RISKS, COPING AND ROLES OF ACCESS TO FINANCIAL SERVICES

MEHERUN AHMED, BAQUI KHALILY [*]

ABSTRACT: *Households move strategically to smooth consumption in the event of economic shocks. This paper comprehensively analyzes various coping schemes adopted by households in the event of different types and intensity of economic shocks. We conclusively find that erosive coping is a dominant strategy for households except asset shocks. It is also evident that the higher the total loss suffered the greater is the likelihood of adopting erosive coping schemes for any of the three economic shocks. Contrary to the findings related to asset shocks, the household is high likely to adopt erosive savings, help from relatives in case of economic shocks. In addition to these two methods, households also takes up new loans and mortgaging land when it encounters expenditure shocks. The househols is more prone to adopt multiple strategies in case of income and expenditure shocks.*

1. INTRODUCTION

The relationship between poverty and natural disasters in the developing world has been a topic of interest and debate among the academics and the policy makers. Households in developing countries face different types of shocks. Some are particular to one household only. These are called idiosyncratic shocks. Again, some shocks, like natural disasters affect the entire village, or a community or a trade or an occupational group. These are referred to as systematic shocks. Households plan strategically to smooth consumption in the event of income shocks followed by an exogenous natural calamity. The set of coping strategies adopted by households depend on a number of

factors, especially, the types of crisis the households face and opportunities available to them.

The people in the coastal belt of Bangladesh are yet to recover from the devastation caused by Hurricane Sidr and Ila. Insurance against weather related risks are beyond the reach of these people in the presence of an extremely thin insurance market. Poor Bangladeshis, like citizens of most developing countries, are unable to purchase various kinds of insurances, e.g., life, property or health insurances, from the formal sector insurers as they are either unavailable or unobtainable.

Providing insurance to rural population in developing countries is quite problematic because of asymmetric information and high transactions costs. Like credit markets in poor regions, insurance markets are characterized by high transactions costs, moral hazard, adverse selection, limited cash flows, low education levels of clients, and weak enforcement mechanisms. Moral hazard and adverse selection remain the two most important reasons hindering the formal insurers penetrating the rural areas in the developing world. Moral hazard arises in the rural villages when farmers when insured are less likely to adopt precautionary measures, or apply appropriate amount of fertilizer, labor and other inputs, raising the chance of failure. Adverse selection refers to the inclination of the relatively riskier farmer to purchase insurance. Without much background information, insurance companies cannot distinguish between riskier and safer clients, making it hard for them to maintain a profit margin. In the face of these constraints the formal insurance providers (either the state subsidized companies or the profit maximizing private-sector insurers) are uninterested to provide services to rural populace even though the demand is rather high.

Recently in Bangladesh, microfinance organizations are playing an important role to fill this vacuity by providing micro-insurance to their clients. Morduch (2004) believed micro-insurance is going to be as successful as microcredit in the fight against poverty. Not much is known about the demand side's response to micro-insurance as a precautionary coping mechanism in the face of any shock.

There has been a revolution in Bangladesh in terms of access to credit for the poor people through the operations of various microfinance institutes. Extensive research has been done evaluating the impact of microcredit in overall well being of the households. Only a few studies investigated the role of microcredit in coping with incomes shocks.

Using a new nationally representative dataset from Bangladesh, the broad objective of this paper is to identify different coping mechanism adopted by affected households in presence of a very thin insurance market and differential access to formal and informal credit markets. Given the availability of some insurance to the poor recently, and wide spread MFI operations, we also focus on the role of access to credit and insurance in mitigating various income shocks, both exogenous and endogenous.

2. LITERATURE REVIEW

Natural disasters affect the consumption pattern of households before and after the event. Forward looking households in an effort to adopt risk mitigating techniques,

incur ex-ante costs. Households also bear ex-post costs in coping with the aftermath of natural disasters. Examples of such costs according to the literature, include loss of uninsured assets, reduction in current consumption, liquidation of assets, interest paid on loans from formal and informal sectors and the loss of human capital for the future generation. The topic of risk coping and efficiency of the household has been extensively researched. In this section I try to provide a review of some of the most recent and relevant research pieces which is far from being exhaustive; rather emphasizes the special research focus of this chapter. First, I try to present the various coping mechanisms adopted by households for consumption smoothing purposes in the event of an income shock as seen in the literature pertaining to the developing countries. In the absence of formal insurance, and availability of credit, households resort to various behavioural responses and also some informal arrangements.

Corbett (1988) classified the coping techniques into two broad categories: precautionary and crisis strategies. Precautionary strategies are adopted in the wake of repeated exposure to similar type of non-acute risks. In contrast, severe threat to food-security forces households to resort to crisis strategies. In a similar study, Dunn and Valdivia (1996) find that in the Andean semi-arid regions, wealthier households owning more assets in the form of livestock, and therefore, are in advantageous positions to adjust or mitigate the shocks ex-post, are less likely to adopt ex-ante risk reducing strategies.

The most prominent *Ex-Ante* strategy adopted by households is to invest in different income sources. As long as the sources of income do not co-vary perfectly, risks to total income are reduced. Alderman and Paxson (1992) noted in their paper that crop and field diversification, mix of farm and non farm occupations are quite wide spread in the rural areas of developing countries. Morduch (1995) in his review paper lists similar findings. Variability reducing inputs and production techniques are often favored by households to smooth income. Households facing higher farm profit volatility send members abroad for steady income flow. Rosenzweig and Binswanger (1993) found that in India poorer farmers are more risk averse in the sense that they adopt less risky production strategies. Farmers facing unpredictable environment, select the blend of assets which are less sensitive to rainfall and generate low profit levels.

Rosenzweig (1988), Urdy (1994) have found that households in the developing world traditionally rely on social networks of extended family, friends and neighbors and other informal institutions to mitigate the effect of the shock as *Ex Post* strategies. They manage only partially to insure against shocks by engaging in informal credit transactions and transfers. Fafchamps and Lund (2003) in a recent paper also find similar results. More recently, in contrast to the African scenario, Morduch (2004) identified several coping strategies for the households in Honduras after Hurricane Mitch. In the presence of missing insurance markets, he found in his study using 1998 data that about 21% of the affected households drastically reduced consumption as a main response to the hurricane. These households were unlikely to draw on insurance, or erode assets, use savings or borrow funds.

It is well known that microcredit plays an important role in the lives of the poor people in Bangladesh. Pitt and Khandkar (1998, 2002) find in their papers that

microcredit increases consumption and reduces poverty. It also helps smooth seasonal consumption during the lean periods. Amin, Rai and Topa (2002) find that poor households who participate in microcredit programs in Bangladesh tend to have relatively better access to insurance and other consumption smoothing devices than non-participants. Moreover, Rosenzweig (1988) found that access to financial mechanisms such as credit and remittances enable the household to manage risks and cope better.

Watts (1983) in his paper concluded that African households are forward looking and their responses are not arbitrary. In his survey he listed the following coping mechanisms in the order of frequency of adoption: storage of food during famine, borrow from kin, temporary migration, sale of livestock, borrow from money lenders, sale of domestic assets, sale of land and finally permanent migration. Cutler (1986) also listed similar coping mechanisms in his study of Beja famine migrants in Sudan. Pleitez-Chavez (2004) finds evidence that households that are subject to adverse income shocks, tend to receive more transfers. He also found a positive correlation between the magnitudes of the negative shock and the amount of transfers. Yang and Choi (2007) found that in Philippines sixty percent of the exogenous reductions in income is matched by remittance inflows from abroad. The authors find evidence against the null hypothesis of unchanged consumption expenditures in households with migrant workers but they found strong significant evidence of variability in consumption expenditures in response to income shocks in households without any migrant worker.

