

Working Paper No. 21

Vulnerability to Shocks and Coping Strategies in Rural Bangladesh

S. R. Osmani
Meherun Ahmed

December 2013



Institute of Microfinance (InM)

Vulnerability to Shocks and Coping Strategies in Rural Bangladesh

S. R. Osmani*
Meherun Ahmed**

*S. R. Osmani is a Professor of Economics at the University of Ulster, UK, and a Visiting Fellow at the Institute of Microfinance (InM).

**Meherun Ahmed is an Assistant Professor at the Asian University for Women in Chittagong.

The paper is an outcome of an InM research study entitled "Poverty Dynamics in Rural Areas of Bangladesh". The authors are grateful to DFID's PROSPER (Promoting Financial Services for Poverty Reduction) Programme for providing funds for the study. However, the views expressed in this paper are entirely those of the authors and do not necessarily reflect the views of InM, DFID, or any other affiliated organisations.

The authors can be communicated at: sr.osmani@ulster.ac.uk

Abstract

This paper uses a novel conceptual framework and a large-scale household survey to study the phenomena of crisis and coping in rural Bangladesh. The empirical exercise is composed of two parts. The first part examines the prevalence of various kinds of shocks in rural Bangladesh and identified a number of important determinants of vulnerability to those shocks. The second part is concerned with the study of coping strategy – in particular, with identifying the major factors that enable households to avoid potentially injurious erosive coping strategies that deplete the assets base thereby jeopardising the household's long-term viability even as they help to overcome a temporary crisis. The study found substantial variations in the exposure to shocks across regions, across occupational groups, across microcredit borrowers and non-borrowers and across participants and non-participants in the government's social safety net programmes. The analysis of coping strategies reveals that a number of factors enable a household to better avoid the adoption of potentially injurious erosive strategies. These include access to microcredit, access to foreign remittance, and opportunities for engaging in non-farm activities. The policy implications are that in order to strengthen the rural household's ability to avoid erosive coping strategies that might threaten their future livelihoods, the government ought to take actions to further enhance the access to credit, to strengthen the social safety net programmes so that they can make a more substantial contribution to the resources of the target groups at times of crises, to create greater opportunities for engaging in non-farm activities even in remote areas, and to address regional imbalances in both exposure to risks as well in the opportunities available to deal with the risks more effectively.

1. Introduction

Fluctuation in economic well-being caused by periodic shocks is a common phenomenon everywhere, but its effects are especially pernicious in a poor rural economy. Not only do the shocks cause immediate hardship, they may also have serious long-term consequences. Both the nature of shocks and the manner in which households try to cope with them can play a decisive role in shaping the dynamics of poverty i.e., how people succeed or fail to move out of poverty over time.¹ This paper looks at the evidence on the vulnerability to shocks in rural Bangladesh and the coping strategies employed by rural households based on a large-scale survey carried out in 2010, with a special focus on the implications for the dynamics of poverty.

A recent study in a similar vein is Santos *et al.* (2010), which also analyses the evidence on shocks and coping strategies in rural Bangladesh based on survey data. The distinctiveness of the present study is that it uses a novel conceptual framework for the purpose of both classifying the nature of shocks and the nature of coping strategies. In particular, the paper argues that for analytical purposes it is useful to employ a three-fold economic classification of shocks – viz. asset shock, income shock and expenditure shock, and a two-fold classification of coping strategies – viz., erosive and non-erosive coping. Statistical analysis of the survey data is then used to identify the determinants of households' vulnerability to different types of shocks as well as the determinants of their coping strategies.

The study makes use of a large-scale survey carried out by the Institute of Microfinance (InM), Dhaka, in rural Bangladesh in 2010 covering 6300 rural households. The sample was drawn following a stratified proportional random sampling technique that is very similar to the one adopted by BBS for the HIES and can therefore be considered to be equally representative of rural Bangladesh.² This was designed as the benchmark survey for a longitudinal study on poverty dynamics in rural Bangladesh proposed to be carried out by InM. Henceforth, this survey would be referred to as the InM Poverty Dynamics Survey.³

The paper is structured as follows. The conceptual framework is developed in section 2. Using this framework, section 3 then analyses the evidence on the prevalence and incidence of various types of shocks in rural Bangladesh (with a three-year reference period) and tries to identify the determinants of a household's vulnerability to shocks with the help of both bivariate and multivariate analysis. Section 4 investigates the nature of coping strategies employed by rural households when faced with different types of crises and tries to identify the determinants of coping strategies. Some concluding observations are offered in section 5.

¹ Quisumbing (2012) provides evidence on the impact of shocks on poverty dynamics in rural Bangladesh. For more general evidence on the relationship between shocks and long-term dynamics of poverty drawn from the experience of many different countries, see the papers in Baulch (2012). For general surveys of the analytical issues as well as empirical evidence related to crisis and coping in poor economies, see Dercon (2002) and Skoufias (2003).

² The respective sample sizes are 7051 rural households in HIES 2010 and 6300 households in the InM survey.

³ At the first step, a total of 180 villages were selected from all the districts of Bangladesh except Rangamati (left out for logistical reasons), and 35 households were drawn from each village, thus giving a total sample of 6,300 households (details of the sampling methodology are explained in Appendix-A1 of Osmani *et al.* 2013). The survey was administered during April–July 2010, with a structured household questionnaire.

2. The Conceptual Framework

Rural life in Bangladesh is traditionally battered by a plethora of economic shocks, ranging from vagaries of nature and uncertainties of the market to personal calamities of myriad types.⁴ Our survey specified as many as twenty one different types of shocks and then allowed room for even more by adding the category of 'others'. For analytical purposes, it is necessary to classify these shocks into some broad categories. In the academic literature on crisis and coping, it is customary to make a distinction between the so-called 'covariate' or 'systemic' shocks and 'idiosyncratic' shocks. 'Covariate' shocks are those that by their very nature tend to affect a large number of people sharing some common characteristics such as place of residence or the nature of occupation. Examples include floods, cyclones, etc. emanating from nature, or the sudden drop in the yield or price of a staple crop, emanating from either nature or the market. By contrast, 'idiosyncratic' shocks are those that are peculiar to a particular person or a household because of the special circumstances in which it finds itself; for example, the death or prolonged illness of the major income earner of the family, or a person losing a job.

This distinction is quite useful for many purposes, especially for policy purposes because the appropriate policy response to the two types of shocks may well be different. For example, the policy of providing insurance against covariate risks cannot but be different from the policy for idiosyncratic risks. Indeed, while a standard insurance policy may well be feasible for the latter, it may not be at all feasible for the former – at the very least a very different kind of insurance policy may have to be devised to deal with risks that affect a large number of people at the same time.

For certain other purposes, however, the distinction between covariate and idiosyncratic risks is not necessarily the most relevant one. This is especially true from the point of view of analysing people's response to shocks i.e., how they attempt to cope with the shocks, which is the principal concern of this paper. When a household loses income because of loss of crops caused by a flood or a drought and when it loses income because a son working abroad has stopped sending money, they may respond to both shocks in pretty much the same way because in both cases the implication for the household economy is the same – namely, a reduction in income. The fact that in one case the loss affected a whole lot of other people besides itself while in the other case misfortune was solely its own may not make much difference to the household's choice of coping strategy.

The point is not that it will make no difference at all. It is entirely possible, for example, that the choice of strategy will be somewhat restricted in the case of covariate shocks insofar as reciprocal support systems will not function as effectively as in the case of idiosyncratic shocks. The point is rather that whether a shock affects others or not may not be the most crucial determinant of a household's choice of strategy; what may matter more is the impact of the shock on the household economy.

Indeed, we would argue that from the perspective of analysing coping strategy, a more useful way of classifying shocks would be to look at the nature of impact on the household economy because response, or the coping strategy, would have to depend on the impact of the shock, regardless of whether it affects others or not. On this reasoning, we propose a three-pronged classification of economic shocks – namely, asset shocks, income shocks and expenditure shocks. Examples are death of livestock as an asset shock, loss of job as an income shock and treatment for illness as an expenditure shock.

⁴ We refer to them as economic shocks not because they all arise from the economic environment in which people live but because they all have consequences for the household economy regardless of their origin.

Since asset is a stock and income is a flow, the response to loss of assets may not be the same as response to the loss of income. When a vital asset is lost, the household may decide to go for some kind of portfolio adjustment in the short to medium run – replacing one kind of asset by another, while trying to replenish the stock of assets in the long run through increased savings or borrowing. When the flow of income gets disrupted, however, the response will depend in the first instance on whether the shock is perceived to be temporary or permanent. Faced with a temporary income shock, a household may try to weather it by short-term borrowing or simply decide to do nothing about it, stoically accepting a temporary loss of welfare. Faced with a permanent loss of income, the household may rethink its production strategy i.e., whether to redirect its material and physical inputs into different lines of production altogether. In short, the sets of responses may well be different depending on whether the shock involves the stock of assets or the flow of income, even though there may be a non-null intersection between the two.

The response to expenditure shocks is likely to be different still. What an unanticipated lumpy expenditure may call for is not so much portfolio adjustment as in the case of asset shock or a reformulation of production strategy as in the case of permanent income shock but inter-temporal substitution of expenditure – i.e., spending more today at the expense of spending less in the future. This might involve borrowing if the household has access to credit, or depletion of assets with a view to replenishing it in the future through increased savings. The response may also involve an adjustment of the labour-leisure choice; for instance, the household may try to earn additional income, at least on a temporary basis, by working harder or increased participation in the labour force (e.g., women being engaged more in income-earning activities outside home).

Table 1 lists the specific types of shocks that we have classified into the three broad categories of shocks. The table is mostly self-explanatory. A few remarks are, however, in order. First, many asset shocks may also involve loss of income. For example, when a cow dies the farmer not only loses an asset but also loses an income flow from the lost sale of milk. In such cases, the shock was categorised as an asset shock even though it also entails a loss of income. Income shocks were defined only as those shocks that do not necessarily flow from the loss of some assets.

