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Household Vulnerability to Global Financial Crisis and Their Risk Coping Strategies: Evidence from Nine Rural Villages in Cambodia

SAING Chan Hang

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Responsibility for ideas, facts and opinions presented in this research paper rests solely with the authors. Their opinions and interpretations do not necessarily reflect the views of the Cambodia Development Resource Institute.

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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
CDRI	Cambodia Development Resource Institute
CMA	Cambodia Microfinance Association
FL	Formal Loan
GFEC	Global Financial and Economic Crisis
HHH	Household Head
IDRC	International Development Research Centre
INFL	Informal Loan
MFI	Micro-finance Institution
NGO	Non-governmental Organisation
PRA	Portfolio and Risk
PCA	Principal Component Analysis
PDS	Poverty Dynamic Study
RGC	Royal Government of Cambodia
TL	Total Loan
USD	United States Dollar

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March 2013

ABSTRACT

Although economic growth started to show signs of recovery in early 2010, a consumption shortfall was pervasive across Cambodian sample villages and household wealth statuses, reflecting the protracted effect of the global financial crisis up to March 2011. This paper aims to investigate the extent of rural household vulnerability and their use and the effectiveness of risk-coping mechanisms in response to the crisis. We find that groups vulnerable to the global financial crisis include larger households and households with older heads, while groups that are better insulated include households with better educated heads, female-headed households and households with married heads. There is also evidence of child labour as households with more children were better protected. Descriptive statistics show that 5 per cent of children below 14 years old are active labourers, and around a third of them engage in study and labour at the same time. In addition, households that have access to common property resources can protect themselves from economic crisis. On household risk management strategies, we find no evidence to support the effectiveness of risk-coping mechanisms, namely selling assets, selling livestock, borrowing and the use of transfers or social networks. Selling agricultural land was also found to be an ineffective coping tool, though there is weak evidence to suggest that selling idle land is effective. When assessing outcomes of rich and poor groups, we found no significant relationship in the use or effectiveness of any specific coping mechanism. To assess the effectiveness of coping mechanisms, we pooled information on reported strategies into three groups, namely active, adaptive and social networks, and found that active strategies and social networking did not help households weather the economic crisis. Results for adaptive strategies are mixed, as their coefficients are both positive and negative, but are not statistically significant.

1

INTRODUCTION

Rural households in Cambodia, as in other developing countries in the region, are vulnerable to both idiosyncratic shocks (e.g. death or severe illness of the household head or members) and covariate shocks, such as flood and drought (World Bank 2006a:53; 2006b:16-18). Their lack of financial and property assets and limited access to basic infrastructure, education, healthcare and protection and safety net programmes undermine their ability to cope with shocks (World Bank 2006b:53, 13-15). This explains why poverty is highly concentrated in the rural and remote parts of the country (World Bank 2009:27).

Alongside the traditional shocks that challenge rural household livelihoods, the living conditions of certain groups deteriorated even further during the global financial crisis. As the crisis started to be felt in Cambodia in early 2009, there was rising concern over its impacts on community households.

Several studies have attempted to investigate the channels through which the impacts of the crisis passed to the rural community and the extent of the effect on rural households. Kang *et al*. (2009), Jalilian *et al.*(2009) and Saing (2009) found that rural households experienced significant reductions in remittances from relatives who had migrated to work in the urban-based garment, construction and hotel and restaurant sectors, which were hit hard by cutbacks in overtime work or redundancy. Kang *et al.*(2009) also confirmed that laid-off workers either worked for even lower wages or returned to their hometowns as farmers, while their rural relatives sent children out to work.

In a survey of 1070 households in 15 villages in Cambodia conducted by Ngo and Chan (2010) in July 2009, 89 percent of respondents reported difficulties in sustaining normal living conditions, mainly because of declining income from dwindling remittances, job losses and lower agricultural commodity prices (wet season rice, maize, cassava), any one of which can undermine a household's ability to repay debt. Households resorted to a range of coping mechanisms to smooth consumption during the crisis and reduced spending on healthcare, sought additional sources of income, migrated to find work, sold assets and borrowed money to buy food.

To provide a clearer picture and a more convincing account, this study adopted commonly applied techniques grounded in economic theory to investigate the extent of rural household vulnerability and the use and effectiveness of coping mechanisms in response to the crisis.

The rest of this paper is structured as follows. The literature review in section 2 looks at the characteristics of households most vulnerable to macroeconomic shock and the use and effectiveness of common household risk-coping mechanisms. The description of the source of data, its coverage and key indicators captured in the dataset in section 3 is followed in section 4 by a simple descriptive analysis of impact, vulnerability and coping strategies observed in the selected rural villages. The framework for empirical analysis is presented in section 5, and empirical findings on household vulnerability and coping strategies are discussed in section 6. Section 7 concludes.

2

LITERATURE REVIEW

Although poverty is not the focus of this study, it is important to distinguish vulnerability from poverty to avoid confusion. Poverty is an ex-post (static) measure of a household's well-being that reflects its current state of deprivation and lack of resources or capabilities to satisfy its needs, while vulnerability, which is a dynamic concept, may broadly be construed as an ex-ante measure of well-being, reflecting not so much how well off a household is, but what its future prospects are (Chaudhuri 2003:2; Glewwe & Hall 1998:182-183).

2.1. Which Groups Are More Vulnerable than Others?

Households in different geographical regions and with differing demographic characteristics and socio-economic factors are affected unevenly by economic crisis.

