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Mortality and survivors' consumption

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Abstract

The literature suggests that in developing countries illness shocks at the household level can have a negative and severe impact on household income. Few studies have so fare examined the effects of mortality. The major difference between illness and mortality shocks is that a death of a household member does not only induce direct costs such as medical and funeral costs and possibly a loss in income, but that also the number of consumption units in the household is reduced. Studies so far focused mainly on adult mortality, disregarded the death of other household members and distinguished only insufficiently between the immediate impact, and the impact after coping strategies have been implemented. Using data for Indonesia, I show that the economic costs related to the death of children and older persons seem to be fully compensated by the decrease of consumption units in the household. In contrast, when prime-age adults die, survivors face additional costs due to the loss of income and, in consequence, implement coping strategies. These strategies are quite efficient and it seems that on average households even over-compensate their loss. This suggests that the implementation of general formal safety nets which are still absent in Indonesia—as in most developing countries—can give priority to the insurance of other types of risks, such as unemployment, illness or natural disasters.

***JEL* Classification:** D12, I12, J12, O12.

Key words: Mortality, risk, insurance, micro-model of consumption growth, Indonesia.

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1 Introduction

To what extent shocks such as droughts, natural disasters, illness or mortality affect household income is an important topic in development economics. In most low and middle income countries only few people are covered by formal insurances against such shocks. Hence, it is important to know how households manage such risks ex-ante and cope with them once any harm has occurred. Private informal coping mechanisms can include measures such as drawing on savings, selling assets, increasing labor supply, reallocating expenditures, receiving transfers from relatives or other social support networks, and borrowing from local (mostly informal) credit markets.[1]

Decreasing life expectancy in countries strongly affected by the AIDS epidemic as well as rising health inequalities in transition countries raise the question how in particular illness and mortality influence on household income, both in the short and in the long run. Illness of a household member generally involves two types of costs. First, costs of diagnosing and treating the illness, and, second, the possible loss in income associated with reduced labor supply and productivity of the ill person and of the persons providing care.

The literature suggests that in developing countries illness has on impact a quite negative effect on household income, but that in average households manage, except in case of severe illnesses, to compensate rather well the related costs. For instance, in an earlier study Pitt and Rosenzweig (1986) found only small effects of illnesses on farm profits in Indonesian farm households. They observed that households substituted reduced family labor by hiring labor from outside the household which allowed to maintain previous consumption levels. For Thailand, Townsend (1995) even found that the percentage of the year that an adult male is sick had no impact at all on household consumption. Kochar (1995) analyzed for the case of South India the effect of illness in the household in more detail. She found that illness to the male lowered wage income and increased informal borrowing during peak periods of agricultural cycles, but that there were no effects during slack periods and no effects of female illnesses. These results also suggest that families living in low-income countries are able to insure illness shocks fairly well. Lindelow and Wagstaff (2005) and Wagstaff (2005) emphasized based on studies on China and Vietnam that unearned income is one of the most important channels of the used informal insurance mechanisms.

Gertler and Gruber (2002) used an original Indonesian data set to distinguish between several degrees of the intensity of illness shocks. They found that while families were able to fully insure minor illnesses, they were not able to insure illnesses that limited their ability to physically perform activities of daily living. They estimated that families were only able to insure

[1] For a recent review on this topic, see Dercon (2005).

less than 40 percent of the income loss from severe illnesses. Dercon (2004) observed rural Ethopian households over time and also found that serious illness shocks had a significant negative impact on food consumption.

Only few studies have so fare examined the effects on household income related to mortality. The major difference between illness and mortality shocks is that a death of a household member does not only induce costs such as funeral costs and possibly losses in income, but that mortality reduces also the number of consumption units in the household. Therefore, whether the economic costs of household mortality are positive or negative depends on the balance between the funeral costs and the income loss on the one hand and the value of the basket formerly consumed by the deceased household member on the other hand. Accordingly the evidence in the literature is quite contrasting.

Beegle (2005) found for the region of Kagera in northwest Tanzania—a region strongly affected by the AIDS epidemic—only small and insignificant changes in labor supply of individuals in households having experienced a prime-age adult death. While some farm activities were temporarily scaled back and wage employment fell after a male death, households did neither shift cultivation towards subsistence food farming nor reduced their diversification over income sources. However Beegle did not identify the impact on household income related to prime-age adult mortality. Dercon and Krishnan (2000), estimated the effect of male and female adult mortality on the nutrition status (measured by the body-mass-index) of surviving household members in rural Ethopia. They also found no significant effects of mortality. Mather, Donovan, Jayne *et al.* (2004) analyzed the effect of prime-age adult mortality on rural household outcomes such as crop production, farm and non-farm profits using a set of household surveys for Kenya, Malawi, Mozambique, Rwanda, and Zambia, however in most cases without a panel dimension in the data. They found that in almost all cases, although affected households may well have suffered negative effects on household crop production and income, the average affected household had similar ex-post land cultivated, total land area, and total income. In contrast, many studies found a huge impact of parental mortality on children's schooling (see e.g. Gertler, Levine and Ames, 2003; Yamano and Jayne, 2003; Yamauchi and Buthelezi, 2005) suggesting that some coping strategies might have severe negative long run inter-generational effects.

Major drawbacks of these studies are that they only focus on adult mortality and that they distinguish only insufficiently between the immediate impact, and the impact after coping strategies have been implemented. Moreover, these studies fail to explain how the rather small effects of mortality on household outcomes can be reconciled with the fact that households themselves see the death of a household member generally as a major economic shock and tend to report high financial costs related to that death.

Trying to fill some of these gaps in the literature, I use panel data from the Indonesian Family Life Survey (IFLS). A special feature of this data is that it contains rather objective measures of household income as well as information about the subjective perceptions of households regarding the economic impact of the death of a household member. Households were asked to estimate the approximate costs during the past five years which where necessary to overcome this shock. Interestingly, using this data one also finds on the one hand that households perceive a death of a household member as a very costly shock, but that on the other hand growth of household consumption per surviving household member does not negatively but rather even positively react to the death of a household member.

The question is, how these two observations can be reconciled. Abstracting from measurement error as source for that discrepancy, one could argue that households only perceive the direct costs introduced by a death as the funeral costs or the loss of an income but that they do not account appropriately for the money which can be saved due to the fact that also the number of consumer units in the household decreased. It could also be that the surviving household members have the tendency to over-compensate the loss through their coping strategies. Hence, the short term or immediate impact could indeed be income decreasing, but the long term impact could be income increasing. Obviously, from a policy point of view, it is very important to distinguish these various cases and to find out if households economically suffer when household members die. If this is not the case the implementation of general formal safety nets which are still absent in most developing countries can give priority to other types of risks, such as unemployment, illness or natural disasters.

To answer this question I proceed as follows. In Section 2, I lay out the theoretical framework. In Section 3, I present the data. In Section 4, I exploit the information on the consequences of economic shocks provided by households in the IFLS. In Section 5, I estimate, also with the data from the IFLS, household consumption growth equations using various estimators controlling in each time for the occurrence of deaths by age, alternative shocks and various household and community characteristics. I also try to account for the possible endogeneity of deaths with respect to household consumption growth. In Section 6, I analyze the difference between the households' subjective perceptions and the results obtained by the growth regressions. In Section 7, I conclude and draw some policy implications.

