Do rural households smooth their consumption? Applying an asset-based approach to the case of Malawi.

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Abstract

Smallholder farming households in most of the developing countries, live in environments that are characterized by substantial risk. They consequently develop a range of risk management strategies. However, analyzing household consumption smoothing behaviour requires the availability of both income and consumption data. Since household income data are usually unavailable in many developing countries, including Malawi, this paper develops an asset-based framework to analyze consumption smoothing behaviour at household and community levels using a two-period panel dataset on 259 rural households in Malawi. The results show that while consumption smoothing takes place at the household level, it is not perfect. Food consumption is protected more than non-food consumption. Risk sharing also takes place at the community level. The major policy implication is that social protection programmes should promote household asset accumulation to enable rural households manage livelihood risks better.

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1. Introduction

There is a vast set of literature that suggests that, in the face of shocks, rural households adopt a variety of risk management strategies and instruments in order to protect their consumption from fluctuations in their income (see Alderman and Paxson, 1994; Fafchamps and Lund, 2003; Townsend, 1994). Tests of consumption smoothing arise from the assumption that households attempt to spread their lifetime earnings evenly across time, through the use of different risk management strategies when faced with shocks (Harrower and Hoddinott, 2004). The results from this research suggest that the majority of households in poor developing economies succeed in protecting their consumption from the full effects of the income shocks to which they are subject, but full insurance is not achieved[1].

This paper aims to provide evidence of the ability of rural farming households in Malawi to smooth their consumption in the face of shocks. In particular, it examines the effectiveness of the different formal and informal risk management strategies in smoothing household consumption. This evidence is highly relevant for policy-making in the case of Malawi where poverty levels remain high[2] and where social safety-net programmes play a critical role. Studies have shown that improved consumption smoothing due to better arrangements to manage risk for all households does not only increase household and societal welfare, but also improves the welfare distribution in society (Holzmann and Jorgensen, 1999).

Since the ground-breaking study on consumption smoothing by Townsend (1994), there has been a lot of research on the ability of rural households in low-income countries to protect their consumption from fluctuations in their income. A vast set of literature points to the fact that households' consumption tends to be remarkably smooth while households' income is subject to large variations. These include Townsend (1994), Chaudhuri and Paxson (2001), and Morduch (2001) for India; Paxson (1993) for

[1] The leading authors on consumption smoothing include Alderman and Paxson (1994), Bardhan and Udry (1999), Skoufias (2003), and Jalan and Ravallion (1999). The available literature on consumption smoothing is reviewed in great detail by Dercon (2004).

[2] According to the 2004 Malawi Integrated Household Survey, 52 percent of the total population in Malawi is poor, with 22 percent living in extreme poverty.

Thailand; Skoufias and Quisumbing (2003) for Bangladesh, Ethiopia, Mali, Mexico and Russia; Fafchamps and Lund (2003) for the Philippines; Deaton (1992) and Grimard (1997) for Cote d'Ivoire; and Dubois (2000) for Pakistan.

One of the important theoretical literature on consumption smoothing is Deaton (1992) where he shows that households that have borrowing constraints are able to smooth consumption with relatively low asset holdings. He sets up an inter-temporal model that incorporates a stochastic labour income and a non-productive asset in the form of cash or grain. In the model, households are able to maintain a stable level of consumption by drawing down on physical or financial assets, even when financial markets are inexistent. He is able to show that substantial changes in consumption arise only when assets are almost completely depleted. The model shows that it is not necessary that a household's asset portfolio be relatively large compared to income. Using simulation models, the study is able to show that for a household holding an average stock of asset value less than the standard deviation of income, consumption variation is half that of income (Deaton, 1992).

Among the growing empirical literature, Skoufias (2003) examined the extent to which Russian households were able to protect their consumption from fluctuations in their income using longitudinal data from 1994 to 2000. The study found that consumption was only partially protected from idiosyncratic shocks to income with food consumption being better protected than non-food consumption expenditures. While non-food consumption expenditure adjustments were seen as an important risk management strategy, other self-insurance strategies, such as borrowing, labour supply adjustments, and sale of assets, also played important roles. However, in a similar study of 364 rural households in Romania, another transition economy, Irac and Minoiu (2007) failed to reject the hypothesis of full insurance of consumption. The authors argue that their findings do not necessarily imply that a Pareto-optimal risk sharing is achieved, as the empirical results could be confounded by the role played by some types of shocks, such as illness, as preference shifters of the utility of consumption.