Recent studies to assess whether larger households are more vulnerable to economic crisis report mixed findings. Frankenberg *et al.* (1999:12) using Indonesia family life surveys to investigate households affected by the 1997 Asian financial crisis found that larger households tend to experience a bigger fall in per capita consumption in time of crisis. This is also confirmed by Dattand Hoogeveen (2000) and Grooteart (1999), but Glewwe and Hall (1998), using household panel data from Peru, found only weak evidence to support the relationship between these two factors. In contrast, Goh *et al*. (2005) discovered that larger households appear to be insulated to a greater extent from consumption shortfall, which is in line with findings by Skoufias *et al.* (1999), Thomas *et al.* (1999) and Islam *et al.* (2007). Glewwe and Hall (1998) report that female-headed households tend to be less vulnerable to economic crisis, which is also confirmed in a study by Corbacho *et al.* (2003), while Goh *et al.* (2005) conclude that female-headed households do not seem to be more vulnerable than male-headed households.

A number of studies find that households with a better educated head and fewer children are less vulnerable to economic crisis (Frankenberg *et al*. 1999; Glewwe & Hall 1998; Corbacho *et al.* 2003; Goh*et al.* 2005). Schultz (1975, cited in Glewwe & Hall 1998:186) suggests that educated individuals adapt more easily to changing economic circumstances. Households with lower welfare status tend to be more vulnerable to crisis than improved welfare groups (Goh*et al*. 2005:250). Using panel household data from a 1994-98 survey in South Korea, Goh *et al.* (2005) found that households in the lowest 20th income distribution percentile were more vulnerable to economic crisis.

Households working in different sectors may be affected unevenly by economic disequilibrium. Glewwe and Hall (1998) hypothesise that jobs in construction, manufacturing and agricultural exports, which may be more sensitive to economic conditions, tend to be less stable, but white collar professions, including government employment, may be relatively stable. However, they find no significant differences between households headed by blue-collar workers, white-collar workers and government workers. A study of urban households in Argentina by Corbacho *et al.* (2003) found that those working in construction were more vulnerable, while households whose heads were employed in the public sector were more protected from economic crisis.

Glewwe and Hall (1998) hypothesise that subsistence farmers and other relatively autarkic households are less affected by, and less vulnerable to, economic shock, though their empirical study on Peru (1998) produced mixed results. However, several other studies, such as Thomas *et al*. (1999), Frankenberg *et al*. (1999), Skoufias *et al.* (1999) and Islam *et al*. (2007) validate the hypothesis that rural households tend to be less affected by economic shock than those in urban areas.

2.2. What Coping Strategies Are Adopted?

In time of economic shock, households are inclined to adopt various coping strategies, such as dissaving and selling physical assets, increased labour force participation, finding new jobs using existing skills, inter-household transfers, using credit for consumption, changing consumption patterns and directly producing consumption goods, to mitigate impacts on their income, thereby smoothing their consumption or reducing their vulnerability (Glewwe & Hall 1998). In the literature, the success of each of these mechanisms has been mixed.

Deaton (1989) postulates that households hit by income shocks may adapt by using savings or selling assets, which implies that households with more assets and savings may be less vulnerable. However, Glewwe and Hall (1998) find no evidence that savings and/or household assets reduce vulnerability to economic crisis, but question the reliability of the dataset. Goh et *al.* (2005), using household survey data from South Korea, find that liquidation of assets does not appear to contribute to consumption smoothing, which may be partly due to the small proportion (10 percent) of households that reported savings withdrawal or sale of securities, land or houses.

Inter-household transfers tend to be a more plausible means of coping with economic shocks. Glewwe and Hall (1998) in their study on Peruvian households found that transfers from household members residing abroad reduced vulnerability, while transfers from other households in Lima had no effect, which suggests the collapse of transfer networks in rural areas as almost all households inside Peru were hit by the shock. Goh *et al.* (2005) find that households receiving private transfers tend to be better protected from economic shock.

Thomas and Frankenberg's (2007:558) descriptive analysis of a household survey in Indonesia reveals that, to cope with shocks, older adults reduce their consumption to protect the nutritional status of young children, households combine to exploit economies of scale of consumption, and budgets are reallocated to provide for immediate needs. Reduced consumption is widely observed in the literature; see, for example, Glewwe and Hall (1998), Lokshin and Yemstov (2001), Fiszbein *et al.* (2003), Goh *et al.* (2005), Ngo and Chan (2010) and So *et al.* (2010).

Cunningham and Maloney's (2000)research to identify which household groups suffered in Mexico's 1995 economic shock found evidence of previously non-waged household members, i.e. spouses and children, joining the labour force as well as increases in the mean number of hours worked; this finding is confirmed by Fiszbein *et al*. (2003). Borrowing to smooth consumption during times of crisis is another common coping mechanism, as confirmed by Lokshin and Yemstov (2001), Fiszbein *et al.* (2003), So *et al.* (2010) and Ngo and Chan (2010).

3

DATA SOURCES

This study uses data collected during a panel household survey conducted in March 2008 and March 2011 in nine rural villages in three rural ecological zones, namely the Mekong (Ba Baong and Prek Kmeng) and the Tonle Sap (Tuol Krasaing, Andoung Trach and Khsach Chi Ros) plains; the upland plateau (Dang Kdar, Kanhchor, Trapeang Prei); and the coastal zone (Kompong Tnaot).The survey captures information on household demography, migration, employment, housing conditions, durable assets (non-land), land, livestock, credit, income and consumption expenditure, access to common property resources, shocks or crises and coping strategies and community development programmes. Information on village characteristics and market prices was also gathered using separate structured questionnaires. Details of village and household selection criteria are elaborated in Fitzgerald and So (2007:41-43).