The other most prominent coping mechanism adopted by poor households in response to shocks is accumulation or erosion of assets. In many parts of the developing world poor credit-constrained households disproportionately hold unproductive liquid assets as a precautionary measure. These precautionary reserves take the form of livestock, foreign currency, durable goods, crop inventories, land etc. (Udry 1995; Jalan and Ravallion, 2001; Gomez-Soto, 2007).

Even though the relationship between natural disasters and poverty is extensively studied, there are still some gaps in this literature. There are only a few studies investigating the household coping mechanisms in Bangladesh. The role of micro credit and micro-insurance as a risk coping strategy is not well researched. This is mainly because micro-insurance is a recent phenomenon and appropriate data are virtually non-existent to the researchers for precise analysis. The role of overlapping of loans, that is borrowing simultaneously from several NGOs as a coping strategy is also not researched. None of the studies focused on the choice of different combinations of strategies adopted by households depending on the nature of shocks. Using household level data from a nationally representative survey conducted in 2010 that has a quite rich, separate module on risk and coping strategies, it is possible to address these gaps in the literature. Even though Bangladesh is a small country geographically, it is visited by many natural disasters. The atrociousness of loss of lives and properties reaches mammoth scale due to high population density. Thus this study bears important policy relevance. The data-set also contains a whole list of demographic and regional variables, allowing us to research the question with better accuracy and statistical sophistication. In this paper, I try to address the following questions:

✓ When individual households face economic shocks what type or combinations of coping strategies do they adopt? Do choices vary by the intensity or types of shocks faced?

✓ Is micro-insurance a likely strategy adopted by households in the face of income shocks?

✓ What roles do micro-credit from Micro Finance Institutes (MFIs) play? Do the households borrow from the formal or informal credit market? Or a mixture of these three sources of credit?

✓ How big a role do remittances play?

✓ Do they dis-save? That is do they cope by eroding savings/assets/capital?

As mentioned before this study tries to bridge the existing gap in the literature. There are only a handful of papers researching this important issue using Bangladeshi data. Also most of these papers focus on a particular coping mechanism, e.g. consumption reduction or migration or microcredit. This paper is comprehensive in the sense that it analyzes all possible strategies for almost all types of disasters, combination of all of these, and complimentarily and substitutability of strategies due to the nature of various shocks.

A summary of the incidence of income shocks, both exogenous and endogenous, by various household demographic characteristics and regional and supply side characteristics is discussed first. A mean level comparison of the various coping strategies is discussed in the next section. A comparison of various coping schemes by income level, various demographic characters, nature and intensity of the natural disasters etc, is also provided in the next section. A regression based analysis is provided follows investigating the impact of shocks. Finally a discussion on the choice of coping schemes is provided.

3. VARIOUS EXOGENOUS AND ENDOGENOUS SHOCKS IN BANGLADESH: DEMOGRAPHIC CHARACTERISTICS OF THE AFFECTED HOUSEHOLDS

Poor people in Bangladesh struggle to smooth consumption in the face of various income shocks. Acute and chronic illness, loss of productive resources, loss of livestock and fisheries, floods, droughts and other natural disasters, river erosion, fire, crop failure, death of earning members etc. are some of the causes that affect family's income and consumption negatively.

The following table provides the summary statistics of households who are affected by various types of shocks. It also shows the frequency distribution of affected households in both rural and urban areas. In our sample, about 3.16 percent of the households were affected by floods. A very small percentage of households reported losses due to river erosion (0.42). 2.7 percent of the sample households suffered some damage due to storms, cyclones or tornados. A very small number of households reported losses due to fire, or loss in industry or sudden decline in remittance receipts.

Since majority of our sample households are in rural areas and predominantly agricultural households, the data reveals that only a very small, 0.21 percent of the households report any job loss or reduction in foreign remittances. The major shocks

that affected most of the households are loss of livestock and death and illness in the family. About 6 percent of the sample households suffered some loss in income due to death of livestock. 24 percent of the households report death or illness of adult earning members of the households. The incidence of all types of shocks is higher in rural areas than in the urban areas indicating that people in rural areas are more vulnerable.

Table 1. Percentage of household affected by different risk types and by region

Risk types	% of Households affected	Freq	% of Households affected in rural Areas	% of Households affected in urban Areas
Flood/excessive rain	3.16	262	3.75	0.85
Rain storm/Cyclone/tornado	2.66	222	3.14	0.77
River erosion	0.42	33	0.47	0.23
Catch fire	0.19	17	0.21	0.12
Suddenly lost service	0.21	18	0.14	0.51
Shortage of rain fall/drought	2.43	226	2.72	1.27
Crop disease	2.83	243	3.10	1.79
Cheated	1.22	109	1.23	1.20
Death of earning member	0.63	59	0.69	0.41
Family members are suffering diseases	23.34	2119	24.05	20.60
Accident of earning member	3.52	308	3.17	4.86
Accident of other member	2.65	261	2.59	2.90
Theft/robbery	2.99	275	2.74	3.97
Death of cattle	3.53	300	3.89	2.10
Death of poultry birds	5.66	504	6.11	3.89
Fish cultivation/loss asset	0.53	47	0.61	0.22
Loss in business	1.41	140	1.28	1.91
Litigation	1.66	149	1.80	1.12
Suddenly stop remittance from abroad	0.10	8	0.11	0.08
Others (specify)	1.89	172	2.11	1.01

Natural calamities like floods, cyclones, rain storms and droughts and cattle diseases affect agricultural households more which are predominantly rural. We clearly see a statistically significant difference between the percentages in the rural and urban areas for these types of shocks. These are covariate shocks. Again there are other risks which also affect the households or entrepreneur adversely but there are no significant differences in acuteness of occurrences in urban and rural areas. Examples include sudden loss of service, death of earning member, an accident of an earning member, an accident of other members, theft/robbery, litigation etc. These shocks are individual-specific and occur in isolation at different times to different individuals.

We probe this geographical difference more closely. In our data, about 47% of the sample households report that they faced at least one crisis last year. Since weather related shocks affect households that are predominantly dependent on agriculture, we tested if there was a statistical difference between households that are mostly rural and those that are urban.

As expected most of the disaster struck households are located in the rural area and difference between the sample proportions of rural and urban affected households are statistically significant at 5% level of significance or less.
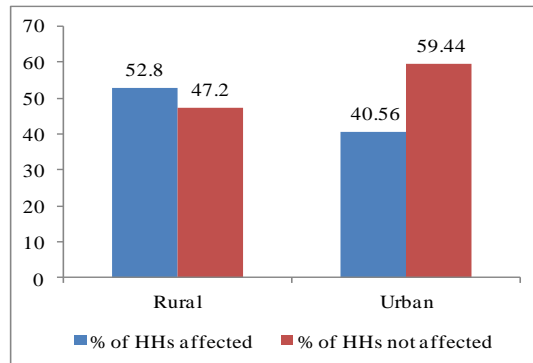
Figure 1. % of Affected and Unaffected Households by location

It is also found in the data that the geographical spread of the disaster or crisis-struck households is more or less evenly distributed across 6 divisions of Bangladesh except Rajshahi and Barishal. About 80% and 65% households respectively from these two divisions were affected by some form crisis last years and the sample difference between the affected and non-affected households in these two divisions are significant at 1% or less implying the incidence of disasters disproportionately affected the households in Rajshahi and Barisal division.
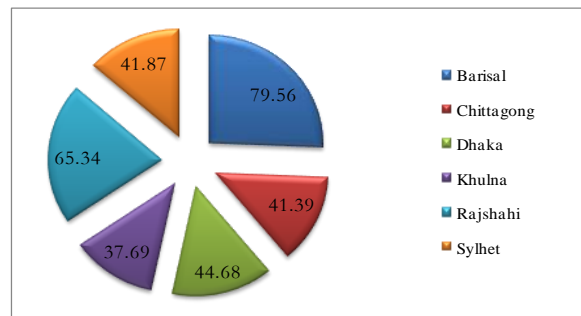

