How effectively do households insure food consumption and assets against funeral expenses? The case of urban Zimbabwe

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Abstract

In response to funeral expenses, which drastically affect household consumption, many families in developing countries enter into formal and/or informal funeral insurance arrangements. Using new household survey data collected in the city of Bulawayo, Zimbabwe, we investigate the effectiveness of these arrangements in insuring food consumption and household non-financial assets against funeral expenses. We find that informal funeral insurance, especially when combined with formal insurance, effectively insures household assets from funeral shocks. Households that own more than one item of the same asset prefer to sell assets rather than destabilise food consumption, in the event that funeral insurance is inadequate or not available. Households without multiple of the same asset prefer to retain their assets and destabilise food consumption. We also show that the funeral insurance of households in Bulawayo partially insures food consumption. Our findings suggest that households have a hierarchy of preferred coping strategies when they are either uninsured or not fully insured against shocks.

Keywords Informal insurance · Formal insurance · Funeral expenses · Food consumption · Household assets

JEL codes D10 · D14 · D15 · D52

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1 Introduction

In response to funeral expenses, which can drastically affect household consumption, many families in developing countries enter into formal and informal funeral insurance arrangements. On the one hand, theoretical work has been devoted to understanding how informal insurance arrangements are made (for instance, Bold 2009), and how households share risk under conditions of imperfect information and weak enforceability (for instance, Ligon et al. 2002). On the other hand, several studies have provided empirical assessments of the functions of informal insurance arrangements and how they operate, especially at the group level; examples include Hall (1987), Roth (2001), Thomson and Posel (2002), Dercon et al. (2006), Case et al. (2013) and LeMay-Boucher (2009).

Earlier empirical work by Cochrane (1991) piloted the analysis of the effectiveness of insuring consumption against general idiosyncratic shocks under complete markets. Gertler and Gruber (2002) assess the extent to which families are able to insure consumption against illness. In a related study, De Weerd and Fafchamps (2011) examine the extent to which insurance in the form of gifts and transfers is effective in insuring against transitory and persistent health shocks. Bold and Dercon (2004) use funeral insurance data from rural Ethiopia to model the emergence of formal mutual insurance companies under limited contract enforceability. Most of the literature on informal funeral arrangements is limited to rural areas; Fafchamps and Ferrara (2012) were among the first to analyse informal insurance in an urban milieu, in Kenya. Berg (2015) adds to the scant literature on informal insurance in urban areas by comparing funeral insurance and life insurance in South Africa.

In this study, we analyse the extent to which households in Bulawayo, Zimbabwe are able to insure food consumption and household non-financial assets such as cell phones, laptops and televisions against funeral expenses immediately after the funeral and before the next income injection. Funerals represent a significant expense and major financial shock for households in our survey sample, costing on average half of annual household salary. Having financed the high funeral expenses through various sources, households typically find themselves unable to meet their daily consumption needs post-burial and before the next income injection (Foster 2007).

The self-insurance literature pioneered by Deaton (1991) takes the view that assets are not something to be insured, but rather are a means by which the smoothing of consumption is achieved. This view is partly used in this paper to address how households use or dispose of assets in order to smooth consumption post-burial and before the next income injection. We also assess if funeral insurance can mitigate the sale of household non-financial assets.¹ Here, the perspective is that funeral expenses must be covered by funeral insurance and should not spill over to affect either household food consumption and/or assets. The possibility that shocks could lead to the post-burial depletion of household assets suggests a potentially large and non-temporary loss in household welfare, compared to a loss limited to the temporary disruption of food consumption.

¹ Note that we refer not to the taking out of funeral insurance on the assets themselves, but to the role of funeral insurance in helping households avoid asset disposal to smooth consumption post burial and before next income injection.

Firstly, we assess the ability of households to insure their food consumption against funeral shocks. We analyse how different types of insurance affect changes in food consumption, relative to uninsured households. We then compare how funeral expenses affect changes in food consumption for insured and non-insured households, and thus how insurance mitigates the adverse effects of funerals on food consumption post-burial and before the next income injection. Secondly, we analyse how household assets are protected against the financial shock of funerals, and also how these assets can be used to protect food consumption, especially where households own multiple of the same asset items.

There is an evolving debate in the literature concerning the relevance of informal systems in social protection, from which three main arguments have emerged: Firstly, that informal mechanisms are rapidly disappearing under processes of commercialisation (Sen 1980; Moser 1998); secondly, that informal mechanisms are functioning well and that public transfers will displace them (Cox and Jimenez 1995); and thirdly, that informal mechanisms are part of preventive social protection from non-state actors (Devereux and Sabates-Wheeler 2004). This paper also connects with these debates and provides evidence mainly in support of the third argument.

Extant work on risk and insurance theories typically examines the Pareto-efficient allocation of risk among households in communities (Bardhan and Udry 1999). These theories predict that, even in the absence of complete markets, poor households are able to insure perfectly against idiosyncratic shocks. However, empirical evidence from the existing literature is mixed (Cochrane 1991; Mace 1991; Hayashi et al. 1996; Kurosaki and Fafchamps 2002). Three key reasons have been advanced to explain why insurance at the community level deviates from Pareto optimality: Limited commitment (Kocherlakota 1996), asymmetric information (Thomas and Worrall 1988) and imperfect enforceability (Bold 2009).

The risk-sharing literature is also related to income and consumption smoothing (see Morduch 1995). The former is most often achieved by diversifying economic activities and making conservative production or employment choices. The latter is typically associated with saving and borrowing, insuring shocks using formal and informal insurance arrangements, and depleting and accumulating non-financial assets.

Most literature on informal funeral insurance is set in rural areas, and as such little is known about the insurance strategies of the urban poor in coping with idiosyncratic shocks (Fafchamps and Ferrara 2012). Yet there is a growing population of people in Africa living in the urban milieu, due to rapid urbanisation. This suggests that some of the norms and practices that used to be prevalent in rural areas are being imported to urban areas, albeit in different forms. Indeed, studies that assess the differences between rural and urban areas on social cohesion, community groups and assistance find that norms that were previously associated with rural areas are now increasingly practiced in urban areas. For instance, Mato (1993) finds that the association between receiving and giving assistance among the elderly is now higher in urban than in rural areas. Nonetheless, some studies still cite huge differences between urban and rural residents, particularly regarding social capital, which is an attribute that is associated with community groups and social cohesion (Adjaye-Gbewonyo et al. 2019). Urban populations tend to be more fluid and mobile, with a multiplicity of social and

economic relationships, and typically without the same intergenerational social ties between households as in rural areas. Studying funeral insurance in an urban milieu could then add to the emerging body of empirical evidence and to these debates.

The key contribution of this paper lies in our analysis of how households protect their food consumption against the effects of shocks by comparing the effectiveness of informal insurance with a combination of formal and informal insurance. Our analysis of informal insurance also contributes to the debates in the literature around non-state mechanisms of social protection. Secondly, we provide evidence on how households cope with shocks when insurance is inadequate after a burial and before the next income injection, and how preferred coping mechanisms are conditional on whether or not a household owns multiple of the same types of assets. These results imply that households that are either uninsured or not adequately insured use a hierarchy of strategies to cope with shocks. Thirdly, this paper adds to the small but growing literature on informal insurance arrangements in urban areas. This is especially germane, as a growing proportion of people in Africa live in urban settings, yet there is uncertainty about whether the same sort of community ties and social solidarity in rural areas also hold in urban areas, with implications for the effectiveness of informal insurance arrangements.

Section 2 presents the data and descriptive statistics (with further details on the data collection provided in Appendix 1), as well as background on the setting of the study. Section 3 discusses the effectiveness of funeral insurance in two parts, first in smoothing consumption and second in mitigating the sale of household assets. In each assessment, the methodology is provided first, followed by the results. Section 4 concludes.

2 Data and descriptive background

In the past two decades, Zimbabwe has been faced with socio-economic hardships that have exposed many households to sickness and death and, given the systemic nature of these hardships, have weakened the ability of households to pool risk. The Economic Structural Adjustment Programme (ESAP) that was implemented in Zimbabwe from 1991 negatively affected vulnerable households in particular (Renfrew 1992; Gibbon 1995). The introduction of ESAP coincided with a major drought in 1991/1992 that is believed to be the worst in drought-prone Zimbabwe in recent times (Van der Hoven et al. 1993). Marquette (1997) finds that ESAP and this drought both adversely affected health, employment, wages and food security, and consequently had an especially negative impact on poor households.