The panel survey is from March 2001 to March 2011. It was originally conducted twice a year in March and September. The full dataset consists of eight cross-sections, namely March and September in 2001, 2004, 2008 and March in 2009 and 2011. Slightly over 1000 households were interviewed in each round except in March 2009, when only 90 households were interviewed due to budget constraints. Therefore, for simplicity and to capture the effect of the global financial crisis, the study team decided to use two rounds of panel data from the surveys in March 2008 and March 2011; the March 2009 round was dropped due mainly to the sample size.

A total sample of 1019 households was interviewed in 2008, but only 1013 could be re-interviewed in 2011 because six households had been away for more than six months, creating unbalanced panel data for 2008-11. Also, due either to death or migration in 2011, 56 households interviewed in 2008 were replaced with new ones. One more sample household was dropped because it failed to obtain information on household characteristics. To avoid or reduce the degree of bias in the analysis, this study employs a balanced panel dataset between 2008 and 2011 with a sample size of 956 households in each cross-section (Table 1).

Table 1: Total Number of Households in the Sample, by Village

Villages	Unbalanced panel		Balanced panel		Attrition rate (%)
	2008	2011	2008	2011	
Tuol Krasaing	120	120	113	113	5.8
Andoung Trach	87	85	76	76	12.6
Trapeang Prei	69	76	61	61	11.6
Khsach Chi Ros	121	120	117	117	3.3
Dang Kdar	130	125	114	114	12.3
KompongTnaot	123	120	119	119	3.3
Prek Kmeng	120	120	114	114	5.0
Kanhchor	124	120	120	120	3.2
Ba Baong	125	127	122	122	2.4
Total	1019	1013	956	956	

Source: CDRI household surveys in 2008 and 2011

4

IMPACTS, VULNERABILITY AND COPING STRATEGIES

Cambodia was admitted to the Association of South-East Asian Nations in 1999 and the World Trade Organisation in 2004. This contributed to significant annual output growth averaging around 9 percent between the early 2000s and 2008. This vibrant and robust growth was eroded in 2009 by the global financial crisis. Some basic indicators illustrating the effect of the crisis are presented in Table 2: per capita GDP, aggregate investment as a percentage of GDP and total export values fell in 2009, while textiles and apparel, hotels and restaurants and real estate also experienced decline.

Table 2: Key Economic Indicators of Cambodia, 2008–11

Indicators	2008	2009	2010	2011
Index of GDP per capita	100	95.4	101.1	113.2
Investment (% of GDP)	19.5	16.0	18.5	19.0
Textile and apparel output growth (%)	2.2	-9.0	2.2	9.9
Hotel and restaurant output growth (%)	9.8	1.8	4.2	9.4
Real estate output growth (%)	5.0	-2.5	3.4	7.6
Index of export values	100	93.7	117.2	159.1

Sources: IMF-WEO September 2011; MEF 2010

Table 3 shows per capita consumption and household expenditure in the nine villages before and after the crisis. At a glance only one village, located near the Thai border and where migration to Thailand is quite common, was insulated from the crisis, while the rest experienced varying falls in daily per capita consumption. A significant decline in consumption was evident in Trapeang Prei, which is a rice-deficit village.

Table 3: Daily per Capita Consumption in Riels, 2008–11 at 2005 prices

Villages	2008	2011	% change
Andoung Trach	2564.6	2759.2	7.6
Ba Baong	4315.0	3267.8	-24.3
Dang Kdar	3160.2	2235.1	-29.3
Kanhchor	2523.0	2064.6	-18.2
Khsach Chi Ros	2142.2	1549.2	-27.7
Kompong Tnaot	3277.0	2601.9	-20.6
Prek Kmeng	3947.6	2624.9	-33.5
Trapeang Prei	3974.6	2033.3	-48.8
Tuol Krasaing	3836.4	3114.6	-18.8
All villages	3295.8	2485.4	-24.6

Source: CDRI household surveys in 2008 and 2011

In order to detect trends of consumption across welfare status, changes in household consumption across income deciles were examined. Table 4 shows that the rich and the poor experienced a proportional fall in per capita consumption between 2008 and 2011. Each group suffered a fall of around one fifth of total consumption, which is quite substantial.

Table 4: Daily per capita Consumption in Riels, 2008–11, at 2005 prices

Deciles	2008	2011	% change
1 (lowest)	1264.5	959.1	-24.1
2	1735.1	1345.8	-22.4
3	2046.8	1616.9	-21.0
4	2330.0	1821.4	-21.8
5	2617.2	2017.0	-22.9
6	2914.7	2245.2	-23.0
7	3257.0	2549.6	-21.7
8	3756.7	2938.3	-21.8
9	4704.7	3654.3	-22.3
10 (highest)	8370.7	5741.4	-31.4
All villages	3296.0	2486.43	-24.6

Source: CDRI household surveys in 2008 and 2011

It could be misleading to conclude that the reduction in household per capita consumption across villages and deciles was a result of the global financial crisis alone without controlling for other factors, i.e. household characteristics and other common and individual shocks highlighted in the introduction. Rural households were also susceptible to various shocks both before and after the global financial crisis struck in 2009.

