Savings : Evidence from Tanzania", *Economic Development and Cultural Change*, 44-3, pp. 485-514.

Dercon, S. and P.Krishnan (2000), “Vulnerability, Seasonality and Poverty in Ethiopia”, *Journal of Development Studies*, 36-6, pp.25-53.

Dercon S., J.Hoddinott and T.Woldehanna (2005), “Shocks and Consumption in 15 Ethiopian Villages, 1999-2004”, *Journal of African Economies*, 14-4, pp.559-585.

De Weerdt, J. and S.Dercon (2006), “Risk-sharing networks and insurance against illness”, *Journal of Development Economics*, 81, pp.337-356.

Fafchamps M., C.Udry and K.Czukas (1998), “Drought and saving in West Africa: are livestock a buffer stock?”, *Journal of Development Economics*, 55-2, pp.273-305.

Famine Early Warning System Network, Various reports available at www.fews.net/malawi/. Accessed April 2007.

Harrower, S. and J.Hoddinott (2005), “Consumption Smoothing in the Zone Lacustre, Mali”, *Journal of African Economies*, 14-4, pp.489-519.

Irac, D.M. and C.Minoiu (2007), “Risk insurance in a transition economy: Evidence from rural Romania”, *Economics of Transition*, 15-1, pp.153-173.

Rosenzweig, M.R. and O.Stark (1989), “Consumption Smoothing, Migration, and Marriage: Evidence from Rural India”, *Journal of Political Economy*, 97-4, pp.905-926.

White, H. (1980), “Heteroscedasticity Consistent Covariance Matrix and a Direct Test for Heterscedasticity”, *Econometrica*, 48, pp.817-838.

Tables

Table 1: Percentage of Households Suffering from Shocks

Variable	Obs	Mean
Health	2355	54.0%
Death	2355	3.3%
Flood	2355	6.5%
Drought	2355	1.7%

Table 2: The Persistence of Shocks. Dependent Variable: Log Per Capita Consumption

	OLS	IV
Sick Member Dummy	0.109*	-0.628*
	(1.961)	(-1.710)
Lag Sick Member	-0.054	0.006
	(-1.583)	(0.112)
Death Dummy	0.106	0.144
	(1.179)	(1.568)
Lag Death	0.079	-0.026
	(1.072)	(-0.233)
Flood Dummy	0.037	0.063
	(0.550)	(0.868)
Lag Flood	0.138	0.251**
	(1.357)	(2.404)
Drought	-0.131	-0.244*
	(-1.222)	(-1.801)
Lag Drought	-0.158	-0.086
	(-1.241)	(-1.037)
Log Per Capita Income	0.721***	0.726***
	(32.296)	(27.593)
Female Head Dummy	-0.135**	-0.167**
	(-2.103)	(-2.402)
Age	0.010	0.016**
	(1.549)	(2.188)
Age Squared	-0.000*	-0.000**
	(-2.007)	(-2.448)
Education (Years)	0.015*	0.019***
	(1.930)	(2.631)
Household Size	-0.047***	-0.040***
	(-4.494)	(-3.491)
Head Married Dummy	-0.017	-0.039
	(-0.258)	(-0.543)
Member in Salaried Employment	-0.059	-0.088
	(-0.998)	(-1.149)
Born Abroad	0.082	0.052
	(1.319)	(0.643)
Member Accessed Credit in 12 Months before Round 1	0.158*	0.194*
	(1.962)	(1.925)
Receive Remittances	0.079	0.139***
	(1.501)	(3.380)
Livestock Index	-0.006	-0.017
	(-0.344)	(-0.949)
Non-Livestock Asset Index	0.068***	0.041**
	(4.892)	(2.401)
Regional Dummies	Yes	Yes
Round Dummies	Yes	Yes
Constant	0.839***	0.644**
	(3.466)	(2.291)
N	1378	1212
r2	0.714	0.644
F	240.406	300.256
Hanson J P-value (overidentification test)		0.4946
Kleibergen-Paap P-value (underidentification test)		0.0000

t-values in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively. Sick Member instrumented using lag of per capita income and number of household members over the age of 55 years.