Figure 2. Geographical distribution of affected households

It is suggested in literature that households solely dependent on agriculture bear brunt of any natural calamity most. We saw indications of similar findings earlier. These households try to insure themselves by diversifying crop pattern, land use pattern etc. We tested the incidence of disasters by the occupation of the head of the household. It turns out that within the agricultural households, the incidence is not evenly distributed. Of the households whose head's only income source is agriculture, 53.18 percent of them reported that they suffered from some shock and 46.49 were not affected. A two-sample test of proportion with a z-value of 4.31 indicates that the incidence is significantly different. 48.75 percent of the households that are not solely dependent on agriculture and have alternative source of income along with agriculture

faced some income shock in the last three years and 50.38 percent reported no income shock and the difference is statistically significant.
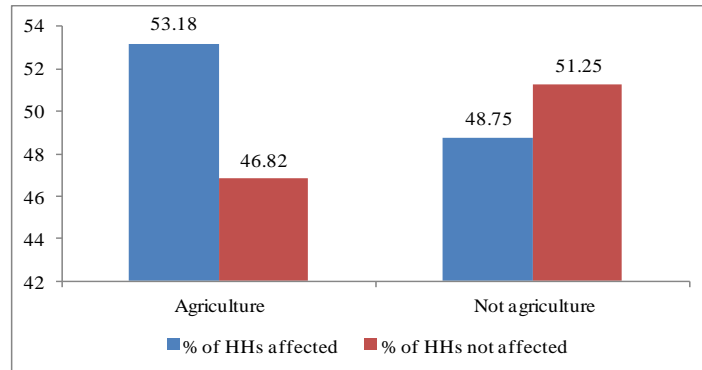
Figure 3. Percent of Affected and Unaffected Households by Occupation

This finding is consistent as the major shocks faced by households are predominantly weather related. The significant share of the affected group also reported loss of crops or livestock and death or illness of adult working members as major shocks faced by them.
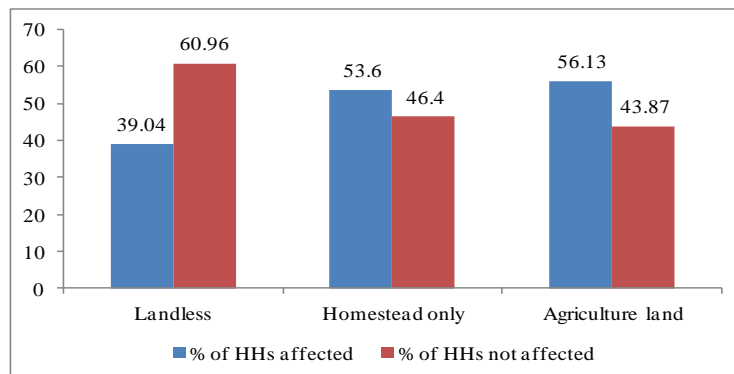
Figure 4. Percentage of Affected and Unaffected Households by landholding

For the landless group there is a discernable difference in terms of shocks suffered by the sample households. The households that only own homestead and the households that own some agricultural or other land used for productive purposes report significant loss of income due to shocks

About 54 percent of the households who only own homestead and 56 percent of the households that own agricultural land face some form of crises in the last year. These differences are statistically significant at 1% level of significance. But the incidence of any income shock is less for the landless households. This is not

surprising as the landless households do not suffer from crop failures due to natural calamities which are quite frequent in Bangladesh.

Figure 5. Incidence of shock by income groups

A very similar pattern is observed when we study incidence of shocks by income status of the households. It is observed that in the sample, poorer households face relatively fewer shocks compared to relatively richer households. About 52% percent and 49 percent of the affected households are poor and non-poor respectively.

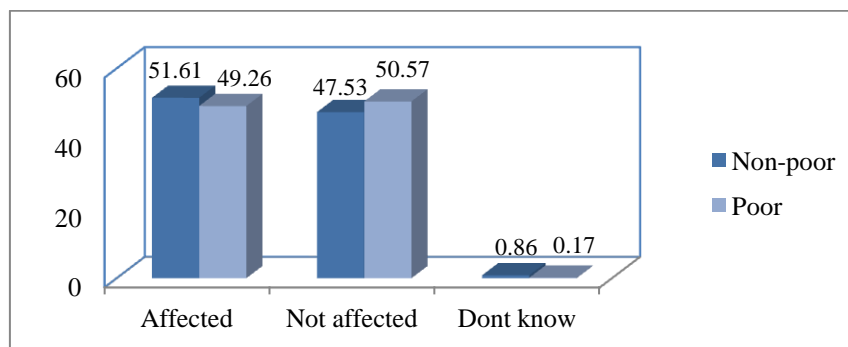There is a significant difference in the sample proportions of affected and non-affected households by their income levels. Poorer households report less income shocks compared to non-poor households and the difference is significant at lower than 5 percent with absolute z-values of 3.43. The opposite pattern prevails for non-affected households. For relatively well off households incidence of shocks are disproportionately higher and is statistically significant at 5% or lower.

Table 2. Percentage of Households Facing Various Natural Shocks in the Last Year According to Their Occupation and Participation Status in Micro-Credit Market

Shocks/Disasters	Participated in Microcredit Programs			Occupation of the Household Head	
	No loan	Only one loan	Multiples Loans	Only Agriculture	Other occupation
Flood	8.98	9.73	3.43	6.61	10.03
Storm/cyclone/Tornado	6.75	3.43	1.59	4.92	4.20
Droughts	0.86	1.01	1.26	1.55	0.76
River Erosion	0.31	0.51	0.75	0.70	0.28
Loss of Crops	5.70	12.97	4.35	8.86	6.42
Loss of livestock	16.51	17.63	20.00	20.96	16.34
Loss in business	1.64	1.82	2.26	0.70	2.64
Fire	2.38	0.20	0.25	0.28	0.10
Death/Illness of Family Members	43.13	36.78	48.54	34.88	46.39
Loss of Jobs/Reduction in Remittances	0.55	0.41	0.17	0.98	0.24
Others	13.19	15.70	17.41	19.55	12.60

The following table describes participation in micro-credit programs and occupation of the household head of different disaster affected households.

It is also not surprising to see that the households that suffer loss of livestock also borrow from multiple MFIs. The same pattern is observed when families lose an earning member. Loss of an earning member induces the household to borrow from several sources and they also diversify occupation. Households in flood prone areas also tend to have principal bread earner having other employment than agriculture. They do it mostly as an insurance against natural calamities that would affect agriculture most.

Thus we do observe through aggregate mean level data that households that are relatively well off income wise, have relatively low level of human capital, and have ownership of agricultural land, and predominantly rural are more prone to shocks or crises.

4. VARIOUS COPINGS STRATEGIES ADOPTED BY HOUSEHOLDS IN BANGLADESH

Risk affects households or entrepreneurs in different ways, with different intensity and has a wider impact on the specific households' well-being. Depending on the intensity and nature of risk households adhere to coping strategies for mitigating, reducing and managing risk. The following table describes the frequency distribution of various coping mechanisms adopted by our sample households.