Table 5 provides an overall picture of household reported shocks during 2008–11. In the nine villages, 54percent of the sample reported encountering shocks in 2008, but only 38 percent experienced shocks in 2011. In 2008 households had to contend with sickness/injury (29 percent), followed by crop failure (7 percent) and animal death (6.4 percent). The picture is slightly different in 2011 in that only 19 percent of households experienced sickness/injury. Overall, the figures indicate that sickness, crop failure and damage and animal death were the most common shocks during 2008–11.

Table 5: Reported Household Shocks, 2008–11

Shock categories	Number of affected HH		% of affected HH to total number of affected HH		% of affected HH to full sample	
	2008	2011	2008	2011	2008	2011
Death of family member(s)	24	13	4.7	3.6	2.5	1.4
Sickness/injury	276	182	53.6	49.7	28.9	19
Fire	5	2	1	0.5	0.5	0.2
Crop failure	66	64	12.8	17.5	6.9	6.7
Crop damage (flood)	46	14	8.9	3.8	4.8	1.5
Other damage (flood)	3	1	0.6	0.3	0.3	0.1
Animal death/theft	61	69	11.8	18.9	6.4	7.2
Theft or cheating	8	20	1.6	5.5	0.8	2.1
Loss of employment	8	1	1.6	0.3	0.8	0.1
Business shutdown	3	0	0.6	0.0	0.3	0.0
Land conflict	15	0	2.9	0.0	1.6	0.0
Other	0	0	0.0	0.0	0.0	0.0
No. of observations (HHs)	515	366	515	366	956	956

Source: CDRI household surveys in 2008 and 2011

Households in the nine villages resorted to a range of mechanisms to cope with the shocks reported. As indicated in Table 6, of the households that experienced shocks in 2008, 46 percent drew on savings while around 22 percent borrowed to cope with the crises. This undermines household investment in child healthcare, education and agricultural production. Around 3.3 percent of the shocked households reduced their consumption, which might have worsened their nutritional status. Close to 10 percent accessed assistance from relatives in 2008, while 4 percent either sold cattle or migrated. This shows the existence of a social network in rural Cambodia. Data in 2011 paints a picture similar to that in 2008, as very few changes were evident between the two periods.

Table 6: Household Reported Coping Strategies, 2008–11

Coping strategies	2008 (n)	2011 (n)	2008 (%)	2011 (%)
Use savings	237	128	46.2	37.9
Reduce consumption	17	16	3.3	4.7
Borrowing	112	79	21.8	23.4
Sell cattle	21	22	4.1	6.5
Sell transport/farm equipment	7	3	1.4	0.9
Rent out land	3	2	0.6	0.6
Sell residential land	6	1	1.2	0.3
Sell agricultural land	3	0	0.6	0.0
Assistance from relatives	48	36	9.4	10.7
Assistance from NGO	4	7	0.8	2.1
HH member migration	20	16	3.9	4.7
Child labour	11	5	2.1	1.5
Other	23	23	4.5	6.8
No. of observations	512	338	512	338

Source: Household panel data from Moving Out of Poverty Study (Fitzgerald and So 2007)

However, it is difficult to conclude which coping mechanism was used in response to which shock, as the questionnaire was not designed to capture such detail. Thus, it is not possible to determine whether coping mechanisms were used to mitigate just one or several shocks. Nevertheless, when faced with shocks, households are more likely to resort to (in order of significance) savings, borrowing, assistance from relatives and NGOs, migration and reduced consumption.

5

CONCEPTUAL FRAMEWORK FOR EMPIRICAL ANALYSIS

As highlighted in the descriptive analysis, the results give only a glimpse of any correlation between vulnerability and individual household characteristics. In order to produce better estimates of vulnerability, it is necessary to control simultaneously for various household characteristics using Deaton's (1992) theoretical framework of determinants of household consumption. Male-headed households could be better protected from the crisis because of their higher level of education. It is therefore vital to control for other household head characteristics when examining relationships between vulnerability and individual household characteristics. Descriptive analysis provides only household direct responses about coping strategies they commonly use, but not the effectiveness of these.

This section describes the empirical approaches used to analyse the extent of household vulnerability and the effectiveness of coping strategies. In estimating household vulnerability, this study aims to identify which household groups are more vulnerable to crisis by adopting an econometric model developed by Glewwe and Hall (1998). In this model, change in household per capita daily food and non-food consumption before and after the crisis is used as a dependent variable to capture household vulnerability, while initial or pre-crisis household characteristics are treated as exogenous variables. To estimate household consumption changes in the nine sample villages, we applied equation (1) (Glewwe & Hall 1998) to pre-crisis data from the March 2008 survey and post-crisis data collected in the March 2011 survey:

$$\text{Ln}(C_{i2011}/C_{i2008}) = b_0 + b_1X_{i2008} + b_2V_{i2008} + b_3RS_{i2008} + U_i \quad (1)$$

Where C_i is the real consumption of household *i*; X_i is a vector of exogenous household characteristics prior to the economic crisis, i.e. household head's age, gender, marital status, employment and education, and household size, number of children and number of elders; V_i is a vector of other controlling variables, namely housing conditions, assets, indebtedness, wealth status and development programmes; RS_i is reported shocks, both idiosyncratic and covariate; and U_i is unobserved factors. Overall poverty line was used to deflate household consumption expenditure in 2011 to 2008 prices. A positive sign of b_1 indicates that a household is better protected or less vulnerable to the crisis.

