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Normative Indicators Combining Poverty and Mortality

A Survey

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Abstract

This paper surveys the small branch of welfare economics that studies indicators combining poverty and mortality. The paper distinguishes two reasons for constructing such indicators. The first reason is to perform multidimensional well-being comparisons. For this purpose, mortality has (negative) intrinsic value. The key question relates to the trade-off that the indicator makes between poverty and mortality, that is, between the quality and quantity of life. A lifecycle utility approach suggests expressing this trade-off as the number of years spent in poverty that is deemed equivalent to one year lost to mortality. The second reason is to investigate the instrumental role that selective mortality—the fact that the poor tend to die earlier—has on the evolution of poverty measures. Then, the key question is how to define the counterfactual situation against which the instrumental impact of mortality is assessed.

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Normative Indicators Combining Poverty and Mortality: A Survey

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1) INTRODUCTION

A vast literature documents the positive association between poverty and mortality, and the potential causality channels underlying this correlation (Mackenbach et al. 1997; Wagstaff 2000; Fritzell et al. 2015). This survey does not review these positive relationships, but takes a purely normative perspective and its focus is on indicators combining poverty and mortality.

We distinguish two reasons for building normative indicators combining poverty and mortality. The first reason is to perform multidimensional well-being comparisons. A summary indicator combining poverty and mortality may prove useful when evaluating policies that imply a trade-off between these two phenomena. Such summary indicator can also be used to compare human development across societies (Stiglitz et al. 2009), at least when assuming that poverty and mortality are the two major sources of well-being losses (Deaton 2013). The second reason is to investigate the instrumental role that selective mortality, i.e., the fact that the poor face higher mortality rates, has on the evolution of poverty measures. Poverty measures only account for those who are alive. If mortality rates among the poor increase, then, ceteris paribus, the fraction of poor individuals decreases, which constitutes a “mortality paradox” (Kanbur and Mukherjee 2007). One may thus wonder what proportion of the measured poverty change is due to changes in mortality rather than changes in living standards.

These two objectives define two distinct branches of literature with specific characteristics. Indicators of multidimensional well-being attribute a (negative) intrinsic value to mortality. The key question is the trade-off that the indicator makes between mortality and poverty. In contrast, for the branch concerned by the mortality paradox, indicators need not attribute intrinsic value to mortality. The key question is how to define the counterfactual situation against which the instrumental impact of selective mortality is assessed. Even if the latter branch relates to a more technical question, we review it alongside the first in the hope to dissipate the confusion that may exist between the two.

We conjecture that the recently developed indicators combining poverty and mortality may complement standard normative indicators that are routinely used to express the trade-off between the quality and quantity of life. Indeed, poverty reduces the quality of life while mortality reduces the quantity of life. Maybe the main advantage of these new indicators is to strike a good balance between simplicity and decent theoretical foundations.

In the next section, we introduce the notation and a simple framework in which individuals, for each period of their lives, are either poor or non-poor. We present the arguments why poverty and mortality should be aggregated using years of life as a common metric. We also introduce the concept of a stationary society, which plays a central role for normative indicators accounting for mortality.

In the following section we show how the expression for a newborn's expected lifecycle utility simplifies in this framework of two statuses. The indicator obtained aggregates poverty and mortality using a single normative parameter. Importantly, this parametric family may sometimes unambiguously rank a pair of societies for which the two dimensions are "in conflict".

Then we show how to adapt the indicator obtained in order to evaluate policies or shocks affecting both poverty and mortality. An adaptation is necessary when endorsing the idea that all years of life lost should have the same value.

In another section we show how the same idea applies to indicators of multidimensional deprivation. An individual is considered lifespan deprived if she dies prematurely. The same framework reveals that lifespan deprivation is a peculiar dimension that requires a specific treatment.

Finally, we turn to the instrumental role that selective mortality has on poverty measures and review the literature on the mortality paradox.