In addition to severe socio-economic hardships, disease has contributed significantly to the high mortality in Zimbabwe. In 2008, a cholera epidemic led to an average of 35 deaths a day from August 2008 to mid-January 2009 (World Health Organization 2009). The HIV/AIDS epidemic had already claimed a cumulative 1.9 million lives out of a population of 13 million in 2010, notwithstanding the fact that the prevalence of HIV in the general population was falling (National Aids Council of Zimbabwe 2011).

The city of Bulawayo, where the fieldwork was conducted, is the second largest city in Zimbabwe. In 2012, the population of Bulawayo was 653,337, compared to

676 650 recorded in the 2002 census. Besides high mortality, extensive out-migration has contributed to this depopulation. As well as the general economic crisis affecting Zimbabwe during this period, the decline in the population of the city can also be attributed to the de-industrialisation of the city, which was previously known to be the industrial hub of Zimbabwe as it used to house many large manufacturing companies and industries (Mbira 2015). As a result, many residents are unemployed and resort to the informal sector or migrate to neighbouring countries. Bulawayo is thus a suitable case for a study of how poor households cope with protecting their consumption and assets when confronted with high funeral expenses in the context of economic crisis, the absence of a state welfare system and high mortality rates.

Zimbabwe lacks consistent data collection through household surveys. As such, the data for this paper comes from a household survey conducted by the authors in Bulawayo between March and July 2014 (see Appendix 1 for further details of the survey methodology). The survey covered 298 households from three high-density poor suburbs (townships) of Bulawayo: Matshobana, Sizinda and Sokusile.

Although cholera and HIV-related deaths have subsided in recent years, mortality and the frequency of funerals are still high in Zimbabwe. 120 of the 298 enumerated households experienced death during the period 2009–2013. Many of these 120 households experienced death more than once, to give 200 observed instances of death in the reference period. The mean age of those dying is 44.3 (and the median is 43) with a standard deviation of 28.41. Of those dying, 54.9 percent were male. In terms of causes of death, 40 percent died of long illness, 37.5 percent died of short illness, 18.83 died of old age and the rest from various other causes.

Long illness is associated in particular with HIV/AIDS related deaths. Between 1994 and 1995, Ainsworth and Over (1997) show that Zimbabwe had the highest HIV infection rate among urban sex workers in sub-Saharan Africa. The fragile health systems and low budget could not handle the huge prevalence of HIV resulting in high mortality rates of prime-aged adults. Case et al. (2013) posit that this increase in mortality of the prime-aged adults can lead to economic hardships for households that experience death, if those who die do not have funeral insurance. In a study done in Kagera, Tanzania, Ainsworth and Over (1997) report that, on average, households spend 50 percent more on funerals than on medical expenses. In a study done in KwaZulu-Natal, South Africa, Case et al. (2013) found that, on average, an adult's funeral costs an equivalent of a year's salary, measured at median per capita African income.

This study focuses on funeral expenses that households had to cover using out-of-pocket spending, funeral insurance and other sources when faced with bereavement.² Table 1 shows descriptive statistics of the various funeral expenses, with the cost of providing food to mourners being the highest single cost. The average expenses of a funeral amount to almost half of annual household income for the households in our sample; this shows the magnitude of these expenses and the significance of funerals as a severe financial shock.

² The survey questions included: (a) Has your household suffered any death in the past five years? (b) How was the deceased related to the head of the household? What was the age of the deceased at time of death? Gender? Year of death and cause of death? (c) What death-related expenses did your household pay? (d) What was the amount? (e) What was the source of payment?

Table 1 Descriptive statistics of funeral expenses

Expense	Mean	Std dev.	Min.	Max.
Feeding relatives and community members	516.77	541.48	23	1200
Transport	281.63	289.45	10	1810
Coffin	421.15	292.02	41	1602
Funeral parlour	169.37	157.19	43	209
Cemetery	57.77	38.79	5	228
Contacting relatives	21.69	20.48	6	90
Clothes/blankets for the deceased	51.71	34.84	0	189
Flowers	25.00	24.25	0	150
Funeral programme	13.16	10.74	0	53
Total funeral costs	1315.91	1033.24	155	5708

Source: Own survey data

Note 1: The funeral expenses shown here include both out-of-pocket expenses paid for out of households' own resources, as well as expenses met through monetary and in-kind insurance payments

Note 2: The expenses are in US\$. Given that the study covers funeral costs experienced by households from 2009 to 2013, all costs are inflated to 2014 prices using the consumer price index

Note 3: Monthly salary statistics: Mean = \$226.34; Std dev. = 270.70; Min. = 0; Max. = 1500

The extent of funeral expenses, as well as the unpredictability of death,³ suggests that funeral expenses could destabilise household finances, leading to a loss in welfare immediately after a burial. Funeral insurance is therefore critical for households. Past research confirms that households regard funeral insurance as important, although many households are covered by informal funeral insurance more than they are covered by formal insurance (see Dafuleya 2013). Other research, such as Case and Menendez (2011), shed light on the determinants of funeral expenses, where one particular factor stands out: significantly less is spent on the funerals for children below the age of five. Funerals of children between five and 17 years are as expensive as those of the elderly and therefore if they are not prepared for, and/or uninsured, they could destabilise household finances.

The survey data shows that families that experienced death in the period 2009 to 2013 relied on several sources to finance funeral expenses. These sources include

³ It may be the case that households are able to predict the likelihood of death if a household member is old and/or has had a long and serious illness. Should this be the case, households with very old members or those that have been sick for a long time may be expected to commit more to insurance than households that do not have such members (see Ardington et al. (2014)). However, in our sample, none of these factors are found to determine commitment to having more insurance (i.e. when formal and informal insurance are used). These observations are based on supplementary regressions in which the likelihood of having insurance is regressed on a range of household-level determinants; results not shown here for reasons of brevity but available on request. Age of the household head does influence the probability of belonging to a burial society, which, however, tends to cover the young and old. These results are discussed later when we address selection bias and are shown in Table 14 in Appendix 2. As such, having insurance is not only restricted to the old aged in the burial societies.

Fig. 1 Sources of payment for funeral expenses. Source: Own survey data. Note 1: The key to the graph follows the order of the bars, that is, burial society is matched with the first bar and relatives with the last. Note 2: Numbers on the vertical side represent the frequency of the source of payment in paying for funeral expenses as reported by the households in the survey, i.e. the number of times that a source was cited in total

burial societies, community risk-sharing initiative (CRSI), borrowing, formal insurance, household savings, church, workplace or relative contributions (see Fig. 1). Furthermore, households were also asked to indicate the most important sources of funeral expenses, these sources were found to be burial societies and CRSI.

A burial society is a funeral insurance group that has members who are bound by the group's constitution, which usually specifies rules for the members, pay-out schedules, sanctions for non-payment and other operational procedures. The burial society has an executive committee that chairs the monthly meetings and administers the operations of the society. Pay-outs occur in cash when a member incurs funeral costs related to the death of a person listed as a beneficiary. In addition, the burial society members visit to console the bereaved family and offer assistance during the funeral.⁴

The CRSI also provides funeral insurance, but differs from a burial society in that it is community wide, and households contribute in cash and in kind when death occurs in another household residing within the boundary of that community. Households are part of the CRSI by default, simply by being resident within a community boundary in a township, unless households actively opt out. In the data, of the 200 incidences of deaths, households were not part of a CRSI (as they opted out) in 61 instances. In the context of Bulawayo, a township or suburb is made up of several communities, typically differentiated by boundaries that are common

⁴ Details of the subscriptions, payouts and accumulated savings of burial societies in Zimbabwe are provided by Hall (1987) and Dafuleya (2012). Case and Menendez (2011) and Case et al. (2013) provide this information, and much more in terms of conventional funeral policies, for burial societies in South Africa.

knowledge to the residents and are managed by a residential committee selected for this purpose.

The household contributions in the CRSI towards funeral expenses are typically very small, that is, they can be US\$1 or less, or can be in-kind such as a bowl of maize powder (Dafuleya and Zibagwe 2012). However, CRSI contributions tend to cover a significant proportion of funeral expenses because of the huge number of households that belong to the CRSI. For example, a contribution of US\$1 by 300 households that belong to a CRSI can raise money enough to meet the needed transport costs for a burial.

Formal insurance in Zimbabwe is provided by funeral parlours, private funeral insurers and some retail traders. The benefits of these formal insurers differ. On confirmation of death, the funeral parlour benefits typically comprise of storing the body of the deceased, providing a coffin and a hearse. Funeral parlours do not have cash benefits. Policies with private funeral insurers are also much less likely to pay benefits in cash. Instead, they mostly provide benefits of transportation in the form of 70-seater busses, a funeral tent and groceries. Retail traders fill in the space of giving a cash benefit upon confirmation of death of a beneficiary. The funeral policies are typically tied with shopping accounts, mostly clothing accounts.

