

Paying the Piper: The High Cost of Funerals in South Africa¹

Anne Case
Princeton University

Anu Garrib
Africa Centre for Health and Population Studies
University of KwaZulu-Natal

Alicia Menendez
University of Chicago

Analia Olgiati
Harvard University

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Corresponding Author: Anne Case, 367 Wallace Hall, Princeton University, Princeton NJ 08544
USA; Phone: +1 (609) 258-2177; Email: accase@princeton.edu

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Abstract

We analyze funeral arrangements following the deaths of 3,751 people who died between January 2003 and December 2005 in the Africa Centre Demographic Surveillance Area. We find that, on average, households spend the equivalent of a year's income for an adult's funeral, measured at median per capita African (Black) income. Approximately one-quarter of all individuals had some form of insurance, which helped surviving household members defray some fraction of funeral expenses. However, an equal fraction of households borrowed money to pay for the funeral. We develop a model, consistent with ethnographic work in this area, in which households respond to social pressure to bury their dead in a style consistent with the observed social status of the household and that of the deceased. Households that cannot afford a funeral commensurate with social expectations must borrow money to pay for the funeral. The model leads to empirical tests, and we find results consistent with our model of household decision-making.

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I. Introduction

In many societies, funerals have evolved into an important institution that plays multiple roles. Funerals allow families and communities to honor the dead and console the grieving. In addition, they mark the social status of the deceased and his household; they knit social fabric for extended families and communities; and they redistribute some of the deceased's resources.

In Southern Africa, social norms surrounding funerals were set at a time when people died largely in early childhood (when, as now, a simple funeral was held) or in old age (when burial-society or funeral-policy contributions could help reduce the financial strain on the household). The AIDS crisis has changed the mortality pattern observed in Southern Africa, with a dramatic increase in the mortality rate of prime-aged adults. In one site in South Africa that has been under demographic surveillance since the early 1990s, life expectancy among females has fallen by 12 years, and among males by 14 years (Kahn et al. 2007). This increase in mortality in middle age can lead to economic hardship for households that experience a death, if those who die do not have burial policies and if norms of what constitutes an appropriate funeral do not change to reflect the change in mortality patterns.

Institutions, such as funerals, that develop over a long period of time may take time to adjust to a change as profound as the shift in the age-mortality profile that occurred in Southern Africa over the past fifteen years. As a result, households that bury members who die in middle age may find themselves less able to maintain a stock of productive assets, to stake migrants in urban areas until they find work, to finance schooling, and more broadly to provide adequate nutrition and a healthy environment within which to raise children.

This paper documents funeral costs and financing for deaths that occurred between 2003 and 2005 in a demographic surveillance site in northern KwaZulu-Natal, South Africa. Specifically, we analyze funeral arrangements following the deaths of 3,751 people who died between January 2003 and December 2005 in the Africa Centre Demographic Surveillance Area. We find that, on average, households spend the equivalent of a year's income for an adult's funeral, measured at median per capita African (Black) income. Approximately one-quarter of all individuals (generally the elderly) had some form of insurance, which helped surviving household members defray some fraction of funeral expenses. However, an equal fraction of households borrowed money to pay for the funeral.

We also examine how households determine appropriate spending for funerals. To do so, we set out a model, consistent with ethnographic work in this area, in which households respond to social pressure to bury their dead in a style consistent with the observed social status of the household and that of the deceased. Households that cannot afford a funeral commensurate with social expectations must borrow money to pay for the funeral. The model leads to empirical tests, and we find results consistent with our model of household decision-making.

Our work is related to that on conspicuous consumption surrounding weddings in many developing countries. Bloch, Rao and Desai (2004) argue for example that, in holding lavish weddings, poor Indian families increase their status in the community by signaling the status of the groom. In their data, there are significantly larger wedding celebrations when the groom has been drawn from outside the community (that is, when his status is not necessarily known to those in the bride's village). Bloch et al. argue that "families clearly gain direct Utility from simply moving up the social ladder" – a movement that lavish weddings help to bring about. In

the South African context, households that do not offer funerals commensurate with expectations may move down the social ladder.

Our work is also closely related to that documenting the costs of AIDS treatment and funeral expenses in other parts of Africa. (Stover and Bollinger, 1999, review evidence on this from Tanzania, Ethiopia, Cote d'Ivoire, and Uganda.) Ainsworth and Over (1997) note that in Kagera, Tanzania, funerals are expensive and elaborate. An important distinction with our findings from South Africa is that, in Kagera, funeral costs were spread more widely, with 45% of expenses covered by gifts from other households.

The next section introduces the data we use to quantify funeral behavior. Section II discusses funeral costs in more detail. Section III presents a model of household decision-making, and tests the model using our data. The concluding section offers some thoughts on the sustainability of the current burial practices, and the implications of current practices for the future wellbeing of household members.

II. Data

In 2000, the Africa Centre for Health and Population Studies began demographic surveillance of approximately 11,000 households in the Umkhanyakude District in northern KwaZulu-Natal.

The surveillance site includes both a township and a rural area administered by a tribal authority.

At six month intervals, every household is visited and demographic and health information is

collected on all household members. Individuals may be resident in the Demographic

Surveillance Area (DSA), or may be non-resident members of households that claim them as

members. Approximately two-thirds of all persons under demographic surveillance are resident

in the DSA at any one time. (See Tanser et al. 2007 for details on the Africa Centre site and surveillance protocols.)