Using household panel data from Bangladesh, Ethiopia, Mali, Mexico and Russia, Skoufias and Quisumbing (2003) examined the extent to which households are able through formal and/or informal arrangements to insure their consumption from specific economic shocks and fluctuations in their real income. The authors used instrumental variables to correct for measurement error in income, imputation error in food consumption and endogeneity of income and found that food consumption was better insured than non-food consumption from idiosyncratic shocks. The study showed that adjustments in non-food consumption appeared to act as a mechanism for partially insuring *ex-post* the consumption of food from the effects of income changes.

Among the very few studies on risk management in Malawi, Tsafack and Maitra (2004) investigated the ability of rural Malawian households to insulate their consumption from idiosyncratic income shocks. Using three rounds of IFPRI data on Malawian households between February 1995 and December 1995, and applying the methodology proposed by Fafchamps and Lund (2003), the authors found that purchases and sales of assets appeared to play an important role in insuring households against idiosyncratic shocks. However, family transfers and borrowing did not seem to be playing an important role. The authors concluded that insurance through asset variation is only effective in the short run because in the medium to long term, this type of insurance could lead to a poverty trap.

The remainder of the paper is organized as follows: section 2 presents the theoretical framework while the strategy used to empirically test for consumption smoothing in the case where income data are not available is outlined in section 3. This is followed by a section describing the data used in the study. The results are presented and discussed in section 5, and section 6 concludes the discussion and offers some policy implications.

2. Theoretical Framework

The theoretical model that is used to analyze consumption smoothing in the literature is based on the consumer's optimization problem in the context of a complete market for state-contingent commodities (Deaton, 1992). Following Skoufias (2003), the model

assumes that there exists a market for state-contingent commodities so that formal and informal risk management strategies across space and over time that households use to protect themselves from risk are taken into account. A further assumption is that households live in communities where risk is shared. Risk-sharing implies that any unpredicted event (shock) that a household faces is covered by a state-contingent transfer from other members of the community (Dercon, 2000). Under this framework, the model assumes that households within a given risk-sharing community purchase state-contingent commodities so as to maximize their utility:

$$V^h = \sum_{s=1}^{S}\sum_{t=1}^{T} \pi_s v_t\left(c_{ts}^h\right) = \sum_{s=1}^{S}\sum_{t=1}^{T} \pi_s \left(1+\delta\right)^{-t} v\left(c_{ts}^h\right) \qquad (1)$$

Where: $v_t(c^h_{ts})$ is the felicity function of the constant relative risk aversion (CRRA) type for household *h* in period *t* as a function of its state *s* consumption in period *t*. π is the probability of occurrence of state *s* and it is assumed to be the same for all households in a given risk-sharing community. The period-specific felicity function is assumed to be discounted to the present by a subjective discount rate δ.

The model assumes that households in the community purchase a unit of consumption in period *t* and state *s* at the price $p_{st}(1+r)^{-t}$. It is important to note that the prices of these state-contingent commodities are also state-specific. Now, assuming that in the state of the world *s* and period *t*, household *h* has an initial asset base A^h_1 and labour income y^h_{st}, then the household aims at maximizing its utility function subject to the lifetime budget constraint:

$$\sum_{s=1}^{S}\sum_{t=1}^{T} p_{st} c_{st}^h \left(1+r\right)^{-t} = A_1^h + \sum_{s=1}^{S}\sum_{t=1}^{T} p_{st} y_{st}^h \left(1+r\right)^{-t} \qquad (2)$$

The existence of the market in contingent claims for the risk-sharing community allows the household's optimization problem to be written as the maximization of expected utility subject to an expected value budget constraint (Skoufias, 2003). Thus, the first-order optimization condition for (1) subject to (2) is given as:

$$\lambda_t\left(c_{st}^h\right) = v_t'\left(c_{st}^h\right) = \theta^h\left(\frac{1+\delta}{1+r}\right)^t \frac{p_{st}}{\pi_s} = \theta^h \mu_t \qquad (3)$$

Where θ is the Lagrange multiplier and $\mu_t = \left(\frac{1+\delta}{1+r}\right)^t \frac{p_{st}}{\pi_s}$. Further, $\lambda_t\left(c_{st}^h\right)$ is the marginal utility of consumption in period *t*.