Table 3. Households coping strategies (%)

Coping types	% of Households coped	Freq.	% of Households coped in rural Areas	% of Households coped in urban Areas
From saving	29.14	1331	25.90	45.68
From insurance	0.17	9	0.15	0.25
Help from relatives	10.00	473	10.20	8.99
Private help	0.80	36	0.89	0.33
Government help (VGD/VGF)	0.06	4	0.05	0.12
Government help (old allowance)	0.11	5	0.12	0.05
100 days program	0.04	2	0.03	0.10
Taken new loan	12.25	558	12.55	10.70
Sold labor in advanced	2.86	126	3.12	1.50
Sold crop in advanced	2.91	128	3.28	1.05
Sold land	1.36	60	1.52	0.54
Mortgaged land	2.00	87	2.29	0.53
No action taken	27.40	1208	28.56	21.48
Others (specify)	7.65	346	7.94	6.16

Erosive strategy remains the principle mode of coping when households face any income shock in order to smooth consumption. Eroding savings leads the chart as about 29.14 percent of the households have tried to mitigated shocks by drawing down previous savings. It is not surprising to see that taking a new loan from a financial institution is the second major coping scheme adopted by households. About 12.25 percent households cope by borrowing from a different MFI as the usual norm of a MFI is to provide only one loan at a time to one individual. Again informal and formal help/support is one of the major strategies for the mainly poor households who can't

save or don't have access to credit. In this regard informal sources such as friends and family always play a major role. About 10.80 percent of households cope through informal support. A very small fraction of the households relied on insurance or government programs. Some other important strategies are selling labor and crop in advance. About 6 percent of the sample households have adopted these two means. Selling and mortgaging land is also a prominent way of coping /managing risk. About 3.5 percent of the households resorted to such strategies. Since land is a vital productive resource, a household would be less inclined to sell the land. It would

There is a significant difference in the coping mechanisms adopted by households based on the geographical location. Urban households adopt erosive strategies in the sense that majority of the affected households about 46% to be precise mitigate shocks through withdrawal of savings. The relevant number is 30% for rural populace and the difference is statistically significant at 5% or less. Also strategies such as advance sale of labor and crop, selling and mortgaging land are adopted mostly by rural households and only a hand full of urban households and rural urban difference is highly statistically significant. Since rural households are predominantly agricultural and land is a chief mode of production, these are not surprising findings. In terms of the other strategies, there are not much differences in the adoption frequencies between the rural and urban populace.

5. COPING MECHANISMS OF VARIOUS DEMOGRAPHIC GROUPS

The following table provides a summary of different coping schemes disaggregated by various demographic characteristics of our sample households. As it is seen in the previous section erosion of savings, borrowing from relatives, advanced sale of labor and crops, new MFI loans and mortgaging land are the favored options of the households, we mostly focus on these coping strategies. It is important to know if coping strategies vary by education, income, occupation and age of the household head. This would help in designing appropriate policies and also help in targeting the most vulnerable and needy group.

There is a positive association between income and erosion of savings as a coping means. About 38% of the households belonging to the highest income quintile cope by withdrawal of savings where as only 18% percent of the households in the lowest income quintile adopt this mode. The difference is highly significant at 5% or less. This finding is not surprising. Poorer households cannot save as much as the higher income groups. Also we have seen earlier that poorer households are not as affected by natural shocks as the rich households are. On the other hand informal support (From friends and family) has a negative relation with the income that is low income households mainly receive support from their kin when they are affected by any income shock. Similarly new loan as a coping strategy is prominent for middle income groups but not for the highest income quintile. However advance labor or crop sale is also effective strategy for the low income households. Richest households in the sample also sell the crops in advance to manage a risk.

Service holders mostly use savings or insurance to cope as 37.71 percent service holders use this strategy. Taking a new loan is adopted by self-employed and

day laborers more compared to service holders. Advanced sale of labor would an obvious choice for day-laborers and this is confirmed by data. The statistical difference between various occupational groups in using advance sale of labor is highly significant.

Table 4. Households characteristics of risk affected households

Characteristics		Coping Strategies							
		Savings or insurance	Relatives	GO and NGO supports	New loan	Advanced labor sale	Advanced crop sale	Land mortgage or sale	No action taken
Income quintile	Lowest	18.69	13.98	0.41	10.07	3.69	3.02	3.28	31.70
	2nd	26.41	13.03	0.38	13.46	3.99	2.85	3.56	27.02
	3rd	30.74	10.46	0.11	14.21	3.82	2.70	2.10	25.79
	4th	34.30	8.10	0.09	15.28	1.35	1.61	3.68	26.13
	Highest	38.25	7.36	0.05	8.16	1.10	4.53	4.33	26.43
Occupation	Service	37.71	11.78	0.07	8.56	1.15	2.53	2.45	19.52
	Self employment	29.94	8.03	0.21	12.00	1.67	3.49	4.46	31.05
	Day labor	25.47	14.27	0.18	15.27	5.70	2.39	2.12	25.16
	Others	28.48	10.90	0.63	8.21	1.28	2.13	3.16	27.52
Education of household head	Illiterate	24.49	12.76	0.39	13.27	4.29	2.83	3.78	28.32
	Incomplete primary	30.12	10.05	0.17	13.57	2.39	1.96	2.44	27.92
	Incomplete SSC	34.66	9.35	0.00	9.49	1.47	3.26	2.65	24.79
	Complete SSC	29.72	9.62	0.00	11.56	3.01	6.49	4.83	31.10
	HSC	37.08	5.68	0.19	9.53	0.00	1.92	4.90	26.58
	Above HSC	47.09	7.77	0.00	9.25	0.00	3.76	4.01	16.86
Age of household head	Age below 30	30.40	11.00	0.08	11.73	3.19	2.09	3.05	26.13
	Age between 30-40	30.80	9.76	0.11	13.45	3.99	2.87	2.84	26.24
	Age between 40-50	29.41	10.53	0.09	12.41	2.07	3.00	3.56	27.53
	Age between 50-60	28.94	11.11	0.58	10.70	1.79	3.39	2.59	30.93
	Age greater than 60	23.03	13.21	0.60	12.29	2.23	3.87	6.35	28.63

Adoption of various coping schemes varies significantly by the education of the household head. There is a positive association between erosion of savings and education level. Higher educated groups usually are service holders and belong to richer income quintiles. They have relatively better access to savings and insurance and data reveals that this is their preferred mode of mitigation. Another important result is that less educated households rely on a new loan to cope compared to households where the head as HSC or higher level of education.

Coping schemes do not vary significantly with age of the household head except for the mode advanced sale of labor. Younger household head tend to adopt this strategy more compared to relatively older age groups.

6. ROLE OF FINANCIAL INSTRUMENTS FOR COPING SHOCKS

Households cope in many ways; try to smooth consumption in the wake of income shocks. The strategies adopted depend on the availability of the financial

instruments available to them. In literature, role of microcredit, remittances have been documented as means of coping. Role of micro-insurance have not been studied significantly. In this paper we try to find if access to these financial instruments enable the households to cope better.

Table 5. % of Affected and Unaffected Households by Participation in Credit Programs

Shocks	Quasi-formal		Formal Loan		Informal Loan	
	Only One Loan	Multiple Loans	Only One Loan	Multiple Loans	Only One Loan	Multiple Loans
Affected Households	44.88	55.12	57.96	42.04	25.39	30.11
Not Affected Households	52.36	47.64	68.21	31.79	25.86	22.96

In Table 5 it is observed that most of the affected households have multiples loans from microfinance institutes (MFIs) and their participation levels are significantly different compared to non-affected households. The same trend is observed for formal loans. They also borrow extensively from informal credit market in the event of any shock or crisis. 30 percent of the affected households borrowed multiple times from informal credit markets in last one year where as only 22 percent of the unaffected households availed informal loans. These differences in participation in credit market between the affected and non-affected households are highly significant. In Bangladesh as revealed in aggregate level data, multiple borrowing from formal, informal and quasi formal sectors probably is significant strategy choice by the disaster affected households. The survey data reveals a curious pattern in terms of remittance receipts by the affected households. It is seen that affected households receive less remittances compared to non-affected households. This is contradictory to the findings in literature about the positive association between remittance flow and occurrence of any type of income shocks.