Upon learning of the death of a household member, a verbal autopsy nurse is sent to interview the deceased's primary caregiver.² Symptoms and health seeking behavior of the deceased are recorded, and sent to two clinicians, who independently assess the information and, where possible, assign a cause of death. For deaths between January 2003 and December 2005, information was also collected on the costs associated with the illness, and with the funeral. This information, from the *Illness and Death (IAD) Survey*, forms the basis of our analysis.

We augment these data with information that was collected on household socioeconomic status in two rounds of data collection. *Household Socio-Economic Survey 1 (HSE1)* was conducted in 2001, and *Household Socio-Economic Survey 2 (HSE2)*, between January 2003 and June 2004. When possible, we assign household SES information from HSE1, in order to quantify the economic and demographic characteristics of the household prior to the death.

Column 1 of Table 1 presents information on individuals followed by the Africa Centre Demographic Information System (ACDIS) in 2001, at the time of HSE1. Just over half of all individuals followed by ACDIS are female. The population under surveillance is young, with a mean age of 23 years. Employment opportunities in the area under surveillance are quite limited, and many household members migrate to find work. This is reflected in reports that only 35 percent of prime-aged adults (ages 18 to 59) resident in the DSA worked for money in 2001, in

² In order to respect households in mourning, the verbal autopsy visit occurs with a lag of at least 6 months. For details on the protocol, visit <http://www.africacentre.ac.za>.

contrast with 58 percent of non-resident prime-aged adults. Individuals in the DSA live in large households, with an average of 10 members, 7 of whom are resident in the DSA.³

Column 2 presents information on individuals followed by ACDIS who died between 2003 and 2005. Household characteristics of those who died are similar to those of all persons followed by ACDIS. Household sizes (10.08 vs. 10.35 members), number of working adult members (1.96), and number of children (4.58 vs. 5.00) are all quite comparable. Employment for adults who died between 2003 and 2005 are similar to reports for resident members as a whole, with 40 percent of the deceased who were prime-aged reported to have been working before they fell ill.

Age at death over this period was 38 years, on average. This reflects the large AIDS burden that this region is shouldering. Verbal autopsies diagnose that 48 percent of all deaths in the DSA from 2003 to 2005 were due to AIDS, which is associated both with high infant mortality and with death in middle age.

Individuals old enough to have gone to school at HSE1 (ages 6 and older) who subsequently died had a half year less education than other individuals followed in ACDIS, on average. However, given changing educational attainment between cohorts and differences in the age profile of those who died and others followed in ACDIS, this difference is much reduced when we control for age and age squared at HSE1 (so that those who died, age adjusted, had attained 0.18 fewer years of education at HSE1).

³ These numbers are presented at the level of individuals within the DSA, in order to compare their information with that from people who died. At the level of the household, average household size is 7.6, with 5.5 resident members.

III. Funerals in the DSA

It would be difficult to exaggerate the importance of funerals in South African life. Funerals serve to honor the dead, who are entering a new life as ‘ancestors.’ In addition, funerals mark the deceased’s status (and that of his family) within the community. They also strengthen ties with neighbors and extended family, who may travel long distances to attend a funeral. More than any other single rite of passage – births, graduations, marriages – funerals provide a focal point for family and community life. (See Roth 1999 for discussion.)

For some or all of these reasons, funerals are elaborate, and expensive. In addition to expenses for a coffin, traditional burial blankets, and (often) a tent for the funeral, immediate family must pay to entertain mourners. After a death, extended household members may arrive for a lengthy visit. It is expected that the immediate family of the deceased will feed mourners who have come for the funeral, for as long as they choose to stay. In addition, animals are slaughtered to honor the dead. Precise customs vary from place to place, but in KwaZulu-Natal, when an adult male dies, general custom is to kill a cow, and to use its meat to feed all present. This is an expensive proposition: cattle during this period sold for approximately 2000 Rand a head.⁴ With median per capita income among Africans (Blacks) approximately 400 Rand a month, the cow represents more than a third of a year’s income for half the African population.

⁴ Prices are those reported by survey respondents during the 2003-2005 period of data collection. These are consistent with other reports for this period. King (2004) reports sale prices for a cow fluctuated between R1500 and R2000 in the former bantustan of KaNgwane, between 2000 and 2002. McCord (2004) reports that sale prices for cows varied from R700 to R3000 in Limpopo in mid-2003. Since that time, prices for cattle have increased. The Weekend Argus (2006) reports the market price for a cow in December 2006 was R3000.

When an adult female dies, a goat is slaughtered. While less expensive than a cow, this is still a considerable expense for the household.

A. Burial societies and funeral policies

One mechanism that has evolved in South Africa to help individuals save for funerals are savings clubs or accounts that pay out only upon death. These include membership in a burial society, or the purchase of a funeral policy with a funeral parlor or an insurance company. For approximately 20 to 30 Rand per month (more, if one is insuring additional household members), individuals are guaranteed that some expenses incurred for their funerals will be paid for by the insurer.