To investigate the effectiveness of coping mechanisms used by households, this study employs an empirical approach developed by Deaton (1992) and Paxson (1992) as followed by Kazianga and Udry (2004). But given data limitations, only some asset indicators could be used to examine the effectiveness of the coping mechanisms. Although a majority of the households used savings and borrowing to cope with shock, we were unable to detect the effectiveness of these mechanisms due to the lack or unreliability of data. In our empirical estimation, the changes in value of property assets and loans between March 2008 and March 2011 were used as dependent variables and changes in real monthly per capita income along with other exogenous household characteristics prior to the crisis were used to capture the effectiveness of coping mechanisms, as expressed in equation (2):

$$\Delta\text{asset}_{i2011/2008} = b_0 + b_1\Delta Y_{i2011/2008} + b_2 X_{i2008} + b_3 RS_{i2011} + U_i \quad (2)$$

Δ asset is a measure of change in real household asset values between March 2011 and March 2008. Those assets include means of transportation, home appliances, agricultural equipment, livestock and cultivable agricultural land.

$\Delta Y_{i2011/2008}$ is a measure of change in household real per capita monthly income between March 2008 and March 2011, the coefficient of which is used to capture the effectiveness of risk-coping mechanisms (that is, a positive sign of b_1 indicates that a specific mechanism is used effectively); X_{i2008} is a vector of controlling household characteristics; RS_{i2011} is reported shocks, both individual and common, during the six months prior to March 2011; and U_i is a set of unobserved factors. Overall poverty line was used to deflate income and asset values in 2011 to 2008 in order to estimate real change in values of assets and income.

In order to make the best use of data and thoroughly examine the effectiveness of coping mechanisms, we adopt an econometric model developed by Lokshin and Yemtsov (2001), using information on coping strategies reported by households in the six months before March 2011. We pooled this information into three groups (1) adaptive strategies: reduced consumption; (2) active strategies: spent savings, borrowed money, sold cattle, sold home and farm equipment, rented out land, sold residential and farm land, migration, placed children in labour services; (3) support from relatives/friends, assistance from NGOs. The estimating equation takes the form:

$$\ln(C_{i2011}/C_{i2008}) = b_0 + b_1X_{i2008} + b_2V_{i2008} + b_3CS_{i2008} + U_i \qquad (3)$$

Similarly to equation (1), C_i is the real consumption of household *i*; X_i is a vector of the exogenous household characteristics prior to the economic crisis; V_i is a vector of other controlling variables; CS_i is reported household coping mechanisms, such as adaptive and active strategies and social networking; and U_i is unobserved factors. A positive sign of b_3 indicates that a particular coping mechanism is effective.

6

EMPIRICAL RESULTS

6.1. Who is Vulnerable to Economic Crisis?

As illustrated in Glewwe and Hall (1998), several competing theories on the determinants of household consumption are debated in recent literature. In this study, we do not intend to test the exogeneity of those determinants, namely household characteristics, to seek a "perfect fit" for household consumption; rather, we aim to provide informative results by ensuring that all explanatory variables in equation (1) do not cause the problem of multicollinearity (high correlation among independent variables), which reduces the reliability of estimators of various explanatory variables. We also apply robust OLS (ordinary least squares) regression with White's (1980) standard error correction to obtain correct t-statistics for accurate interpretation of the results. For coefficients of correlation among independent variables, which indicate no sign of multicollinearity as they are all below 0.5, and summary statistics and definition of all variables, see Table 7 in the appendix.

The results recorded in appendix Table 8 provide strong evidence that large households tend to be more vulnerable to economic crisis than smaller ones, indicating the absence of economy of scale achieved on food, non-food and overall consumption, which contradicts the findings of Goh *et al.* (2005). There is also evidence that older household heads are less protected from economic crisis, which coincides with previous studies (Glewwe & Hall 1998; Goh *et al.* 2005). As expected, better educated household heads are better insulated from the crisis because they presumably work in a more stable environment, which evident for both food and non-food consumption. This result is consistent with Schultz's well-known hypothesis (1975).

Interestingly, female-headed households are more likely to be protected from economic crisis, which is evident for overall and non-food consumption, and those with a married head are also less vulnerable to crisis. The larger the number of older members a household has, the more vulnerable it is, but households with a greater number of children below 14 years old are better protected from crisis because around 5 percent of them are active labourers. Sending children out to work tends to help protect the family from economic crisis, but deprives children of some of their physical and cognitive potential.

There is no strong relationship between vulnerability and household head employment status. Although there is no evidence that households employed in agriculture and services are vulnerable to economic crisis, there are indications that those engaged in retail sales are. Households with better housing conditions, i.e. concrete or wooden walls, and larger stock of home appliances and livestock are less vulnerable to economic crisis, though this is only significant for non-food and total consumption. There is no evidence as to whether indebted households are either less or more vulnerable, but households that could afford to make a donation to other vulnerable households in the village prior to the crisis tend to be less vulnerable.

Households that have access to common property resources appear to be more vulnerable, with the coefficients significant at 5 percent for total consumption, 10 percent for food and 1 percent for non-food consumption (Table 8). In terms of wealth status, households across all consumption quintiles are highly vulnerable to economic crisis.

6.2. Is there Evidence of Effective Use of Coping Mechanisms?

Using equation (2) illustrated in Section 5, this section investigates the effectiveness of household coping mechanisms in response to economic crisis. As described in Section4, regardless of the type of shock, a majority of the households reported that they use savings, borrow, get assistance from relatives, sell cattle, reduce consumption and migrate to cope with shocks. Based on this descriptive analysis, we examine the effectiveness of those mechanisms, except for savings (due to the absence of data), by estimating the coefficient of association between change in asset values and change in monthly real household income.