2 Theoretical framework

In what follows, I focus rather on consumption than on income, i.e. the amount of money which is spent after households made their decisions regarding savings or disavings to smooth their consumption. As basic theoretical framework I use a simple model of household consumption growth, where the growth rate of household consumption between t and $t-1$, $\dot{c}'_{h,t}$ is given by:[2]

$$\dot{c}'_{h,t} = \alpha + \beta c_{h,t-1} + \gamma Z_h + \delta X_{h,t}, \quad (1)$$

where greek letters stand for vectors of parameters, $c_{h,t-1}$ is the consumption of the beginning of the period, Z_h is a vector of household specific characteristics which are constant over time, and $X_{h,t}$ is a vector of household specific characteristics which vary over time. When the coefficient β has a negative sign, household consumptions converge conditional on Z_h and $X_{h,t}$ allowing for differences in the steady state. The vector Z_h contains information about the initial productivity of the household such as the initial human and physical capital of the household. The vector $X_{h,t}$ contains information about changes in the productive factors. Both can arise from active actions of the household such as investment in human or physical capital, an increase in the labor used to generate c_h or from shocks—idiosyncratic or aggregate shocks—such as unemployment, illness or natural disasters. Hence, separating those shocks $S_{h,t}$ from $X_{h,t}$, the growth equation can be written as follows:

$$\dot{c}'_{h,t} = \alpha + \beta c_{h,t-1} + \gamma Z_h + \delta X_{h,t} + \zeta S_{h,t}. \quad (2)$$

Assuming that households have not perfect control about household structure, changes in the living standard of household h may be better expressed in terms of changes in household consumption per capita $\dot{c}_{h,t}$:

$$\dot{c}_{h,t} = \alpha + \beta c_{h,t-1} + \gamma Z_h + \delta X_{h,t} + \zeta S_{h,t} - \dot{n}_{h,t}, \quad (3)$$

where $\dot{n}_{h,t}$ stands for the growth rate of household size n_h, i.e. $\dot{n}_{h,t} = (n_{h,t} - n_{h,t-1})/n_{h,t-1}$.

Household size n_h increases with births $b_{h,t}$ and immigration into the household $i_{h,t}$ and decreases with emigration $e_{h,t}$ and deaths of household members $d_{h,t}$. This can be expressed by the following accounting identity:

$$n_{h,t} = n_{h,t-1} + b_{h,t} + i_{h,t} - e_{h,t} - d_{h,t}. \quad (4)$$

Abstracting from general equilibrium effects, which might arise in the economy through changes in the population structure, variations in n_h can have at least two kinds of effects. First, a *direct* effect, i.e. the household increases or decreases by a net consumer of household income or net contributor to household income. Second, an *indirect* effect, i.e. survivors of the household may, following changes in n_h, modify their labor supply behavior, their savings behavior and their use of non-labor income sources. Hence, the vector $X_{h,t}$ should comprise among other things $(\cdot)$ variations in $n_{h,t}$ caused by $b_{h,t}$, $i_{h,t}$, $e_{h,t}$, and $d_{h,t}$:

$$X_{h,t} = f(b_{h,t}, i_{h,t}, e_{h,t}, d_{h,t}, (\cdot)). \quad (5)$$

[2] In what follows, flow measures with the subscript t indicate changes between $t-1$ and t.

Births, immigration, emigration and deaths to the household can be completely exogenous, for instance, when a natural disaster or an accident kills a household member, or can be endogenous, for instance, if household consumption growth determines investment in health or incites household members to leave the household or external persons to join it.

It is straightforward to formulate hypotheses about the *direct* impact of these demographic changes on consumption growth per capita:

$$\frac{\partial \dot{c}_{h,t}}{\partial i_{i\epsilon h,t}} > 0, \quad \frac{\partial \dot{c}_{h,t}}{\partial e_{i\epsilon h,t}} < 0, \quad \frac{\partial \dot{c}_{h,t}}{\partial d_{i\epsilon h,t}} < 0$$

if individual i is a net contributor to household income per capita and

$$\frac{\partial \dot{c}_{h,t}}{\partial i_{i\epsilon h,t}} < 0, \quad \frac{\partial \dot{c}_{h,t}}{\partial b_{i\epsilon h,t}} < 0, \quad \frac{\partial \dot{c}_{h,t}}{\partial e_{i\epsilon h,t}} > 0, \quad \frac{\partial \dot{c}}{\partial d_{i\epsilon h,t}} > 0.$$

if individual i is a net consumer of household income per capita.

However, from a theoretical perspective it is not evident in which direction the *indirect* effects of demographic change affect household income per capita. In fact, that depends whether the remaining household members over-compensate or not through their behavioral reaction the direct effects. For instance, survivors might increase their labor supply after the death of the main income earner to an extent—intentionally or not—that household consumption per capita is higher than it was before. Hence, in what follows, I try to answer that question empirically.

3 Data

To analyze empirically the questions raised in the previous sections, I use three waves of the Indonesian Family Life Survey (IFLS) conducted by RAND, the University of California Los Angeles and the University of Indonesia's Demographic Institute. The IFLS is an ongoing longitudinal socioeconomic and health survey. It is representative of 83% of the Indonesian population living in 13 of the nation's current 26 provinces. The first wave (IFLS1) was conducted in 1993 and covers 33,083 individuals living in 7,224 households. IFLS2 sought to re-interview the same respondents in 1997. Those who had moved were tracked to their new location and, where possible, interviewed there. A full 94.4% of IFLS1 households were located and re-interviewed, in that at least one person from the IFLS1 household was interviewed. This procedure added a total of 878 split-off households to the initial households. The entire IFLS2 cross-section comprises 33,945 individuals living in 7,619 households. The third wave, IFLS3, was conducted in 2000. It covered 6,800 IFLS1 households and 3,774 split-off households, totaling 43,649 individuals. In IFLS3, the re-contact rate was 95.3% of IFLS1 households. Hence, nearly 91% of IFLS1 households are complete panel households.[3]

The IFLS contains among other things detailed information on the socio-demographic structure of households, their employment, their expenditures, their self-consumed production, made and received transfers, and financial and material assets. In addition a community survey which was added in each round to the IFLS allows to link community characteristics including infrastructure to each household. To measure consumption I add expenditures (excluding expenditures for durables) and self-consumed production. For each year household consumption is expressed in 1993 prices and adjusted by regional price deflators to the Jakarta price level.