Table 1
Typology of Shocks

<i>Asset shocks</i>	<i>Income shocks</i>	<i>Expenditure shocks</i>
River erosion	Flood/excessive rainfall	Accident/death of earning member
Death of livestock	Cyclone/tornado/tidal wave	Maternity care
Death of poultry	Drought	Other health
Death/Loss of fish stock	Crop disease	Litigation
Unexpected loss in business	Loss of job	Dowry
Fire/arson	Loss of domestic remittance	
Theft/burglary/robbery	Loss of foreign remittance	
Sequestration of assets	Accident/death of earning member	
Loss of assets by other means		

Second, death or serious accidents or illnesses of major income earners have implications for both income and expenditure. In these cases, we let the data decide how to categorise the event. For all shocks, we asked the respondents to give estimates of both one-time loss at the time the shock occurred and any possible loss of income flow in the future. If the respondents reported only one-time lumpy expenditure in the event of death or illness of an earning member and gave no information on the loss of income flow, we treated it as an expenditure shock. If, on the other hand, they reported only loss of income flow and no one-time loss, we treated it as an income shock. In case they reported both one-time loss and loss of income flow, we categorised the event on the basis of the bigger loss.

Third, although most types of lumpy expenditures could send a shockwave through the household economy, we have not included all of them under the category of expenditure shocks. Shocks are meant to be unanticipated in nature, and not all lumpy expenditures are unanticipated. Many of them are planned, and people prepare for them over a long period of time – for example, construction of house, weddings, and so on. As anticipated expenditures, these do not qualify to be counted as shocks. We have, however, included dowry as an expenditure shock, although it could be argued that payment of dowry is on the borderline of being an anticipated expenditure.

In trying to understand household's response to shocks, we need to bear in mind the distinction between expenditure shock on the one hand and asset and income shocks on the other. When faced with an expenditure shock, a household necessarily incurs the expenditure, for otherwise we would not classify it as a shock; the only question is how the household manages to find the extra money to meet the unanticipated demand on its resources. In the case of asset and income shocks, however, the household faces a prior decision problem: namely, whether to do anything at all to make good the loss of assets or income. Only if the decision is in the affirmative does the question arise at the second stage as to how to go about finding the money. The first part of this two-stage decision-making process may be said to reveal a household's ability to cope with asset and income related shocks, and the second part may be said to reveal its coping strategy. The second part – i.e. how to get the money – is also relevant for expenditure shocks, but the first part is not. In short, while the concept of coping strategy applies to all three types of shocks, the concept of the ability to cope applies only to asset and income related shocks.

Just as there are a multitude of possible shocks there are also a multitude of ways in which a household might decide to cope with them – depending on the nature of the shock and the resources available to it. Therefore, just as we need to classify shocks into broad categories for analytical purposes, we also need to classify coping strategies into certain broad categories. The particular classification we use in this paper is that of erosive and non-erosive coping strategies. As in the case of our chosen classification of shocks, the rationale for the classification of coping strategies also lies in the distinctive nature of their impacts on the household economy. Erosive strategy, as the name implies, involves some immediate erosion of the household's asset base, while non-erosive strategy keeps the asset base intact, at least in the short run. Examples of erosive strategy include sale of assets and drawing down accumulated savings. An erosive strategy with especially injurious long-term consequences would involve stopping children from going to school either to save on educational expenses or to use children's labour for the purpose of earning additional income; in either case, it would entail loss of future human capital. Examples of non-erosive strategy include borrowing, drawing upon reciprocal support systems within the community, seeking help from the government's social safety net, etc.

In our conceptual framework, there is a presumption that non-erosive coping strategies are better than erosive ones. By depleting the asset base, erosive strategies may jeopardise the future sustainability of a household's livelihood in a way that non-erosive strategies would not. Thus, if a household sells an asset in order to cope with a crisis (an erosive strategy) it may never be able to recover the asset or its equivalent, whereas if it borrows to meet the crisis (a non-erosive strategy) it would hopefully repay the debt some day and thus survive the crisis without having to deplete the asset base.

Against this view it might be argued that the distinction made here between borrowing and sale of assets is somewhat artificial because if a household is able to save enough to repay its debts over time it should also be able to save over time to recover the lost assets. In that case, erosive strategy need not be any more injurious to future livelihood than non-erosive strategy. In the ideal world of textbook economics, where people either save or borrow to maximise an inter-temporal utility function, this argument has a lot of validity. It is being increasingly recognised, however, that saving to repay a debt is not the same thing as saving to purchase an asset. Common sense as well as recent advances in behavioural economics suggests that people find it very difficult to save in practice what they might rationally decide to save so as maximise their inter-temporal utility. A whole literature on time-inconsistent preferences has emerged to examine the multifarious implications of this apparently irrational behaviour.⁵ One of the well-known implications is that people often need some kind of commitment device in order to be able to save. The obligation to repay a debt is precisely such a commitment device.

The implication of this counter-argument in our immediate context is that even if a household is able to save enough to repay its debt it may not be able to save enough to recover a lost asset in the absence of an effective commitment device. Erosive coping may, therefore, be genuinely injurious to future sustainability of a household's livelihood in a way that non-erosive strategies would not be. The distinction between erosive and non-erosive strategies is thus both theoretically meaningful and practically relevant. Given the injurious nature of erosive strategies from the perspective of future viability of a household economy, it is necessary to identify the factors that predispose a household toward one or the other type of coping strategy; and one of the main objectives of this paper is to identify these factors in rural Bangladesh.

3. Prevalence and Determinants of Vulnerability to Shocks

Information on the household's experience of economic shocks was collected with two different reference periods. For information on the number and types of shocks faced, we used the reference period of three years preceding the survey, which spanned from mid-2007 to mid-2010. Since there is likely to be some irregularity in the occurrence of certain types of shocks – especially those related to nature as well some major idiosyncratic events such as accidents or death in the family – it was felt that a reference period of three years would provide a more reliable picture. For in-depth analysis of the damage caused by the shocks and how the households tried to cope with them, a reference period of one year preceding the survey (mid-2009 to mid-2010) was used since it was felt that recalling the details of events occurring over a longer period might prove difficult on the part of the respondents. The analysis of the

⁵ See, for example, Ashraf *et al.* (2006), Banarjee and Mulainathan (2010), Frederick *et al.* (2002), and Laibson (1997), among others.

incidence and typology of shocks presented in this section uses data pertaining to the three-year reference period, while the analysis of coping presented in the next section uses data on the one-year reference period.⁶

Some summary statistics on the prevalence and typology of shocks are presented in Tables 2 and 3. Our data show that some 40 per cent of rural households suffered some kind of major economic shock over the three-year period preceding the survey, indicating serious vulnerability of a large segment of the population to fluctuations in economic well-being (Table 2). Of the three broad categories of shocks, expenditure shock was by far the most important category, afflicting roughly one-quarter of all households. About half as many households (about 12-13 per cent) faced either asset shock or income shock.⁷

Table 2
Number of Households Facing Economic Shocks
In Rural Bangladesh: 2007-2010

	Number	Percentage
Asset shocks	794	12.6
Income shocks	772	12.3
Expenditure shocks	1533	24.3
Any shock	2488	39.5
Total	6300	100.0

Note: Data refer to 3 years preceding the survey i.e., from mid-2007 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

A more detailed breakdown of the three types of shocks can be found in Table 3; it shows the frequency distribution of all types of shocks taking into account that the same household may have faced the same type of shock more than once during the reference period. Expenditure shocks are found to account for almost half of all the shocks faced. The single most important type of shock is health-related expenditure, accounting for almost 40 per cent of all shocks.⁸ The overwhelming importance of health-related shocks in the lives of the rural people of Bangladesh is a common finding of several other studies of shocks and crises in rural Bangladesh (e.g., Ahmed *et al.* 2009; Islam and Maitra 2012; Quisumbing 2012). The second most important type of shock is death of poultry (15%), followed by damage to crops and property caused by natural disasters such as storms/cyclone/tidal waves (10%). If we add floods and excessive rainfall to the latter group, natural disasters would rank as high as the death of poultry.⁹ The vulnerability of rural Bangladesh to the vagaries of nature is clearly evident from these figures, as is the extreme fragility of a livelihood strategy that relies heavily on raising poultry on the side – a widespread practice of rural households and of rural women, in particular.

⁶ For both reference periods, we excluded minor shocks from the analysis – a minor shock being defined, somewhat arbitrarily, as loss of income or asset worth less than taka 1000, and in the case of expenditure shock, an unanticipated expenditure of less than taka 1000.

⁷ Since some households experienced shocks of more than one type, the sum of households facing the three types of shocks exceeds the number of households facing some kind of shock.

⁸ Health-related expenditure includes expenses incurred for the treatment of both illnesses and accidents.

⁹ Note that this ranking is purely in terms of the number of shocks faced, not terms of the severity of the damage caused, for which we did not collect any information for the three-year reference period. It may also be noted that if we had included all shocks – even the minor ones involving loss of less than taka 1000 – death of poultry would unambiguously rank the second highest, followed by natural disasters, however inclusively the latter was defined.

Table 3
Frequency Distribution of Various Types of Economic Shocks
In Rural Bangladesh: 2007-2010

	Number	Percentage
<i>Asset shocks</i>	1291	26.9
Death of poultry	726	15.1
Death of livestock	298	6.2
Theft/burglary/robbery	105	2.2
Others	162	3.4
<i>Income shocks</i>	1186	24.7
Storms/cyclones/tidal wave	495	10.3
Crop disease	252	5.2
Flood/excessive rainfall	170	3.5
Others	269	5.6
<i>Expenditure shocks</i>	2327	48.4
Health-related expenditure	1897	39.5
Maternity care	190	4.0
Litigation	143	3.0
Dowry	97	2.0
All	4804	100.0

Note: Data refer to 3 years preceding the survey i.e., from mid-2007 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

We expected dowry to be more of a widespread shock than is shown by our data, accounting for only 2 per cent of all shocks. This is perhaps partly explained by the reluctance of many respondents to admit giving dowry in view of the emerging social consensus against the practice. Partly perhaps it was also because expenses on account of dowry got merged with overall wedding expenses, which we did not count as an expenditure shock, as we wanted to focus on unanticipated shocks. In any case, it is very likely that the incidence of dowry is underestimated here.

Who are more vulnerable to shocks?