There are relevant differences between providers of formal insurance and informal insurance (that is burial societies and CRSI). The former providers are registered and are subject to statutory supervision whereas the latter are not registered and are not subject to any statutory supervision. The providers of informal insurance have other advantages over conventional insurers. The sense of group belonging and ownership is strong for informal insurance. Furthermore, emotional support is usually provided by other members of same burial society. This is typically expressed by visiting and consoling the bereaved family every evening of the funeral until the day of burial (Dafuleya and Zibagwe 2012).

Figure 1 (and Table 3) show that some households borrow to finance funeral expenses (and consumption after burial and before next income). The survey data shows that most of the urban poor households in Bulawayo do not rely on formal credit markets for loans when they are in need. Only two out of 298 households received a loan from a microfinance institution during the reference period⁵ and only eight of 298 households received a loan from a commercial bank in the same period. In total therefore, only three per cent of households received a loan through the formal credit market. Only five per cent of households reported that they received a loan from a moneylender (loan sharks). Most of the credit transactions are therefore in the informal credit markets, that is, from relatives, friends and neighbours. Relatives, as well as church and workmates, also make contributions towards funeral expenses that are not meant to be repaid. These are recorded as sources of payment from relatives, church and/or workmates as shown in Fig. 1. If assistance that is extended at a funeral is in terms of credit, it was recorded under borrowing.

⁵ Various factors that are reported in the literature may explain the very limited use of loans from microfinance institutions by households. Klinkharmer (2009) indicates that lack of loans may be explained by the harsh environment in Zimbabwe, worsened by the inability to lend in hard currency. The author also mentions preference of microfinance institution to loan micro and small enterprises. Dube and Matanda (2015) assert that the microfinance institutions suffered from many factors, leading to their collapse and subsequent failure to service loan demands.

Household savings are among the sources used to pay for funeral expenses. As part of this, households create mechanisms of committing to savings with other households, yet the savings are at a household level and do not in any way extend to other households in terms of credit or other help. The strategy to have household savings in a common pot with other members can be seen as a way of overcoming the temptation to spend money that is intended to be saved. In the event of any type of risk occurring, such as death, these savings are converted to idiosyncratic insurance.

The descriptive statistics of variables used in this study are provided in Table 2. These are presented separately for households that are uninsured, informally insured, formally insured, or both formally and informally insured. Seventy-five percent of uninsured households, 21% of uninsured households, 25% of formally insured households, and just 6.3% of households with both forms of insurance experienced some form of negative change in food consumption immediately after a funeral. This is despite the fact that the average funeral expenses of the uninsured households are lower (at a mean of US\$423.80) compared to those of informally insured households (at a mean of about US\$1 000).

In most households, the change in food consumption immediately following a funeral takes the form of eating smaller quantities of food and, to a lesser extent, changing to a cheaper diet and reducing the number of meals per day.⁶ These issues are further analysed in Section 3 using regressions to assess whether funeral insurance protects households from a slump in consumption and from drawing down non-financial assets to finance death expenses.

As noted earlier, each of the 200 funerals in the sample was treated as an event and used as a unit of observation. Consequently, all regressions are run on the 200 funeral observations. If a household experienced at least two funerals during the study period, both funerals are used in the regressions, together with contemporaneous covariates. The number of reported observations varies across regressions due to some observations being automatically dropped because of perfect predictions of success. While some household characteristics, for example household income,⁷ vary at the points in time when different funerals were conducted, other household characteristics are unchanged over the period. Adjustments are therefore made to correct for this using the robust standard error estimation strategy proposed by White (1980).

⁶ The main survey question asked in this respect was: What happens to the way the household eats and spends, between the time the person is buried and the next income? Household experiences that were captured included: (a) No change in eating patterns; (b) Eat less food (smaller portions); (c) Reduce the number of meals; (d) Change diet to cheaper or less-preferred food; (e) Use own savings to purchase food; (f) Borrow food/cash (details from where and who were specified in the questionnaire); (g) Sell assets to purchase food.

⁷ Household income was measured by summing all income sources of the members of the household; that is, salaries, informal work, rent from tenants, pension and trading. The survey collected this information over the five years of the period of study. Recall errors are likely to be more serious on informal work and trading income. To reduce the recall errors, the questions started with the current monthly income from these sources and went on to ask if the monthly income was somewhat consistent in that year and if it represents the yearly amount in the five years of the study period. Follow ups and checks were made on the years that had income above and below normal.

Table 3 Post-burial borrowing or selling assets by insurance types

Type of insurance	Borrow immediately after burial			Sell immediately after burial		
	No	Yes	Total	No	Yes	Total
None	25	75	100	50	50	100
Informal	78.79	21.21	100	92.42	7.58	100
Formal	75	25	100	87.50	12.5	100
Both	81.25	18.75	100	87.5	12.5	100

Source: Own survey

The mean of the variable 'household drawing down other savings' is zero for uninsured households. This indicates that uninsured households do not use any household savings to finance food after a funeral. It could be that these households do not have savings from which to draw down. This is also evident from the fact that uninsured households borrow and sell assets immediately after a funeral (see Table 3). It is unlikely that a household would borrow if it has other savings to draw from, unless it is fixed savings.

While formally and informally insured households also do not use any household savings to finance food after a funeral, the interpretation of this is different from the case of uninsured households. For households with both formal and informal funeral insurance, it could be that there is no need to draw down household savings, given that the funeral expenses may be covered by insurance. This is likely because these households have two types of funeral insurance. For those covered by informal insurance only or formal insurance only, households draw down on other savings. This could mean that formal and informal insurance complement each other in insuring funeral expenses.

About half of uninsured households sold assets to finance food consumption, suggesting that the effects of failing to insure funeral expenses extend beyond food consumption. This may not only leave households in debt, but having to engage in distress asset sales, which could have devastating future effects. In contrast, most insured households do not borrow and neither do they sell assets immediately after a funeral.

Table 4 provides descriptive statistics of asset ownership. Cell phones and television sets are the only assets with an average ownership that is greater than one (that is the average household owns more than one of these types of goods). While other assets, such as DVD players, laptops and hand tools, have a mean below one, some households do own more than one of these items.

Table 4 also shows that the household assets that are mainly sold to finance food consumption after a burial and before the next income are, in decreasing order: cell phones, DVD players, laptops and television sets. In addition to households being more likely to sell items of which they have duplicates, as discussed in greater detail later, it is also apparent that they were more likely to sell items that could be perceived as luxuries, and less likely to sell more essential household goods such as stoves or potential income-generating items such as a hand tools.

Table 4 Post-burial asset sales to finance food consumption

Assets	Mean number owned	Std dev.	Min.	Max.	Percentage of property sold				
					Uninsured households	Informally insured households	Formally insured households	Informally & formally insured households	All households
TV	1.05	0.20	0	3	31	6.3	0	0	13.4
Radio	0.48	0.51	0	1	7.3	0	0	0	2.3
DVD	0.71	0.45	0	2	16.8	6.3	50	0	23
Refrigerator	0.80	0.40	0	1	0	0	0	0	0
Stove	1	0	1	1	0	0	0	0	0
Washing machine	0.02	0.14	0	1	0	0	0	0	0
Microwave	0.11	0.31	0	1	0	0	0	0	0
Heater	0.10	0.30	0	1	0	0	0	0	0
Cell phone	1.51	0.88	0	4	28.9	37.5	50	33.4	34
Bicycle	0.13	0.36	0	2	11	6.2	0	0	4.5
Car	0.09	0.29	0	1	0	0	0	0	0
Pick-up truck	0.02	0.13	0	1	0	0	0	0	0
Laptop	0.22	0.24	0	2	0	6.2	0	33.3	16
Desk computer	0.03	0.16	0	1	0	37.5	0	33.3	4.5
Hand tools	0.24	0.66	0	3	5	0	0	0	2.3

Source: Own survey

3 Testing the effectiveness of funeral insurance

Next, we present econometric evidence concerning the effectiveness of both formal and informal insurance in protecting food consumption (Section 3.1) and household assets (Section 3.2) post-burial and before the next income injection into the household. For both parts of the analysis, we first present the methodology and then the econometric results.

3.1 Insuring food consumption against funeral expenses

How well are households able to insure their food consumption when faced with the considerable cost of a funeral? We begin by analysing the effects of different types of insurance on households' food consumption outcomes, relative to uninsured households. Thereafter, we analyse (separately for different categories of insured and uninsured households) the extent to which food consumption is protected against funeral expenses.