It is possible to deduce from the household roster births, immigration, emigration and deaths to the households including the dates when these events occurred. Regarding health status, the survey provides a self-assessment for selected adults as well as anthropometric information for children. Moreover, the survey contains a specific section, where households were asked if they faced any economic shock or hardship during the past five years, such as a death of a household member, a natural disaster, a price shock or a drought. In 1993 households were also asked to enumerate the measures taken by the household to overcome this shock and to provide an estimate of the total costs involved. Whereas in 1997 only the occurrence of shocks was registered, in 2000 the survey asked households besides the measures undertaken also to declare separately in the case of a death the direct costs such as funeral costs as well as the costs which occurred through the loss of earnings if the deceased person was occupied. This 'subjective information' on the impact of a death of a household member will be compared with more objective and indirect information of changes in household consumption.

I used the data to construct a balanced panel over the three years 1993, 1997 and 2000. I retained only households which were interviewed in all three years and where consistent information on the key variables over time was available. That led to a sample of 6,303 households.

Without going into details of the Indonesia's recent social and economic development, it is important to remember that Indonesia was one of the hardest hit countries during the Asian financial crisis. The crisis started to be felt in the South-East Asia region in April 1997 and began to hit Indonesia in December 1997, just after IFLS2 was conducted. The sustained crisis period continued then in Indonesia more than a year. But in 2000, when IFLS3 was conducted, the population had returned to roughly its pre-crisis standard of living, with some people even a little better off (Strauss, Beegle, Dwijanto *et al.*, 2002). However, public health expenditure fell significantly during the crisis. In addition, the 1997/98 drought, which was a consequence of *El Niño*, and some serious forest fires caused serious health problems and

[3]For details see Strauss, Beegle, Sikoki *et al.*, (2004).

a sharp drop in food production in some regions. Rukumnuaykit (2003) showed that the drought and smoke pollution had significant adverse effects on infant mortality in rural areas. However, Strauss *et al.* (2002) found that adult body-mass-indices did not worsen and that the fraction of preschool-aged children with very low heights for their age and gender even fell over the 1997-2000 period.

4 Households' perceptions of the impact of deaths

Table 1 describes how households perceived a death of a household member. Roughly 10% of all households knew one or several deaths in their household during the five years preceding the survey. In 1993 the median costs reported by households to overcome a death of a household member during these five years is more than 260 thousand Ruphias (in prices of 1993), this corresponds to almost 50% of the median of yearly household expenditures per capita. In the year 2000, regarding the medical and funeral costs involved, the median household among those affected by a death declared to have spent 325 thousand Rupiah, which corresponds to approximately 40% of the median of yearly household expenditures per capita. Roughly 55% of the deceased household members did not have a monthly income, but among the 45% who had the median loss in earned income corresponded according to the households' declarations to almost 1.5 million Rupiah, which is almost the double of the median of yearly household expenditures per capita. In sum, the information provided in this section suggests that households perceive a death of a household member as a substantial reduction in their disposable income. To cope with that shock almost 40% of all households declared to have received assistance or transfers from other households. In addition almost a quarter of all households took loans, sold assets and used savings. 12% of all households in 1993 and 21% in 2000 declared to have increased labor supply.

[insert Table 1 here]

Households were not asked directly to what extent these measures were effective in compensating the costs induced by the death, but given the low percentage of households having declared to have reduced expenditures—5% in 1993 and 13% in 2000—it is possible that households are on average quite effective in coping with such shocks. This will be analyzed in detail in the next section using household consumption growth regressions.

5 The impact of mortality on household consumption growth

5.1 The econometric model

Based on the theoretical framework presented in Section 2, the determinants of growth of household consumption per capita are now investigated. It is tested whether demographic change, and in particular the death of a household member, has any significant impact on household consumption of survivors.

The simplest way to perform that test is to pool the household observations for both periods and to regress using OLS annual per capita consumption growth on time-invariant (Z_h) and time-varying ($X_{h,t}$) household characteristics, household specific economic shocks ($S_{h,t}$) and a period effect (T_t):

$$\dot{c}_{h,t} = \alpha + \gamma Z_h + \delta X_{h,t} + \zeta S_{h,t} + \tau T_t + \varepsilon_{h,t}, \tag{6}$$

where $\varepsilon_{h,t}$ is a household specific error term with mean zero. The considered time-invariant variables include a dummy for urban residence and dummies for the 13 provinces covered by the IFLS data. The time-varying variables include the sex, age and education level of the household head (the variability of the former variables is of course limited), household size, the share of young and old household members and dummies for demographic shocks affecting the household. The vector of self-reported household specific economic shocks includes dummies whether the household was affected between the surveys by a crop loss due to bad climatic conditions, by a natural disaster, by unemployment of a household member, or by a significant price decrease of goods it produces and sells. The period dummy takes the value zero for the period 1993 to 1997 and one for the period 1997 to 2000. The OLS estimator provides consistent and efficient estimates of the common α and the slope vectors γ, δ, ζ and τ if there is no unobserved heterogeneity correlated with the included variables. The demographic shocks included in X can be unpacked in dummy variables for births (b), immigration (i), deaths (d) and emigration (e) of individuals of age j occurring in household h between $t-1$ and t:

$$\dot{c}_{h,t} = \alpha + \gamma Z_h + \delta X_{h,t} + \kappa b_h + \sum_j \lambda_j i_j + \sum_j \mu_j d_j + \sum_j \nu_j e_j + \zeta S_{h,t} + \tau T_t + \varepsilon_{h,t}, \quad \text{with} \quad j = 1, \ldots, a^{\max}. \tag{7}$$

If $\mu_j = 0$ households are perfectly insured, because survivors' consumption does not respond to the death of a household member of age j, i.e. the risk is fully shared through market or non-market institutions. If $\mu_j < 0$ households face an imperfect insurance and lose, and, conversely, if $\mu_j > 0$ the direct effect of mortality is positive or the insurance system of households overcompensates the negative effects due to the death of a household member of age j.

To test for convergence, the logarithm of consumption per capita at the beginning of each period can also be included in the model:

$$\dot{c}_{h,t} = \alpha + \beta \ln c_{h,t-1} + \gamma Z_h + \delta X_{h,t}$$
$$+\kappa b_h + \sum_j \lambda_j i_j + \sum_j \mu_j d_j + \sum_j \nu_j e_j + \zeta S_{h,t} + \tau T_t + \varepsilon_{h,t}. \qquad (8)$$

Obviously, the inclusion of lagged consumption as a regressor may present econometric problems because of the endogeneity of lagged consumption in a consumption growth regression. This issue will be addressed below. Before I discuss the assumption of non correlation between unobserved factors and the included variables. It is very likely that unobserved household specific characteristics such as certain skills and preferences, and so on, are correlated with the included variables, and, hence, the OLS estimator is biased and inconsistent. Therefore, the model may be better estimated using the fixed effects (or within-group) estimator (FE):

$$\dot{c}_{h,t} = \alpha_h + \beta \ln c_{h,t-1} + \delta X_{h,t}$$
$$+\kappa b_h + \sum_j \lambda_j i_j + \sum_j \mu_j d_j + \sum_j \nu_j e_j + \zeta S_{h,t} + \tau T_t + \varepsilon_{h,t}, \qquad (9)$$

where α_h embodies all the household-specific time-invariant effects. The disadvantage of this model is that now obviously it is impossible to identify the effects of specific time-invariant household characteristics, because these effects are all absorbed in the fixed effect.