As Morduch (2004) points out, micro-insurance is going to be the next revolution in terms of fight against poverty. Without access to any form of insurance, the poor struggle to replenish their loss from any shock and are trapped in poverty cycle for long. Role of micro-insurance has not been well documented in literature mostly because of lack of proper data. In our survey, a very small percentage of households have access to such financial instruments.
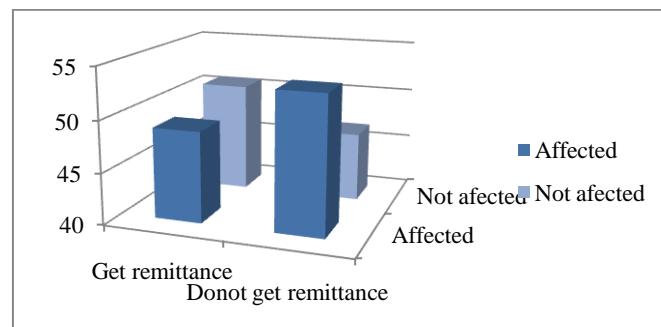

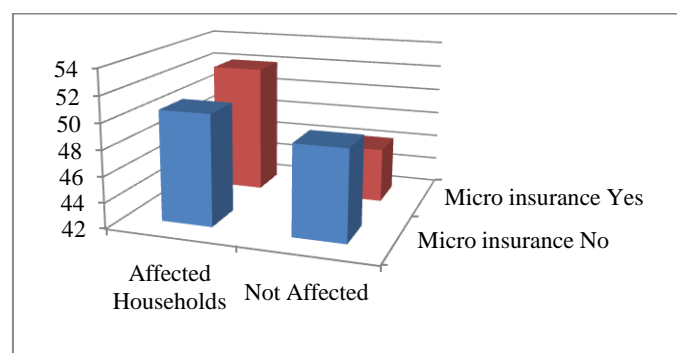**Figure 6. Remittance Receipts by Incidence of shocks**

Figure 7. Percentage of Affected and Unaffected Households by micro insurance

A significantly larger share of the affected households had micro-insurance and the difference is highly statistically significant. 52 percent of the affected households had insurance from the quasi formal sector compared to 46 percent of the non-affected households. There is not much difference in terms of availing micro-insurance depending on incidence of shocks.

Of the households that do not have any form of insurance, the incidence of shock is evenly distributed among these households. Not surprisingly, a larger proportion of the sample households that are affected by shocks have availed insurance.

Even though the descriptive statistics gives us some indication of the coping behavior of the households, it may be misleading as various forces can confound the actual behavioral pattern. We try to precisely estimate the crisis coping behavior of households through regression analysis when they incur some income shocks. It would be interesting to see if the same pattern prevails in the regression analysis when confounding and co-moving factors are controlled for.

7. REGRESSION ANALYSIS

Depending on the severity and the nature of the shocks, households adopt a gamut of different strategies. They might also combine different strategies to guard against transitory and permanent shocks. The questionnaire listed several possible coping strategies (almost exhaustive) and also allowed the respondents to cite/mention other ones not included in the list. The coping methods listed in the questionnaire are: use of savings; insurance; financial help from relatives, NGOs, and government; new micro-loan, mortgage or sale of land etc. The literature suggests that informal insurance arrangements, borrowing from kin, community cooperatives etc may be ineffective for shocks that are common to all members of the informal insurance groups. Households also cope by borrowing from multiple sources, formal and informal credit markets and MFIs. Remittances and sale of assets are also seen as coping mechanisms adopted by households. There is not much known about the simultaneous memberships of various MFIs, or combination of several techniques as coping strategies in Bangladesh.

With this background information in mind, we proceed to identify for each type of disaster or shock or crisis, the most likely coping method adopted by households. The coping strategies might vary by the demographic and socio-economic conditions of the affected households. We delve into that analysis with a view to recommend and formulate appropriate, efficient policies, and to help in identifying the right target groups etc.

In order to examine more rigorously the impact of natural disasters on consumption expenditure, income and savings, we specify an empirical model which permits tests of hypotheses concerning the type and severity of shocks, availability of microcredit, erosion of savings and assets, migration of family members etc.

We basically interested in the following: What are the most likely strategies adopted by households depending the nature and intensity of the shocks? Whether having access to finance enabled the households to cope better in the event of an income shock?

To assess the likelihood of various choice strategies adopted by households based on the observed characteristics of the households and the nature of the income shocks, we would adopt both bi-variate probit and multinomial conditional logit model for our estimation.

In our data 14 coping strategies are listed. The multinomial logit response probabilities of various coping strategies would be given by

$$P(y = j \mid x) = \exp(x\beta_j)/[1 + \sum_{h=1}^{j} \exp(x\beta_h)]$$

Where x is the vector of choice variables. The coping strategies, a random variable y taken on values, *J=1,…,14.*

It is important that relative probabilities for the alternative coping strategies depend only on the attributes of those strategies only, i.e., relatives odds between two alternatives pass the Independence from Irrelevant Alternatives (IIA) assumption. Given that individuals may simultaneously choose several of the coping strategies at one point in time, it is clear that the response probabilities will not pass IIA test.

In order to tackle this problem we perform factor analysis. This process will identify common coping capability of the households and reduce the number of 14 variables to a smaller number according common covariates. And these grouped variables are most likely to be independent of each other. This is crucial for the IIA assumption. Factor analysis is a statistical technique which explains a set of observed variables in terms of a smaller number of latent variables called factors. These latent factors are assumed to account for the correlations among observed variables. Thus the common covariate of all these coping variables would capture the latent coping capability of the affected households. I do not assume at the outset that one factor would overwhelmingly explain the entire common covariance matrix of these 14 variables. On the contrary, I let the data determine the number of factors to be retained and try to interpret them according to the factor loadings of the variables[1]. The following figures show the results of the factor analysis in a nutshell.

_____

[1] *We use factor analysis instead of principle component analysis as the latter imposes the restriction that all the components completely explain the correlation structure among the variables. Factor analysis,*
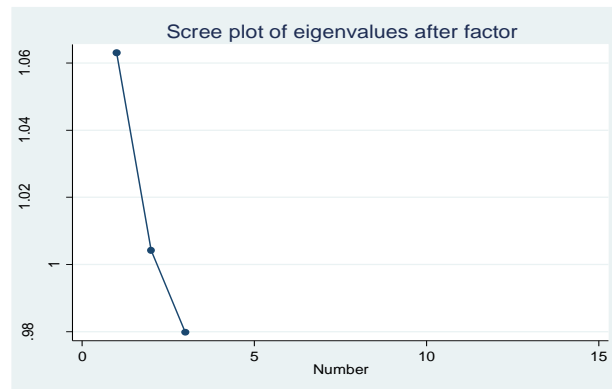
Figure 8. Scree Plot after Factor Analysis

Both the Kaiser-Guttman (only the eigenvalues that are greater than one) and Scree plot[2] (the curve levels off after the eigenvalue) suggest that we keep only 2 factors.
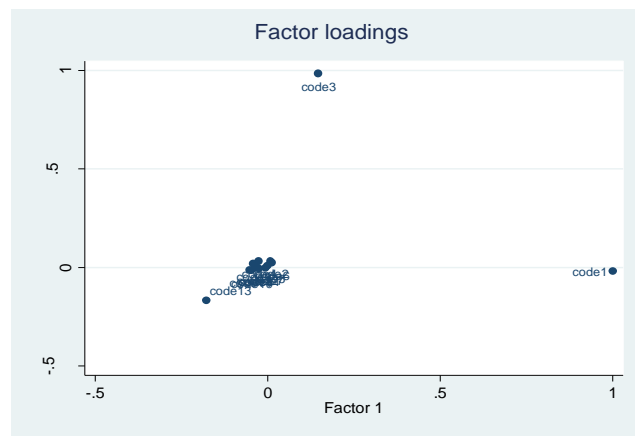
Figure 9. Factor Loadings after Factor Analysis

The factor-loading graph indicates that code 1 and code 3 are distinctly different and the rest of the codes co-vary together. Code 13 which is no action taken is separate than from the group. Code 1 is coping through savings and code 3 is help from relatives. Thus our dependent variable would take j=4 values with "no action taken" as base. Since the data on its own through factor analysis reflects that these four variables are independent of each other, the IIA assumption would not be violated.