Information on who participated in these policies, and what the policies paid at the time of the death, is presented in Table 2. Twenty-eight percent of the deceased had a policy of some variety, almost all of which paid something. Participation in burial societies and funeral policies is closely related to individuals' receipt of the South African state old-age pension—a generous pension that is provided monthly in cash to women over age 60 and men over age 65. (See Case and Deaton 1998 for details.⁵) Each month, after receiving their pensions, pensioners can pay into their burial accounts at the *pension pay point*. (Funeral parlors and insurance companies are the only private firms allowed to conduct business inside pension pay points, which are generally surrounded by a fence or barrier of some sort.) In the IAD data, 79 percent of pensioners participated in a burial fund, true of only 18 percent of individuals who were not pension-eligible. The probability of participating in a burial fund jumps by 35 percentage points as men

⁵ Since the time of our survey, the age of eligibility for pension receipt has been equalized between women and men.

and women move from being slightly too young to receive the pension, to being just old enough to be age-eligible for the pension.

Why would younger adults not belong to a burial society? We can only speculate, but one possibility suggested to us “is the same reason that Duflo et al. (2008) find that farmers aren’t keen on buying fertilizer when they need it (at the beginning of the season) but are very responsive to the option to buy fertilizer immediately after their harvest. It might be that people don’t like to plan, but if they have money in hand, and a seller is strategically positioned when they receive cash, then they will buy what they know they will need later on.”⁶

Over half of these policies were held with funeral parlors; and 40 percent with other private insurers. Nearly all of the policies (91 percent) paid money to the household at the time of the funeral. The cash payments are large, averaging 4500 Rand. This money need not be spent by the household on the funeral but, as we shall see below, in general it represents only part of funeral spending for individuals who held policies.

Policies were much less likely to provide goods in kind. Only 23 percent of policies provided a coffin; 23 percent provided food; 13 percent, a tent. Even when a policy provides a coffin or food, the deceased’s household may incur additional expenses for these items. While it is rare in the IAD data to find that additional money was used to ‘upgrade’ the coffin provided by the policy, it is not unknown (4 percent of cases). It is quite common for additional money to be spent on meat and groceries, if the provision of food was part of the policy. (92 percent of cases spent additional money on meat; 75 percent spent additional money on groceries.)

⁶ Karla Hoff, personal correspondence. A non-competing hypothesis is that planning for one’s own death is painful, more so for the young than for the old.

B. Funeral costs

Information on purchases for the funeral is presented in Table 3. Large expenditures include a coffin, 858 Rand on average; meat, 1382 Rand on average; and groceries, 1084 Rand on average. Other expenditures, for example on burial blankets, are close to universal, but are much less expensive. Overall, spending on funerals averages 4300 Rand per burial. It is significantly higher if the deceased had a funeral policy (5900 Rand), or if we restrict our attention to adult deaths (4700 Rand).

Table 4 presents information on who paid for these funeral-related expenses. (Note that when a funeral policy paid money, and that money was used to purchase funeral-related items, this is included in the household members' contributions toward funeral expenses.) The vast majority of expenses (90 percent) were paid by household members living with the deceased at the time of the death. This is true both for funerals where a funeral policy paid, and for funerals in which one did not. Other family, not in the household, contributed 6 percent of resources put toward the funeral, with community, church, and employers contributing smaller amounts. In the IAD questionnaire, expenses for funeral items were asked separately from reports on who contributed to the funeral, and at what level. The reports nonetheless balance: the primary caregiver on average can recall 4273 Rand worth of funeral expenses, and 4228 Rand of contributions made by family and others.

The second panel of Table 4 reports on borrowing that the households undertook to finance funerals. Nearly a quarter of all deaths resulted in money being borrowed to pay for the funeral. Conditional on borrowing, households took loans from money lenders over 50 percent of

the time; neighbors, 25 percent; and other family, 14 percent of the time. The statistics on money lenders are troubling: in South Africa, money lenders charge exorbitant interest rates, 30 percent per month or more (Siyongwana 2004). Poor households who borrow 1300 Rand from a money lender for a funeral may find themselves paying back many multiples of that over several years.⁷

In summary, funerals are expensive, and often leave households economically vulnerable. In the next section, we examine the determinants of funeral spending and borrowing. We develop a model of household decision-making on funeral spending, which provides tests for our data.

IV. Household decision-making on funeral spending and borrowing

The ethnographic literature and our own experience in training field workers to administer questionnaires on illness and death modules suggest that social norms are held strongly and play an important role in setting funeral spending. Denoting characteristics that mark an individual's status (sex and relationship to the head of household, for example) as X_1 and community and extended family perception of household permanent income at the time of the death as \hat{Y} , we hypothesize that the community and extended family form an opinion about the appropriate size of the funeral F^* according to the deceased's status and that of his household at the time of the death:

$$F^* = \beta_1 X_1 + \gamma \hat{Y}.$$

⁷ Consistent with findings of Roth (1999), we rarely observe households selling assets to pay funeral expenses. Roth argues that this is largely because the time between the sale of the asset and the receipt of cash is too long for households who need immediate cash to pay for funeral-related items.