We now proceed to examine the issue of which categories of households are more vulnerable to shocks than others. Since different types of households may be vulnerable to different types of shocks, we examine this issue separately for the three broad categories of shocks defined earlier as well as for the overall experience of shocks. For this purpose, we categorise rural households along several dimensions – e.g., place of residence, standard of living, occupation, gender, education, and access to credit, foreign remittance and social safety net. We begin by looking at the bivariate relationships between each of these characteristics and the incidence of shocks, before embarking on a multivariate analysis that is essential for identifying the effects of these characteristics in a more reliable manner.

To begin with, we find a very strong regional dimension of shocks, as revealed by the association between the region (old administrative divisions) in which a household lives and the shocks it faces (Table 4). Barisal is found to be the most vulnerable region, where as many as 55 per cent of rural households faced some kind of shock as compared with 40 per cent in the country as a whole. The extreme vulnerability of Barisal is evident for each of the three broad types of shocks. The next two most vulnerable regions are Sylhet (49%) and Rajshahi (45%). On the other side of the spectrum are the divisions of Dhaka and Chittagong, where only just over 30 per cent of households experienced economic shocks of one kind or another.

Table 4
Regional Variation in the Proportion of Households
Facing Economic Shocks in Rural Bangladesh: 2007-2010
 (percentage of households facing shocks in a region)

Division	Any shock	Asset shock	Income shock	Expenditure shock
Barisal	55.2	22.2	28.4	29.9
Sylhet	49.1	16.6	21.8	25.7
Rajshahi	45.9	17.4	13.0	27.6
Khulna	37.8	10.2	22.2	15.8
Dhaka	32.2	8.8	4.6	23.5
Chittagong	31.9	7.1	5.8	23.8
All	39.5	12.6	12.3	24.3

Note: Data refer to 3 years preceding the survey i.e., from mid-2007 to mid-2010. The six regions are old administrative divisions of the country.

Source: InM Poverty Dynamics Survey 2010.

The vulnerability of Barisal has probably a great deal to do with its relative isolation from the rest of the country in terms of communication links, a problem that the proposed Padma bridge was supposed to address. Its riverine topography as well as proximity to the sea also probably makes it more vulnerable to natural disasters. By contrast, the resilience of Dhaka and Chittagong is explained not only by good connectivity (although a lot more remains to be done to improve the connectivity between Dhaka and Chittagong) but also by a diversified economy thanks to the concentration of industry and commerce in these two divisions. It is notable that the superiority of Dhaka and Chittagong is most strikingly evident in the case of asset and income shocks rather than in the case of expenditure shocks. This is not surprising because the first two types of shocks are more closely related to the economic environment in which a household lives, while expenditure shocks are mostly idiosyncratic in nature. Indeed, there is very little regional variation in the incidence of expenditure shocks, the only notable exception being Khulna, where for reasons we are unable to fathom only 15 per cent of households experienced expenditure shocks as against 24 per cent for the country as a whole.

Table 5 looks at the incidence of shocks across different levels of living standards as measured by poverty groups. We initially divide the entire population between two groups: poor and non-poor; the poor are then further sub-divided between extreme and moderate poor, while the non-poor are subdivided between marginally non-poor and well-off.¹⁰ Perhaps somewhat

¹⁰ The definitions of these categories and the methodology of identifying them are explained in Osmani and Latif (2013).

counter-intuitively, we find that the poor are not necessarily more vulnerable to shocks than the non-poor. The consequences of any given shock may be more devastating for the poor, but in terms of the frequency of various types of shocks faced the poor as a group do not fare worse, and this is true even for the extreme poor. In fact, the extreme poor seem to experience the lowest incidence of all three broad categories of shocks, and there is a tendency for the incidence to rise with the standard of living, with the well-off group suffering from the highest incidence of all types of shocks.¹¹

Table 5
Incidence of Various Types of Economic Shocks by Poverty Category
in Rural Bangladesh: 2007-2010
 (percentage of households in a poverty category facing shocks)

Poverty Category	Any shock	Asset shock	Income shock	Expenditure shock
<i>Poor</i>	34.9	11.0	9.8	21.1
Extreme poor	32.2	9.9	8.9	19.8
Moderate poor	38.5	12.5	11.1	22.9
<i>Non-poor</i>	41.4	13.3	13.3	25.7
Marginally non	36.6	13.0	11.6	20.6
Well-off	42.5	13.3	13.6	26.8
<i>All</i>	39.5	12.6	12.3	24.3

Note: Data refer to 3 years preceding the survey i.e., from mid-2007 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

We next look at the association between a household's occupation and its vulnerability to shocks. Judging by the principal occupation of the household head, the households are first divided between farm sector, non-farm sector, and others.¹² Within each of farm and non-farm sectors, a further distinction is made between self-employment and paid employment, and in the non-farm sector paid employment is further sub-divided into casual wage labour and salaried jobs. The results are shown in Table 6.

¹¹ We postpone till the multivariate analysis our speculation on the reason behind this tendency.

¹² The last category includes households who live on mostly remittance income, rental income or unearned income (such as pension, interest, etc.).

Table 6
Incidence of Various Types of Economic Shocks by Occupational Category
in Rural Bangladesh: 2007-2010
 (percentage of households in an occupational category facing shocks)

Principal occupation of the household head	Any shock	Asset shock	Income shock	Expenditure Shock
<i>Farm sector</i>	43.3	15.0	16.8	24.5
Farm self-employment	45.3	17.0	20.3	24.3
Farm wage labour	40.7	12.5	12.3	24.9
<i>Non-farm sector</i>	36.6	10.9	8.2	24.2
Non-farm self-employment	36.7	11.8	8.2	23.5
Paid non-farm employment	36.4	9.8	8.2	25.0
Non-farm wage labour	33.6	8.7	7.4	24.3
Non-farm salaried work	40.0	11.3	9.2	25.8
<i>Others</i>	35.7	9.6	9.3	24.1
All	39.5	12.6	12.3	24.3

Note: Data refer to 3 years preceding the survey i.e., from mid-2007 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

The most salient observation here is that, as expected, the farm sector is found to be more vulnerable to shocks than the non-farm sector. Some 43 per cent of households with farming as the main occupation have suffered from some kind of shock as against 37 per cent among the non-farm population. The incidence of shocks for the 'others' category is similar to the non-farm sector. The second point to note is that the vulnerability of the farming population is evident only for asset and income related shocks. By contrast, the incidence of expenditure shocks is remarkably similar for all occupation groups, reflecting the fact that expenditure shocks are mostly idiosyncratic in nature and as such do not depend significantly on the occupation of the household. Third, within both farm and non-farm population the self-employed are more vulnerable to asset and income shocks than casual wage labourers. In the case of asset shocks, the reason is simply that almost by definition wage labourers have much less income-earning assets compared to the self-employed people and as such are less vulnerable to asset shocks. Their advantage in terms of income shocks probably emanates from the fact that as casual wage labourers they can look for alternative employment opportunities when a particular avenue closes, an option that is not available to the self-employed people, at least in the short run. The same reasoning also probably explains the fact that salaried workers are more susceptible to income shocks; like the self-employed people and unlike casual workers, they cannot immediately look for alternative avenues when the regular avenue closes for some reason.

Table 7 shows the association between the educational status of the household head and vulnerability to economic shocks. Of the five levels of educational achievement we have identified, the first four (up to the secondary plus level) do not show any systematic variation. The only variation we find is for the highest group – those who have completed higher secondary education and above; they seem to suffer from higher incidence of each type of crises compared to the rest of the population. Why achievement of high level of education should cause greater vulnerability to shocks is not intuitively clear. Perhaps, it reflects the positive association between standard of living and vulnerability observed earlier.

Table 7
Incidence of Various Types of Economic Shocks by Educational Status
of the Household Head in Rural Bangladesh: 2007-2010
 (percentage of households in an educational category facing shocks)

Educational status of the household head	Any Shock	Asset shock	Income shock	Expenditure shock
Illiterate	38.6	9.8	25.2	38.6
Less than primary	40.3	13.5	23.4	40.3
Primary plus	39.9	14.3	23.8	39.9
Secondary plus	38.0	12.8	21.7	38.0
Higher secondary plus	43.9	16.6	26.4	43.9
<i>All</i>	39.5	12.3	24.3	39.5

Note: Data refer to 3 years preceding the survey i.e., from mid-2007 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

The association between vulnerability and a number of other possible correlates can be found in Table 8. The first correlate we look at here is the gender of the household head. In addition to making the usual distinction between male-headed and female-headed households, we further sub-divided the latter group between those who are currently married and those who are either widowed or separated or divorced.¹³ It is the latter category of female-headed households that seems to be the most disadvantaged in terms of living standards; in a recent study they were found to have the highest incidence of poverty among the three groups (Osmani and Latif 2013). However, when it comes to vulnerability to shocks, they do not seem to do too badly. In fact, both types of female-headed households seem to do better than males. This has probably got something to do with the earlier finding that the poorer households not necessarily more vulnerable to shocks. Partly, it may also be related to the fact that, given the cultural milieu of Bangladesh, a much higher proportion of male-headed households are engaged in farming compared to the female-headed households, which makes for the greater vulnerability of males.¹⁴

¹³ 'Never married' female household heads are a rarity in rural Bangladesh.

¹⁴ According to our data (from the InM Poverty Dynamics Survey 2010), almost half of the male-headed households are engaged in farming, while only about 8 per cent of female-headed households are found in this sector – the vast majority of them (73%) belong to the 'others' category.