The important result from (3) is that the marginal utility of consumption consists of a household-specific component θ^h and a time-specific component μ_t. Skoufias (2003) assumes that the felicity function takes a special functional form such as an isoelastic utility function $v(c_t) = \frac{1}{1-\rho} c_t^{1-\rho} f(z_t)$, where $f(z_t)$ is a function allowing for the influence of time-varying preference factors. Following this specification, after logarithmic transformation, equation 8.3 can be expressed as:

$$\ln c_t^h = -\rho^{-1}\left(\ln \theta^h - \ln f(z_t) + \ln \mu_t\right)$$

which, after first-differencing over time, yields:

$$\Delta \ln c_t^h = -\rho^{-1}\left(-\Delta f(z_t) + \Delta \ln \mu_t\right) \qquad (4)$$

The implication of (4) is that the growth rate in household consumption between time t-1 and t, after controlling for time-varying preference factors, is a function of the growth rate in aggregate shocks only summarized by the term $-\rho^{-1}(\Delta \ln \mu_t)$.

However, the version of equation 4 which is used more in empirical work takes the form of:

$$\Delta \ln c_{htv} = \sum_{tv} \delta_{tv}\left(CD_{tv}\right) + \beta \Delta \ln y_{htv} + \gamma X_{htv} + \Delta \varepsilon_{htvt} \qquad (5)$$

Where: $\Delta \ln c_{htv}$ is the change in the log of consumption, which is also the growth rate in total consumption per capita of household *h* in period *t*, located in community *v*.

$\Delta \ln y_{htv}$ is the growth rate of income

X_{htv} is a vector of time-varying household or household head's characteristics

δ, β and γ are the parameters to be estimated

$\Delta\varepsilon_{htv}$ is a household specific error term to capture changes in unobservable components of household preferences.

CD_{tv} is a set of community dummies interacted by survey round to control for covariate shocks at community level

3. Empirical Strategy

Based on (5), it is apparent that testing for consumption smoothing does not only require consumption data but income data as well. In particular, when consumption is fully insured against shocks (complete consumption smoothing), one would expect changes in income to have no effect on consumption (Skoufias, 2003; Harrower and Hoddinott, 2004; Irac and Minoiu, 2007). Due to lack of household income data in both survey rounds[3], the study uses information on household asset ownership to construct a welfare index for each of the two rounds, which is then used as a proxy for household income. In both rounds, the respondents were asked about their ownership of individual assets, types and number of livestock, the monetary value of the assets, and their intra-household control.

To construct the asset index, a methodology proposed by Rutstein and Johnson (2004) was used. The same methodology was used by Devereux *et al*. (2007) in their study of vulnerability and social protection in Malawi. Although information was collected on 19 types of durable assets in both rounds, only 10 types of durable assets were considered in the analysis (see table 1), as the ownership of the excluded assets was lower than 1 percent of the sampled households, and thus played a negligible role among households. The asset index also includes information on ownership of important livestock, as reported in table 1. The asset score for each household was then calculated by assigning to each listed asset a weight equal to the reciprocal of the proportion of the sampled

[3] Most household surveys in developing countries use consumption-based welfare measures. For a review of why consumption expenditure is a better measure of household welfare than income, especially for rural households whose income largely comes from self-employment in agriculture, see Deaton (1997).

households that owned that particular item. The next step was to multiply that weight by the number of units of any particular asset owned by the household and summing the product over all possible assets[4].

Table 1: Changes in Household Asset Ownership

Type of Asset	Level of ownership (percent of households)		Weight
	2004	2006	
Bed	30.1	29.6	3.33
Bicycle	31.0	33.2	3.23
Chair	43.0	40.6	2.33
Pounding Mortar/Pestle	48.7	50.9	2.05
Radio (wireless)	51.0	52.8	1.96
Sewing machine	2.6	1.9	38.46
Tape/CD player	3.9	3.1	25.64
Table	34.3	35.1	2.92
Television	1.9	2.2	52.63
Cattle	6.2	5.0	16.19
Goats	6.2	7.8	3.81

Source: Own compilation

The calculated asset index was highly correlated with real household expenditure ($r = 0.699$, $p<0.001$) in 2004.