Estimating Equation. The model of coping scheme choice is given by:

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accounts for the covariance of these variables in terms of a much smaller number of common covariates (factors). Factor analysis does not force the common factors to explain the entire covariance matrix. That is it allows the individual-variable specific influences to explain the remaining variances.
[2] See appendix for the Scree plots for factor analysis.

$$prob(Y_i = j) = \frac{e^{\beta_j' x_j'}}{\sum e^{\beta_j' x_j}}, j = 0,1,..4$$

J takes 4 values in one model where we investigate the relative likelihood of adoption In case of probit models, J takes only one value. X represents the vector of control variables. We discuss the included controls and variables of interest in the following section.

8. COMPARATIVE LIKELIHOOD OF ADOPTION OF VARIOUS STRATEGIES

First we try to analyse the likelihood of adoption of the three strategies comparing to no action to take depending on the type of shock or the intensity of shocks by running multinomial logit models. The coefficients, even though difficult to interpret, provide us with the direction of the likelihood and relative strength of each choice. The four coping options are coping through eroding savings, help from relatives, all of the others and the base is no action taken.

In addition to the standard household level demographic control variables like family size, region of residence, age of the household head, some important household level and supply side variables namely, education, electricity coverage, duration of MFI membership, etc. are included in our regression analysis. Among the household level characteristics, household head's education level plays an important role in the choice of coping strategies. Higher education implies access to information about potential income shocks and available coping strategies. The household is able to make better informed decisions regarding ex-ante and ex-post coping strategies when faced with income shocks. A relatively poor household's marginal disutility from income loss is much higher than a wealthier household. Household's permanent income level would affect the choice of coping mechanisms. Education of household head and the electricity coverage are used as proxies for household level permanent income. An individual having a longer term relationship with MFIs would have more information and more faith on the activities of the MFIs. It also reflects larger loan sizes which enable the household to access bigger sums of money and confirms the bankability of the client. Loan size is included to capture this effect. Rural areas are characterized by a high degree of economics fragmentation. Long distances, difficult geography, lack of paved roads, lack of public transportation make accessibility to markets difficult and expensive. We would include divisional dummies and a binary indicator for rural area to address the importance of regional and infrastructural facilities in the choice of coping strategies.

The choice variables of interest are intensity of shocks, represented by only one shock and two or more shocks last year; and types of shocks, natural, income loss or death in the family etc. Model 1 studies the intensity and model two investigates the types of shocks and their influence on households' choice of shock mitigating schemes.

It seems from Table 6 model 1, that the number of shocks faced in the last one year does not significantly increase or decrease the likelihood of choice of the three

coping methods. The log-odds of the choices to base outcome are not statistically significant for the variables only one shock and two or more shocks.

In Table 6, model 2 we also observe that if the household faces a natural shock it increases the likelihood of the log odds of the adopting the group of strategies as compared to base. So is the case when there is a loss in business. It is interesting to note that only in case of death and injury of adult working member in the family, the household is significantly likely to adopt all possible options available to them as the log odds between at no action taken and saving, help from relative and group strategies are 1.9, 1.8 and 1.5 respectively. In case of such shocks, households would significantly erode their saving as the odds ratio is higher than that of the other two options. The likelihood of borrowing from relatives again is higher compared to the group option of sale or mortgage of land; or advance sale of labor or crops, apply for a new loan etc. This pattern is not observed for any other type of disasters faced by the households. Erosion of savings or seeking help from kin are not most sought after mechanisms in case of natural or business loss related shocks. One possibility of not borrowing from kin may stem from the fact that natural disasters or bad crop or death of live stock due epidemics like swine flu are systematic in nature, affecting a whole region or community.

To test the consistency of the results we split the sample according to ownership of land and occupation of the head of the household. The results are presented in table 4 and table 5. A very similar trend as in Table 6 is observed. For the households that own only homestead and the households that own some agricultural land, any income shock through natural disasters, makes it more likely for these households to adopt the group strategy to mitigate the shock as the log odds compared to the base are positive. Any health injury or death in the family prompts the household to adopt all 3 of the strategies compared to the base in both samples. The household is relative more likely to erode savings, then it would borrow from kin and then adopt the group option. Exact same pattern is seen when the sample is split by the occupation of the head of the household.

The other control variables show expected signs in all the models. Households that have electricity coverage erode savings or borrow from relatives. One year increase in the education of the household head reduces the log odds of adopting any of the strategies. Living in the urban area also reduces the likelihood of eroding saving or seek help from relatives. All these variables are proxies for household's income status and rich households as we have seen in mean level analysis are better capable of managing shocks and thus have advantageous positions of not to adopt erosive strategies.

9. LIKELIHOOD OF ADOPTION OF DIFFERENT FINANCIAL INSTRUMENTS

In order to identify how the households avail the financial instrument in case of different types of disasters, we run several probit models where the dependent variable is a binary indicator of borrowing from MFIs, purchase of micro-insurance, purchase of formal insurance and remittance receipts. We focus on these variables as

the mean level analysis indicates the significance of these variables. The multinomial regression analysis also shows that erosion of savings is more likely relative to other options only in case of death and injury of a family member. Erosive strategies are not significant in cases of other income shocks affecting the households. In the multinomial regressions, the relative comparisons of choices were analyzed but we also wanted to know individual likelihood of various financial instruments for policy reasons. As factor analysis indicated particular grouping of the data, this type of analysis was not possible in the multinomial framework because of IIA assumption.

In

Table **9** we find that households would borrow from MFIs if it faces any number of shocks. The estimated coefficients for the binary variables, only one shock and two or more shocks are statistically significant at 1%. Micro-credit appears as one of the major instrument choice in coping against any type of shock. If the household is more prone to various shocks, that is if it faces two or more shocks in a year, it is significantly likely to borrow from MFIs. These households are also highly likely to purchase micro-insurance or formal insurance as ex-ante coping mechanism. Remittance doesn't play a significant role and is not a significant choice for mitigating the affects of shocks.

Households are positively likely to borrow from MFIs as an ex-post income smoothing strategy if they face any natural disasters like floods, or droughts or cyclones etc. The coefficient for loss in business or death of live stock is again positive and significant implying the likely choice of micro-credit to help cope this type of income shocks. If there is a death or injury or any other severe health problems of a family member, households positively and significantly resort to loans from MFIs.

Natural calamities, business loss and theft or robbery etc. are positively associated with the likelihood of purchasing of micro-insurance as an ex-anti coping device. Formal insurance in Bangladesh is mostly life insurance but households are entitled to borrow against their insurance amount. It is not surprising that there is a positive and significant association between formal insurance purchase and loss in business and theft and robbery.

There is an increased influx of remittances if the household suffers from theft or robbery and if a family member dies or suffers from some injury. But there is no significant association between remittance inflow and natural disasters or loss in business and income loss due to damage or loss of crops or livestock controlling for household demographic, income and region fixed effects.