Here γ is the fraction of permanent income that is thought to be appropriate to use for the burial ($0 < \gamma < 1$), net of the spending determined by the deceased's characteristics.⁸ The funeral expenses we observe in our data are the desired spending plus an idiosyncratic error:

$$F = F^* + u_1 = \beta_1 X_1 + \gamma \hat{Y} + u_1. \quad (1)$$

Community and extended family do not observe household permanent income. Instead, they observe a vector of household and individual characteristics that are correlated with household permanent income, which they use to form an expectation of it. Denoting these observable characteristics as X_2 , we can express perceived household income \hat{Y} and true household permanent income Y as:

⁸ We follow Deaton (1992) in defining permanent income as “the annuity value of current financial and human wealth” (page 81). We have no evidence that pressure about the size of funeral comes from the community or extended family, rather than from within the household itself. However, ethnographic work suggests that the community plays an important role in setting the size of the funeral. Our use of individual and household ‘status’ is different from that proposed by Cole, Mailath and Postelwaite (1992). These authors take an agent’s status “as a ranking device that determines how well he fares with respect to nonmarket decisions” (page 1096). That is, status brings with it benefits on which clubs a person is invited to join, or which families a person can marry into. In our work, ‘status’ is determined by household and individual observable resources, which dictates a nonmarket decision – here, what should be spent on funerals. Households that break social norms on appropriate funeral spending, given observable household resources, may be ostracized, and perhaps not welcome at future funerals in the community.

$$Y = \hat{Y} + u_2 = \beta_2 X_2 + u_2, \quad (2)$$

so that true household permanent income differs from that perceived by an unobservable component, u_2 , drawn from a distribution with variance σ_2^2 .

That permanent income may influence funeral spending linearly can be seen in Figure 1, where we present means of total funeral expenses by the number of assets owned by the household, which we take as a marker of permanent income. More elaborate models may also be consistent with our data, but are not necessary here. We demonstrate below that our model, in which markers for individual status and household permanent income contribute additively to the desired funeral size, is adequate to explain the funeral spending and borrowing patterns we find in our data.

Households with lower permanent income than that perceived ($u_2 < 0$) will be less able to meet social expectations with respect to the size of the funeral, without borrowing money. Specifically, the household will have inadequate resources to meet F^* if

$$Y < F^* = \beta_1 X_1 + \gamma(\beta_2 X_2). \quad (3)$$

The probability that the household will need to borrow ($B = 1$) to finance a funeral of size F^* can be written, substituting (2) into (3):

$$\Pr[B = 1] = \Pr[u_2 < \beta_1 X_1 + (\gamma - 1)\beta_2 X_2]. \quad (4)$$

This provides us with several checks, and a formal test, of our model. First, characteristics associated with lower individual status will have different predictions for spending and borrowing than do characteristics associated with lower household permanent income. Characteristics of the deceased associated with lower individual status (that is, with lower values of X_1) should reduce both the size of the funeral, as in (1), and the probability of borrowing, as in (4). In contrast, any information available to the community that causes them to revise downward their estimate of household permanent income, \hat{Y} , should reduce the size of the funeral, as in (1), but *increase* the probability of borrowing for the funeral. We examine these in turn.

A. Individual status, funeral spending and borrowing

We provide estimates of the association between individual status, funeral spending and funeral borrowing in Table 5. The first set of columns presents results of OLS regressions for funeral spending, with and without controls for household characteristics, and the second set provides OLS results, using the same specifications, for borrowing money for the funeral.⁹

⁹ In our regression analyses, we control for age using indicators for 10-year age categories. Results are not changed if, instead, we include age at death and that age squared in our regressions. In addition, regressions include indicators for the year of death and an indicator that age at death is missing (true for 5 cases). These variables are part of the set of variables we refer to as X_1 . Age at death is a status variable, and year of death is a crude control for inflation. Robust standard errors are presented, allowing for correlation between unobservables for observations from the same homestead.

Characteristics that enter individual status (X_1) include sex and relationship to the household head, and here we examine whether these characteristics move funeral spending and borrowing in the same direction, as predicted by the model. Women have lower status in the DSA than do men, so we would expect both that less would be spent on women's funerals, and that the probability of borrowing for a woman's funeral would be lower. We find that this is the case: with or without controls for household demographics and SES, approximately 600 Rand less is spent on a woman's funeral, and borrowing for a woman's funeral is 2.5 to 3.5 percentage points less likely on average.¹⁰

We also examine whether household members with a more distant relationship to the head are treated differently from other members. Relative to a parent, spouse or child of the head (or indeed the head himself), we find all other relationships to be associated with lower funeral spending, and a lower probability of borrowing for the funeral.¹¹ Specifically, the funerals of 'other' relatives or non-relatives of the head are approximately 800 to 1000 Rand less expensive, and the probability of borrowing for their funerals is approximately 4 percentage points lower.

B. Observable household characteristics, funeral spending and borrowing

We can also examine whether observable characteristics that are associated with household permanent income have different effects on spending and borrowing, as is predicted by our

¹⁰ This largely reflects the difference in cost between slaughtering cows and goats. With the exception of burial clothing, for which a small (34 Rand) but statistically significant amount more was spent on men, meat was the only funeral-related expense for which we find a significant difference in spending between the sexes.

¹¹ "Other" relationships are siblings, grandparents, grandchildren, sons- or daughters-in-law, other family and individuals not related to the current head of household.

model. Table 6 presents OLS regression results for funeral spending (columns 1 to 4) and borrowing for funerals (columns 5 to 8). We find that household assets are associated with significantly higher spending on funerals, with an increase in spending of almost 300 Rand for each asset, and with a significantly lower probability of borrowing, with each asset associated with a 1 percentage point drop in the probability of borrowing, on average.

Half of all individuals who died in the DSA between 2003 and 2005 died of AIDS. Death from AIDS is associated with significantly higher medical expenditures prior to death, which renders households significantly poorer (Naidu and Harris 2006). When an individual dies of AIDS, almost 1000 fewer Rand are spent on the funeral, on average, while the probability of borrowing to pay for the funeral is 7 percentage points higher.