If the household fixed effects are strictly uncorrelated with the time-varying and time-invariant regressors, then it might be more appropriate to model the household specific constant terms as randomly distributed across cross-sectional units. This view would be appropriate if we believed that sampled cross-sectional units were drawn from a large population (Greene, 2003). It is not very likely that this assumption is valid for the used data sample, and hence the estimates are probably inconsistent. However, if the assumption is valid, the payoff to this form would be that it greatly reduces the number of parameters to be estimated and that also time-invariant covariates could be included in the model. The random-effects model (RE) is given by:

$$\dot{c}_{h,t} = \alpha + \beta \ln c_{h,t-1} + \gamma Z_h + \delta X_{h,t}$$
$$+\kappa b_h + \sum_j \lambda_j i_j + \sum_j \mu_j d_j + \sum_j \nu_j e_j + \zeta S_{h,t} + \tau T_t + u_h + \varepsilon_{h,t}, \qquad (10)$$

where u_h is the household specific random effect. The RE estimator can be tested against the FE estimator using a Hausman specification test.

The assumption that the unobserved household specific effects are uncorrelated with the included variables may of course be a major shortcoming of the RE model. Hausman and Taylor (1981) suggested an estimator which allows under some conditions to preserve the advantage of the FE estimator, i.e. correlation between the unobserved household specific effects and the included regressors, and the advantage of the RE estimator, i.e. the identification of effects linked to time-invariant household characteristics. To employ the Hausman-Taylor (HT) estimator, four types of explanatory variables have to be observed: (i) time-varying variables which are uncorrelated with u_h, $X_{1,h,t}$, (ii) time-invariant variables which are uncorrelated with u_h, $Z_{1,h}$, (iii) time-varying variables which are correlated with u_h, $X_{2,h,t}$, and (iv) time-invariant variables which are correlated with u_h, $Z_{2,h}$. The idea of the HT estimator is that the within estimator consistently estimates δ_1 and δ_2. Using these estimates, one can obtain the within-residuals. Intermediate, but consistent estimates of γ_1 and γ_2 are obtained by regressing the within-residuals on $Z_{1,h}$ and $Z_{2,h}$, using $X_{1,h,t}$ and $Z_{1,h}$ as instruments. The order condition for identification requires that the number of variables in $X_{1,h,t}$ be at least as large as the number of variables in $Z_{2,h}$, and that there be sufficient correlation between the instruments and $Z_{2,h}$ to avoid a weak instrument problem. The variables in $X_{2,h,t}$ have to exhibit sufficient within-panel variation to serve as their own instruments. The within estimates of δ_1 and δ_2 and the intermediate estimates of γ_1 and γ_2 can be used to obtain sets of within and overall residuals. These two sets of residuals can be used to estimate the variance components. The estimated variance components can then be used to perform a GLS transformation for each of the variables. The HT estimator of the coefficients of interest can then be obtained by instrumental variables regression (Greene, 2003). To implement the HT estimator, I use the self-reported occurrence of crop loss, a natural disaster, and a price shock, the period dummy and average wealth in the community where the household is located as time-varying exogenous variables ($X_{1,h,t}$), the logarithm of household income per capita and unemployment in the household and the demographic shock variables as time-varying endogenous variables ($X_{2,h,t}$), sex and age of the household head, the urban dummy and the province of residence all measured in 1993 as time-invariant exogenous variables ($Z_{1,h}$), and household size in 1993 as time-invariant endogenous variable ($Z_{2,h}$).

A further alternative would in principle be the Jalan-Ravallion estimator (Jalan and Ravallion, 2002) that allows for some time-varying latent heterogeneity. This estimator relies on a decomposition of the error term and quasi-differencing techniques to obtain using a GMM procedure estimates of the parameters of interest. However, to apply this estimator one needs at least four rounds of data, i.e. three growth rates. Therefore this method is not used here, where just three rounds of data are available.

Two econometric problems were not yet discussed. First, as mentioned above, consumption per capita observed at the beginning of the period is likely to be endogenous with respect to the growth rate of consumption per capita. To solve this problem consumption per capita is instrumented using the logarithm of household wealth, dummies for the quality of roads in the community and dummies for the sectoral composition of employment in the community.

Second, household mortality might also be endogenous with respect to the growth rate of household consumption per capita.[4] For instance, a sharp drop in household consumption per capita might hinder a household to prevent the death of an ill household member through appropriate health investments. Or, conversely, the household sells assets to increases nutrition and medical expenditures and just prevents by this measure the death of an ill member. To address this problem I try to instrument household mortality. As instruments I use whether the household head is male and the crude death rate in the community. The crude death rate is computed over the sample population and is therefore certainly only a rough measure of community specific mortality conditions. A better measure would be age-specific mortality rates computed via regional census data. However, these statistics were not available. But this type of instrumentation has also another shortcoming. The crude death rate in the community might also be known by the household. What is really needed are instruments which exclude all predictable death events like a real exogenous shock on mortality caused by some natural disaster or an accident. Unfortunately the survey does not provide direct information on such death events. But, for adults the survey contains self-assessed health: adults had the choice to declare themselves as 'very healthy', 'somewhat healthy', 'somewhat unhealthy' and 'unhealthy'. I assume that adults who died between $t-1$ and t and who declared themselves 'very healthy' or 'somewhat healthy' in $t-1$ died through an exogenous cause. Obviously, this is a very imperfect measure, especially because, it is well known, that self-assessments of health depend itself on income (see e.g. Crossley and Kennedy, 2000), but in lack of any other information it might be worth to test this approach.

Table 2 presents some descriptive statistics of the dependent and explanatory variables used for estimation.

[insert Table 2 here]

5.2 Estimation results

Table 3 shows the results of the pooled regression, the fixed effects regression, the random effects regression and the random effects regression using

[4]Obviously, this applies also to the other included demographic shocks e, b and i, but given the focus on household mortality, the issue will not be addressed for these other variables.

the HT estimator. With respect to the variables of interest the results differ not substantially between the four used models. But the parameter estimate of the (instrumented) logarithm of income per capita depends significantly on the estimator chosen. This parameter is negative and significantly different from zero in all estimations, but the indicated conditional convergence is much faster and closer to that obtained when no instrumentation is used when the FE or HT estimators are employed (approximately 0.004 percentage points vs. 0.0005 percentage points less growth for an increase of consumption per capita by one percent). This may result from the fact that the instrument variables do not exhibit sufficient variation over time within households, and, hence the coefficient obtained by the FE estimator is biased. The highest explanatory power is achieved with the FE model with an adjusted R^2 of 0.26. However, the hypothesis that all household fixed effects are zero cannot be rejected with certainty ($P= 0.26$). In contrast, a Breusch-Pagan test for the RE model indicates that the hypothesis that all random effects are zero can be comfortably rejected ($P< 0.01$). However, using a Hausman specification test one can reject the hypothesis of orthogonality of the random effects and the regressors, and hence the FE model should be preferred against the RE model. The HT estimator is a nice alternative by allowing to combine random effects with time-invariant regressors, but again a Hausman specification test shows that the HT estimates are inconsistent and FE estimates should be preferred.