Results of this section are presented in Tables 9, 10 and 11 in the appendix. Table 9 shows the positive response of households in selling assets, such as means of transport, home appliances and agricultural equipment; however, none of the coefficients are statistically significant, indicating no evidence of the effective use of coping mechanisms. Similar results are revealed for the sale of livestock assets, borrowing and social networking (Table 10). There are positive responses between selling livestock and borrowing and change in income, but they are not statistically significant. A negative response is evident for transfers, suggesting ineffective use of social networks; however, the coefficient is not statistically significant at any level.

There is no evidence that selling agricultural land is effective in coping with economic crisis, except for the sale of idle land, which is statistically significant at 10 percent (Table 11). We also ran robust regression by rich and poor groups for all coping mechanisms, but found no significantly positive or negative results concerning the effective use of mechanisms.

To make the best use of available data, we used reports by households on the type of coping mechanisms applied during the crisis to investigate household use and effectiveness of these strategies. Following Lokshin and Yemtsov (2001), we pooled information into three categories, namely adaptive, active and social networking strategies. The results show that active strategies and social networking, well recognised as informal coping mechanisms, and did not help households weather the economic crisis, as their coefficients are not statistically significant for non-food consumption (Table 12). Results for the effectiveness of adaptive strategies are mixed, their coefficients being both positive and negative, but they are not statistically significant at all. Overall, there is no evidence that the mechanisms used by households in the nine rural villages were effective in mitigating the effects of the crisis.

7

CONCLUSION

Although signs of recovery emerged in early 2010, a consumption shortfall was pervasive in all nine sample villages and across both household wealth statuses, reflecting the continuing effect of the global economic crisis to March 2011. Households also reported having faced other shocks, namely sickness, crop failure, flood damage and animal death during 2008–11. In the meantime, a number of commonly used coping strategies were reported.

The study finds that larger households tend to be more vulnerable during the pre-crisis period, which indicates the absence of economies of scale of consumption, while older household heads are less protected from crisis. Households with better educated heads are better insulated as they are more likely to have stable employment, which indicates the significance of household investment in child and adult education. Interestingly, female-headed households are more likely to be protected from economic crisis than male-headed households, which implies the emerging role of women in generating household income, while households with married heads are also less vulnerable to economic crisis.

Somewhat alarmingly, the use of informal child labour as a means to smooth household consumption becomes increasingly pronounced during economic crisis, as indicated by households with a larger number of children being better insulated. The survey shows that 5 percent of children below 14 years old are active labourers and around a third of them engage in both study and labour. Sending children out to work helps to protect a family from economic crisis, but prevents children reaching their potential, both physically and cognitively. There is no evidence that households engaged in agriculture and services are pushed into vulnerability or indebtedness by economic crisis, but households engaged in retail sales are vulnerable. Households that can afford to donate and have better housing conditions and more home appliances and livestock are less vulnerable to economic crisis. Surprisingly, even households that have access to common property resources are also vulnerable to economic crisis.

We found no evidence that selling assets or the use of transfers or social networks are effective coping mechanisms. Selling agricultural land was found to be ineffective, though there is weak evidence to support the effectiveness of selling idle land. When assessing outcomes by rich and poor groups, we found no significant relationship in the use or effectiveness of any specific mechanism.

We pooled coping strategies into active, adaptive and social networking groups and found that active strategies and social networking did not help users weather the crisis. Results for adaptive strategies were mixed but not statistically significant.

APPENDIX TABLES

Table 7: Descriptive Statistics of Key Variables

Variables	Observation	Mean	Standard deviation	Definition
logcons	956	-25.97	51.46	% change logarithm consumption
hhsize	956	5.75	2.16	Household size
age	956	47.08	12.12	Age of household head
agesqr	956	2363.63	1203.59	Age of household head squared
educ	956	3.30	2.90	Years of education of household head
female	956	0.22	0.42	Household head is female
married	956	0.80	0.40	Household head is married
elder	956	0.14	0.44	Number of older members
adult	956	3.80	1.61	Number of adult members
primjob2	956	0.34	0.47	Household head employed in agriculture
primjob3	956	0.19	0.40	Household head in retail sales
primjob5	956	0.14	0.34	Household head as workers in services
children	956	1.96	1.52	Number of children in household
housecon	956	0.76	0.43	1=wooden/concrete, 0=thatched
transpindx	956	0.00	1.19	Index transport asset
homeindx	956	0.00	1.42	Index home equipment
livestockindex	956	0.00	1.24	Index livestock asset
landagri	956	0.75	0.43	Agricultural land asset
indebt	956	0.50	0.50	Household indebted
loansize	476	148.34	266.64	Size of loan in cash per unit loan
Rtrnsfer	956	0.21	0.40	Household received transfer 2008 in 0000 riel
Gtrsfer	956	0.16	0.36	Household gave donation 2008 in 0000 riel
programroad	956	0.52	0.50	HH participate and benefit from road programme
programirrig	956	0.15	0.35	HH participate and benefit from irrigation programme
programsav~g	956	0.10	0.30	HH participate and benefit from savings programme
progsubhealt	956	0.40	0.49	HH participate and benefit from subsidised health care
indshock	956	0.26	0.44	HH individual shocks in 2008
comshock	956	0.08	0.27	HH common shocks in 2008
accompr	956	0.94	0.23	HH access to common property resources
quint08_1	956	0.20	0.40	HH status in lowest quintile in 2008
quint08_2	956	0.20	0.40	HH status in second lowest quintile in 2008
quint08_3	956	0.20	0.40	HH status in third quintile in 2008
quint08_4	956	0.20	0.40	HH status in fourth quintile in 2008
quint08_5	956	0.20	0.40	HH status in fifth quintile in 2008