In ninety percent of cases in which the deceased held a funeral policy, that policy paid money to the household at the time of the death. Consistent with our model, it is the cash transfer, and not the ownership of a policy, that is associated with significantly higher spending on the funeral, and a significantly lower probability of borrowing to fund the funeral.

C. Formal tests of household decision-making

Our model also yields formal tests of the association between funeral expenditures and borrowing decisions, which we analyze here. We rewrite the equation for funeral spending as

$$F = \beta_1 X_1 + \gamma(\beta_2 X_2) + u_1 \quad (1')$$

and the equation for the probability of borrowing for the funeral as

$$\Pr[B = 1] = \Pr\left[\frac{u_2}{\sigma_2} < \frac{\beta_1}{\sigma_2} X_1 + (\gamma - 1) \frac{\beta_2}{\sigma_2} X_2\right] \quad (4')$$

where u_2 has been standardized for convenience in what follows. Having done this, we can test several elements in our model.

First, the ratio of each regression coefficient β_1 , from vector X_1 in (1'), relative to the corresponding regression coefficient $\frac{\beta_1}{\sigma_2}$ from (4'), should be equal for each element of X_1 .

That is, for each variable X_{1i} , for $i \in (1, k)$,

$$\frac{\beta_{1i}}{\beta_{1i} / \sigma_2} \dots = \frac{\beta_{1k}}{\beta_{1k} / \sigma_2} = \sigma_2 \quad . \quad (5)$$

Such a test is of interest in its own right, in gauging whether the model fits the data. The ratio of the coefficients on X_1 from (1') and (4') also yields an estimate of the scaling parameter σ_2 from (4'). This is useful in what follows.

In addition, the ratio of each regression coefficient $\gamma\beta_2$, from vector X_2 in (1'), relative to the corresponding regression coefficient $\frac{(\gamma-1)\beta_2}{\sigma_2}$ from (4'), should be equal for each element of X_2 . That is, for each variable X_{2i} , for $i \in (1, j)$,

$$\frac{\gamma\beta_{2i}}{(\gamma-1)\beta_{2i}/\sigma_2} \dots = \frac{\gamma\beta_{2j}}{(\gamma-1)\beta_{2j}/\sigma_2} = \frac{\gamma\sigma_2}{(\gamma-1)} \quad (6)$$

The equality of these ratios provides a second test of our model. We can also use them, together with our estimate of σ_2 from equation (5), to estimate the fraction of household income, γ , that is expected will be spent on the funeral, net of spending expected based on the deceased's status.

Results of these tests are provided in Table 7. In *chi*-square tests presented in the last column of the table, we fail to reject the equality of ratios for X_1 variables (equation 5), or for X_2 variables (equation 6).¹² Moreover, these equations yield an estimate of γ equal to 0.56. In the next section, we compare this estimate of γ , provided by reduced form estimation of (1') and (4'), with that yielded by the maximum likelihood estimation.¹³

D. Maximum likelihood estimates

¹² We can use the coefficients estimated to calculate the relative amounts spent on household members who die. When a male head of household aged 50 dies of a non-AIDS related condition in 2005, in a household with the mean number of assets observed in our sample for households in which a death occurred, we expect on average the household will spend R6383 on his funeral. Relative to that, we expect on average if his spouse died in otherwise identical circumstances, spending would be 91% percent of this amount; if his teenaged son died, 75%; and if his teenaged daughter died, 67%. If, instead, the 50 year old head had died of AIDS, we would expect R5635 would be spent on his funeral (88% of what would be spent if death were from another cause). If the head's wife died of AIDS, relative to the death of her husband from a non-AIDS related cause, 80% would be spent; for a teenaged son's death from AIDS, 64%; and for a teenaged daughter's death from AIDS, 55%.

¹³ The estimate of γ reported is the mean of that recovered from the three estimates we have from (6).

To gain more precision in our estimates, we turn to maximum likelihood estimation. We denote the latent variable driving the borrowing decision as $B^* = F - \beta_2 X_2 - u_2$, where $B = 1$ if $B^* > 0$, and 0 otherwise. We assume that funeral expenses and the latent need to borrow are jointly normally distributed. The relevant joint density when borrowing occurs will be

$$g(F, B = 1) = \int_{-\infty}^{F - \beta_2 X_2} f(F - \beta_1 X_1 - \gamma \beta_2 X_2, u_2) du_2, \quad (7)$$

and for cases where no borrowing occurs is

$$g(F, B = 0) = \int_{F - \beta_2 X_2}^{\infty} f(F - \beta_1 X_1 - \gamma \beta_2 X_2, u_2) du_2.$$

We can express the likelihood function to be maximized as

$$L(\beta_1, \beta_2, \gamma) = \prod [g(F, B = 1)]^B [g(F, B = 0)]^{(1-B)}. \quad (8)$$

To estimate (8), we re-write (7) as

$$g(F, B = 1) = \int_{-\infty}^{F - \beta_2 X_2} f(u_1, u_2) du_2.$$

Standardizing u_2 , and defining $z = \frac{u_2}{\sigma_2}$, yields

$$g(F, B=1) = \int_{-\infty}^{(F-\beta_2 X_2)/\sigma_2} f(u_1, z) dz = \int_{-\infty}^{(F-\beta_2 X_2)/\sigma_2} f(z|u_1) f(u_1) dz = f(u_1) \int_{-\infty}^{(F-\beta_2 X_2)/\sigma_2} f(z|u_1) dz \quad (9)$$

where the marginal density of u_1 can be written $f(u_1) = \phi\left(\frac{u_1}{\sigma_1}\right) \frac{1}{\sigma_1}$.