We test the effectiveness of funeral insurance to insure food consumption against unexpected funeral expenses using Eq. (1):

$$P(\Delta C_i = 1 | \mathbf{x}) = \beta \text{Ins}_i + \gamma (\text{Exp}_i) + \delta X_i + \alpha S_i + e_i. \quad (1)$$

The variable ΔC_i denotes changes in food consumption that take place after a funeral and before the next income is received. Possible changes include a reduction in the number of meals per day, eating smaller portions of food, and changing the diet to cheaper and/or less-preferred food. Any indication by households of experiencing these changes is coded one, and zero otherwise. Variable Exp_i represents funeral expenses, and Ins_i shows whether or not a household has funeral insurance.

Vectors of household demographic variables, X_i , and suburb-level effects, S_i (for the three suburbs in Bulawayo covered in this study), are also included for control purposes. The household demographic variables selected are: household size, age of the household head, ability of the household head to do a full workload, total household income, and number of migrants. These variables are considered important, given that they may affect whether a household changes its eating patterns after a funeral. We also include variables that capture whether a household borrowed, used savings and/or sold assets to finance food consumption.

Several issues concerning logit regression Eq. (1) need explanation. First, the base of the variable Ins_i is all those households that do not have funeral insurance, whether formal or informal. The coefficients resulting from this variable are therefore assessed in comparison to the base. The estimations of the effectiveness of funeral insurance in this sense are relative to uninsured households. Second, the equation is run without distinguishing between CRSI and burial societies, as both are informal funeral insurance and most households belong to both. If a household has either of these insurance mechanisms, it is regarded as informally insured. However, in regressing the equation we are able to distinguish between households that have formal versus informal insurance, and those with both. This comparison is undertaken in Table 6.

The estimates of Eq. (1) are presented in Table 5, which shows determinants of whether household food consumption is negatively affected after a funeral. Funeral expenses do give rise to a slump in household food consumption patterns

Table 5 Effect of funeral expenses on post-burial food consumption

Variables	(1) Reduce number of meals	(2) Eat smaller quantities	(3) Cheap diet	(4) Any change in consumption
Funeral insurance: informal	-0.879 (5.762)	-1.319* (0.706)	-1.764* (1.065)	-1.337* (0.760)
Funeral insurance: formal	-1.232 (5.958)	-1.457* (0.869)	-2.419* (1.360)	-1.642* (0.932)
Funeral insurance: formal and informal	-	-2.344** (1.030)	-	-3.512*** (1.092)
Used household saving after the funeral (=1)	3.121* (1.666)	-0.257 (0.804)	-	-0.407 (0.818)
Funeral expenses	0.002 (0.001)	0.0005 (0.0004)	0.001** (0.0001)	0.0007*** (0.0003)
Borrowed immediately after the funeral (=1)	-5.740** (2.650)	0.445 (0.429)	-0.077 (0.570)	0.625 (0.415)
Sold assets immediately after the funeral (=1)	-4.664** (2.341)	0.435 (0.496)	-0.966* (1.083)	0.454 (0.502)
Household size	-0.958 (0.735)	-0.086 (0.098)	-0.061 (0.118)	-0.183* (0.100)
Age of household head	0.175* (0.090)	-0.001 (0.017)	-0.024 (0.021)	0.011 (0.016)
Household total income	-0.006* (0.004)	-8.06e-05 (0.000656)	0.0003 (0.001)	-0.001 (0.001)
Number of migrants	-0.097 (0.275)	-0.100 (0.119)	-0.044 (0.176)	-0.032 (0.109)
Household head is able to do full workload (=1)	-	0.791 (0.746)	0.486 (0.887)	-1.816** (0.806)
Sokusile neighbourhood	-6.321 (6.945)	-0.275 (0.595)	1.797** (0.895)	-0.037 (0.588)
Sizinda neighbourhood	0.619 (1.694)	0.069 (0.581)	1.660* (0.876)	0.565 (0.552)
Pseudo R^2	0.21	0.26	0.34	0.29
Observations	85	117	95	134

Source: Own survey

Note 1: gaps in the table, denoted by dashes, are where the model cannot be fitted because the coefficient of the variables in question would be negative infinity (that is, predict success perfectly). For example, no households with formal and informal insurance experienced a reduction in the number of meals, that is, they are all coded zero

Note 2: All four regressions are run on the 200 funeral observations from the data. The observations indicated in the table are those that are retained after automatic dropping in cases where the variables predict success perfectly

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 6 Effect of funeral expenses on food consumption, by insurance types

Variables	(1) Reduce number of meals	(2) Eat smaller quantities	(3) Cheap diet	(4) Any change in food consumption
Formally and/or informally insured households				
Funeral expenses	−0.00007 (0.0004)	0.0002 (0.0003)	0.0002 (0.0004)	0.0002 (0.0003)
Control variables	Yes	Yes	Yes	Yes
Pseudo R^2	0.19	0.22	0.27	0.25
Observations	92	110	95	110
Informally insured households only				
Funeral expenses	0.00001 (0.0005)	0.001 (0.001)	0.004* (0.002)	0.002 (0.001)
Control variables	Yes	Yes	Yes	Yes
Pseudo R^2	0.17	0.22	0.26	0.23
Observations	78	81	74	96
Uninsured households				
Funeral expenses	0.002 (0.002)	0.008*** (0.003)	0.012*** (0.004)	0.010*** (0.004)
Control variables	Yes	Yes	Yes	Yes
Pseudo R^2	0.17	0.22	0.26	0.27
Observations	59	59	57	59

Source: Own survey

Note 1: control variables are listed in Tables 11–13 in Appendix 2

Note 2: the total number of funeral observations used to run the regression for formally and/or informally insured households, informally insured households, and uninsured households are 139, 102, and 61 respectively. However, some observations are automatically dropped where success is perfectly predicted, yielding the final number of observations for each regression as indicated above

Robust standard errors in parentheses

*** $p < 0.01$; * $p < 0.1$

immediately after a funeral and before the next income is received. Insured households are better able to mitigate a slump in food consumption compared to uninsured households, with statistically significant differences in avoiding a reduction in the quantity of food and shifting to a cheaper diet. The strongest effects are observed for households with both formal and informal funeral insurance, supporting the notion that these forms of insurance complement each other. The higher the cost of the funeral, the higher the chances are that the household will change to a cheaper diet.

If funeral expenses are significant in determining whether food consumption is smoothed or not, then it could be that funeral insurance fails to completely insure funeral expenses. Given that the data used here includes both households with and without insurance, it is likely that the lack of insurance in uninsured households explains why funeral expenses are significant (see columns 3 and 4 of Table 5) in determining slumps in food consumption. Analysing this using only insured households, as we do in Table 6, could shed more light on the coefficients of funeral expenses in households with funeral insurance.

Next, we estimate the relationships separately for households with and without insurance, and with different types of insurance, to assess if funeral expenses destabilise their food consumption. We use Eq. (2) to test this:

$$P(\Delta C_i = 1|x) = \beta(\text{Exp}_i) + \delta X_i + \alpha S_i + e_i. \quad (2)$$

In Eq. (2), if households with funeral insurance are completely insured against funeral expenses, the variable β should be equal to zero. That is, the funeral expenses would not affect food consumption immediately after the funeral and before the next income injection into the household. The results from estimating Eq. (2) are presented in Table 6. Here, only variables of interest are presented and those that are not of interest are only included in Tables 11–13 in Appendix 2.

For households that are formally and/or informally insured, the funeral expenses do not seem to affect food consumption after a funeral. For informally insured households, which are those belonging to CRSI and/or burial societies, funeral expenses are significantly (at 10%) associated with a change to a cheaper diet after a funeral. For instance, an increase in funeral expenses of US\$100 is associated with a 40 percentage points increase in the rate of changing to a cheaper diet. This is indicative of the fact that informal insurance may not be completely effective in protecting households against reduced food consumption. Nonetheless, informal insurance completely insures funeral expenses for any other slumps in food consumption, that is, a reduction in the number of meals and eating smaller quantities after a burial. This, however, is not the case with uninsured households, for which funeral expenses have a significant effect on all measures of food consumption, except for reduction in the number of meals taken (see columns 2 to 4 of Table 6 for uninsured households).

These findings point to two conclusions. First, there is some evidence that insured households smooth consumption better than uninsured households. Second, informal funeral insurance only partially prevents a reduction in food consumption after a burial. Households also use other forms of insurance, such as formal insurance, borrowing and drawing down from other household savings, to completely protect food consumption against funeral expenses.