Four types of deaths are distinguished in the regressions: the death of a child (0-14 years old), the death of an adult man (15-59), the death of an adult woman (15-59), and the death of an elderly person (60 years and older). Surprisingly, in all specifications all these types of deaths, except that of an adult woman, have a significant positive effect on the growth rate of household consumption per capita. Depending on the estimation, the occurrence of at least one death of a child increases the annual growth rate of household consumption per capita by four to eight percentage points. The death of an elderly person is associated with an increase by three to six percentage points. The death of an adult man still increases the growth rate by three to six percentage points. These effects may appear very large, but imagine the following case: if in a four-person household an inactive person dies, then the *direct* effect of that death would be to increase consumption per survivor by 33 percent, which is about seven times the median growth rate in the sample.

Emigration of household members has roughly the same effect on household consumption—in direction and magnitude—than mortality. All coefficients are significantly positive and different from zero. The highest effect is related to the emigration of a child and an older household member. The effect of emigrating adults is a bit lower, but still significantly different from zero for both men and women. Births and immigration, i.e. the increase of the number of household members, has a negative effect. The birth of child reduces on average the annual growth rate of household consumption per capita by roughly five percentage points, which is slightly more than the median growth rate in the sample. The effect of an immigrating older person also lies in this range. Immigrating male and female adults decrease the growth rate by two to four percentage points. All the estimated parameters for the demographic shocks suggest that generally an additional member consumes more than it earns. This seems plausible for a newborn, a child or an older retired person, but surprises for an adult in age of activity. Some of the individuals in age of activity who died, may have known a period of illness and thus inactivity before their death, and hence their disappearance may imply an economic relief for these households. An alternative explanation is that surviving household members are very efficient in coping which such shocks through higher labor supply, disaving, the sale of assets and the reception of transfers from other households like parents, siblings, and children, and hence, on average, over-compensate the direct income loss through the death of an active person. In this respect it is also interesting to check whether the effect of a death on household income depends on the time which elapsed since the death. These hypotheses are examined in the next section, but before it is worth to discuss the coefficients of some other included control variables and to check if the results hold if the endogeneity of household mortality is taken into account.

[insert Table 3 here]

The effects of other shocks by which households were possibly affected are in most cases not significant different from zero. This is also due to the fact that most of these shocks occur not very frequently (see Table 2). Crop loss, a natural disaster and a price shock comes never out as significant. Unemployment of a household member seems, as one can expect, to reduce the growth rate of household consumption per capita, but only weakly, what again suggests that households are very efficient in coping with shocks.

As outlined in the previous sub-section, household mortality might be endogenous with respect to growth of household consumption. To take this endogeneity into account, household mortality is instrumented and the fixed effects model is re-estimated. To limit the variables which have to be instrumented, only a dummy variable indicating whether the household knew at least one death during the past period is considered. Table 4 shows that the positive effect of mortality on household income holds when the possible endogeneity is taken into account. However, a Sargan test of overidentifying restrictions shows that the instruments are only hardly valid, and hence the result should be taken with caution.

[insert Table 4 here]

Another mean to test if endogeneity might be a problem is to look at death events which can be assumed to be clearly exogenous to household income, like deaths resulting from accidents. As discussed above, an acceptable proxy of such deaths might be to pick up those which concerned individuals who declared themselves at the beginning of the period as to be 'healthy' or 'somewhat healthy' (vs. 'somewhat unhealthy' and 'unhealthy'). Such self-assessments of the health status are available in the survey for adult men and adult women. Table 5 shows that there is no systematic difference regarding the impact of 'accidental' deaths and other deaths. The positive impact of deceased adult men on survivors' consumption still holds. The impact of deceased adult women is not significant, for both 'accidents' and other causes.

[insert Table 5 here]

To sum up, the micro-economic growth regressions clearly suggest that mortality has a rather positive and not negative impact on the consumption level of survivors. This is in contrast with the perceptions of households described in Section 4. Several explanations might be behind that difference. First, households report in their self-assessment the direct and immediate impact of mortality which consists essentially in medical costs preceding the death, funeral costs and a possible income loss and they disregard the reduction in consumer units. Second, households underestimate in their self-assessment the efficiency of their coping strategies, such as higher labor supply, the sale of assets and disaving or the reception of informal transfers from relatives and friends outside the household. Both hypotheses are examined in more detail in the next section.

6 Reconciling households' perceptions with the results from growth regressions

To check whether households' perceptions rely essentially on the short term and direct impact, I re-estimate the fixed-effects model and include interaction effects between the mortality dummies and the number of months which have elapsed between the beginning of the period and the most recent death event within the household in that period. If the direct impact is negative due to funeral costs and possibly an immediate loss of income and the medium-term effect is positive due less consumers in the household and/or efficient coping mechanisms, the interaction term should show a negative sign; the closer the death to the end of the period, the more household income per capita should be affected by the direct costs. The results in Table 6 show that the interaction effects are only hardly significant whether deaths are considered in general or deaths are separated by age groups.[5]

[5]This was also the case if duration entered the interaction effect with a quadratic term.

They suggest—taken a death in general—that the effect is higher the closer the death event to the end of the period. The consideration by types of deaths shows that this effect is entirely driven by the death of children, suggesting that the death of a child does not involve any substantial economic costs but, in contrast, exacerbates directly a rather positive impact on the consumption of survivors.

[insert Table 6 here]

Next, I investigate to what extent survivors react to household mortality. Two types of reactions are considered in detail: the sale of assets and disaving and higher labor supply.

Whether households insure themselves against the death of a breadwinner by building up assets in good years, which they deplete in bad years is investigated by regressing growth of household wealth on the mortality dummies, initial wealth and the same control variables than those used in the consumption growth regressions. Wealth is evaluated at its current value using the households' self-assessments and deflated to 1993 (Jakarta) Rupiahs. It includes farm and non-farm land (used for business or not), houses and buildings (used for business or not), vehicles (used for business or not), livestock, hard stem plants, heavy and small farm and other business equipment, household appliances, jewelry, financial savings and receivables. Table 7 shows that whereas a death of a child and an older person have no significant impact on changes in wealth over time, a death of an adult has a significant negative impact on household wealth, suggesting that survivors try to cope with the death of an adult household member by depleting assets to finance current expenditures. The estimations imply depending on the model used a reduction of the annual growth rate of household wealth by approximately five to seven percentage points. If this effect is compared to that of adult mortality on consumption growth—both evaluated for the median household—the regression results suggest that a death of an adult man implies 78 thousand Rupiahs less wealth per capita and 39 thousand Rupiahs higher consumption per capita per year. Hence, households seem indeed to deplete assets to cover the direct costs involved with a death, but in so doing rather over-compensate the total loss. Again, it is interesting to find that no such wealth effect can be observed for the death of children and older persons. For them, the direct medical and funeral costs seem to be completely compensated by the decrease in consumer units.