Under the assumption that u_1 and z are mean zero, the distribution of z conditional on u_1 is normally distributed

$$z | u_1 \sim N\left(\frac{\sigma_{12}}{\sigma_1^2} u_1, 1 - \frac{\sigma_{12}^2}{\sigma_1^2}\right).$$

Making a simple change of variables, equation (9) becomes

$$g(F, B=1) = f(u_1) \Phi\left(\frac{\left(\frac{F - \beta_2 X_2}{\sigma_2}\right) - \frac{\sigma_{12}}{\sigma_1^2} u_1}{\sqrt{1 - \frac{\sigma_{12}^2}{\sigma_1^2}}}\right) \quad (10)$$

and

$$g(F, B = 0) = f(u_1) \left[1 - \Phi \left(\frac{\left(\frac{F - \beta_2 X_2}{\sigma_2} \right) - \frac{\sigma_{12}}{\sigma_1^2} u_1}{\sqrt{1 - \frac{\sigma_{12}^2}{\sigma_1^2}}} \right) \right]. \quad (11)$$

Substitution of (10) and (11) into (8) provides the expression we use for our likelihood.

We present maximum likelihood (ML) estimates for the structural parameters from (1') and (4') in Table 8. We again use sex and relationship to the household head as our markers for the status of the deceased, and household assets, an indicator that the death was from AIDS, and an indicator that a funeral policy paid money at the time of the death as our markers for household permanent income at the time of the funeral. Our ML estimation suggests households are expected to spend a third of household permanent income on a funeral ($\gamma = 0.34$), net of the spending expected based on the deceased's status.¹⁴ Estimates for the impact of household socioeconomic status variables are very similar to those presented in Table 7, once we multiply our β_2 maximum likelihood coefficients by our estimate of γ .

V. Conclusions

This paper provides quantitative evidence from KwaZulu-Natal on the extent to which funerals place households at risk, taking potentially productive resources and turning them into consumption (coffins, meat, groceries). In addition, in a quarter of all funerals for individuals

¹⁴ This estimate is smaller than that yielded by reduced form (0.56), however the latter is imprecisely estimated, and we cannot reject that the estimates are the same.

who died between 2003 and 2005 in the DSA, households borrowed money for the funeral, which can be anticipated to drain household resources well into the future. Our point estimates suggest that households are expected to spend a third of household permanent income on funerals, an amount shaded up or down according to the status of the deceased.

These results do not lead us to optimism on the impact of the AIDS crisis on the future economic wellbeing of South Africans. Economic research focusing on the long-run effect of AIDS finds, if the crisis results in lower population growth, that AIDS could “endow the economy with extra resources which ... [will] raise the per capita welfare of future generations.” (Young, 2005).¹⁵ Recent evidence from Demographic and Health Surveys finds that fertility rates have not have fallen in response to the AIDS crisis in the manner suggested by Young (2005). (See Juhn, Kalemli-Ozcan and Turan 2008, and Fortson 2009.) To this, we add evidence that households are taking what, in other circumstances, could be productive capital and using it on coffins, meat and groceries to bury their dead. To the extent that productive resources are diverted into expensive funeral celebrations, earlier predictions that the pandemic will benefit future generations economically are less likely to come to pass.

Elaborate funerals are unlikely to be sustainable if the AIDS pandemic continues to take lives at a rapid rate. New norms may develop. According to the BBC, the king of neighboring Swaziland put a ban on lavish funerals (<http://news.bbc.co.uk/1/hi/world/africa/2082281.stm>). In South Africa, there is qualitative evidence that some communities have tried to set new norms, but these norms are often not acceptable to extended family who come in from far away to attend

¹⁵ This earlier research also assumes a constant savings rate over the life of the crisis, in order to focus on the effect of a potential fertility decline.

the funeral. The South African Council of Churches has called repeatedly for “appropriate and affordable” funerals. (See, for example, <http://www.sacc.org.za/docs/AnRept05.pdf> .) However, movement in this direction has been quite slow. Understanding coordination failures between communities, or among members of extended households, will be important if there is to be an effective response working toward smaller, less expensive funerals.

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Table 1. Africa Centre Demographic Surveillance Data

| All individuals in DSA 2001 | Illness and Death (IAD) Sample 2003-2005 | |
|--|---|--|
| | Household characteristics | |
| Household size (HSE1) | 10.35 | 10.09 |
| Number of resident members (HSE1) | 7.36 | 7.16 |
| Number of employed members ages 18+ (HSE1) | 1.96 | 1.96 |
| Number of children 0-17 (HSE1) | 5.00 | 4.58 |
| Number of pension-aged household members (HSE1) | 0.51 | 0.63 |
| Household assets (HSE1) | 6.20 | 5.83 |
| | Individual characteristics | |
| Female | 0.526 | 0.515 |
| Age at HSE1 | 23.4 | Age at death 38.4 |
| | -- | Cause of death was AIDS 0.478 |
| Resident in DSA, Employed at HSE1 (ages 18-59) | 0.346 | Deceased employed when healthy (ages 18-59) 0.402 |
| Not resident in DSA, Employed at HSE1 (ages 18-59) | 0.575 | |
| Education at HSE1(ages 6+) | 6.20 | 5.69 |
| Number of observations (individuals) | 81177 | 3751 |

Note. Information on employment and education comes from the first socio-economic survey (HSE1). IAD sample is restricted to deaths that occurred between January 2003 and December 2005.