10. CONCLUSION AND POLICY RECOMMENDATIONS

There is a dearth of literature analyzing the combinations of various pathways by which households cope during a crisis in Bangladesh. To our knowledge this is first study the investigated the relative likelihood various coping strategies for almost all kinds of shocks faced by the households. It is quite comprehensive in that sense. The study gives special attention to micro-insurance as being used as a coping strategy by the poor segment of the society.

We observe that people who are tied to land, i.e., whose major occupation is agriculture cope by adopting a group strategy involving new MFI loan, Sale and mortgage of land and labor etc. to mitigate losses due to an exogenous natural disaster like floods, cyclones, storms and river erosion etc. The other prominent strategies adopted by these agricultural households are erosion of savings loans from relatives when there is a death or sickness in the family.

A very similar pattern is observed in terms of adoption of various coping schemes when agricultural households face any income shock (loss in crop, livestock, industry etc.) or severe illness or death in the family. Borrowing from MFIs is a major coping strategy when the household faces income shock from natural calamity or loss in income and this pattern prevails irrespective of the household's income and land ownership status, occupation and education level of the household head.

In almost all of these scenarios, the role of loans from NGOs, Government programs and loans from formal credit market seem negligible for all types of crises and for all types households irrespective of their socio-economics characteristics. Erosion of savings, loans from MFIs and help from relatives prominently top the list of choices of coping strategies adopted by households. The significant role of microcredit, micro-insurance in mitigating shocks has important policy implications. Death and health shocks makes the household most vulnerable and forces it to erode savings and borrow from relatives and also seek out other options. Increase in accessibility of life insurance and other medical facility would prevent erosion of physical and financial capital which is vital for productive efficiency of the households. Once diminished it is often impossible for the poor households to replenish this capital and as a result they might fall into poverty trap for good. Policy makers ought to pay attention to this as well. This study also highlights the importance of health and life insurance and provide insight for the Government to promote MFI operation in the insurance market as formal sector insurance may be costly and inaccessible to the poorer segment of the society.

11. TECHNICAL NOTE ON FACTOR ANALYSIS

In common factor analysis a small number of factors are extracted to account for the inter-correlation among the measured variables. This helps to identify the latent dimensions that explain most of the correlations among variables. We have a set of bargaining measure variables, $x_{1j}, \ldots, x_{Nj}$. We want q common factors which accounts for most of the covariance of the measured variables, x_N.

The standardized vector of observed variables can be expressed as a function of correlation of variables and uniqueness associated with each variable.

$$x = fA' + e$$

where, A=Nxq factor loading matrix represents the correlation coefficient s between N variables and q factor factors.

The squared factor loading is the percent of variance in that variable explained by the factor.

$$f = 1xq \text{ matrix of factors}$$

e=1xN vector of uncorrelated errors with covariance equal to the uniqueness matrix, ψ, which is NxN diagonal matrix.

The variance of bargaining measures x, denoted by Z is composed into two parts: $z = AA' + \psi$

The factor scores can be obtained by (regression scoring, Thomson 1951)

$$\hat{f} = A'Z^{-1}x$$

The scores are the indices that are estimates of components.

A very similar statistical procedure to factor analysis is PCA which accounts for the maximum portion of the variance present in the original set of variables. PCA is typically applied when the researcher instead of using all variables, wants to use some indices that contain all the information present in the measures is the PCA which derives a small number of components accounting for the variability found in a relatively large number of variables. There are major differences between PCA and FA. In FA, it is assumed that the variance of a single variable can be decomposed into a common variance shared by all observed variables and a unique variance particular to a variable. While in FA, only the common variance of the measured variables are taken into account, Principle components are defined simply as a linear combinations of all observed variables and PCA makes no distinction between common and unique variance. PCA contains both common and unique variance.

Determining the number of factors in FA: The most commonly used criteria in determining the optimal number of factors to be extracted are Kaiser-Guttman rule and the scree test. The Kaiser-Guttman rule states that the number of factors to be extracted should be equal to the number of factors having eigenvalues (variance) greater than 1. A Scree plot illustrates the rate of change in the magnitude of eigenvectors for the factors. The point where eigenvalues gradually levels off indicates the maximum number of factors to be retained.

Table 6. Multinomial Logit Model: Dependent variable: Multiple coping strategies

	Model-1			Model-2		
	Savings	Relatives	Others	Savings	Relatives	Others
Affected by one shock	-0.199	-0.690	-0.505			
	(0.828)	(0.833)	(0.714)			
Affected by two or more shock	0.510	-0.494	0.465			
	(0.837)	(0.847)	(0.722)			
Affected by natural shock?				0.018	-0.269	0.515***
				(0.152)	(0.187)	(0.124)
Affected by livestock death?				-0.158	-0.641**	-0.120
				(0.197)	(0.265)	(0.165)
Business loss or fish cultivation				-0.198	-0.289	0.486**
				(0.253)	(0.321)	(0.200)
Injury or death of family member				1.948***	1.807***	1.584***
				(0.122)	(0.141)	(0.107)
Fraud or theft or rubbery				-0.303	-0.553**	0.000
				(0.184)	(0.244)	(0.155)
Irregularity in remittance Income				-0.085	0.248	-0.079
				(1.188)	(1.170)	(0.932)

note: *** p<0.01, ** p<0.05, * p<0.1. Each regression controls for age and education of the household head, Family size, Urban Dummy and Division FE. No action taken as base

Table 7. Multinomial Logit Model of Multiple coping strategies, Homestead, Agri. Land

	Homestead						Agri. Land					
	Model-1			Model-2			Model-1			Model-2		
	Savings	Relatives	Others	Savings	Relatives	Others	Savings	Relatives	Others	Savings	Relatives	Others
One shock	-0.715	-0.565	-0.836				-0.304	11.715	-0.921			
	(0.921)	(1.020)	(0.824)				(1.422)	(553.008)	(1.168)			
2 more shock	0.030	-0.372	0.106				0.329	11.671	-0.101			
	(0.930)	(1.032)	(0.832)				(1.431)	(553.008)	(1.177)			
Natural shock				-0.102	-0.377*	0.403***				-0.306	-0.460*	0.083
				(0.163)	(0.198)	(0.133)				(0.198)	(0.265)	(0.168)
Livestock				-0.174	-0.630**	-0.080				-0.181	-0.225	0.006
				(0.209)	(0.275)	(0.174)				(0.269)	(0.360)	(0.226)
Business loss				-0.153	-0.320	0.447**				-0.513	-0.384	-0.083
				(0.276)	(0.350)	(0.222)				(0.397)	(0.506)	(0.330)
Injury or death				1.747***	1.642***	1.421***				1.930***	1.954***	1.586***
				(0.131)	(0.152)	(0.115)				(0.178)	(0.227)	(0.162)
Theft				-0.293	-0.739***	-0.045				-0.671**	-0.761*	-0.174
				(0.198)	(0.275)	(0.167)				(0.281)	(0.417)	(0.229)
Remittance				-12.637	0.110	-0.833				1.065	14.990	0.847
				(523.187)	(1.175)	(1.180)				(1,019.898)	(734.644)	(949.005)

note: *** p<0.01, ** p<0.05, * p<0.1 . Each regression controls for age and education of the household head, Family size, Urban Dummy and Division FE.