4. Data

The study uses a two-period panel dataset of 259 rural households in Malawi. Data on the first period came from the Malawi Second Integrated Household Survey (IHS2). The IHS2 was a comprehensive socio-economic survey of the living standards of households in Malawi. This is part of the World Bank's Living Standards Measurement Study (LSMS) across countries, aimed at improving current data and methods of poverty and

[4] For a review of the validity of the asset-based approach as a proxy for household welfare when income data are lacking, see Morris *et al*. (1999) who used data from Malawi, Mali and Cote d'Ivoire.

inequality analysis (World Bank, 2007). The IHS2 was collected in 2004 covering a sample of 11,280 households spread across 564 communities in 26 districts in Malawi. 300 households were identified from the IHS2 dataset using a three-stage stratified sampling technique, and followed up between June and December 2006 with a similar questionnaire. However, due to attrition, information was collected from 259 households only from 20 communities across 8 districts. In the IHS2, information on shocks were obtained by asking respondents whether their households were severely affected negatively by a set of 16 shocks during the five years (1999-2004) preceding the date of the survey in 2004. The same question was asked in 2006 but the time considered was two years, covering the time between the date of the survey and that of the previous survey (2004-2006).

5. Results and Discussion

The summary statistics for the data described above are reported in table A1 in the appendix. The means and medians of food, non-food, and total household real expenditure per capita between the survey rounds are presented in table 2. The results show that among the sampled households, more than 50 percent of household expenditure is devoted to food. This food share was more than 60 percent among the poor households in both rounds. There is evidence from the results that households try to protect food consumption more than the non-food consumption between the survey rounds. For instance, the median food consumption varies by less than 5 percent in the whole sample while non-food consumption is more volatile (around 12 percent). A breakdown of the sample into poor and non-poor households shows that median food consumption is considerably less volatile among the poor (around 5 percent) than for non-poor households (around 11 percent).

Table 2: Mean and Median Per Capita Consumption, by Survey Round

	2004		2006	
Type of consumption	**Mean**	**Median**	**Mean**	**Median**
Total consumption/capita (*All)*	22,468	15,738	23,795	15,554
(*Poor*)	10,936	10,749	12,019	11,072
(*Non-Poor*)	34,640	24,812	36,226	21,165
Food consumption/capita (*All*)	12,829	9,246	12,360	9,704
	(57%)		(52%)	
(*Poor*)	6,622	6,414	7,576	6,998
	(61%)		(63%)	
(*Non-Poor*)	19,381	14,595	17,409	13,124
	(56%)		(48%)	
Non-food consumption/capita (*All*)	9,572	5,954	11,394	5,312
	(43%)		(48%)	
(*Poor)*	4,314	3,915	4,442	3,905
	(39%)		(37%)	
(Non-poor)	15,123	10,978	18,731	8,362
	(44%)		(52%)	

Source: Own compilation

Notes: 1. All figures are annual per capita amounts in Malawi Kwacha.
2. Percentages of total consumption are reported in parentheses.
3. N= 259
4. The Malawi consumption poverty line during the two survey rounds was MK 16,164[5] per capita

I. Consumption Smoothing using Household Asset Index

The results so far give an indication of whether households protect their consumption from income shocks (as reported in table 2). We now apply the test of consumption smoothing by considering the impact of changes in household asset index (as a proxy for income) on changes in consumption.

[5] This is equivalent to €87.27 (February 2009 exchange rate)

The model to be estimated is given as:

$$\Delta \ln c_{htv} = \sum \delta_{tv}\left(CD_{tv}\right) + \beta \Delta \ln A_{htv} + \gamma X_{htv} + \Delta \varepsilon_{htv} \qquad (6)$$

Equation (6) is similar to (5) apart from the fact that income has been replaced by household assets (A_{htv}), due to data constraints. As before, CD_{tv} is used to control for the role of covariate shocks that are common to all households within any given community. Under conditions of complete consumption smoothing, changes in income is supposed to have no effect on household consumption (Skoufias, 2003). In the similar vein, complete consumption smoothing would imply that $\beta = 0$.

The results from specification (6) are reported in table 3. Three specifications of the dependent variable were used - the change in log of total consumption, change of log of food consumption and change of log of non-food consumption, respectively. Multicollinearity among the variables is not a big concern in the consumption smoothing model as the variance inflation factor (VIF) and the corresponding tolerance results presented in table A2 (in the appendix) show.

Although the model includes household characteristics, the concern is only on the asset index variable. The results show that in all the three components of household consumption $\beta>0$ and it is highly significant. This shows that complete consumption smoothing is not practiced among the sampled households. Thus, neither total consumption nor its two components are completely insured from income shocks. Specifically, the results show that a 10 percent reduction in asset index is accompanied by a 5.9 percent decrease in total consumption, a similar 5.9 percent reduction in household food consumption and a slightly higher (6.1 percent) decline in household non-food consumption. The results thus show that the level of protection of food and non-food consumption from changes in income is similar among the surveyed households.