Table 8
Some Other Correlates of the Incidence of Economic Shocks
in Rural Bangladesh: 2007-2010
 (percentage of households in category facing shocks)

Household characteristics	Any shock	Asset shock	Income shock	Expenditure shock
<i>Gender of the household head</i>				
Male	40.0	12.9	12.8	24.3
Female, currently married	36.1	10.8	7.0	23.7
Female, widowed/divorced/separated	35.4	9.6	8.8	25.0
<i>Microcredit borrowing</i>				
Borrower	42.7	14.1	11.8	26.9
Non-borrower	36.7	11.3	12.7	22.1
<i>Foreign remittance</i>				
Receiver	37.8	10.7	10.6	23.5
Non-receiver	39.7	12.8	12.5	24.4
<i>Social Safety Net</i>				
Participant	42.2	13.4	12.9	26.6
Non-participant	37.4	12.0	11.8	22.5
All	39.5	12.6	12.3	24.3

Note: Data refer to 3 years preceding the survey i.e., from mid-2007 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

The rest of the correlates in Table 8 are related to access to three resources – namely, microcredit, foreign remittance and the social safety net programmes of the government. Of the three, access to foreign remittance does not seem to have any pronounced association with vulnerability. However, the other two factors do have a very strong association. Microcredit borrowers appear to be considerably more vulnerable than non-borrowers – some 43 per cent of them experienced some kind of economic shocks compared to 37 per cent among non-borrowers. It is also notable that unlike most of the other correlates studied above, which seem to have little association with expenditure shocks (owing, as we have argued, to the idiosyncratic nature of these shocks), microcredit borrowing does have strong association with expenditure shocks. The borrowers have a considerably higher propensity to face expenditure shocks compared to non-borrowers. Evidently, there are some idiosyncratic features of borrowers that make them more vulnerable to shocks. Recognition of this vulnerability and the belief that access to credit may help them at times of crisis must be one of the reasons why they choose to borrow.¹⁵

Similarly, the households that participate in various social safety net programmes run by the government have greater vulnerability to crisis compared to the non-participants: some 42 per cent of participants experienced some kind of economic shock as against 37 per cent of the non-participants. And as in the case of microcredit borrowers, the participants in social safety net programmes also had greater vulnerability to expenditure shocks, in particular, which seems

¹⁵ As we shall see, the multivariate analysis confirms this finding. It is notable that existing empirical studies that seek to explain why certain households choose to become microcredit borrowers and others don't do not usually consider vulnerability as an explanatory variable (see, for example, the related papers in Osmani and Khalily 2010); but our findings suggest that they should.

to be uncorrelated with most of the other variables we have considered. Thus, one can argue that social safety net programme has had some success in targeting its services to the vulnerable population. Whether it has also succeeded in helping them to address the problem of vulnerability in a sustainable way is of course another matter. We shall throw some light on this issue, as well as on the success of microcredit in addressing the problem of vulnerability, in the next section.

Multivariate analysis of vulnerability

In order to isolate the effects of the variables discussed above, as well as of other possible factors, we carried out a probit analysis of vulnerability. The dependent variable is a dummy variable, which takes the value 0 for those who did not experience shocks in the three-year reference period and 1 for those who did.

The explanatory variables are of several types. First, there are the standard household-level characteristics such as gender, occupation and educational status of the household head, the size of the household, and the number of working age people available in the household. Also included in this group is the non-standard variable of the age of the household (as distinct from the age of the household head) as measured by the number of years ago the household was formed. The idea was to capture any possible life cycle effect on a household's propensity to experience economic shocks of various kinds. Both age and age-squared were used to allow for possible non-linearity in the life cycle effect.

Second, there are a number of variables to capture the standard of living of the household since it was recognised that while shocks may affect the standard of living it is also possible for standard of living to influence a household's vulnerability to shocks. The possibility of two-way causation, however, renders it necessary to be especially careful in choosing the explanatory variables. In order to avoid biased estimation, the standard of living variables should be such that while they may influence the propensity to face shocks they should not in turn be substantially affected by the experience of shocks. This requirement rules out income as a measure of standard of living. As an alternative, we chose per capita consumption on the ground that it is a better measure of permanent income that is relatively less affected by unanticipated shocks.¹⁶

¹⁶ In the presence of credit market imperfections, consumption is not an ideal measure of permanent income, but it is still better than current income.

Table 9
Determinants of Vulnerability to Shocks (all kinds combined)

<i>Dependent variable:</i>		
Whether a household faced any shock	Coefficient	t-value
<i>Explanatory variables</i>		
Consumption expenditure	2.06E-06	3.39
Access to microcredit	0.174616	3.70
Access to foreign remittance	-0.0157361	-0.24
Participation in social safety net	0.1225449	2.56
Age of the household	0.0089162	1.81
Age of the household squared	-1.78E-04	-1.81
Educational status of household head	0.0220428	1.11
Gender of household head (dummy)	0.0334224	0.74
No. of working age members	-0.0030747	-0.14
Household size	0.0021756	0.14
Principal occupation of household head	-0.1397284	-2.69
Average distance from imp. places (km)	0.0263466	1.41
Scope for non-farm work near village	-0.0760172	-0.74
Soil fertility in the village	0.1438398	1.52
Dummy for Barisal	0.5329343	2.26
Dummy for Chittagong	-0.021439	-0.15
Dummy for Khulna	0.0767924	0.40
Dummy for Rajshahi	0.4024726	3.24
Dummy for Sylhet	0.3533018	1.71

Notes: (1) The equations were estimated using the probit model. A negative coefficient means that higher values of the explanatory variable reduce the probability of facing shocks; conversely for a positive coefficient. (2) The score for 'Educational status of household head' varies from 0 to 4; 0 stands for 'illiterate', 1 for 'less than primary level', 2 for 'primary plus but not completing secondary education', 3 for 'secondary plus but not completing higher secondary level', and 4 stands for 'higher secondary plus'. (3) Gender dummy is defined as 1 for 'widow/divorced/separated females', and 0 otherwise (i.e., males as well as currently married females). (4) Principal occupation dummy takes the value 1 for farm activities, 2 for non-farm activities and 3 for others (such as living on remittance income, old-age pension, rental income, etc.) (5) The microcredit dummy takes the value 0 for non-borrowers and 1 for borrowers. The remittance dummy takes the value 0 for non-receivers and 1 for receivers. The dummy for social safety net takes the value 0 for non-participant and 1 for participant. (6) The score for 'Scope for non-farm activities near village' varies between 1 and 3, higher score signifying better scope. (7) Standard errors were adjusted for stratified cluster sampling design.

Third, there are three village-level characteristics reflecting respectively the connectivity of the village, the scope for undertaking non-farm activities in and around the village, and fertility of the soil. There are also division dummies to capture the regional variation in the incidence of shocks discussed earlier.

The results of the probit analysis are presented in Table 9. The following variables were found to be statistically significant: (1) consumption expenditure, as a measure of the standard of living, (2) principal occupation of the household, (3) access to microcredit and social safety net programmes, and (4) a number of division dummies.

The positive coefficient of the consumption variable suggests that higher standard of living, as measured by higher levels of consumption expenditure, predisposes a household towards greater vulnerability to shocks, other things remaining the same. This confirms the finding of bivariate analysis carried out earlier in the section. A full explanation of this finding must await further research. One possibility is that better off households have a more diversified livelihood strategy, operating on various fronts, including farming, non-farm activities, as well as regular jobs. While such diversification may serve them well in making good uses of their resources as well as in dealing with economic shocks when they arise, it may also expose them to more shocks because the probability of facing a shock would necessarily increase if one operates on a number of fronts rather than on a single front.

The occupation dummy takes on the value 0 for farming and 1 for both non-farm activities and 'others'. The negative coefficient of this variable thus confirms the finding from bivariate analysis that farming population is more predisposed to facing economic crises compared to the rest of the population. The microcredit variable takes on the value 1 for borrowers and 0 for non-borrowers, while the social safety net variable takes on value 1 for participants and 0 for non-participants. Thus the negative coefficients of these two variables confirm the finding from the bivariate analysis that microcredit borrowers and safety net participants are more vulnerable to shocks compared to others. The coefficients of the division dummies indicate that Barisal, Rajshahi and Sylhet are more vulnerable than the rest of the country.

In sum, higher standard of living goes hand in hand with higher exposure to shocks; households with farming as the main occupation are more vulnerable to shocks than others; microcredit borrowers are more vulnerable than non-borrowers, while participants in social safety net programmes are more vulnerable than non-participants; and households living in Barisal, Rajshahi and Sylhet divisions are more likely to experience economic shocks compared to households living in the other three divisions (Dhaka, Chittagong and Khulna).

There remains the question, however, of the relative importance of the factors that have a statistically significant effect on vulnerability. Not all factors that are statistically significant are equally important in explaining vulnerability – some may have quantitatively stronger effect than others. We examine this issue below, by estimating the marginal effects of the factors that have been found to be statistically significant.

In order to find the marginal effect of a variable, we assigned alternative values of that variable to all households, keeping the values of all other variables as they are, and then predicted for each household the probability of facing economic shocks at different values of the given variable. Next, we took the average of these predicted probabilities for the entire sample. These averages represent a number of possible counterfactuals i.e., what the extent of vulnerability would have been for the overall sample if all the households had the assigned values of the variable under consideration, keeping all other variables at their actual values. These averages can be interpreted as the probability of facing shocks at different values of the concerned variables, other things remaining the same. The difference of these counterfactual average probabilities for two successive values of the variable – called 'marginal vulnerability' in this paper – represents the marginal effect of the variable concerned.¹⁷ This effect can also be interpreted as change in the

¹⁷ This procedure of calculating the marginal effect varies from the standard practice in the way the 'other' variables are held constant while varying the values of the variable concerned. In standard practice, each household is assigned the average values of the 'other' variables taken over the entire sample so that each household has exactly the same values of these variables; by contrast, we assigned to each household whatever values of these other variables they actually happened to have. Thus, in our case, the meaning of 'holding the other variables constant' is that we keep the values of these variable unchanged, whereas the meaning in the standard practice is that these values are kept identical for every household – namely, the average values for the sample as a whole.

probability of facing shocks as the value of the concerned variable changes, keeping other things constant. The results are presented in Tables 10 and 11.

These results show that an average borrower of microcredit has a 6.5 per cent higher probability of facing economic shocks than a non-borrower; a participant in social safety net programmes has 4.5 per cent higher probability of facing shocks than a non-participant; and being engaged in non-farm activities reduces vulnerability by 5.2 per cent compared to working on the farms. While gender of the household head has a statistically significant effect on vulnerability, the magnitude of the effect is relatively small. Quantitatively, the most pronounced effect is found in regional variation: living in Barisal entails as much as 20 per cent higher probability of facing economic shocks than living elsewhere in the country, other things remaining the same, while those who live in Rajshahi and Sylhet are respectively 15 per cent and 13 per cent more vulnerable than others (Table 10).