Table 8: Determinants of Household Vulnerability to Economic Crisis

	Dependent variable: change in consumption		OLS Robust
Variables	Log cons.	Log food cons.	Log non-food cons.
Household size	-1.662**	-5.898***	-7.758***
Age of household head	-1.857*	1.340	-0.903
Age squared of household head	0.020*	-0.011	0.010
Year education of household head	0.726	1.209**	1.782*
HH head is female	12.561**	3.394	33.072***
HH head married	12.647**	1.376	24.681**
HH members aged above 60	-12.612**	-2.132	-9.293
HH engaged in agriculture	2.126	5.380	-0.847
HH engaged in retail sales	-0.187	-5.537	-21.830**
HH engaged in services	3.810	2.711	10.660
Number of children aged below 14	-0.096	0.331***	0.317*
House concrete/wooden	8.912**	3.427	12.799*
Transport asset index	0.897	-1.141	3.410
Home appliance index	2.628**	1.110	2.779
Agricultural asset index	1.617	0.315	2.431
Livestock asset index	3.654***	1.447	6.613***
HH with agricultural land	-3.205	4.433	6.685
HH indebted	4.030	-1.993	-2.734
HH received transfer 2008	-1.063	0.201	1.614
HH gave donations 2008	11.023***	3.750	1.299
HH in road programme	-1.802	3.049	-9.350
HH in irrigation programme	17.906***	-1.585	17.309*
HH in savings programme	3.397	-2.346	3.327
HH in subsidised health programme	-2.788	2.901	-4.243
Individual shocks 2008	-5.522*	7.316**	-24.808***
Common shocks 2008	0.245	1.832	1.963
HH access to common property resources	-15.587**	-11.834*	-42.533***
HH in quintile 2 in 2008	-22.921***	-15.993***	-21.042**
HH in quintile 3 in 2008	-33.654***	-20.446***	-25.167***
HH in quintile 4 in 2008	-53.916***	-31.916***	-52.815***
HH in quintile 5 in 2008	-88.299***	-48.135***	-100.899***
Constant	59.413**	-3.450	108.083**
Number of observations or households	956	956	956
R-squared	0.313	0.161	0.206
Adjusted R-squared	0.290	0.132	0.179

Significance levels: * 10 percent; ** 5 percent ; *** 1 percent

Table 9: Determinants of Change in Household Transport, Home and Agricultural Assets

Variables	Dependent variables: changed asset values		OLS Robust
	Transport asset	Home appliance	Agricultural equipment
Change in monthly income (2008–11)	0.000	0.000	0.000
Household size	-15.105*	-1.740*	-4.640
Age of household head	2.850	-0.105	-19.591
Age of household head squared	-0.025	0.001	0.232
Education of household head	8.393	-1.627*	-32.417
Household head female (dummy)	13.258	4.903	130.271
Household head married (dummy)	-74.059	-1.239	132.995
Number of elders	43.588	-4.068	-68.905
Number of children	-0.248	-0.143*	1.247
HH head engaged in agriculture	-21.286	-2.037	8.974
HH head engaged in retail sales	-190.679**	-17.713***	-225.791
HH head engaged in services	-81.149*	-3.387	-90.315*
HH indebted	7.083	10.109**	-132.697
HH received transfers	12.909	-1.023	58.214
HH gave donations	-48.377	2.508	-231.347
HH in road programme	19.871	-2.841	-75.965
HH in irritation programme	5.747	5.500*	18.450
HH in savings programme	-26.079	-4.303	35.170
HH in subsidised health programme	19.951	6.391**	-83.358
HH reported individual shocks 2011	29.412	2.086	-203.641
HH reported common shocks 2011	10.072	9.363***	90.019
HH in quintile 2 in 2008	-22.399	-2.582	17.093
HH in quintile 3 in 2008	-31.219	-4.834	15.491
HH in quintile 4 in 2008	-2.609	-10.193*	19.271
HH in quintile 5 in 2008	-138.364**	-21.593***	-151.209
Constant	60.186	15.845	574.570
Number of observations/households	956	956	956
R-squared	0.067	0.089	0.025
Adjusted R-squared	0.042	0.064	-0.001

Significance levels: * 10 percent; ** 5 percent; *** 1 percent

Table 10: Determinants of Change in Values of Livestock, Loan Size and Transfer

	Change asset values and transfers		OLS Robust
Independent variables	Livestock	Loan size	Received transfer
Changed monthly income (2008–11)	0.000	0.000	-0.005
Household size	-18.046***	0.052	2586.529*
Age of household head	13.538*	-2.636	-1672.617
Age of household head squared	-0.164**	0.025	20.863
Education of household head	-2.547	-5.192	781.059
Household head female (dummy)	40.222	89.756	3777.243
Household head married (dummy)	-2.616	77.326	2022.695
Number of elders	71.303**	28.164	-3747.854
Number of children	1.841***	1.977**	-88.358
HH head engaged in agriculture	-68.483*	-22.233	-4636.088
HH head engaged in retail sales	29.405	-51.015	-8443.658*
HH head engaged in services	-5.999	48.231	9767.631*
HH indebted	49.351*	-105.289**	-85.103
HH received transfers	49.589*	8.976	-42173.139***
HH gave donations	28.319	-0.500	8903.418*
HH in road programme	-99.377***	32.771	966.459
HH in irritation programme	33.373	40.201	5343.890
HH in saving programme	38.767	68.682	16145.343**
HH in subsidised health programme	-50.703*	-32.442	-3449.931
HH reported individual shocks 2011	-25.415	21.941	1838.731
HH reported common shocks 2011	0.926	54.656**	-133.055
HH in quintile 2 in 2008	-100.479**	11.780	1376.666
HH in quintile 3 in 2008	-24.256	90.964**	-1398.757
HH in quintile 4 in 2008	-48.166*	10.926	3363.052
HH in quintile 5 in 2008	-45.128	55.722	7809.077
Constant	-203.940	-28.895	17734.469
Number of observations/households	956	956	956
R-squared	0.062	0.030	0.153
Adjusted R-squared	0.037	0.004	0.131