Next, we address some potential challenges to the validity and robustness of these results associated with the possibilities of bad controls, selection bias, omitted variable bias, and measurement errors. An additional concern related to measurement errors is that measuring the expenses of conducting a funeral for households that do not keep financial diaries is a difficult exercise, and there may be measurement errors in the data on the cost of funerals.

3.1.1 Bad controls

It is possible that some of the independent variables in Table 5 might themselves be dependent variables too, thus rendering them bad controls (see Angrist and Pische 2008). For example, borrowing and selling assets after the funeral to finance consumption can be dependent variables too. This is not a significant concern, however, given the way in which our variables are measured. The timing of the funeral expenses and selling of assets is known with certainty from our survey. To finance funeral expenses, the households use coping strategies such as funeral insurance and

contributions from relatives, the church and their workplaces. None of the funeral expenses in the survey are financed from the sale of assets as measured here. To finance food consumption after the funeral and before the next income, some households borrow, dis-save or sell assets. The survey questions were specific on this by asking what the household does to cope post-burial. In addition, in robustness checks, borrowing or selling assets post-burial can be dropped from being used as controls without changes in the significance level and sign of the explanatory variable of interest (funeral expenses).

3.1.2 Selection bias

Another possible concern is that households with high income and strong financial management skills are most likely to select into funeral insurance. The process by which households come to be either informally or formally insured in the communities under study alleviates this concern. For the formally insured households, about half of them join the funeral insurance because they are formally employed and have a predictable income that affords them the opportunity to contribute, with the assistance of employers, every month. Almost half of households who have joined the formal funeral insurance are not formally employed, and most of these rely on remittances to pay their monthly subscriptions. The education levels of households who have joined formal insurance, which may be a proxy of their financial management skills, are similar.

Most households subscribe to informal insurance. Regarding this group, we check if household membership is dependent on, for instance, household income or gender of the household head, which could render such groups elitist or exclusionary. This is done by estimating the following equation:

$$\Pr(G_i = 1) = \beta X_i + \varepsilon, \quad (3)$$

where G represents household membership in the informal insurance scheme, and is equal to one if a household is a member and zero otherwise. The variable X_i represents household characteristics, and ε is the error term.

The results of regressing Eq. (3) are presented in Table 14 in Appendix 2. The regression results indicate that membership of informal insurance schemes is determined neither by gender nor income, nor by number of migrants from a household, but is influenced by the age of the household head. Older persons typically subscribe to informal insurance and their insurance covers younger members of the household (which perhaps renders the young people's need to subscribe to informal insurance redundant). As a result, we can safely posit that the type of insurance selected is therefore exogenous.

3.1.3 Possible omitted 'loss of appetite' variable bias

One assumption of Eqs. (1) and (2) is that none of the independent variables are correlated with the error term. However, it is possible that the reduction in the number of meals eaten per day, or eating smaller quantities, may be due to a loss of appetite in family members who are grieving. Two pieces of evidence, however, suggest that this is not a concern for our results. First, at least 40% of households

borrow or sell assets to meet their own food needs after a burial, and furthermore both borrowing and sale of assets have mitigating effects on the reduction in the number of household meals. Households would not borrow or sell assets to finance food when they are not hungry or have lost their appetites. Second, for an omitted variable to confound with one of the independent variables, in this case funeral expenses, there must be a correlation of the possible omitted variable, 'loss of appetite', with both changes in food consumption and funeral expenses. Concerns in this regard are assuaged by differences in the timing in the way these variables are measured. Funeral expenses are incurred in the period between bereavement and burial. When lower food consumption is measured in the period between the burial and the next income injection, this would not be correlated with funeral expenses incurred in the previous period. Thus, it is unlikely that funeral expenses may be confounded with the effect of the omitted 'loss of appetite' variable. Furthermore, the omitted variable is not correlated with whether or not a household is insured.

3.1.4 Measurement errors

To address the problem of measurement errors, we use an alternative variable that is correlated with the funeral expenses but uncorrelated with the error term in Eq. (1). It is not easy to identify a suitable such instrument, for two reasons. Firstly, to find a variable that is correlated with funeral expenses is not easy. Secondly, the second condition, which requires non-correlation with the error term, cannot be rigorously tested empirically. Consequently, the selection of an alternative variable is based on intuition and/or economic reasons ahead of carrying out econometric tests to check its suitability.

Given the foregoing difficulties, the approach taken was to search for variables in the data that can be correlated with funeral expenses and yet make intuitive and economic sense to act as reasonable alternatives to funeral expenses. Two variables were identified. First, we collected information in the survey on how the deceased was related to the head of household. The idea behind using this variable is that, if the deceased was close to the household head, such as a child or parent, then this is likely to be reflected in high funeral costs.

Second, the age of the deceased at the time of death could also be positively correlated with high funeral expenses and also with having funeral insurance (see Case and Menendez 2011). While we expect attendance at a funeral of an adult person to be high, leading to high funeral costs compared to funerals for children,⁸ we do not expect the funerals of the elderly to be the only ones protected by insurance; that is, we do not expect age to be positively correlated with having insurance. This is based on the specific characteristics of the insurance system in the Zimbabwean setting. Membership of an insurance scheme is by family, not by individual. Hence, when the household head joins a funeral policy or a burial society,

⁸ Survey data provides evidence that the death of an adult results in higher funeral costs compared to the death of a child. However, with deaths at a very old age, the effect of the age of the deceased on funeral expenses may be lessened (as shown by the negative but insignificant coefficient of the 'age of the deceased squared' variable); see Table 14 in Appendix 2.

this is on behalf of the family as a whole, with the cover extending automatically to all members. This mitigates the likelihood of households taking out insurance cover in anticipation of a death (associated with age or illness of a member), since it is family-based rather than individually-based. Indeed, the data shows that there is no relationship between the age of the deceased and the status of having or not having formal and/or informal insurance, as shown in Fig. 2. The age of the deceased at the time of death is therefore also identified as a possible instrument.

The first-stage regression results of searching for a suitable instrument (see Table 15 in Appendix 2) show that age at the time of death is a highly significant variable that determines the cost of funeral expenses. For example, the death of a 50-year-old would be associated with funeral expenses at least US\$500 higher than for the funeral for a one-year-old. It is therefore viable to use the age of the deceased at the time of death as a proxy for funeral expenses. An additional reason for using the age of the deceased is that data on the age is more accurate than data on funeral expenses. This, however, cannot be said about the relationship of the deceased with the household head. While intuition would suggest that core family members would attract high funeral expenses, this appears not to be so, as extended family members seem to attract more funeral costs, and this is significant at 1%. Thus, we drop this alternative variable and retain the former.

Using data for both insured and uninsured households, the second-stage regression results (see Table 16 in Appendix 2) based on using age as the instrument are similar to the results based on Eq. (1), which is reassuring. Households with insurance do significantly better than those without.⁹ Using data for insured households only, the second-stage regressions results (see Table 17 in Appendix 2) based on using age as the instrument show that funeral expenses for informally insured households are no longer significant in determining migration to a cheaper diet and any of the other slumps in food consumption. However, there are still signs that households do borrow and use other savings immediately after the funeral and before the next income injection. This seemingly confirms that insured households complement their funeral insurance cover from other sources to smooth food consumption.

3.2 Insuring household non-financial assets against funeral expenses

In Table 3, it can be seen that some households sell assets to finance food consumption immediately after a burial. We now turn to assess this in detail to check if insured households mitigate the sale of assets to finance food consumption post-burial and before the next income injection.

Equations (4) and (5) are similar to Eqs. (1) and (2). The only difference now is that ΔP_i , which is the change in household assets that directly follows a funeral, is considered instead of the change in food consumption. ΔP_i takes the value of one when there is a slump, and zero otherwise.

⁹ It should be noted, however, that this informal insurance is not free; households pay for it through monthly subscriptions, which must be weighed against the benefits.

Fig. 2 Relationship between age of the deceased and insurance cover. Note: 0 is the code for a death that did not have an insurance cover and 1 is the code for a death that was covered by insurance

In Eq. (4), the effectiveness of funeral insurance to smooth assets after a burial is assessed relative to uninsured households. In Eq. (5), the assessment is limited to households with insurance, and we assess if funeral expenses determine the distress sale of assets by insured households.

$$P(\Delta P_i = 1|\mathbf{x}) = \beta \text{Ins}_i + \gamma(\text{Exp}_i) + \delta X_i + \alpha S_i + e_i. \quad (4)$$

$$P(\Delta P_i = 1|\mathbf{x}) = \beta(\text{Exp}_i) + \delta X_i + \alpha S_i + e_i. \quad (5)$$

The results of regressing Eq. (4) are presented in Table 7. As with the case in regressing Eq. (1), the base of the variable of interest, Ins_i , is all uninsured households. The results of the coefficients of insured households, whether formal, informal or both, are therefore assessed in comparison to uninsured households.

