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The effect of prime age adult mortality on household composition and consumption in rural Ethiopia

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ABSTRACT

Using panel data from Ethiopia covering 1994–1997, we estimate the impact of prime age adult mortality on household composition, household expenditures and dietary diversity. We employed propensity score matching with a difference-in-difference estimator to control for endogeneity of mortality to the outcomes of interest. Households losing a productive adult did not replenish the lost labor, regardless of economic status, sex or status of the deceased adult. With the exception of non-poor households, adult mortality resulted in increased dependency ratios, but did not adversely affect households' expenditure patterns (total, food and non-food expenditures) regardless of the sex and position of the deceased and the economic status of the households. Although food expenditures were protected, a decline in dietary diversity, especially among the poorest households, reflected increased nutrition insecurity associated with adult mortality.

Introduction

With the death of an adult member of a household, that household must adjust to the consequent loss of labor and related income, to loss of management skills, and to loss of acquired human capital investment. Loss of an individual's labor and related income may result in changes in the demographic composition of the household and in its expenditure patterns. Although there are recent contributions to this literature (Mason et al., 2010; Linnemayr, 2010; Grimm, 2010; Hosegood, 2009; Chapoto and Jayne, 2008; Beegle et al., 2008), there remains a need for rigorous empirical studies on the magnitude of the effects of prime age adult mortality (PAM) on household and individual welfare outcomes, their magnitude, and variations across different contexts. Understanding these effects is critical to developing effective ways of responding to adult mortality, especially with the persistence of the HIV/AIDS epidemic in Africa. Building on the literature, this paper evaluates the impact of PAM on household composition, total expenditures, food expenditures, non-food expenditures, and dietary diversity in rural Ethiopia.

This paper draws on two strands of literature. The first flows from the broader literature on consumption smoothing. The theory of full insurance initiated by Arrow (1964) in this literature indicates that the value of consumption at the margin for each household is the same, provided there are institutions that pool risks and that can make Pareto-optimal allocation possible. This implies that the growth in household consumption will respond to the growth in aggregate level consumption but not to idiosyncratic shocks such as illness or transient variation in income. This means that well-functioning risk-sharing institutions will mitigate the consumption effects of idiosyncratic shocks across households within a village. There is evidence that households are able to smooth consumption over short time horizons such as over agricultural seasons (Townsend, 1994).

When a family member falls ill, households incur direct costs of illness such as medical expenditures and indirect costs such as loss of labor, income (in case of a productive member falling ill) and lost productivity of those providing care. Studies investigating the impact of illnesses show that households, on average, are able to protect income in response to illnesses (Townsend,

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1994; Kochar, 1995; Wagstaff, 2007). But Gertler and Gruber (2002) in Indonesia and Cochrane (1991) in the United States find that minor illnesses (that is, illnesses of short duration) are insured while major illness of long duration are not fully insured.

In Ethiopia, using the 1994–1997 panel, Skoufias and Quisumbing (2005) found that illness did not have a significant impact on food and non-food expenditures. Using more recent rounds of the ERHS from 1999 to 2004 that covered a longer interval, Dercon et al. (2005) found that illness reduced consumption expenditures by 9%; it is possible that the longer duration panel was able to capture longer-term impacts of illness, especially if impacts of illness expenses such as depletion of assets or forgone income are compounded over time.

This strand of literature explicitly acknowledges that households adopt a variety of risk-minimizing and risk-coping strategies to protect themselves from consumption fluctuations when faced with shocks (for example, Skoufias and Quisumbing, 2005). These strategies include informal transfers and remittances (in cash and in kind) from relatives and friends (Morduch, 1999), labor-sharing, selling assets (Deaton, 1992), shifting to low-risk, low-return agriculture (Rosenzweig and Binswanger, 1993), or obtaining loans from the financial sector (Udry, 1994). Ex-post responses also include availing of targeted food assistance and formal social-protection interventions. Some of these coping strategies may unintentionally jeopardize the family's future food security, such as divesting assets, incurring debts and pulling children out of school.

Rural households in Ethiopia have developed their own risk-sharing arrangements. In addition to the very common extended family network, *iddir* (funeral societies), *equib* (credit associations), *senbete* (some social gatherings), *debo* (labor-sharing arrangements), and *mahiber* (religious gatherings) are some of the most common institutions developed by the communities themselves to mitigate their vulnerability to the effects of shocks (see von Braun et al., 1999).