[insert Table 7 here]

The second coping strategy which is considered is labor supply. Table 8 shows the estimated parameters of two probit models which describe the association between mortality and the propensity of individuals (older than

15 years) to work and earn an income in the year 2000, controlling for other shocks, sex, age, age squared, education, household size, the position in the household and urban/rura residence. The first model is estimated on those individuals active in 1993 and the second on those individuals inactive in 1993. Household mortality is measured with one dummy variable taking the value one if the individual has known in her/his household at least one death during the period 1993 and 2000. An analysis for the sub-periods 1993 to 1997 and 1997 to 2000 cannot be done, because the employment module of the IFLS2 is not yet available. The first model shows clearly that household mortality increases the propensity of individuals to work. If an individual is confronted with a death within her/his household the probability of a survivor to work increases by 1.9 percent if the individual was already active in 1993 and by 6.1 percent if the individual was inactive in 1993 (both marginal probabilities evaluated at the sample mean). These orders of magnitude are obviously rather low, but they possibly would have been come out higher, if it had been possible to estimate the probit models also by sub-periods and, hence, to capture the labor supply effect directly after the death event. Interestingly, most of the other economic shocks are also associated with higher labor supply. In contrast, immigration of new persons into the household is associated with lower labor supply. These results are in line with evidence provided by Yamauchi and Buthelezi (2005) who showed using South-African data that the death of working prime-age adult household members increases labor supply among older boys. For the case of South India, Kochar (1995) also found increased labor supply as the key response to adult mortality.

[insert Table 8 here]

A third possibility of survivors to cope with household mortality is to rely on transfers from other households. Unfortunately, transfers have not been asked in a consistent way over the three surveys and it seems that they are strongly affected by measurement error. Even when concentrating only on those transfers received by the household head and the spouse from their parents, siblings and children outside the household, it was not possible to identify any significant effect of household mortality, neither when the amount of transfers is considered nor when simply the fact that they received transfers is considered. In general it was very difficult to explain any variation in transfers. The only variables which had really some explanatory power were regional dummies, suggesting that transfers occur in particular in specific regions. However, between 60 percent and 75 percent of all households declared to have received transfers from family members outside the household.

7 Conclusion and policy implications

The results from this study suggest that the effect of mortality on survivors' consumption strongly depends whether a child, an older person or an prime-age adult person dies, i.e. what seems to matter is what happens to the households' dependency ratio. The economic costs related to the death of children and older persons like medical expenses preceding the death and funeral cost seem to be fully compensated by the decrease of consumption units in the household. In contrast, when prime-age adults die, survivors face additional costs due to the loss of income earned by the deceased household member and, hence, they have to implement appropriate coping strategies. Two of them have been analyzed in detail: the depletion of assets and higher labor supply. Both are shown to respond positively to adult mortality. For instance, the estimations suggest that the death of an adult household member implies on average during the three to five years following the death a reduction of household wealth per capita by 78 thousand Rupiahs per year and an increase of consumption per capita by 39 thousand Rupiahs per year. This suggests that survivors perceive, when asked about the economic impact of a death, first of all the direct impact of mortality and disregard the efficiency of their coping strategies and the reduction of consumer units in the household, which is related to that death.

While a death of a household member is without doubt tragic and costly in its own right, it is interesting to find, that in average survivors even over-compensate the economic costs induced by mortality and are obviously better off than before. Cynically spoken, there is a 'gift of the dying', expression coined by Young in a recent paper (Young, 2005), where he studied the long term impact of AIDS mortality on economic growth in South-Africa. He argued that in the long run it is likely that the negative effects of a decline in human capital due to mortality are over-compensated by a mortality induced decline in fertility and a resulting increase in investment in human capital. It is also interesting to note that the results of this study are in line with another study on Indonesia, where on a higher aggregation level, it is shown that mortality modifies only slightly poverty and inequality measures over time (see Cogneau and Grimm, 2004).

The ability of households to cope rather well with mortality shocks suggests that the implementation of general formal safety nets which are still absent in Indonesia—as in most developing countries—can give priority to the insurance of other types of risks, such as unemployment, illness or natural disasters. Unemployment for instance, had in almost all regressions a negative, and mostly significant, impact on growth of consumption per capita.

However, the finding that Indonesian households are quite efficient in coping with economic shocks has also be shown by other studies. For instance, Thomas, Smith, Beegle *et al.* (2002) found that Indonesian households following the financial crisis in 1997/98 adopted strategies to mitigate the effects of the crisis, which appear to have been most successful at least for those at the top of the income distribution. Frankenberg, Smith and Thomas (2003), report that "a wide array of mechanisms were adopted in response to the financial crisis. Households combined to more fully exploit benefits of scale economies in consumption. Labor supply increased even as real wages collapsed. Households reduced spending on semi-durables while maintaining expenditures on foods. Rural households used wealth, particularly gold, to smooth consumption." Cameron and Worswick (2003), showed that rural Indonesian households compensated successfully income losses from crop loss through higher labor supply avoiding to reduce consumption expenditure. They also showed that household members did not need to increase their total hours of work as the crop losses appear to reduced the value of their time in household farming allowing them to take on extra jobs. However, despite these strategies for managing and coping with risk, vulnerability to consumption shortfalls remains high in developing countries and further development of safety nets is therefore necessary. The study of Gertler, Levine and Ames, (2003) also showed that in some Indonesian households coping with shocks implied to withdraw children from school, which may have substantial costs in the long run, by shifting the burden to the next generation.

Finally, the conclusion should not end without mentioning that panel data with larger sample sizes and more waves and thus a higher number of death events would be helpful to analyze the impact of mortality on household consumption and the response of survivors' to such shocks in more detail and more precisely.

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Tables and Figures

Table 1
Occurrence of deaths, costs and measures to cope with

	1993	1997	2000
Share of HH having known a death within the past 5 years	0.10	0.10	0.09
Median cost to overcome the death within past 5 years[a,b,c]	263.7		
In relation to yearly median per capita expenditure	0.48		
Median cost of medical and funeral[a,c,d]			325.1
In relation to yearly median per capita expenditure			0.41
Median yearly income of the deceased [a,c,d]			0
Median yearly income of the deceased (if occupied)[a,c,d,e]			1,509.7
In relation to yearly median per capita expenditure			1.97
Measures taken to overcome the death[a,f]			
Increased labor supply/activity	0.12		0.21
Taken a loan	0.23		0.24
Sold assets	0.25		0.18
Used savings	0.19		0.19
Got transfers/assistance	0.39		0.37
Cut expenditures	0.05		0.13
Observations n	6,303	6,303	6,303

Notes: [a] Not available in 1997 (IFLS 2). [b] Not available in 2000 (IFLS 3). [c] In thousands of real Rupiah (1993, Jakarta). [d] Not available in 1993 (IFLS 1). [e] 45% percent of all declared deaths in this section concerned household members with an income. [f] Multiple declarations possible.

Source: IFLS1, IFLS2 and IFLS3; computations by the author.