The results indicate that households with funeral insurance, whether formal, informal or both, reduce the odds of selling household assets to finance food consumption immediately after a funeral almost eightfold compared to uninsured households. The coefficient of funeral expenses is positive, signalling that an increase in these expenses is associated with asset depletion. For instance, an increase of US \$1 315.91 in funeral costs is associated with a one percentage point increase in the rate of asset sales. While highly statistically significant, this is economically very small in magnitude. The small economic effect is consistent with the fact that households prefer not to sell their assets, but do so only as a last resort.

Next, we limit the analysis to insured households to assess if insured households are able to insure household assets against funeral expenses. We also include the results of assessing uninsured households' ability to smooth assets to allow for further comparison.

Using Eq. (5), if funeral insurance is effective in insuring household assets against funeral expenses after a funeral and before the next income injection, then the coefficient of funeral expenses should be zero (see Table 8). For insured households (columns 1 and 2 of Table 8), we cannot reject the hypothesis that the coefficient of funeral expenses is zero, regardless of whether the insurance is informal, or is formal and/or informal, suggesting that funeral insurance is effective in avoiding the distress sale of household assets. In contrast, for uninsured households, the coefficient of funeral expenses is statistically significant, with an increase of US\$100 in funeral expenses being associated with a 1.33 percentage point increase in the rate of selling household assets to finance food consumption after a burial.

These results suggest that informal (and formal) funeral insurance effectively mitigates asset depletion for households that have gone through bereavement, while uninsured households sell their assets. However, as will be seen in the next part of

Table 7 Effect of funeral expenses on asset depletion

Variables	Sold assets immediately after funeral
Funeral insurance: informal	-7.579*** (0.487)
Funeral insurance: formal	-7.856*** (0.779)
Funeral insurance: formal and informal	-7.724*** (0.677)
Used household savings (=1)	0.641 (0.877)
Funeral expenses	0.0007*** (0.0002)
Borrowed immediately after the funeral (=1)	-0.217 (0.358)
Household size	-0.102 (0.092)
Age of household head	0.175 (0.017)
Household total income	-0.0006 (0.0006)
Number of migrants	0.222 (0.101)
Household head is able to do full workload (=1)	-5.557*** (0.876)
Sokusile neighbourhood	-4.822* (0.793)
Sizinda neighbourhood	-0.455 (0.531)
Pseudo R^2	0.44
Observations	136

Source: Own survey

Note: The funeral observations are 200. Observations in cases where success is perfectly predicted and cases without sufficient data were automatically dropped, yielding the actual observations reported in the table.

Robust standard errors in parentheses

*** $p < 0.01$; * $p < 0.1$

the analysis, the effects of insurance on asset sales differ depending on whether households own multiple of the same type of asset.

3.3 Multiple asset ownership

A household is considered to have multiple asset ownership if it has at least two items of the same type of asset (see Table 4). A household with two laptops may find it easier to sell one to finance food consumption compared to a household with only one. A household without a minimum of two items of the same asset, may rather go through disruption in food consumption than destabilise the only assets they have. If this is the case, adding the variable ‘owns at least two of the same asset’ and interacting it with funeral expenses would assist to test the ‘multiple asset ownership’ effect in triggering household asset sales immediately after a burial. This is captured in Equation (9):

$$\text{Logit}(P_i) = \gamma \text{Exp}_i + \mu \text{MULT}_i + \pi (\text{Exp}_i * \text{MULT}_i) + \delta X_i + \alpha S_i + e_i, \quad (6)$$

where MULT_i takes the value of one when a household has more than one of the same type of asset, and zero otherwise. $\text{Exp}_i * \text{MULT}_i$ is a term used to interact funeral expenses with the variable ‘owns at least two of the same asset’.

Table 8 Effect of funeral expenses on asset depletion, by insurance types

	Formally and/or informally insured households only	Informally insured households only	Uninsured households only
	(1)	(2)	(3)
Variables	Sold assets immediately after	Sold assets immediately after	Sold assets immediately after
Funeral expenses	0.0003 (0.0004)	0.002 (0.535)	0.013* (0.008)
Borrowed immediately after the funeral (=1)	−0.583 (0.393)	−0.042 (0.011)	−0.154 (0.839)
Household drawing down other savings (=1)	0.341 (0.844)	1.468 (1.209)	−0.626 (0.998)
Household size	−0.066 (0.165)	−0.018 (0.220)	0.039 (0.133)
Age of household head	0.008 (0.033)	0.010 (0.036)	−0.014 (0.023)
Household total income	−0.0001 (0.001)	−0.003** (0.0003)	−0.002* (0.002)
Number of migrants	0.437* (0.212)	0.336* (0.303)	0.177 (0.167)
Household head is able to do full workload (=1)	−	−	−1.664*** (0.747)
Sokusile neighbourhood	−1.441* (1.431)	0.914 (1.867)	−0.295 (0.876)
Sizinda neighbourhood	0.315 (1.319)	0.152 (1.458)	−0.242 (0.816)
Pseudo R^2	0.18	0.17	0.19
Observations	95	78	59

Source: Own survey

Note: the observations for formally and/or informally insured households and informally insured households only are 139 and 102 respectively. Observations in cases where success is perfectly predicted and cases without sufficient data were automatically dropped, yielding the actual observations reported in the table. Two observations from the uninsured households were dropped for lack of sufficient data

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 9 shows the results of regressing Eq. (6) to test the confounding effect of ownership of multiple household assets. Notably, household ownership of multiple items of the same asset is associated with higher odds of selling assets to finance food consumption after a funeral (1.65 times in comparison with households without multiple of the same asset). This result provides evidence that households with multiple of the same asset prefer smoothing food consumption by selling assets, relative to households without multiple of the same asset.

Funeral insurance may thus mitigate the sale of assets after a funeral. It therefore is salient to separate households with at least two items of the same asset from those with only one of each type of asset in order to understand the contribution of funeral insurance in the context of household asset ownership. These results are presented in Table 10. In column 1, the regression is limited to households that do not own multiple of the same asset. For these households, having insurance makes no

Table 9 Effects of funeral expenses and ownership of multiple assets on asset depletion

Variables	(1) Sold assets immediately after funeral
Funeral insurance: informal	-7.292*** (0.857)
Funeral insurance: formal	-7.331*** (0.947)
Funeral insurance: formal and informal	-7.324*** (0.929)
Used household savings (=1)	0.814 (0.901)
Funeral expenses	0.0007** (0.0003)
Owens at least two of the same asset (=1)	1.647** (0.925)
Funeral expenses × Owens at least two of the same asset (=1)	0.090* (0.0004)
Borrowed immediately after the funeral (=1)	0.667 (0.423)
Control variables	Yes
Pseudo R^2	0.32
Observations	98

Source: Own survey

Note: The funeral observations are 200. Observations in cases where success is perfectly predicted and cases without sufficient data were automatically dropped, yielding the actual observations reported in the table

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

significant difference in mitigating the sale of assets after a burial to smooth consumption; this is accounted for by the fact that households without multiple assets generally do not need to sell assets to meet funeral expenses.

Column 2 presents the regression results for households with multiple of the same asset. Here, having insurance mitigates the selling of household assets, and this difference is highly statistically significant. For instance, having informal funeral insurance reduces the odds of selling assets after a burial 6.22 times compared to the case for uninsured households. This shows the effectiveness of insurance—not only in protecting food consumption, but also in protecting household assets from sale under the duress of meeting funeral expenses.

Furthermore, as can be seen in column 2, funeral expenses are associated with asset sales for households with multiple items of the same asset. An increase of US\$1 000 in funeral expenses is associated with a 0.6 percentage points increase in the rate of selling household assets; while this is small in magnitude, it is statistically significant.