Finally, looking at different levels of consumption expenditure, it is found that households at the 50th percentile (median) of the consumption distribution are 1.2 per cent more vulnerable than those lying at the 25th percentile, and those at the 75th percentile are 2.1 per cent more vulnerable than those at the 50th percentile (Table 11). Thus, while higher standard of living entails greater exposure to shocks, quantitatively the effect is rather small compared to the other variables discussed above (barring gender).¹⁸

¹⁸ We also carried out similar analyses separately for the three broad types of economic shocks – viz., asset shock, income shock and expenditure shock. The results of the regression analyses are reported in the Appendix Tables A.1-A.3.

Table 10
Impact of Some Factors on the Vulnerability to Economic Shocks
in Rural Bangladesh: 2007-2010
 (Predicted probability of facing economic shocks)

Correlates	Average vulnerability	Marginal Vulnerability
<i>Microcredit</i>		
Receiver	43.1	
Non-receiver	36.6	-6.5
<i>Overall</i>	39.5	
<i>Social safety net</i>		
Participant	42.2	
Non-participant	37.6	-4.5
<i>Overall</i>	39.5	
<i>Principal occupation</i>		
Farm	42.4	
Non-farm	37.2	-5.2
<i>Overall</i>	39.5	
<i>Gender of the household head</i>		
Male	39.4	
Female, currently married	40.6	1.2
Female, widowed/divorced/separated	41.9	1.2
<i>Overall</i>	39.5	
<i>Region</i>		
Barisal	58.4	
Others	38.2	-20.2
Rajshahi	50.1	
Others	35.1	-15.0
Sylhet	52.1	
Others	38.8	-13.3
<i>Overall</i>	39.5	

Notes and Sources:

- (1) Based on the probit regressions reported in Table 9.
- (2) Predicted average vulnerability at a particular value (of the variable shown in the first column) is estimated by assigning that value to all households but retaining all other attributes of the households i.e., all other variables in the regression equations are assigned the values that the households actually have.
- (3) Marginal vulnerability at a particular value is the difference of predicted average vulnerability at that value from that of the preceding value.

Table 11
Impact of Standard of Living on the Vulnerability to Economic Shocks
in Rural Bangladesh: 2007-2010
 (predicted probability of facing economic shocks)

	Average vulnerability	Marginal vulnerability
<i>Consumption expenditure</i>		
25th percentile	36.6	
50th percentile	38.2	1.6
75th percentile	40.8	2.6
<i>Overall</i>	39.5	2.1

Notes and Sources: See Table 10.

4. Analysis of Coping Strategy

In this section we analyse households' responses to economic shocks, with a special focus on identifying the factors that shape the nature of their response. The data for this analysis were collected with a one-year reference period as opposed to the three-year reference period that was used for analysing the incidence of shocks in section 3.

In section 2, we noted the importance of making a distinction between the concepts of the 'ability to cope' and the 'coping strategy' in the context of analysing a household's responses to shocks. We argued there that while the concept of ability to cope applies only to asset and income shocks, the idea of coping strategy applies to all three types of shocks, including expenditure shocks. We begin our empirical analysis of responses to crisis by looking first at the ability to cope.

Table 12 shows that during the one-year period preceding the survey one-third of rural households faced one kind of economic shock or another. However, only in less than one-third of these cases (31%) the households made an attempt to cope with the crisis by trying to replenish the loss, either partially or wholly, depending on their ability. According to our definition, the ability to cope with crises was demonstrated only in the case of 31 per cent of the shocks. For income shock, the rate was slightly higher – at 35 per cent, while for asset shocks the rate was slightly lower – at 24 per cent. Thus for the vast majority of shocks, the households simply did not make any attempt to cope at all – they just accepted the loss.

It is important to enquire about the factors that determine the household's decision about whether or not to do something to recover the loss. We tried to investigate this issue first through bivariate analysis and then through multivariate analysis, but failed to find any systematic pattern. Our explanatory variables included both relevant characteristics of the shocks themselves (e.g., the magnitude of loss) and relevant characteristics of the households and the environments in which they live that might have a bearing on their ability to cope. But no statistically significant relationships were found that were robust to alternative specifications.

Table 12
Incidence of Shocks and the Ability to Cope
 (percentage)

	Incidence of shock	Ability to cope
Asset or income shocks	33.1	31.1
Asset shocks	10.1	24.0
Income shocks	8.8	35.6

Note: Data refer to one year preceding the survey i.e., from mid-2009 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

This was puzzling. On reflection, we suspect that our data are not refined enough to identify the determinants of the ability to cope. The problem lies in the way we are to interpret the data when a household reports that when faced with an asset or income shock it did nothing to recoup the loss. There are two distinct possibilities. First, it could mean that the household did want to recoup the loss but was unable to do so, for whatever reason. The other possibility, however, is that it did not even try to recover the loss, taking the loss in its stride. Take, for example, the case of death of livestock. If a poor household has a cow and it dies, the household may not simply be able to replace it, at least in the short to medium run (recall that our reference period was only one year) even if it wants to. On the other hand, if a rich farmer has ten cows and one of them dies, he may not even bother to replace it (again, in the short to medium run), perhaps because the remaining cows were good enough to give him a handsome living and he decided that whatever money he had would be better used for other purposes. The concept of ability to cope applies to the first case, but not so much to the second. More importantly, the underlying factors that determine the two choices may be very different. Indeed, the factors that determine a household's failure to recoup the loss even when it wants to are unlikely to be the same as the factors that determine its decision to take the loss in its stride. This is probably the reason why our analysis, which was necessarily unable to distinguish the two cases discussed above, failed to come up with any systematic pattern. While this has important lessons for future empirical research on crisis and coping, for the present we have to move on and proceed to analyse the coping strategies pursued in those cases where the households did succeed in making good the loss, either in part or in full.

As discussed in section 2, for analytical purposes we make a distinction between erosive and non-erosive coping strategies. The significance of this distinction is that non-erosive strategies are more likely to contribute to sustainable livelihoods of households by avoiding actions that erode their asset base. It is, therefore, important to identify the factors that are more likely to enable a household to adopt non-erosive coping strategies, or equivalently, to identify the factors that predispose a household to use erosive strategies.

But first let us address a measurement issue. Each of the three broad categories of shocks encompasses a number of specific shocks, and it is quite possible that when faced with multiple shocks within a particular category a household might adopt erosive strategies for some and non-erosive strategies for others. The question then arises as to how to characterise the household's response with respect to that particular broad category of shock. Thankfully, this problem was minimised in our case by two factors. First, because our reference period was only one year, the incidence of multiple shocks within any given broad category was very minimal; when multiple shocks did strike they tended to fall more into different broad categories of shocks rather than within the same category. Thus, for example, one would easily find cases

where a household faced both an income shock and an expenditure shock within the same year, but the cases where they faced two different kinds of income shock within a year were very few. The second mitigating factor was that in the few cases where a household did face multiple shocks within the same category, in the majority of cases they tended to follow the same strategy – either erosive or non-erosive. In consequence, there are only a miniscule number of cases where a household adopted both erosive and non-erosive strategies within the same category of shock. In such cases, we looked at the number of times they adopted a particular strategy. Whichever strategy was followed in half or more shocks, that particular strategy was assigned to the household.

Table 13 shows the distribution of responses between erosive and non-erosive strategies adopted by those households who did manage to obtain some funds for dealing with the shocks. For all categories of shocks, 38 per cent of responses were of the erosive variety. There are, however, sharp differences across the categories of shocks. Erosive strategies accounted for only 12 per cent of responses in the case of asset shocks and 20 per cent in the case of income shocks. By contrast, in the case of expenditure shocks, erosive and non-erosive strategies were pursued almost in equal measure.

Table 13
The Distribution of Erosive and Non-erosive Coping

	Erosive	Non-erosive	Total
Asset shocks	38.0	62.0	100.0
Income shocks	12.2	87.8	100.0
Expenditure shocks	19.9	80.1	100.0
Any shock	49.3	50.7	100.0

Note: Data refer to one year preceding the survey i.e., from mid-2009 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

In trying to identify the correlates of coping strategy, we first carried out some simple bivariate analysis and then a multivariate analysis. For bivariate analysis, we looked at the association of coping strategies with three access variables – namely, access to microcredit, foreign remittance, and social safety net programmes, and two household-level characteristics – namely, principal occupation of the household head and the educational status of the household head.

Table 14
Some Correlates of Erosive Coping in Rural Bangladesh
 (percentage of households adopting erosive coping)

Household characteristics	Any shock	Asset shock	Income shock	Expenditure shock
<i>Microcredit borrowing</i>				
Borrower	41.4	12.9	20.5	54.9
Non-borrower	34.7	11.5	19.1	43.9
<i>Foreign remittance</i>				
Receiver	38.7	12.3	20.8	50.1
Non-receiver	32.9	10.6	11.1	42.6
<i>Social Safety Net</i>				
Participant	38.3	11.1	18.1	51.2
Non-participant	37.7	13.4	22.5	47.1
All	38.0	12.2	19.9	49.3

Note: Data refer to one year preceding the survey i.e., from mid-2009 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

Access to microcredit appears to have a strong association with coping strategy, as microcredit borrowers tend to adopt erosive strategies less than non-borrowers (Table 14). For all categories of shocks, microcredit borrowers adopted erosive strategies in about 35 per cent of cases as against 41 per cent by non-borrowers. The difference is evident mainly in expenditure shocks, however. For asset and income related shocks there does not appear to be much difference between the two groups.

Access to foreign remittance also has a strong association with coping strategy, as households who receive remittance tend to adopt erosive strategies less than others (Table 14). For all categories of shocks, receivers of foreign remittance adopted erosive strategies in about 33 per cent of cases as against 39 per cent by non-receivers. The difference seems to be of the same order of magnitude as in the case of access to microcredit. However, unlike in the case of microcredit, the difference is not confined to expenditure shocks; it is also evident for income shocks and to a much lesser extent for asset shocks as well.

Unlike microcredit and foreign remittance, access to social safety net programmes does not seem to make any difference to the choice of coping strategies overall (Table 14). Compared to the non-participants, the participants in social safety net programmes tend to adopt erosive strategy at a slightly lower rate for expenditure shocks and at a slightly higher rate for income shocks, but the differences are not large.