Table 2
Description of the sample used

	1993/1997		1997/2000	
	Mean	S.D.	Mean	S.D.
Household head male	0.850		0.828	
Age of hh head	45.7	14.0	48.8	13.7
HH head no education	0.194		0.177	
HH head primary education	0.508		0.517	
HH head secondary ed. and more	0.298		0.306	
Household size	4.7	2.1	4.6	2.0
Share young (0-15) in hh	0.307		0.279	
Share older (60 and older) in hh	0.109		0.131	
Urban residence	0.456		0.452	
Death of a child	0.010		0.007	
Death of an adult man	0.025		0.018	
Death of an adult woman	0.016		0.014	
Death of an older person	0.057		0.055	
Emigr. of a child	0.136		0.131	
Emigr. of an adult man	0.214		0.200	
Emigr. of an adult woman	0.197		0.205	
Emigr. of an older person	0.008		0.017	
Birth	0.276		0.193	
Immigr. of a child	0.091		0.079	
Immigr. of an adult man	0.112		0.142	
Immigr. of an adult woman	0.110		0.124	
Immigr. of an older person	0.022		0.020	
Crop loss (hh level)	0.112		0.097	
Natural disaster (hh level)	0.018		0.012	
Unemployment (hh level)	0.036		0.035	
Price shock (hh level)	0.078		0.040	
Annual growth of real monthly hh cons. p.c.	0.095	0.201	0.039	0.238
Yearly hh cons. p.c. (in 1000 rupiahs)	956	3793	1077	1251
Annual growth of real hh wealth	0.111	0.325	0.021	0.342
Real hh wealth (in 1000 rupiahs)	31500	155000	27900	84200
n	6303		6303	

Notes: Stocks are measured at the beginning of the period.

Source: IFLS1, IFLS2 and IFLS3; compuations by the author.

Table 3
Growth regressions of household consumption per capita

Dependent variable	pooled IV reg			*FE* IV reg		
Growth rate	Coeff.		S.E.	Coeff.		S.E.
ln Expenditure (IV)	-0.051	***	0.012	-0.355	***	0.048
Death of a child	0.073	***	0.019	0.087	***	0.022
Death of an adult man	0.036	***	0.012	0.066	***	0.014
Death of an adult woman	0.026	*	0.014	0.015		0.016
Death of an older person	0.060	***	0.008	0.059	***	0.009
Emigr. of a child	0.064	***	0.006	0.060	***	0.007
Emigr. of an adult man	0.044	***	0.005	0.053	***	0.006
Emigr. of an adult woman	0.048	***	0.005	0.048	***	0.006
Emigr. of an older person	0.073	***	0.016	0.069	***	0.018
Birth	-0.068	***	0.004	-0.055	***	0.006
Immigr. of a child	-0.054	***	0.007	-0.064	***	0.008
Immigr. of an adult man	-0.036	***	0.006	-0.040	***	0.007
Immigr. of an adult woman	-0.027	***	0.006	-0.034	***	0.007
Immigr. of an older person	-0.054	***	0.012	-0.050	***	0.014
Crop loss (hh level)	-0.002		0.006	-0.003		0.007
Natural disaster (hh level)	0.017		0.015	0.021		0.017
Unemployment (hh level)	-0.017	*	0.010	0.004		0.011
Price shock (hh level)	0.011		0.008	0.009		0.009
1997-2000 dummy	-0.045	***	0.005	0.044	***	0.015
Constant	0.747	***	0.125	4.207	***	0.547
ρ (fraction of var due to α_h)					0.685	
H0: all α_h=0 (P > F)					0.251	
Adj. R^2		0.221			0.260	
n		12606			12606	

Notes: $*$ significant at the ten percent level. $**$ significant at the five percent level. $***$ significant at the one percent level. Other included control variables are age and age squared of the household head, household size and the share of young (0-15 years old) and older (60 years and older) household members. In the pooled regression are included in addition a dummy for male household heads, dummies for the education level of the household head, dummies for urban residence and dummies for residence in one of the 13 provinces. Household expenditure per capita is instrumented using household wealth, community employment shares (eight categories), and dummies for road quality in the community.

Source: IFLS1, IFLS2 and IFLS3; estimations by the author.

Table 3 (... *continued*)
Growth regressions of household consumption per capita

Dependent variable	*RE* IV reg			*HT* reg		
Growth rate	Coeff.		S.E.	Coeff.		S.E.
ln Expenditure (IV)	-0.051	***	0.012	-0.378	***	0.004
Death of a child	0.074	***	0.019	0.047	**	0.021
Death of an adult man	0.037	***	0.012	0.032	**	0.013
Death of an adult woman	0.026	*	0.014	-0.011		0.016
Death of an older person	0.060	***	0.008	0.031	***	0.008
Emigr. of a child	0.064	***	0.006	0.023	***	0.006
Emigr. of an adult man	0.044	***	0.005	0.021	***	0.005
Emigr. of an adult woman	0.048	***	0.005	0.018	***	0.005
Emigr. of an older person	0.074	***	0.016	0.044	***	0.017
Birth	-0.068	***	0.004	-0.028	***	0.005
Immigr. of a child	-0.054	***	0.007	-0.032	***	0.007
Immigr. of an adult man	-0.036	***	0.006	-0.018	***	0.006
Immigr. of an adult woman	-0.027	***	0.006	-0.006		0.007
Immigr. of an older person	-0.054	***	0.012	-0.023	*	0.013
Crop loss (hh level)	-0.002		0.006	-0.005		0.007
Natural disaster (hh level)	0.017		0.015	0.018		0.016
Unemployment (hh level)	-0.017	*	0.010	-0.004		0.011
Price shock (hh level)	0.011		0.008	0.009		0.008
1997-2000 dummy	-0.045	***	0.005	0.055	***	0.003
ln Wealth (community average)				-0.005	*	0.003
Constant	0.740	***	0.131	5.154	***	0.381
ρ (fraction of var due to u_h)		0.027			0.985	
H0: var(u) = 0 (P $>\chi^2$)		0				
H0: *RE*,*HT* efficient, *FE* not (P $>\chi^2$)		0			0	
Adj. R^2		0.243				
n		12606			12606	

Notes: $*$ significant at the ten percent level. $**$ significant at the five percent level. $***$ significant at the one percent level. The *RE* model includes in addition to the control variables used in the *FE* model a dummy for male household heads, dummies for the education level of the household head and dummies for urban residence as well as dummies for residence in one of the 13 provinces. Household expenditure per capita is instrumented using household wealth, community employment shares (eight categories), and dummies for road quality in the community. The *HT* estimator uses crop loss, natural disaster, price shock, the period dummy and average wealth in the community as time-varying exogenous variables, the logarithm of household income per capita and unemployment in the household and the demographic shock variables as time-varying endogenous variables, sex and age of the household head, the urban dummy and the province of residence all measured in 1993 as time-invariant exogenous variables, and household size in 1993 as time-invariant endogenous variable.

Source: IFLS1, IFLS2 and IFLS3; estimations by the author.