In columns 3 and 4 of Table 10, we assess the effectiveness of funeral insurance in smoothing food consumption for households with and without multiple of the same asset. We find that having funeral insurance mitigates a slump in food consumption after a funeral – for both households with and without multiple of the same asset. However, the effect is stronger for households without multiple of the same asset. For example, households with both formal and informal insurance halve the odds of

Table 10 Effect of funeral expenses on asset depletion, by ownership of multiple assets

Variables	Sold assets immediately after funeral		Slump in any food consumption	
	(1)	(2)	(3)	(4)
	No multiple ownership of same asset	Multiple ownership of same asset	No multiple ownership of same asset	Multiple ownership of same asset
Funeral insurance: informal	-2.012 (0.361)	-6.218*** (0.672)	-1.071* (0.742)	-1.001* (0.627)
Funeral insurance: formal	-2.679 (0.726)	-4.786*** (0.773)	-1.117* (0.740)	-1.002* (0.711)
Funeral insurance: formal and informal	-1.890 (0.671)	-5.628*** (0.770)	-2.102** (0.774)	-1.617* (0.783)
Used household savings (=1)	1.658 (1.062)	0.375 (0.875)	0.510 (0.917)	0.292 (0.653)
Funeral expenses	0.0003 (0.0004)	0.001* (0.0002)	0.0006** (0.0006)	0.0004 (0.0003)
Borrowed immediately after the funeral (=1)	-0.217 (0.358)	-0.580 (0.384)	-0.489 (0.457)	-0.319 (0.301)
Controls	Yes	Yes	Yes	Yes
Pseudo R^2	0.11	0.19	0.21	0.17
Observations	96	43	96	43

Source: Own survey

Note: The funeral observations are 200. Observations in cases where success is perfectly predicted and cases without sufficient data were automatically dropped, yielding the actual observations reported in the table

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

experiencing a slump in food consumption, with a small but still significant effect for households with multiple of the same asset.

Funeral insurance for households without multiple of the same asset improves the household's ability to smooth consumption. For households with multiple of the same asset, funeral insurance does not only smooth consumption, it also effectively mitigates the sale of assets to finance food consumption.

4 Conclusions

The results show that insured households are able to smooth food consumption better than uninsured households in the face of a financial shock associated with a funeral. Informal funeral insurance makes a significant difference in avoiding the adverse effects of funeral shocks on household food consumption, but is more effective when combined with formal insurance. This contributes to the literature on informal household insurance, and also provides evidence for the enhanced effectiveness of informal insurance when combined with formal insurance. Furthermore, insurance is found to be effective in protecting household assets against being sold to finance food consumption post-burial when households experience a funeral shock. Again, informal insurance is found to be effective, but the combination of formal and informal insurance is more effective. This contributes to the literature by providing new evidence on the possible effects of insurance on mitigating asset depletion, which could have sustained negative effects on household welfare. We also introduce a novel analysis of how ownership of multiple items of the same asset influences coping strategies and willingness to sell assets. If households are either uninsured or insurance is inadequate, and if they own multiple items of the same asset, they opt to sell one of these items to protect food consumption post-burial. However, households without multiple of the same asset prefer to retain their assets, even should it mean reducing food consumption.

The above suggests that households have a hierarchy of preferred coping strategies in the face of an idiosyncratic shock. For the case analysed here—households in Bulawayo affected by a funeral shock—insurance significantly mitigates the effects of the shock, but if insurance is inadequate or households are uninsured, clear preferences emerge around households' coping strategies. If households own multiple of the same type of asset, they are likely to dispose of one of these items rather than suffer adverse changes in food consumption. If households do not own multiple of the same asset, they will reduce food consumption. The selling of non-multiple assets, in the case that households do not own multiple of the same type of asset, is a last resort; households prefer to suffer lower food consumption while retaining assets of which they own only one item.

This study has also contributed to the literature on informal funeral arrangements, which is generally limited to rural areas. A common perception is that social networks such as funeral societies are weak in urban areas. However, evidence in this paper shows that this may not be the case, as there are several funeral societies in the city of Bulawayo that provide informal funeral insurance cover for a number

of households with or without access to formal insurance, and this appears to be an effective insurance mechanism.

These results are now used to draw conclusions in the context of the three views in the social protection landscape that were presented in the introduction. First is the view that informal insurance will disappear rapidly under processes of commercialisation (see Sen 1980; Moser 1998). This study demonstrates that informal insurance co-exists and complements formal insurance in modernised Bulawayo in Zimbabwe. The second view suggests that informal mechanisms are well-functioning initiatives, so that any public transfers will have little net impact because they will simply be crowded out. Given that this article shows that informal insurance co-exists with formal insurance, it therefore is possible that informal insurance can also co-exist with public transfers. The third view is that group- and community-level informal insurance schemes are part of social protection systems that are outside the scope of state social protection. The study indicates that individual insurance, group and community insurance play a significant role in smoothing consumption in the face of a death shock.

As such, this article supports the view that informal funeral insurance schemes are part of social protection provided by non-state actors. Furthermore, borrowing and savings used as shock-mitigating strategies arguably constitute non-state social protection, given that these, together with insurance, are usually not differentiated by households (Alderman and Paxson 1992). There thus are gains that may be realised from social policy that supports and provides a conducive environment for informal insurance.

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Compliance with ethical standards

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5 Appendix 1: Survey data collection process

The survey data was collected through collaboration with the Institute of Development Studies at the National University of Science and Technology in Zimbabwe, which supplied three research assistants and a research supervisor for the fieldwork, all of whom were trained for this role before the fieldwork commenced. All identified research protocols were observed, and clearance to conduct the survey was provided by the Bulawayo City Council and the Zimbabwe Republic Police.

The household questionnaire was designed by the authors and collected information on, *inter alia*, the household profile, death in the household, household consumption and expenditure, migration and remittances, household income, household assets and household networks. The draft questionnaire was initially pre-tested, and its improved version was then piloted in December 2013.

The contemporary records of the City of Bulawayo (BCC) show that the city has a total of 29 wards with 107 suburbs. In the absence of poverty or deprivation data in the national and city council documents, the authors, with the assistance of BCC officials, used the categorisation of households into poor and non-poor based on the density of the suburb as the starting point to identify the target population. In particular, housing structures and characteristics were used as a proxy for deprivation. In this way, 21 suburbs that are predominantly low-income and high-density were identified out of the 107. These 21 suburbs have a total target population of 32 450 households, according to the BCC records.

A two-stage cross-sectional sample design was used. In the first stage, three out of 21 suburbs were randomly selected, namely Matshobana, Sizinda and Soku-sile. Based on the sample size formula provided by Sudman (1976), the target sample size was calculated to be 300 households, allowing for an expected non-response rate of 10% (yielding an effective target sample size of 270). This sample size of 300 was then equally distributed among the three suburbs. In the second stage, the number of municipal stands (a piece of land with an official boundary within which dwellings are built) in each area was divided by the sample size of 100 per township, to derive the intervals on which the systematic household selection was based.

In Soku-sile township (suburbs and townships are used interchangeably here), for example, there are slightly over 1700 municipal stands, with clearly designated house numbers on each stand. Given that we needed 100 households from this township, one in every 17 houses was systematically selected, starting with the first house number in the township. This procedure was also followed for the other two selected townships, namely Matshobana and Sizinda, with the relevant intervals in each case. In the event that the house visited had nobody available, a second visit was made. If the house still was empty on the second visit, this was recorded in the questionnaire and a substitute house was then selected, based on a schedule of house substitutes that was prepared in advance. The respondents answering the questions were adult household members who were well informed on decision-making in relation to issues such as household networks, spending and income.

The sample could not be weighted due to the absence of matching census data for the relevant population. Consequently, a total of 300 households were selected systematically, giving a sampling fraction of 1:108 across the three townships. The final dataset for the purposes of this analysis contains 298 households. The survey solicited information for the preceding five-year period (2009 to 2013 inclusive).

There is a possibility of recall errors in the data pertaining to previous years. However, the data collected was on issues that may take time to fade from a person's mind. For instance, the data used for this paper expected the respondents to recall years in which they needed assistance and whether they were able to receive it from relatives or friends/neighbours. For issues that were difficult to recall, such as income, the questionnaire asked respondents to first provide information concerning income for the previous month, then for the whole year, and finally they were asked if the figure represented the yearly amount in the past five years. If the derived yearly figures were not representative of the past five years, probing was done on the years that were different.

Further details on the fieldwork methodology, the questionnaire and manual are available from the authors on request.