Looking at the occupational pattern, there does not seem to exist any systematic association with responses to asset and income-related shocks but there does exist a strong association with responses to expenditure shocks and to shocks as a whole (Table 15). In these latter cases, erosive strategies are adopted most extensively by those engaged in the farming occupation and least extensively by those who live on unearned income ('others') while the non-farm households are found somewhere in between.

Table 15
Occupation, Education and Erosive Coping in Rural Bangladesh: 2007-2010
 (percentage of households adopting erosive coping)

Characteristics of the household head	Any shock	Asset shock	Income shock	Expenditure shock
<i>Principal occupation</i>				
Farming	40.2	12.4	20.5	54.7
Non-farm activities	37.1	12.2	17.1	46.8
Others	31.6	10.5	23.1	37.7
<i>Educational status</i>				
Illiterate	37.3	12.4	20.7	46.7
Less than primary	36.5	15.5	18.6	46.6
Primary plus	35.7	10.3	19.3	47.6
Secondary plus	45.9	11.4	25.6	64.1
Higher secondary plus	51.3	12.5	15.2	69.4
All	38.0	12.2	19.9	49.3

Note: Data refer to one year preceding the survey i.e., from mid-2009 to mid-2010.

Source: InM Poverty Dynamics Survey 2010.

For educational status too, we do not find any systematic association with responses to asset or income-related shocks but we do find a clear association with responses to expenditure shocks and to shocks as a whole (Table 15). In these cases, household heads with educational achievement above the secondary level have a greater propensity to adopt erosive strategies compared to those with less than secondary level of education.

Multivariate analysis of coping strategy

In order to identify the variables that predispose a household towards adopting the erosive strategy we carried out a multivariate analysis with the help of probit regression. The dependent variable was a dummy for coping strategy which took the value 0 for non-erosive strategy and 1 for erosive strategy. The explanatory variables included all the factors used in the bivariate analysis above plus a few more. We needed an asset variable because the existence of assets may have a bearing on the adoption of erosive strategies, for after all if a household does not have assets it cannot obviously adopt the strategy of eroding assets. We could not, however, use the current asset levels because they will bear the effect of any erosive strategies adopted by the household in the survey year. For this reason, we used the level of assets owned by the households one year preceding the survey, which would have a bearing on the household's ability to undertake erosive coping in the survey year without themselves being affected by coping. Among other household-level characteristics, we also included the age of the household, the gender of the household head, the size of the household and the number of working age members available.

We also constructed a 'social capital' variable using information on a household's social connections. It is an ordinal variable, with higher values indicating higher level of social capital. While social capital is likely to have a bearing on the choice of coping strategy, the direction of its effect is somewhat ambiguous. On the one hand, the existence of strong social capital may enable a household to draw upon external help in a way that will help them avoid potentially injurious

erosive strategy. On the other hand, households with strong social capital may feel that even if they lose some asset in the process of coping they may be able to recover it relatively easily with the help of support from their social network. This may incline them towards adopting erosive strategies more than would otherwise be the case.

There is also a scale variable in the form of the severity of all kinds of shocks experienced in a year. It was measured by the total loss suffered by a household on account of the shocks. The hypothesis is that the more severe the aggregate impact of shocks the more likely it is that a household will run out of the options to use relatively less painful non-erosive strategy and be forced to adopt the more injurious erosive strategy.

Among the village level characteristics, we included a variable indicating the scope for working in non-farm activities on the reasoning that greater scope for such activities will provide a cushion at times of crises, thereby obviating the need for adopting erosive strategies. It turned out, however, that this variable could not be used in conjunction with the occupational dummy because of multi-collinearity. When used alone, either variable turned out to be significant, but ceased to be so when used together. We therefore used one or the other of the two variables, the choice between them being determined by the level of statistical significance. Finally, we used the division dummies to capture any regional variation in the propensity to adopt erosive strategies for reasons that lie outside the household-level and village-level characteristics.

The results of probit analysis for shocks of all types combined are presented in Table 16. The following variables turn out to be statistically significant: (1) access to microcredit, (2) access to foreign remittance, (3) age of the household, (4) scope for non-farm activities in and around the village, and (5) a couple of division dummies.

Table 16
Determinants of Erosive Coping (for all shocks)

<i>Dependent variable:</i>		
Whether a household adopted erosive coping	Coefficient	t-value
<i>Explanatory variables</i>		
Aggregate severity of shocks	-3.47E-07	-0.90
Access to microcredit	-0.2016227	-3.06
Access to foreign remittance	-0.2142379	-1.68
Participation in social safety net	0.010321	0.16
Age of the household	0.0168487	1.94
Age of the household squared	-0.00043	-2.32
Educational status of household head	0.0149391	0.50
Gender of household head (dummy)	-0.0647433	-1.01
No. of working age members	0.0060217	0.18
Household size	0.0124465	0.47
Financial assets one year ago (taka)	3.50E-07	1.49
Physical assets one year ago (taka)	1.99E-08	0.92
Social capital (score)	0.0304244	1.58
Scope for non-farm work near village	-0.1904894	-2.00
Dummy for Barisal	-0.2464199	-1.19
Dummy for Chittagong	-0.1279763	-0.81
Dummy for Khulna	-0.3073882	-1.67
Dummy for Rajshahi	-0.0275477	-0.21
Dummy for Sylhet	-0.5072412	-2.12

Notes: (1) The equations were estimated using the probit model. A negative coefficient means that higher values of the explanatory variable reduce the probability of facing shocks; conversely for a positive coefficient. (2) The score for 'Educational status of household head' varies from 0 to 4; 0 stands for 'illiterate', 1 for 'less than primary level', 2 for 'primary plus but not completing secondary education', 3 for 'secondary plus but not completing higher secondary level', and 4 stands for 'higher secondary plus'. (3) Gender dummy is defined as 1 for 'widow/divorced/separated females', and 0 otherwise (i.e., males as well as currently married females). (4) The microcredit dummy takes the value 0 for non-borrowers and 1 for borrowers. The remittance dummy takes the value 0 for non-receivers and 1 for receivers. The dummy for social safety net takes the value 0 for non-participant and 1 for participant. (5) Social capital is an ordinal variable, with higher values indicating higher level of social capital. (6) The score for 'Scope for non-farm activities near village' varies between 1 and 3, higher score signifying better scope. (7) Standard errors were adjusted for stratified cluster sampling design.

The main findings can be summed up as follows. Access to microcredit and foreign remittance enables a household to avoid potentially injurious erosive coping strategies. There is also a clear life cycle effect here. The older households tend to adopt more erosive strategies, presumably because they would have accumulated more assets over time that they can afford to erode, but only up to a point beyond which they tend more towards non-erosive strategies (as indicated by the negative sign of age-squared). The existence of non-farm activities around the village helps, as expected, to avoid the adoption of erosive strategies. Finally, households living in Sylhet and Khulna divisions tend to avoid erosive strategies more than those living in other divisions.

Table 17
Impact of Some Factors on the Propensity to Adopt Erosive Coping
in Rural Bangladesh
 (predicted probability of adopting erosive strategy)

Correlates	Average probability	Marginal probability
<i>Microcredit</i>		
Receiver	41.8	
Non-receiver	34.4	-7.5
<i>Overall</i>	38.0	
<i>Social safety net</i>		
Participant	38.9	
Non-participant	31.2	-7.7
<i>Overall</i>	38.0	
<i>Scope for non-farm activities</i>		
Low	45.2	
Medium	38.0	-7.2
High	31.2	-6.8
<i>Overall</i>	38.0	-7.0
<i>Region</i>		
Khulna	39.3	
Others	28.4	-10.9
Sylhet	39.7	
Others	22.5	-17.2
<i>Overall</i>	38.0	

Notes and Sources:

- (1) Based on the probit regression reported in Table 16.
- (2) Predicted average probability at a particular value (of the variable shown in the first column) is estimated by assigning that value to all households but retaining all other attributes of the households.
- (3) Marginal probability at a particular value is the difference of predicted average probability at that value from that of the preceding value.

We turn finally to the estimation of the marginal effects of some of the significant variables following the same methodology as used in section 3. The results presented in Table 17 show that access to microcredit and access to foreign remittance have quantitatively similar effect on the propensity to adopt erosive strategies. In both cases, the probability of adopting coping strategy goes down by about 8 per cent. The effect of regional variation is also quite strong – households living in Sylhet have a 17 per cent lower probability of adopting erosive strategy than the rest of the population, while households living in Khulna have an 11 per cent lower probability of doing so.¹⁹

5. Concluding Observations

This paper used a novel conceptual framework and a large-scale household survey to study the phenomena of crisis and coping in rural Bangladesh. The empirical exercise was composed of two parts. The first part examined the prevalence of various kinds of shocks in rural Bangladesh and identified a number of important determinants of vulnerability to those shocks. The second part was concerned with the study of coping strategy – in particular, with identifying the major factors that enable households to avoid potentially injurious erosive coping strategies that deplete the assets base thereby jeopardising the household's long-term viability even as they help to overcome a temporary crisis.

On the determinants of vulnerability, the study found that the poor are not necessarily more vulnerable to shocks than the non-poor – indeed higher standard of living seems to be associated with greater exposure to shocks; households with farming as the main occupation are more vulnerable to shocks than others; microcredit borrowers are more vulnerable than non-borrowers; participants in social safety net programmes are more vulnerable than non-participants; and households living in Barisal, Rajshahi and Sylhet divisions are more likely to experience economic shocks compared to households living elsewhere.

On the determinants of coping strategy, the main findings are as follows: access to microcredit and foreign remittance enables a household to avoid potentially injurious erosive coping strategies. There is also a clear life cycle effect here. The older households tend to adopt more erosive strategies, but only up to a point beyond which they tend more towards non-erosive strategies. The existence of non-farm activities around the village helps avoid the adoption of erosive strategies. Finally, households living in Sylhet and Khulna divisions are better able to avoid erosive strategies compared to those living in other divisions.