Table 4
Growth regressions of household consumption per capita
Instrumenting household mortality

Dependent variable	*FE* reg			*FE* IV reg		
Growth rate	Coeff.		S.E.	Coeff.		S.E.
Death in the household	0.056	***	0.007	0.082	***	0.030
Instrumental variables						
Household head male				0.028	***	0.007
Crude death rate in commun.				0.499	***	0.151
Constant				0.063	***	0.008
ρ (fraction of var due to α_h)	0.723			0.724		
H0: all α_h=0 (P > F)	0			0		
H0: IV valid, Sargan test (P > χ^2)				0.029		
Adj. R^2	0.255			0.255		
n	12606			12606		

Notes: $*$ significant at the ten percent level. $**$ significant at the five percent level. $***$ significant at the one percent level. Both regressions include all control variables noted in Table 3 (*FE*), including the dummies for emigration, birth and immigration.

Source: IFLS1, IFLS2 and IFLS3; estimations by the author.

Table 5
Growth regressions of household consumption per capita
Distinguishing death by 'accidents' and other causes

Dependent variable	*FE* reg		
Growth rate	Coeff.		S.E.
Death of a child	0.085	***	0.022
Death of an adult/older man by 'accident'	0.042	**	0.017
Death of an adult/older woman by 'accident'	0.032		0.020
Death of an adult/older man not by 'accident'	0.056	**	0.022
Death of an adult/older woman not by 'accident'	-0.018		0.023
ρ (fraction of var due to α_h)	0.678		
H0: all α_h=0 (P $>$ F)	0.273		
Adj. R^2	0.259		
n	12606		

Notes: $*$ significant at the ten percent level. $**$ significant at the five percent level. $***$ significant at the one percent level. The regression includes all control variables noted in Table 3 (FE), including the dummies for emigration, birth and immigration.

Source: IFLS1, IFLS2 and IFLS3; estimations by the author.

Table 6
Growth regressions of household consumption per capita
Introducing time interaction effects

Dependent variable	*FE* reg			*FE* reg		
Growth rate	Coeff.		S.E.	Coeff.		S.E.
Death in the household	0.041	***	0.011			
Survival time x Death in the hh	0.001	*	0.000			
Death of a child				0.046	***	0.033
Death of an adult man				0.054		0.025
Death of an adult woman				0.030	**	0.031
Death of an older person				0.044		0.015
Survival time x Death child				0.003	***	0.002
Survival time x Death adult man				0.001		0.001
Survival time x Death adult woman				-0.001		0.001
Survival time x Death older person				0.001		0.001
ρ (fraction of var due to α_h)		0.682			0.686	
H0: all α_h=0 (P $>$ F)		0.289			0.228	
H0: all inter. effects = 0 (P $>$ F)					0.265	
Adj. R^2		0.260			0.260	
n		12606			12606	

Notes: $*$ significant at the ten percent level. $**$ significant at the five percent level. $***$ significant at the one percent level. The 'survival time' corresponds to the number of months which have elapsed between the beginning of the period and the most recent death event within the household in that period. Both regressions include all control variables noted in Table 3 (FE), including the dummies for emigration, birth and immigration.

Source: IFLS1, IFLS2 and IFLS3; estimations by the author.

Table 7
Growth regressions of household wealth

Dependent variable	*FE* reg			*RE* reg		
Growth rate	Coeff.		S.E.	Coeff.		S.E.
ln Wealth	-0.327	***	0.004	-0.113	***	0.002
Death of a child	0.052		0.036	0.036		0.031
Death of an adult man	-0.050	**	0.023	-0.069	***	0.020
Death of an adult woman	-0.031		0.027	-0.069	***	0.024
Death of an older person	-0.015		0.016	-0.011		0.013
Emigr. of a child	-0.015		0.011	-0.030	***	0.009
Emigr. of an adult man	-0.013		0.010	-0.032	***	0.008
Emigr. of an adult woman	-0.019	**	0.010	-0.001		0.008
Emigr. of an older person	-0.119	***	0.030	-0.120	***	0.025
Birth	-0.010		0.009	-0.007		0.007
Immigr. of a child	0.022	*	0.013	0.041	***	0.011
Immigr. of an adult man	0.040	***	0.011	0.054	***	0.009
Immigr. of an adult woman	0.039	***	0.012	0.042	***	0.010
Immigr. of an older person	0.022		0.025	0.048	**	0.021
Crop loss (hh level)	-0.011		0.012	0.010		0.010
Natural disaster (hh level)	0.009		0.028	0.007		0.024
Unemployment (hh level)	-0.052	***	0.019	-0.049	***	0.016
Price shock (hh level)	0.009		0.014	0.022	*	0.012
1997-2000 dummy	0.007		0.006	-0.051	***	0.005
Constant	4.852		0.096	1.564		0.049
ρ (fraction of var due to α_h, u_h)		0.806			0.253	
H0: all α_h=0 (P $>$ F)		0				
H0: var(u) = 0 (P $>$ χ^2)					0	
H0: *RE* efficient, *FE* not (P $>$ χ^2)					0	
Adj. R^2		0.160			0.203	
n		11394			11394	

Notes: $*$ significant at the ten percent level. $**$ significant at the five percent level. $***$ significant at the one percent level. The FE model includes as control variables the age and age squared of the household head, household size and the share of young (0-15 years old) and older persons (60 years and older) in the household. The RE model includes in addition a dummy for male household heads, dummies for the education level of the household head and dummies for urban residence as well as dummies for residence in one of the 13 provinces. 606 households were not used for the regressions, because their growth rate exceeded 100 percent. While that can of course be real, especially for very low initial levels of wealth, they influence enormously the results.

Source: IFLS1, IFLS2 and IFLS3; estimations by the author.

Table 8
Employment probit model

Dependent variable	Employed in 1993			Not empl. in 1993		
Being employed in 2000	Coeff.		S.E.	Coeff.		S.E.
Death in the household	0.094	*	0.056	0.158	**	0.066
Emigration of at least one person	0.019		0.045	0.132	**	0.052
Immigration of at least one person	-0.143	***	0.040	-0.229	***	0.047
Crop loss (hh level)	0.025		0.052	0.204	***	0.067
Natural disaster (hh level)	0.199		0.123	-0.189		0.147
Price shock (hh level)	0.137	**	0.063	0.015		0.077
Male	0.636	***	0.068	0.565	***	0.098
Age	0.047	***	0.010	0.032	***	0.010
(Age squared)/100	-0.086	***	0.010	-0.066	***	0.011
Primary education	-0.099	*	0.052	-0.120	**	0.060
Secondary education and more	-0.140	**	0.063	-0.276	***	0.075
Spouse of household head	-0.204	***	0.070	-0.047		0.086
Child of household head	-0.128		0.192	-0.057		0.145
Other household member	-0.337	***	0.124	-0.322	***	0.121
Household size	-0.018		0.011	-0.024	*	0.013
Urban	-0.194	***	0.043	-0.303	***	0.050
Constant	0.789	***	0.228	0.101		0.225
Pseudo R^2		0.143			0.097	
n		7218			3515	

Notes: $*$ significant at the ten percent level. $**$ significant at the five percent level. $***$ significant at the one percent level.

Source: IFLS1, IFLS2 and IFLS3; estimations by the author.