Table 2. Burial Societies and Funeral Policies

| BURIAL SOCIETY AND FUNERAL POLICIES | | |
|---|----------|-------------|
| Fraction with a policy | 0.284 | |
| Fraction pension-eligible with a policy | 0.787 | |
| Fraction non-pension eligible with a policy | 0.182 | |
| Number of observations | 3668 | |
| | | |
| FUNERAL POLICY PAID | Fraction | Mean Amount |
| Money for the funeral | 0.907 | 4515 |
| Coffin | 0.230 | |
| Food | 0.232 | |
| Transport | 0.087 | |
| Tent | 0.134 | |
| Number of observations | 1007 | |

Note. The fraction of policies that paid for an expense is conditional on the deceased having been covered by a funeral policy or burial society that paid at the time of the funeral.

Table 3. Costs of Funerals

| | Fraction making purchase | Mean All deaths (Rand) |
|------------------------|--------------------------------|------------------------------|
| Coffin | .710 | 858 |
| Meat | .946 | 1382 |
| Groceries | .974 | 1084 |
| Tent | .575 | 317 |
| Clothing | .726 | 82 |
| Blankets | .983 | 266 |
| Transport | .692 | 318 |
| Other | .113 | 64 |
| Total Rands | | 4273 |
| Number of observations | 3698 | 3682 |

Note. Cost of the funeral are those for items not given in-kind by a burial society or funeral policy. The number of observations in each mean varies because respondents sometimes did not know whether items were purchased. (For example, 3682 respondents knew whether meat was purchased; 3666 knew whether a tent was rented.)

Table 4. Accounting for Funeral Costs

| CONTRIBUTIONS TO FUNERAL COSTS (RAND) | | |
|---|----------------------------|----------------------------------|
| | Fraction Contributing | Mean amount |
| Household members | 0.949 | 3789 |
| Other family | 0.250 | 260 |
| Community | 0.146 | 54 |
| Church | 0.084 | 37 |
| Employer | 0.037 | 80 |
| Other | 0.011 | 14 |
| Total | | 4228 |
| Number of observations | 3747 | |
| MONEY BORROWED | | |
| | Fraction borrowing | Mean conditional on borrowing |
| | .238 | 1387 |
| Number of observations | 3615 | |
| Conditional on borrowing, fraction borrowing from: | | |
| Bank | .016 | 3815 |
| Money lender | .524 | 1326 |
| Employer of deceased | .007 | 2133 |
| Employer of another person | .038 | 2284 |
| Family outside the household | .138 | 1414 |
| Neighbor | .248 | 1150 |
| Other | .021 | 1482 |
| Number of observations | 862 | |
| ASSETS SOLD | | |
| | Fraction selling assets | Mean conditional on selling |
| | .039 | 2650 |
| Number of observations | 3635 | |

Note. Costs of the funeral are those not paid in kind by a burial society or funeral policy. Sixteen observations were not used in calculating mean sum borrowed, conditional on borrowing, because either two borrowing sources were mentioned (5 cases), or none of our categories was mentioned (11 cases).

Table 5. Individual Status, Funeral Spending and Borrowing

| | Dependent variable: | | | |
|---|----------------------------|---------------------|-------------------------------------|-------------------|
| | Funeral spending (Rand) | | =1 if borrowed money for funeral | |
| Female | -544.93 (106.04) | -611.98 (107.31) | -0.025 (0.014) | -0.036 (0.015) |
| Relationship of deceased to current head was 'other' | -1004.58 (110.63) | -756.73 (112.97) | -0.036 (0.016) | -0.037 (0.017) |
| Household characteristics? | No | Yes | No | Yes |
| Number of observations | 3751 | 3324 | 3615 | 3209 |

Note. OLS regressions with robust standard errors in parentheses. Unobservables are clustered at the homestead level. All regressions include year of death indicators, a complete set of age indicators by 10-year age categories and an indicator that age at death was missing (5 cases). Omitted category for relationship of the deceased to current head of household includes parents, spouse and children. 'Other' relationships are: siblings, grandparents, grandchildren, sons- or daughters-in-law, other family and individuals not related to the current head of household. Household characteristics in columns 2 and 4 are household size, household asset holdings and the maximum number of years of education in the household (all measured in 2001).