The contrast between microcredit and social safety net in this context is worth commenting on. Our evidence shows that both microcredit borrowers and participants in social safety net programmes are more vulnerable to economic shocks than the rest of the population. We argued that it is this perception of vulnerability that perhaps drives many households to seek out microcredit. And, as our results demonstrate, access to microcredit indeed meets the expectation of borrowers by enabling them to avoid erosive strategies better as compared to non-borrowers. As a consequence, borrowers are better able to protect their asset base. A recent study has found

¹⁹ As in the case of vulnerability (in Section 3), we also estimated separate probit regressions for coping strategies against asset-related, income-related and expenditure-related shocks. The regression results are presented in the Appendix tables A.4-A.6.

that even though microcredit borrowers tend to start the journey in life with fewer assets relative to non-borrowers, they move up the asset ladder faster and are thus able to close the asset gap in later life (Osmani, 2012). This must be attributed in no so small measure to the fact that access to microcredit enables them to avoid coping strategies that erode the asset base. Thus microcredit not only flows more towards the vulnerable households but also helps them to deal with their vulnerability better.²⁰

By contrast, while social safety net does reach out to the more vulnerable population it does precious little to help them to deal with their vulnerability. In particular, it does not help them to avoid erosive coping strategies at times of crises any better compared to the non-participants, even after controlling for other factors. This is probably explained by the fact that the contribution made by social safety nets to the resources available to the households is quantitatively very insignificant.²¹

In order to strengthen the rural household's ability to avoid erosive coping strategies that might threaten their future livelihoods, the government ought to take actions to further enhance the access to credit, to strengthen the social safety net programmes so that they can make a more substantial contribution to the resources of the target groups at times of crises, to create greater opportunities for engaging in non-farm activities even in remote areas, and to address regional imbalances in both exposure to risks as well in the opportunities available to deal with the risks more effectively.

²⁰ In the specific context of health-related shocks, the contribution of microcredit towards improving the coping strategy of rural households of Bangladesh was also noted by Islam and Maitra (2012).

²¹ For comprehensive analyses of the social safety programmes in Bangladesh, see, among others, Ahmed *et al.* (2009), Khuda (2011), Morshed (2009), Rahman *et al.* (2011) and Rahman and Chaudhury (2012).

References

- Ahmed, S. S., Narayan, A. and Zaman, H. (2009) "Are the Poor Protected? Vulnerability and the Role of Social Safety Nets", in A. Narayan and Zaman, H. (eds.) *Breaking Down Poverty in Bangladesh*. The University Press Limited: Dhaka.
- Ashraf, N., Karlan, K. and Yin, W. (2006). "Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines", *Quarterly Journal of Economics*, 121(2): 635-672.
- Banarjee, A. and Mulainathan, S. (2010) "The Shape of Temptation: Implications for the Economic Lives of the Poor." Working Paper 15973. National Bureau of Economic Research: Cambridge, Mass.
- Baulch, B. (ed.) *Why Poverty Persists: Poverty Dynamics in Asia and Africa*. Edward Elgar: London.
- Dercon, S. (2002) "Income Risk, Coping Strategies and Safety Nets", *The World Bank Research Observer*, 17(2): 141-166.
- Frederick, S., Loewenstein, G. and O'Donoghue, T. (2002) "Time Discounting and Time Preference: A Critical Review." *Journal of Economic Literature*, 40(2): 351-401.
- Islam, A. and Maitra, P. (2012) "Health Shocks and Consumption Smoothing in Rural Households: Does Microcredit have a Role to Play?", *Journal of Development Economics*, Vol. 97: 232-243.
- Khuda, B. (2011) "Social Safety Net Programmes in Bangladesh: A Review", *Bangladesh Development Studies*, XXXIV(2): 87-108.
- Laibson, D.(1997) "Golden Eggs and Hyperbolic Discounting." *Quarterly Journal of Economics*, 112(2): 443-477.
- Morshed, K. A. M. (2009) *Social Safety Net Programmes in Bangladesh*. The United Nations Development Programme (UNDP): Dhaka.
- Osmani, S. R. (2012) "Asset Accumulation and Poverty Dynamics in Rural Bangladesh: The Role of Microcredit." Working Paper No. 11. Institute of Microfinance: Dhaka
- Osmani, S. R. and Khalily, M. A. B. (2011) *Readings in Microfinance: Reach and Impact*. Institute of Microfinance and the University Press Limited: Dhaka.
- Osmani, S. R. and Latif, A. (2013) "The Pattern and Determinants of Poverty in Rural Bangladesh: 2000-2010." Working Paper. Institute of Microfinance: Dhaka.
- Osmani, S. R., Latif, A., Sen, B., Rahman, R. I., Ahmed, M., Khan, T. F. and Islam, R. (2013). "Dynamics of Poverty in Rural Bangladesh: Report of the Benchmark Survey". Research Report. Institute of Microfinance: Dhaka.
- Quisumbing, A. (2012) "Poverty Transitions, Shocks and Consumption in Rural Bangladesh, 1996-97 to 2006-07", in B. Baulch (ed.) *Why Poverty Persists: Poverty Dynamics in Asia and Africa*. Edward Elgar: London.
- Rahman, H. Z. et al. (2011) *Social Safety Nets in Bangladesh, Vol. 1: Review of Issues and Analytical Inventory*. Power and Participation Research Centre (PPRC) and the United Nations Development Programme (UNDP): Dhaka.

Rahman, H. Z. and Choudhury, L. A. (2012) *Social Safety Nets in Bangladesh*, Vol. 2: Ground Realities and Policy Challenges. Power and Participation Research Centre (PPRC) and the United Nations Development Programme (UNDP): Dhaka.

Santos, I., Sharif, I.; Rahman, H. Z.; and Zaman, H. (2011) *How Do the Poor Cope with Shocks in Bangladesh? Evidence from Survey Data*. © World Bank. <https://openknowledge.worldbank.org/handle/10986/3573> License: Creative Commons Attribution CC BY 3.0.

Skoufias, E. (2003) "Economic Crises and Natural Disasters: Coping Strategies and Policy Implication", *World Development*, 31(7): 1087-1102.

Appendix Table A.1
Determinants of Vulnerability to Asset Shocks

<i>Dependent variable:</i>		
Whether a household faced any shock	Coefficient	t-value
<i>Explanatory variables</i>		
Consumption expenditure	9.71E-07	2.60
Access to microcredit	0.1264682	2.52
Access to foreign remittance	-0.0046419	-0.05
Participation in social safety net	0.0452194	0.83
Age of the household	0.0168113	2.20
Age of the household squared	-0.0003697	-2.08
Educational status of household head	0.0426996	1.81
Gender of household head (dummy)	0.0378603	0.57
No. of working age members	-0.0103858	-0.43
Household size	0.0288088	1.51
Principal occupation of household head	-0.1610915	-2.97
Average distance from imp. places (km)	0.0226204	1.35
Scope for non-farm work near village	-0.1001362	-1.05
Soil fertility in the village	0.0530308	0.49
Dummy for Barisal	0.5451836	2.06
Dummy for Chittagong	-0.1235725	-0.80
Dummy for Khulna	0.0163963	0.08
Dummy for Rajshahi	0.4181821	3.28
Dummy for Sylhet	0.29552	1.60

Notes: (1) The equations were estimated using the probit model. A negative coefficient means that higher values of the explanatory variable reduce the probability of facing shocks; conversely for a positive coefficient.

(2) The score for 'Educational status of household head' varies from 0 to 4; 0 stands for 'illiterate', 1 for 'less than primary level', 2 for 'primary plus but not completing secondary education', 3 for 'secondary plus but not completing higher secondary level', and 4 stands for 'higher secondary plus'.

(3) Gender dummy is defined as 1 for 'widow/divorced/separated females', and 0 otherwise (i.e., males as well as currently married females).

(4) Principal occupation dummy takes the value 1 for farm activities, 2 for non-farm activities and 3 for others (such as living on remittance income, old-age pension, rental income, etc.)

(5) The microcredit dummy takes the value 0 for non-borrowers and 1 for borrowers. The remittance dummy takes the value 0 for non-receivers and 1 for receivers. The dummy for social safety net takes the value 0 for non-participant and 1 for participant.

(6) The score for 'Scope for non-farm activities near village' varies between 1 and 3, higher score signifying better scope.

(7) Standard errors were adjusted for stratified cluster sampling design.

Appendix Table A.2
Determinants of Vulnerability to Income Shocks

<i>Dependent variable:</i>		
Whether a household faced any shock	Coefficient	t-value
<i>Explanatory variables</i>		
Consumption expenditure	3.54E-08	0.09
Access to microcredit	-0.0025291	-0.04
Access to foreign remittance	0.0285309	0.27
Participation in social safety net	0.0042734	0.07
Age of the household	0.0095497	1.65
Age of the household squared	-1.72E-04	-1.37
Educational status of household head	0.1103516	4.47
Gender of household head (dummy)	-0.0082678	-0.12
No. of working age members	0.0281891	0.99
Household size	-0.0008302	-0.03
Principal occupation of household head	-0.4225162	-6.13
Average distance from imp. places (km)	0.0167726	0.64
Scope for non-farm work near village	-0.01638	-0.14
Soil fertility in the village	0.1576891	1.23
Dummy for Barisal	1.059753	3.54
Dummy for Chittagong	0.1058828	0.59
Dummy for Khulna	0.7919142	3.21
Dummy for Rajshahi	0.5609283	3.41
Dummy for Sylhet	0.8619279	3.16

Notes: (1) The equations were estimated using the probit model. A negative coefficient means that higher values of the explanatory variable reduce the probability of facing shocks; conversely for a positive coefficient. (2) The score for 'Educational status of household head' varies from 0 to 4; 0 stands for 'illiterate', 1 for 'less than primary level', 2 for 'primary plus but not completing secondary education', 3 for 'secondary plus but not completing higher secondary level', and 4 stands for 'higher secondary plus'. (3) Gender dummy is defined as 1 for 'widow/divorced/separated females', and 0 otherwise (i.e., males as well as currently married females). (4) Principal occupation dummy takes the value 1 for farm activities, 2 for non-farm activities and 3 for others (such as living on remittance income, old-age pension, rental income, etc.) (5) The microcredit dummy takes the value 0 for non-borrowers and 1 for borrowers. The remittance dummy takes the value 0 for non-receivers and 1 for receivers. The dummy for social safety net takes the value 0 for non-participant and 1 for participant. (6) The score for 'Scope for non-farm activities near village' varies between 1 and 3, higher score signifying better scope. (7) Standard errors were adjusted for stratified cluster sampling design.