Table 8. Multiple coping strategies, Agri. Household, Non-agri household

	Agri. Household						Non-agri household					
	Model-1			Model-2			Model-1			Model-2		
	Savings	Relatives	Others	Savings	Relatives	Others	Savings	Relatives	Others	Savings	Relatives	Others
One shock	-13.481	-12.967	-12.587				0.209	-0.483	-0.393			
	(660.047)	(660.047)	(660.047)				(0.928)	(0.931)	(0.739)			
2 or more shock	-12.917	-12.501	-11.455				0.930	-0.367	0.513			
	(660.047)	(660.047)	(660.047)				(0.937)	(0.947)	(0.749)			
Natural shock				-0.166	-0.064	0.907***				0.046	-0.320	0.376**
				(0.369)	(0.363)	(0.247)				(0.169)	(0.220)	(0.146)
Livestock death?				-0.465	-0.562	0.140				-0.113	-0.636**	-0.227
				(0.506)	(0.542)	(0.319)				(0.217)	(0.305)	(0.197)
Business loss				-13.954	-0.372	0.871				-0.161	-0.313	0.443**
				(682.348)	(0.909)	(0.550)				(0.261)	(0.346)	(0.217)
Injury or death				2.167***	1.977***	1.593***				1.905***	1.803***	1.585***
				(0.295)	(0.300)	(0.224)				(0.135)	(0.163)	(0.122)
Fraud, theft,				-0.741	-0.565	0.164				-0.271	-0.530**	-0.047
				(0.608)	(0.679)	(0.358)				(0.196)	(0.264)	(0.173)

note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Each regression controls for age and education of the household head, Family size, Urban Dummy and Division FE.

Table 9. The likelihood of taking different coping strategies for different shocks

	Micro credit		Micro-Insurance		Formal Insurance		Remittance	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
One shock	0.138***		-0.022		-0.018		-0.115***	
	(0.030)		(0.047)		(0.035)		(0.043)	
2 or more shock	0.159***		0.140*		0.169***		-0.054	
	(0.052)		(0.076)		(0.059)		(0.077)	
Natural shock		0.140**		0.185*		-0.053		0.087
		(0.060)		(0.099)		(0.071)		(0.098)
Livestock death?		-0.048		0.109		0.175*		-0.025
		(0.080)		(0.117)		(0.090)		(0.130)
Business loss		0.208**		0.430***		0.308***		-0.249
		(0.099)		(0.127)		(0.105)		(0.181)
Injury or death		0.122***		0.026		-0.050		0.276***
		(0.047)		(0.072)		(0.055)		(0.076)
Fraud, theft,		0.003		0.196*		0.133		0.395***
		(0.075)		(0.107)		(0.084)		(0.107)

note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Each regression controls for age and education of the household head, Family size, Urban Dummy and Division FE.

Table 10. Impact of shock on Food expenditure by microcredit use

	Agri. Household				Non-agri household			
	With micro-credit		with no micro-credit		with micro-credit		with no micro-credit	
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
One shock	504.251***		242.284		283.203**		246.470**	
	(155.418)		(152.784)		(117.839)		(99.911)	
2 or more shock	696.328***		468.967*		303.398		648.997***	
	(242.405)		(272.932)		(194.591)		(189.083)	
Natural shock?		-4.036		-384.074		-883.657***		-430.979**
		(263.898)		(284.612)		(228.404)		(216.803)
Livestock death?		725.370**		134.913		-195.086		205.834
		(340.903)		(431.629)		(302.302)		(280.472)
Business loss		-174.493		-1,434.503*		387.560		852.302**
		(644.831)		(764.027)		(314.400)		(348.046)
Injury or death		136.025		-477.498**		-354.725**		-498.045***
		(221.499)		(238.929)		(170.418)		(170.082)
Theft or rubbery		121.986		889.013*		-194.845		761.782***
		(407.839)		(464.140)		(258.043)		(256.955)

note: *** p<0.01, ** p<0.05, * p<0.1 . Each regression controls for age and education of the household head, Family size, Urban Dummy and Division FE.

Table 11. Food expenditure by Homestead, Agri. Land with micro-credit, with no micro-credit

	Homestead				Agri. Land			
	with micro-credit		with no micro-credit		with micro-credit		with no micro-credit	
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
One shock	220.576**		141.423		467.578***		336.946**	
	(108.084)		(100.253)		(173.619)		(138.419)	
2 or more shock	354.375**		553.903***		548.437**		752.077***	
	(173.686)		(176.215)		(264.985)		(221.489)	
Natural		-680.457***		-378.594*		1,065.859***		-543.984**
		(194.417)		(194.924)		(289.409)		(238.668)
Livestock		-57.952		37.823		-61.656		-173.189
		(257.533)		(253.897)		(391.079)		(312.227)
Business loss		589.677*		855.410**		978.173*		1,638.940**
		(304.159)		(353.233)		(516.727)		(480.070)
Injury or death		-216.137		-454.704***		-199.627		-410.632**
		(152.040)		(156.707)		(244.785)		(203.016)
Theft or rubbery		-201.393		659.383***		-469.686		254.912
		(242.105)		(246.500)		(402.164)		(325.811)

note: *** p<0.01, ** p<0.05, * p<0.1 . Each regression controls for age and education of the household head, Family size, Urban Dummy and Division FE.

Table 12. Loss remedy by Agri., Non-agri household with and without micro-credit

	Agri. Household				Non-agri household			
	With micro-credit		with no micro-credit		with micro-credit		with no micro-credit	
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
One shock	2,697.078***		8,057.065***		5,117.719***		8,057.065***	
	(804.834)		(1,125.787)		(817.984)		(1,125.787)	
2 or more shock	4,231.747***		17,706.482***		10,031.022***		17,706.482***	
	(1,255.301)		(2,130.583)		(1,350.758)		(2,130.583)	
Natural		119.716		1,522.075		220.726		5,374.548
		(1,739.264)		(3,449.343)		(2,035.910)		(3,714.220)
Livestock death?		2,136.594		6,617.952		7,807.381***		727.303
		(2,246.779)		(5,231.110)		(2,694.610)		(4,804.967)
Business loss		-1,306.850		1,945.105		7,312.660***		1,822.241
		(4,249.864)		(9,259.605)		(2,802.442)		(5,962.643)
Injury or death		-1,206.346		-1,328.950		-2,571.174*		-7,049.298**
		(1,459.828)		(2,895.692)		(1,519.045)		(2,913.803)
Theft or rubbery		8,510.063***		8,308.617		9,047.960***		14,205.101***
		(2,687.932)		(5,625.129)		(2,300.097)		(4,402.094)

note: *** p<0.01, ** p<0.05, * p<0.1 . Each regression controls for age and education of the household head, Family size, Urban Dummy and Division FE.

Table 13. Loss remedy by Homestead, Agri. Land with and without micro-credit

	Homestead				Agri. Land			
	with micro-credit		with no micro-credit		with micro-credit		with no micro-credit	
	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2	Model-1	Model-2
One shock	4,539.752***		7,098.612***		5,640.042***		8,499.175***	
	(776.758)		(1,080.437)		(1,151.320)		(1,825.205)	
2 or more shock	9,350.977***		15,953.017***		8,770.652***		19,224.834***	
	(1,248.213)		(1,899.091)		(1,757.200)		(2,920.582)	
Natural		499.924		6,115.307**		865.478		5,265.253
		(1,763.100)		(3,115.941)		(2,395.138)		(4,359.311)
Livestock death		5,425.930**		2,618.487		8,182.312**		2,634.572
		(2,335.485)		(4,058.662)		(3,236.556)		(5,702.858)
Business loss		8,203.222***		3,808.872		3,107.198		1,844.108
		(2,758.313)		(5,646.585)		(4,276.412)		(8,768.535)
Injury or death		-2,013.070		-3,175.750		-1,646.180		-2,588.628
		(1,378.803)		(2,505.026)		(2,025.831)		(3,708.120)
Theft or rubbery		10,179.196***		18,157.230***		20,804.031***		28,984.488***
		(2,195.574)		(3,940.414)		(3,328.296)		(5,950.974)
Remittance income		-9,985.892		18,011.999				13,535.173
		(23,503.161)		(20,698.010)				(38,446.408)

note: *** p<0.01, ** p<0.05, * p<0.1 . Each regression controls for age and education of the household head, Family size, Urban Dummy and Division FE.

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