The second strand refers to the specific literature on the impact of PAM on farm households. A general assumption in some of this literature and in popular discussion on PAM, especially related to AIDS, is that it results in higher dependency ratios, severe labor constraints, and increased medical expenditures in case of chronic illness preceding death, funeral costs, thereby leading to increased food insecurity. The net effect of PAM on per capita consumption depends on the extent to which costs and income loss associated with PAM are offset by the reduction of consumption units due to the death of the productive adult.

Studies that examine households' 'coping strategies' in response to PAM show that households adapt in a number of ways. These include demographic changes such as attracting new productive adults or sending children to other households; relying on informal remittances and transfers; altering production activities to adjust to the labor loss such as reducing the area cultivated; and divesting assets (Gillespie and Kadiyala, 2005; Kadiyala and Chapoto, 2010).

PAM may be correlated with individual and household characteristics such as wealth and education that are themselves important determinants of household composition, agricultural production and consumption patterns. As Chapoto and Jayne observe (2008), although the few longitudinal empirical studies measuring impacts of adult mortality on rural households' welfare acknowledge that adult death may be endogenous to outcomes, PAM was treated mostly as an exogenous event (Ainsworth and Semali, 2000; Beegle, 2005; Yamano and Jayne, 2004). Kadiyala et al. (2009), Chapoto and Jayne (2008), Donovan and Bailey (2006), and Gertler et al. (2004) explicitly address the problem of endogeneity, further discussed in the following sections. Despite the popular assertion that PAM increases food insecurity, to date only a handful of studies have investigated the impact of PAM on household consumption patterns while taking into account issues of endogeneity in Ethiopia or elsewhere.

The present study uses four rounds of panel data from Ethiopia to investigate the impacts of PAM on household composition, value of total consumption, value of food and non-food consumption and dietary diversity using data on expenditures. It seeks to take into account endogeneity issues and uses PSM with difference-in-difference (DID) estimators to control for observable and (time invariant) unobservable characteristics that might bias the estimated impacts. The term "prime age" in this paper refers to adults between 15 to 54 years of age, 54 years being the life expectancy at age 15 years in Ethiopia.[1]

Data

We used a three year panel (1994–1997) of the Ethiopian Rural Household Survey (ERHS),[2] a collaborative endeavor by the Economics Department of Addis Ababa University, the Centre for the Study of African Economies (CSAE), Oxford University and the International Food Policy Research Institute (IFPRI). The history of ERHS, details of sampling strategy and data are elaborated elsewhere (Dercon et al., 2005; Dercon and Krishnan, 2003).[3]

Briefly, since 1994, ERHS surveyed a total of 1477 households from 15 villages. Between 1994 and 1997, the sample households were interviewed four times: in the first part of 1994, later in the same year, in the first part of 1995 and 1997. The 15 ERHS villages are representative of Ethiopia's major agro-ecological zones, with the exception of pastoralists, who are underrepresented. One to three villages were selected per stratum. Within each village, households were selected using random sampling, stratified by female and male headed households. In addition, to ensure that landless households were not excluded, the sample was stratified within each village to ensure that a representative number of landless households were included. Sample sizes in each village were chosen so as to approximate a self-weighting sample, when considered in terms of the farming systems. That is, as of 1994, each person represents the same proportion of persons found in the main sedentary farming systems. The resulting sample can be considered broadly representative of the households in nonpastoralist farming systems in the country as of 1994.

All the households represented by a complete set of information at the baseline and the final round were included in the analysis.

[1] The term "prime age" refers to those adults who are economically productive and of reproductive age. The age range used for "prime age" differs across various studies. The high end point for defining prime age varies from 49 to 59 depending on the country and purpose of the study: for example, 15–59 years in Zambia (Chapoto and Jayne, 2008); 15–54 years for men and 15–49 years for women in Kenya (Yamano and Jayne, 2004). Even though only 10% of those people in the ERHS data set are above 49 years of age, individuals could continue to make economic contributions past this age. Therefore, for the purposes of this dissertation research, the upper bound of the prime age range is the average life expectancy of Ethiopians at the age of 15–54 years (WHO, 2002).

[2] Ethiopia Rural Household Survey Dataset, 1989–2004. 2009. Washington, DC: International Food Policy Research Institute (IFPRI).

[3] For further details of ERHS: http://www.ifpri.org/dataset/ethiopian-rural-household-surveys-erhs-1989-2004.