Table 6. Household Income, Funeral Spending and Borrowing

| | Dependent variable: | | | | | | | |
|------------------------------------|-------------------------|---------------------|---------------------|---------------------|----------------------------------|------------------|-------------------|-------------------|
| | Funeral spending (Rand) | | | | =1 if borrowed money for funeral | | | |
| Household asset holdings | 281.68 (21.41) | -- | -- | 259.48 (20.33) | -0.007 (0.002) | -- | -- | -0.005 (0.002) |
| Indicator: cause of death was AIDS | -- | -927.58 (119.52) | -- | -841.48 (115.51) | -- | 0.067 (0.017) | -- | 0.062 (0.017) |
| Deceased had a funeral policy | -- | -- | -167.16 (309.38) | -- | -- | -- | -0.044 (0.043) | -- |
| Funeral policy paid money | -- | -- | 1795.76 (336.53) | 1315.50 (190.94) | -- | -- | -0.074 (0.043) | -0.109 (0.018) |
| Number of observations | 3568 | 3629 | 3668 | 3378 | 3442 | 3499 | 3581 | 3300 |

Table 7. Testing Predictions of the Model

| | Dependent Variable: | | Ratio: |
|---|--------------------------------------|---|----------------------------------|
| | Total spending on funeral (1') | Indicator: =1 if borrowed money for the funeral (4') | coefficient from (1')/(4') |
| Indicator: female | -551.55 (102.831) | -0.034 (0.015) | 16019.66 |
| Indicator: relationship to head of household is 'other' | -809.79 (104.868) | -0.039 (0.016) | 20509.65 |
| <i>Chi-square test:</i> X ₁ coefficients (<i>p</i> -value) | | | 0.00 (0.994) |
| Household assets | 289.72 (22.002) | -0.006 (0.002) | -44688.79 |
| Indicator: funeral policy paid money | 1351.81 (113.933) | -0.106 (0.018) | -12750.61 |
| AIDS death | -747.45 (207.215) | 0.066 (0.017) | -11410.32 |
| <i>Chi-square test:</i> X ₂ coefficients (<i>p</i> -value) | | | 0.07 (0.966) |
| γ : Fraction of household permanent income to be used for the funeral | | | 0.557 |
| Number of observations | 3461 | 3381 | |

Note. OLS regressions with bootstrapped standard errors in parentheses. Unobservables are clustered at the homestead level. All regressions include a complete set of age indicators by ten-year age categories and an indicator that age at death was missing (5 cases).

Table 8. Maximum Likelihood Estimates

| | coefficient (standard error) | z-score |
|---|---------------------------------|---------|
| β_1 : Individual characteristics | | |
| Female | -618.35 (104.59) | 5.91 |
| Indicator: relationship to head of household is 'other' | -1340.15 (112.11) | 11.95 |
| β_2 : Predictors of household permanent income | | |
| Household assets | 802.90 (204.29) | 3.98 |
| Indicator: funeral policy paid money | 5579.84 (1412.85) | 4.00 |
| AIDS death | -2121.55 (605.58) | 3.54 |
| γ : Fraction of household permanent income to be used for the funeral | 0.342 (0.086) | 4.04 |
| Number of observations | 3381 | |

Note. Unobservables are clustered at the homestead level.

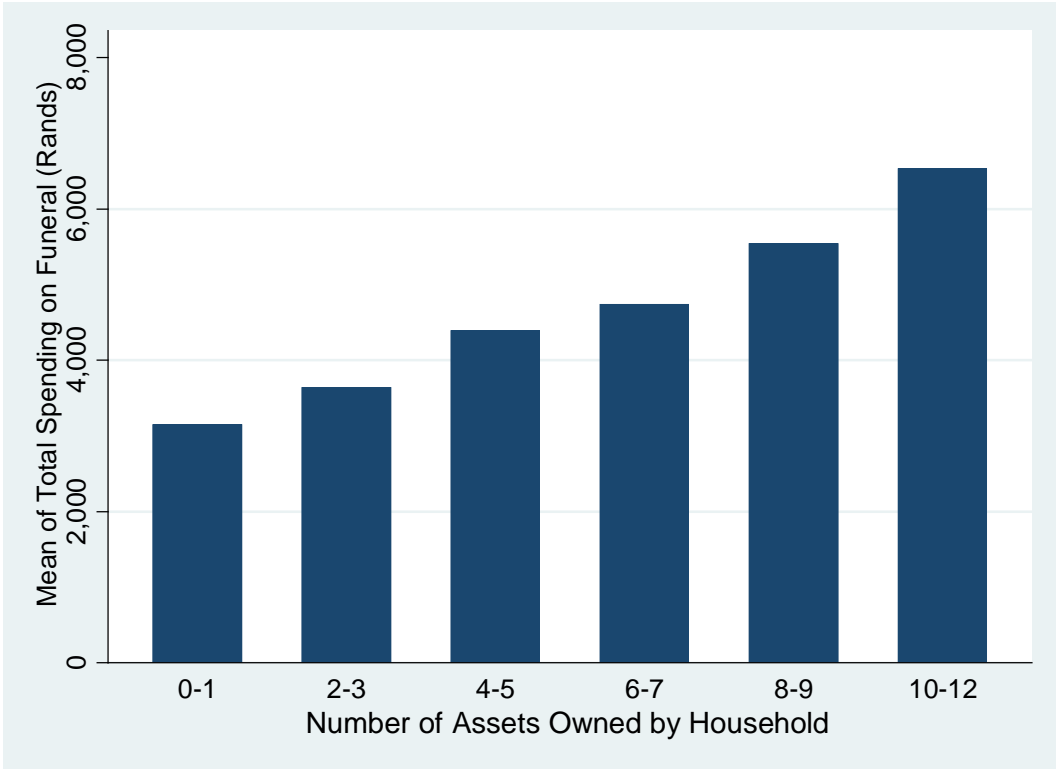


Figure 1. Mean Total Spending on Funerals and Assets Owned by the Household