Table 3: The Impact of Changes in Household Asset Index (and other variables) on Consumption

	Δ ln Total Consumption	Δ ln Food Consumption	Δ ln Non-Food Consumption
Δ ln Asset Index	0.59***	0.59***	0.61***
	(0.09)	(0.12)	(0.12)
Δ ln Family Size	-0.00	-0.03	0.04
	(0.02)	(0.02)	(0.03)
Household Head is Female	0.05	0.02	0.16***
	(0.03)	(0.04)	(0.06)
Household Head is <26 years old	-0.01	-0.03	0.06
	(0.04)	(0.07)	(0.06)
Household Head is >65 years old	-0.08	0.00	-0.17**
	(0.04)	(0.06)	(0.08)
F test	8.46***	2.58***	4.53***
R^2	0.55	0.38	0.42
N	259	259	259

Source: Own compilation

Notes:
1. Dependent variables are change in log per capita consumption, change in log food consumption per capita, change in log non-food consumption per capita between rounds, respectively
2. Standard errors are reported in parentheses
3. N = 259
4. *** significant at 1 percent level; ** significant at the 5 percent level; * significant at 10 percent level.
5. Standard errors are corrected for heteroscedasticity using Huber-White method.
6. Additional regressors included but not reported include a set of community dummies interacted with survey round.

II. Community Risk Sharing

This section examines the extent to which partial consumption smoothing and risk sharing take place among households within the same community. In order to achieve this, a new variable, $\Delta\left(\overline{\ln A_{tv}}\right)$, is introduced to capture the change or growth rate in the average asset index for the community. The model to be estimated now becomes:

$$\Delta \ln c_{htv} = \alpha + \beta \Delta \ln A_{htv} + \lambda \Delta \left(\overline{\ln A_{tv}} \right) + \gamma X_{htv} + \Delta \varepsilon_{htv} \qquad (7)$$

The specification in (7) implies that λ=0 when income shocks are not shared at all among community members, while λ≠0 when partial insurance and risk sharing take place among households within the same community. The results of the estimation (reported in table 4) show some evidence of mutual insurance among the surveyed households. In particular, estimates of λ show that a 10 percent increase in community mean asset index raises total household consumption by 3 percent. The raise in food consumption is similar (3.3 percent) while that of non-food consumption is slightly larger (at 5.6 percent). This shows that the growth rate in average community asset index has a significant role in the growth rate of household consumption.

Although the *a priori* expectation was that there would be stronger community risk sharing in food consumption than in non-food consumption, the results are contrary to this expectation. The change in growth rate of community assets seems to have a more positive and significant role in the growth rate of household non-food consumption than in food consumption. This result is not surprising because most households rely on free food distribution to deal with drought, which was the major shock that affected food consumption in both periods. The widespread use of safety net programmes between the two survey rounds meant that risk sharing through social networks was used more for non-food related shocks than for food related shocks.

Table 4: Evidence of Partial Consumption Insurance and Community Risk Sharing

	Δ ln Total Consumption	Δ ln Food Consumption	Δ ln Non-food Consumption
Δ ln Household Asset Index	0.59***	0.59***	0.61***
	(0.09)	(0.13)	(0.13)
Δ ln Community Asset Index	0.30**	0.33*	0.56**
	(0.12)	(0.18)	(0.24)
Δ ln Family Size	0.01	-0.02	0.06
	(0.01)	(0.02)	(0.03)
Female Headed Household	0.05	0.00	0.17**
	(0.03)	(0.05)	(0.06)
Household Head is <26	-0.01	-0.03	0.05
	(0.04)	(0.07)	(0.06)
Household Head is >65	-0.07**	-0.02	-0.11
	(0.08)	(0.05)	(0.08)
F test	24.73***	7.71***	9.40***
R^2	0.51	0.30	0.34
N	259	259	259

Source: Own compilation

Notes:
1. Dependent variable is change in log per capita consumption.
2. Standard errors are reported in parentheses
3. N = 259
4. *** significant at 1 percent level; ** significant at the 5 percent level
5. Standard errors are corrected for heteroscedasticity using Huber-White method.
6. Additional regressors included but not reported include a set of community dummies interacted with survey round.