Appendix Table A.3
Determinants of Vulnerability to Expenditure Shocks

Dependent variable:		
Whether a household faced any shock	Coefficient	t-value
Explanatory variables		
Consumption expenditure	2.30E-06	4.25
Access to microcredit	0.1667321	3.29
Access to foreign remittance	-0.0892113	-1.26
Participation in social safety net	0.1436713	2.95
Age of the household	0.0068391	1.41
Age of the household squared	-0.0001562	-1.65
Educational status of household head	-0.0233609	-1.19
Gender of household head (dummy)	0.0287982	0.67
No. of working age members	-0.0081496	-0.35
Household size	-0.0233713	-1.4
Principal occupation of household head	0.012543	0.26
Average distance from imp. places (km)	0.0237608	1.31
Scope for non-farm work near village	-0.1216831	-1.21
Soil fertility in the village	0.0515123	0.65
Dummy for Barisal	0.1613212	0.98
Dummy for Chittagong	0.0196103	0.14
Dummy for Khulna	-0.3101509	-2.17
Dummy for Rajshahi	0.1453166	1.18
Dummy for Sylhet	0.0030233	0.02

Notes: (1) The equations were estimated using the probit model. A negative coefficient means that higher values of the explanatory variable reduce the probability of facing shocks; conversely for a positive coefficient. (2) The score for 'Educational status of household head' varies from 0 to 4; 0 stands for 'illiterate', 1 for 'less than primary level', 2 for 'primary plus but not completing secondary education', 3 for 'secondary plus but not completing higher secondary level', and 4 stands for 'higher secondary plus'. (3) Gender dummy is defined as 1 for 'widow/divorced/separated females', and 0 otherwise (i.e., males as well as currently married females). (4) Principal occupation dummy takes the value 1 for farm activities, 2 for non-farm activities and 3 for others (such as living on remittance income, old-age pension, rental income, etc.) (5) The microcredit dummy takes the value 0 for non-borrowers and 1 for borrowers. The remittance dummy takes the value 0 for non-receivers and 1 for receivers. The dummy for social safety net takes the value 0 for non-participant and 1 for participant. (6) The score for 'Scope for non-farm activities near village' varies between 1 and 3, higher score signifying better scope. (7) Standard errors were adjusted for stratified cluster sampling design.

Appendix Table A.4
Determinants of Erosive Coping (for asset shocks)

<i>Dependent variable:</i>		
Whether a household adopted erosive coping	Coefficient	t-value
<i>Explanatory variables</i>		
Aggregate severity of shocks	-1.80E-06	-1.87
Access to microcredit	-0.2386914	-1.82
Access to foreign remittance	-0.2770086	-1.20
Participation in social safety net	0.1560397	0.99
Age of the household	0.0293256	0.99
Age of the household squared	-0.00054	-0.84
Educational status of household head	-0.0556315	-0.67
Gender of household head (dummy)	-0.2330387	-1.41
No. of working age members	0.0201667	0.26
Household size	0.0274224	0.49
Principal occupation of the household head	0.054783	0.45
Financial assets one year ago (taka)	1.82E-07	0.69
Physical assets one year ago (taka)	-6.17E-08	-1.43
Social capital (score)	0.108218	3.04
Dummy for Barisal	-1.222505	-2.68
Dummy for Chittagong	-0.0074526	-0.02
Dummy for Khulna	-0.4021414	-1.14
Dummy for Rajshahi	0.1188459	0.39
Dummy for Sylhet	-0.6652351	-1.46

Notes: (1) The equations were estimated using the probit model. A negative coefficient means that higher values of the explanatory variable reduce the probability of facing shocks; conversely for a positive coefficient. (2) The score for 'Educational status of household head' varies from 0 to 4; 0 stands for 'illiterate', 1 for 'less than primary level', 2 for 'primary plus but not completing secondary education', 3 for 'secondary plus but not completing higher secondary level', and 4 stands for 'higher secondary plus'. (3) Gender dummy is defined as 1 for 'widow/divorced/separated females', and 0 otherwise (i.e., males as well as currently married females). (4) The microcredit dummy takes the value 0 for non-borrowers and 1 for borrowers. The remittance dummy takes the value 0 for non-receivers and 1 for receivers. The dummy for social safety net takes the value 0 for non-participant and 1 for participant. (5) The occupation dummy takes value 0 for farming and 1 for all others. (6) Social capital is an ordinal variable, with higher values indicating higher level of social capital. (7) Standard errors were adjusted for stratified cluster sampling design.

Appendix Table A.5
Determinants of Erosive Coping (for income shocks)

<i>Dependent variable:</i>		
Whether a household adopted erosive coping	Coefficient	t-value
<i>Explanatory variables</i>		
Aggregate severity of shocks	-4.63E-06	-1.91
Access to microcredit	-0.0300011	-0.20
Access to foreign remittance	-0.3640358	-1.26
Participation in social safety net	0.0559614	0.36
Age of the household	0.0144338	0.87
Age of the household squared	-0.0001378	-0.44
Educational status of household head	0.0145374	0.21
Gender of household head (dummy)	0.2200896	1.69
No. of working age members	-0.0600541	-0.79
Household size	0.0948632	1.72
Financial assets one year ago (taka)	1.53E-06	3.06
Physical assets one year ago (taka)	-5.61E-08	-1.20
Social capital (score)	-0.0028338	-0.07
Scope for non-farm work near village	-0.5147681	-2.85
Dummy for Barisal	-0.283537	-0.59
Dummy for Chittagong	-0.546407	-1.60
Dummy for Khulna	-0.4704528	-1.43
Dummy for Rajshahi	-0.1350951	-0.43
Dummy for Sylhet	-1.157964	-3.37

Notes: (1) The equations were estimated using the probit model. A negative coefficient means that higher values of the explanatory variable reduce the probability of facing shocks; conversely for a positive coefficient.

(2) The score for 'Educational status of household head' varies from 0 to 4; 0 stands for 'illiterate', 1 for 'less than primary level', 2 for 'primary plus but not completing secondary education', 3 for 'secondary plus but not completing higher secondary level', and 4 stands for 'higher secondary plus'.

(3) Gender dummy is defined as 1 for 'widow/divorced/separated females', and 0 otherwise (i.e., males as well as currently married females).

(4) The microcredit dummy takes the value 0 for non-borrowers and 1 for borrowers. The remittance dummy takes the value 0 for non-receivers and 1 for receivers. The dummy for social safety net takes the value 0 for non-participant and 1 for participant.

(5) Social capital is an ordinal variable, with higher values indicating higher level of social capital.

(6) The score for 'Scope for non-farm activities near village' varies between 1 and 3, higher score signifying better scope.

(7) Standard errors were adjusted for stratified cluster sampling design.

Appendix Table A.6
Determinants of Erosive Coping (for expenditure shocks)

<i>Dependent variable:</i>		
Whether a household adopted erosive coping	Coefficient	t-value
<i>Explanatory variables</i>		
Aggregate severity of shocks	-3.87E-07	-0.61
Access to microcredit	-0.2960339	-3.34
Access to foreign remittance	-0.3042753	-2.09
Participation in social safety net	-0.0635924	-0.81
Age of the household	0.0144834	1.25
Age of the household squared	-0.0004564	-1.86
Educational status of household head	0.0752063	1.92
Gender of household head (dummy)	0.0323984	0.40
No. of working age members	-0.0012526	-0.03
Household size	0.0288377	0.90
Principal occupation of the household head	-0.2812798	-3.59
Financial assets one year ago (taka)	6.29E-07	1.77
Physical assets one year ago (taka)	3.51E-08	0.95
Social capital (score)	0.012624	0.44
Dummy for Barisal	0.02143	0.08
Dummy for Chittagong	-0.1149472	-0.61
Dummy for Khulna	-0.0165401	-0.07
Dummy for Rajshahi	0.044386	0.31
Dummy for Sylhet	-0.1349783	-0.46

Notes: (1) The equations were estimated using the probit model. A negative coefficient means that higher values of the explanatory variable reduce the probability of facing shocks; conversely for a positive coefficient.

(2) The score for 'Educational status of household head' varies from 0 to 4; 0 stands for 'illiterate', 1 for 'less than primary level', 2 for 'primary plus but not completing secondary education', 3 for 'secondary plus but not completing higher secondary level', and 4 stands for 'higher secondary plus'.

(3) Gender dummy is defined as 1 for 'widow/divorced/separated females', and 0 otherwise (i.e., males as well as currently married females).

(4) The microcredit dummy takes the value 0 for non-borrowers and 1 for borrowers. The remittance dummy takes the value 0 for non-receivers and 1 for receivers. The dummy for social safety net takes the value 0 for non-participant and 1 for participant.

(5) The occupation dummy takes value 0 for farming and 1 for all others.

(6) Social capital is an ordinal variable, with higher values indicating higher level of social capital.

(7) Standard errors were adjusted for stratified cluster sampling design.

The Institute of Microfinance (InM) is an independent non-profit organisation established primarily to meet the research and training needs of national as well as of global microcredit programmes. Initiated and promoted by Palli Karma-Sahayak Foundation (PKSF) on 1 November 2006, the Institute is principally funded by UKaid, Department for International Development (DFID) through its Promoting Financial Services for Poverty Reduction (PROSPER) Programme. InM has an excellent team of professionals in research, training and knowledge management. InM draws research scholars from reputed universities here and abroad. The major services that InM provides are research on poverty, microfinance, enterprise development, impact assessment and evaluation of microfinance programmes. Beside research, InM provides microfinance related training, capacity building support and knowledge management services to microfinance institutions and other development organisations.

For Information please contact:



Institute of Microfinance (InM)

- House # 2/1, Block-D, Lalmatia, Dhaka-1207, Bangladesh
 - PKSF Bhaban, Agargaon, Dhaka-1207, Bangladesh
- PABX: +88-02-8100479, +88-02-8100676-7, Fax: +88-02-8100481
Email: info@inm.org.bd; Web: www.inm.org.bd