6 Appendix 2: Additional tables

Tables 11–17

Table 11 Effect of funeral expenses on food consumption, by insurance types

Control variables	(1) Reduce number of meals	(2) Eat smaller quantities	(3) Cheap diet	(4) Any change in consumption
Borrowed immediately after the funeral (=1)	1.581** (0.746)	0.206 (0.444)	0.200 (0.527)	0.473 (0.387)
Sold assets immediately after the funeral (=1)	0.354 (1.297)	0.094 (0.768)	–	0.276 (0.753)
Household drawing down other savings (=1)	1.400* (0.742)	0.905* (0.520)	–	0.543 (0.510)
Household size	–0.091 (0.221)	–0.127 (0.184)	0.183 (0.217)	–0.02 (0.018)
Age of household head	0.048 (0.042)	–0.005 (0.031)	–0.046 (0.058)	–0.017 (0.026)
Household total income	–0.001* (0.0003)	–0.0004 (0.001)	–0.003* (0.004)	–0.005* (0.004)
Number of migrants	–0.062 (0.333)	–0.233 (0.224)	–0.222 (0.242)	–0.115 (0.230)
Household head is able to do full workload (=1)	–	–1.362* (1.424)	–1.554* (1.300)	–1.872** (0.963)
Sokusile neighbourhood	–2.938 (1.589)	–0.671 (0.824)	4.615* (1.893)	–0.255 (0.493)
Sizinda neighbourhood	0.201 (0.592)	1.072 (0.581)	1.189* (1.667)	0.845 (0.969)

Source: Own survey

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 12 Effect of funeral expenses on food consumption: informally insured households

Control variables	(1) Reduce number of meals	(2) Eat smaller quantities	(3) Cheap diet	(4) Any change in consumption
Borrowed immediately after the funeral (=1)	0.710 (0.529)	1.169** (4.872)	0.194 (0.884)	-0.056 (0.808)
Sold assets immediately after the funeral (=1)	0.953 (0.747)	0.125 (5.984)	0.306 (1.276)	-
Household size	-1.013* (0.730)	-0.343* (0.198)	-0.132 (0.183)	-0.417* (0.183)
Age of household head	0.150* (0.042)	0.013 (0.029)	-0.109 (0.049)	-0.021 (0.028)
Household total income	-0.002* (0.001)	-0.0002 (0.001)	-0.001* (0.003)	-0.002* (0.001)
Number of migrants	-0.069 (0.169)	-0.115 (0.211)	-0.233 (0.391)	-0.039 (0.190)
Household head is able to do full workload (=1)	-	-0.818 (1.140)	-1.779** (1.035)	-1.684** (1.638)
Sokusile neighbourhood	-0.002 (0.780)	0.630 (1.245)	2.749* (1.633)	-0.054 (0.712)
Sizinda neighbourhood	0.293 (0.793)	1.613 (1.045)	1.058* (1.013)	1.420 (0.987)

Source: Own survey

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 13 Effect of funeral expenses on food consumption: uninsured households

Control variables	(1) Reduce number of meals	(2) Eat smaller quantities	(3) Cheap diet	(4) Any change in consumption
Borrowed immediately after the funeral (=1)	-0.330 (0.862)	-1.649* (1.071)	1.120 (1.376)	-0.245 (1.196)
Sold assets immediately after the funeral (=1)	1.047 (0.695)	1.066 (0.783)	-2.252* (1.296)	-0.163 (0.818)
Household drawing down other savings (=1)	-0.559 (0.937)	-0.329 (1.013)	-0.731 (1.587)	-1.526 (1.428)
Household size	-0.053 (0.137)	-0.197 (0.156)	0.183 (0.217)	0.004 (0.176)
Age of household head	0.016 (0.023)	-0.004 (0.026)	-0.146** (0.058)	-0.017 (0.026)
Household total income	-0.005** (0.001)	-0.0005 (0.0009)	0.003 (0.004)	-0.004* (0.004)
Number of migrants	-0.180 (0.190)	-0.831** (0.198)	0.222 (0.242)	0.115 (0.229)
Household head is able to do full workload (=1)	0.095 (0.734)	-1.165 (0.829)	-1.554* (1.300)	-0.872 (0.963)
Sokusile neighbourhood	0.530* (0.893)	-0.445 (1.041)	4.616** (1.893)	2.553* (1.493)
Sizinda neighbourhood	0.351** (0.822)	0.506 (0.840)	1.668 (1.189)	1.845* (0.969)

Source: Own survey

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 14 Determinants of households belonging to informal insurance schemes

Variables	(1) Belong to an informal insurance scheme (yes = 1)
Household size	0.081 (0.076)
Age of household head	0.046** (0.023)
Age of household head squared	0.0007** (0.0003)
Household head is male (=1)	0.084 (0.293)
Household total income	0.002 (0.0008)
Household total income squared	−0.000003 (0.000005)
Number of migrants from a household	0.148 (0.121)
Neighbourhood: Sokusile	0.181 (0.375)
Neighbourhood: Sizinda	−0.347 (0.375)
Wald Chi-square (9)	49.53
Observations	278

** $p < 0.05$ **Table 15** Alternative measures of funeral expenses

Variables	(1) Funeral expenses	(2) Funeral expenses
Alternate variable 1: age of the deceased	14.11** (5.502)	
Age of the deceased squared	−0.033 (0.076)	
Alternate variable 2: extended family		428.4*** (155.8)
Other relatives		163.4 (221.8)
Total household income	0.308 (0.328)	0.147 (0.208)
Household size	46.70* (27.46)	49.23* (28.06)
Number of migrants	0.228 (36.66)	−2.891 (40.07)
Informal funeral insurance	274.3 (250.1)	247.6 (266.2)
Formal funeral insurance	534.6*** (123.7)	1.178*** (334.7)
Formal and informal funeral insurance	944.8*** (203.2)	1.641*** (304.4)
Age of household head	−10.82 (27.16)	3.478 (4.821)
Constant	−256.2 (574.6)	−113.5 (372.0)
Observations	167	167
R-squared	0.535	0.536

Source: Own survey

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 16 Effect of age of the deceased on food consumption

Variables	(1) Reduce number of meals	(2) Eat smaller quantities	(3) Cheap diet	(4) All changes in consumption
Funeral insurance: informal	-727.1 (10.662)	-1.517** (0.668)	-0.863 (0.793)	-1.971*** (0.731)
Funeral insurance: formal	-654.8 (0)	-1.388 (0.859)	-1.636 (1.220)	-2.185** (0.925)
Funeral insurance: formal and informal	-	-2.839*** (1.007)	-	-3.609*** (1.008)
Used household savings (=1)	-0.656 (359.4)	0.012 (0.009)	0.0208 (0.0128)	0.015* (0.009)
Age of the deceased at time of death	620.6 (11.665)	0.444 (0.451)	0.420 (0.532)	0.664 (0.423)
Borrowed immediately after the funeral (=1)	547.2 (16.554)	-0.379 (0.805)	-	-0.310 (0.793)
Sold assets immediately after the funeral (=1)	404.5 (12.871)	1.111** (0.556)	-	0.725 (0.552)
Household size	-5.761 (3150)	-0.076 (0.103)	-0.0623 (0.119)	-0.159 (0.098)
Age of household head	16.10 (158.1)	-0.007 (0.017)	-0.024 (0.021)	0.007 (0.015)
Household total income	-0.427 (11.53)	5.37e-05 (0.0006)	0.001 (0.001)	-0.0007 (0.0007)
Number of migrants	-20.32 (2.364)	-0.167 (0.131)	-0.043 (0.159)	-0.049 (0.112)
Household head is able to do full workload (= 1)	-	0.666 (0.783)	0.292 (0.863)	1.834** (0.862)
Sokusile neighbourhood	-334.3 (0)	-0.469 (0.548)	0.878 (0.658)	-0.396 (0.525)
Sizinda neighbourhood	66.19 (0)	-0.231 (0.557)	0.611 (0.606)	0.199 (0.487)
Constant	-375.3 (0)	0.222 (1.479)	-0.708 (1.746)	-0.293 (1.380)
Pseudo R^2	0.21	0.25	0.29	0.32
Observations	85	117	95	134

Source: Own survey

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 17 Effect of age of the deceased on food consumption, by insurance types

Variables	(1) Reduce number of meals	(2) Eat smaller quantities	(3) Cheap diet	(4) All slumps in consumption
Formally and/or informally insured households				
Funeral expenses	−0.004 (0.018)	0.007 (0.008)	0.006 (0.010)	0.005 (0.007)
Control variables	Yes	Yes	Yes	Yes
Pseudo R^2	0.16	0.18	0.23	0.21
Observations	87	102	92	106
Informally insured only				
Funeral expenses	−0.153 (859.6)	0.016 (0.015)	0.013 (0.018)	0.015 (0.012)
Control variables	Yes	Yes	Yes	Yes
Pseudo R^2	0.21	0.20	0.27	0.22
Observations	72	81	69	96
Uninsured households				
Funeral expenses	0.0009 (0.004)	0.007** (0.004)	0.021*** (0.008)	0.016*** (0.005)
Control variables	Yes	Yes	Yes	Yes
Pseudo R^2	0.24	0.19	0.28	0.31
Observations	59	59	57	59

Source: Own survey

Robust standard errors in parentheses

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

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