Significance levels: * 10 percent; ** 5 percent; *** 1 percent

Table 11: Determinants of Change in Value and Size of Agricultural and Idle Land

Independent variables	Dependent variables: change in land value & size			
	Agric. land size	Agric. land value	Idle land size	Idle land value
Changed monthly income (2008–11)	0.000	0.000	0.000*	0.000
Household size	-0.074**	-380.046***	-0.009*	-3.524
Age of household head	0.008	-313.460	0.007	-3.983
Age of household head squared	0.000	2.730	0.000	0.028
Education of household head	0.033	-184.223	-0.005	-0.276
Household head female (dummy)	0.071	1076.517	-0.002	6.729
Household head married (dummy)	0.130	153.629	0.020	20.721
Number of elders	-0.332	-365.248	0.061	10.631
Number of children	0.002	18.173	0.001	-0.503
HH head engaged in agriculture	0.040	-788.547	0.016	-14.633
HH head engaged in retail sales	-0.209	-4387.419*	0.005	-5.680
HH head engaged in services	0.161	-1414.687	0.007	4.225
HH indebted	0.159	2086.225*	-0.003	2.442
HH received transfers	-0.038	209.064	0.025	7.042
HH gave donations	0.305	-3817.521	0.005	-6.565
HH in road programme	-0.319	673.134	-0.031	22.119
HH in irritation programme	-0.181	2070.501***	0.031	19.272
HH in savings programme	0.326	2263.272***	0.023	12.370
HH in subsidised health programme	0.373*	537.789	0.003	-33.084
HH reported individual shocks 2011	0.167	673.050	0.026	7.509
HH reported common shocks 2011	0.290	688.829	0.038	24.253
HH in quintile 2 in 2008	-0.075	-251.287	0.009	-2.126
HH in quintile 3 in 2008	-0.222*	-516.475	-0.031	-46.474
HH in quintile 4 in 2008	-0.228*	-749.075	-0.003	-31.115
HH in quintile 5 in 2008	-0.282	-3756.959**	0.004	-22.088
Constant	-0.359	8328.827	-0.135	142.556
Number of observations/households	956	956	956	956
R-squared	0.033	0.037	0.018	0.017
Adjusted R-squared	0.008	0.011	-0.008	-0.010

Significance levels: * 10 percent; ** 5 percent; *** 1 percent

Table 12: Robust Regression of Change in Household Consumption and Coping Strategies

Variables	% change in log consumption		OLS Robust
	Log. cons	Log. food cons.	Log non-food cons
Household size	-1.603**	-5.857***	-7.436***
Age of household head	-1.829*	1.364	-0.838
Age squared of household head	0.020*	-0.012	0.009
Year education of household head	0.766	1.225**	1.913*
HH head female	12.872**	3.396	33.898***
HH head married	12.602**	1.219	24.191**
HH members age above 60	-11.949**	-1.879	-7.617
HH engaged in agriculture	2.356	5.551	0.618
HH engaged in retail sales	-0.159	-5.561	-22.196**
HH engaged in services	4.065	2.831	11.777
Number of children	-0.094	0.333***	0.304*
House concrete/wooden	8.785**	3.375	12.453
Transport asset index	0.869	-1.136	3.602
Home appliance index	2.655**	1.114	2.861
Agricultural asset index	1.536	0.267	1.525
Livestock asset index	3.448***	1.359	6.032**
HH with agricultural land	-3.061	4.596	8.355
HH indebted	4.480	-1.756	-0.045
HH received transfer 2008	-0.488	0.339	3.141
HH give donations 2008	11.249***	3.849	2.298
HH in road programme	-1.853	3.055	-9.264
HH in irrigation programme	17.833***	-1.674	17.139*
HH in savings programme	3.053	-2.335	3.038
HH in subsidised health	-2.952	2.841	-5.269
Individual shocks 2008	-1.231	9.937*	1.520
Common shocks 2008	2.597	3.583	16.886*
HH access to common property	-16.327**	-11.680	-42.937***
Adaptive strategies	-7.225	-4.435	2.616
Active strategies	-3.966	-3.267	-32.496***
Social network	-9.794*	-1.452	-25.029**
HH in quintile 2 in 2008	-22.897***	-16.112***	-21.896**
HH in quintile 3 in 2008	-33.754***	-20.549***	-26.191***
HH in quintile 4 in 2008	-54.148***	-32.037***	-53.291***
HH in quintile 5 in 2008	-88.245***	-48.167***	-101.013***
Constant	58.740**	-4.381	104.789**
Number of households/observations	956	956	956
R-Squared	0.315	0.161	0.216
Adjusted R-Squared	0.290	0.130	0.188

Significance levels: * 10 percent; ** 5 percent; *** 1 percent

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