6. Conclusion and Policy Implications

This chapter was aimed at examining the extent to which the surveyed households smooth their consumption against income shocks. While the study extends the empirical literature by examining the possibility of analyzing household consumption smoothing behaviour even when income data are not available, the results point to a number of policy implications. First, the paper has shown that at the household level, consumption

smoothing takes place but it is not perfect. The results suggest that households protect food consumption more than their non-food consumption. At the community level, risk sharing was taking place and was used more to protect household non-food than food consumption. Since the majority of these households had access to free food distribution in response to the drought shock in both study periods, household assets were used to generate income to respond more to non-food than food related shocks. The major implication for policy is that social protection programmes in Malawi should go beyond the provision of safety nets that promote current consumption. They should aim at protecting and building household assets to enable rural households to manage livelihood risks better and reduce their vulnerability to poverty.

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APPENDIX

Table A1: Summary Statistics of the Data

Variable	Description	Mean	Standard Deviation
Dependent variable			
2006 real expenditure per capita	Real consumption expenditure per capita in Malawi Kwacha in 2006	29,064.47	80,775.93
Household Characteristics in 2004			
Female headed household (1=yes)	Whether the household head is female	0.26	0.44
Age of head is <26 (1=yes)	Whether the household head is below 26 years old	0.11	0.31
Age of head is between 26 and 65 (1=yes)	Whether the household head is between 26 and 65 years old	0.80	0.40
Head' level of education: No schooling (1=yes)	The household head has no schooling at all	0.28	0.45
Head's level of education: Junior Primary (1=yes)	The head has been 1 and 4 years of schooling	0.22	0.42
Head's level of education: Secondary educ (1=yes)	The head has some secondary education (9-12 years of schooling)	0.14	0.34
Head's level of education: Post-secondary (1=yes)	The head has some post-secondary education (beyond 12 years of schooling)	0.05	0.22
Per capita land holding size	Land holding size (acres/capita)	0.59	0.54
Household enterprise (1=yes)	Whether the household has a non-farm enterprise in 2004	0.38	0.49
#goats/sheep owned	Number of goats and sheep owned by the household in 2004	1.20	3.17
Age of head	Age of the household head (years)	43.23	14.36
Household size	The size of the household	4.92	2.28

Number of children	The number of children the household has	2.96	1.97
Dependency ratio	Household dependency ratio	2.62	1.66
2004 real expenditure per capita	Real consumption expenditure per capita in Malawi Kwacha in 2004	25,943.03	34,378.16
Community Characteristics in 2004			
Weekly market in community (1=yes)	Whether there is a weekly market in the community	0.14	0.34
Health clinic in community (1=yes)	Whether there is a clinic/dispensary/health centre/hospital in the community	0.21	0.41
Regular bus service in community (1=yes)	Whether there is a regular bus/transportation services in the community	0.28	0.45
Post office in community (1=yes)	Whether there is a post office within the community	0.11	0.31
MASAF project in community (1=yes)	Whether there is a Malawi Social Action Fund (MASAF) project within the community	0.14	0.35
Distance to tarmac road	Distance to the nearest tarmac road (Km)	15.39	18.09
Distance to district headquarters	Distance to the district headquarters (Km)	29.87	19.51
Distance to primary school	Distance to the nearest government primary school (Km)	1.52	2.32
Distance to secondary school	Distance to the nearest government secondary school (Km)	17.81	13.58
Distance to commercial bank	Distance to the nearest commercial bank (Km)	27.04	17.03
Shock Variables in 2006			
Drought 2006 (1=yes)	Whether the household reported experiencing drought between 2005 and 2006	0.80	0.40
Food price rise 2006 (1=yes)	Whether the household reported experiencing a rise in the prices of food commodities between 2005 and 2006	0.39	0.49
Illness 2006 (1=yes)	Whether the household reported experiencing an illness 7 days prior to the	0.38	0.49

	interview date		
Fall in crop prices 2006 (1=yes)	Whether the household reported experiencing a fall in the sale prices for crops between 2005 and 2006	0.31	0.46
Number of observations	259		

Table A2: VIF and Tolerance Results for the Consumption Smoothing Model

VARIABLE	VARIANCE INFLATION FACTOR (VIF)	TOLERANCE (1/VIF)
Δln community Assets	1.26	0.79
Δln household Assets	1.19	0.84
Δln household size	1.13	0.89
Household head aged<26	1.09	0.92
Female headed household	1.05	0.95
Household head aged>65	1.04	0.96
MEAN VIF	1.13	

Source: Own compilation