2) FRAMEWORK AND STATIONARY SOCIETIES

The indicators we present are fairly simple. However, exposing their connection to lifecycle utility requires introducing a non-negligible amount of notation. The reason is that such indicators aim at evaluating a society *in a given period* while mortality has consequences over many subsequent periods.

There is a discrete set of periods $\{...,t-1, t, t+1,...\}$, each period being a calendar year. In each period, some individuals are born, then all alive individuals consume and then some individuals die. In each period, the consumption status of an individual is to be either poor (P) or non-poor (NP). The life of an individual i is defined as the list $l_i = (l_{i0},...,l_{id})$ of the consumption statuses she enjoys between age 0 and the age $d_i \in \{0, ..., a^*-1\}$ at which the person dies, where for each age a we have $l_{ia} \in \{NP, P\}$ and a^* is the maximal lifespan. The set of lives is thus $L = \cup_{d\in\{0,...,a^*-1\}}\{NP, P\}^{d+1}$, where $\cup$ is the union symbol.

There are n_t individuals born in period t. The number of individuals who are born in period t and survive at least to age a is denoted by $n_t(a)$, where $n_t(0)=n_t$. The profile of lives for the cohort born in t is denoted by $C_t = (l_1,...,l_{n_t})$. The cohort born in t defines a distribution on the set of lives, which we denote by $\Gamma_t : L \to [0, 1]$, with $\sum_{l\in L} \Gamma_t(l) = 1$. Following Harsanyi (1953), the social welfare of the cohort born in t can be written as its average lifecycle utility

$$W(C_t) = \frac{1}{n_t}\sum_{i=1}^{n_t} U(l_i) = \frac{1}{n_t}\sum_{i=1}^{n_t}\sum_{a=0}^{d_i} u(l_{ia}), \qquad (1)$$

where U is the lifecycle utility function and u is the period utility function, i.e., $U(l_i)=\sum_a u(l_{ia})$, for which we assume that $u(NP) \geq u(P) \geq 0$. Observe that mortality is intrinsically valued through its opportunity cost: death reduces the number of periods a person is poor or non-poor. Also, period utility is not discounted. This simplification is called for when evaluating well-being in period t in order to avoid giving lower social weights to older individuals.

Of course, we do not observe in period t the profile of lives for the cohort born in t. Rather, we observe the period's natality, mortality and consumption statuses. A society in period t is the list of profiles of lives for all cohorts born during the a^* periods preceding t, which we denote by $S_t = (C_{t-a^*+1}, ..., C_t)$. The poverty observed in period t is summarized by the period's head-count ratio

$$HC^t = \frac{\sum_{a=0}^{a^*} p_{t-a}(a)}{\sum_{a=0}^{a^*} n_{t-a}(a)}, \qquad (2)$$

where $p_t(a)$ denotes the number of individuals born in t who are alive and poor at age a. The mortality observed in period t is captured by a vector of age-specific mortality rates $\mu^t=(\mu^t_0,\dots,\mu^t_{a^*-1})$ where $\mu_a^t = \frac{n_{t-a}(a)-n_{t-a}(a+1)}{n_{t-a}(a)}$ and is summarized by the period's life-expectancy at birth

$$LE^t = \sum_{a=0}^{a^*-1} \prod_{k=0}^{a-1} (1-\mu_k^t). \qquad (3)$$

A society is stationary if all its cohorts have the same size and the same distribution of lives. Formally, society S_t is stationary if for any period $t' \in \{t - a^*+1, \dots, t\}$ we have

- $\Gamma_{t'} = \Gamma_t$ (constant distribution of lives),
- $n_{t'} = n_t$ (constant size of cohorts).

Stationary societies play a central role in the construction of normative indices combining poverty and mortality (Baland et al., 2021a). These indices should perform sound comparisons of stationary societies because they correspond to an "equilibrium" situation. In a stationary society, the mortality and poverty observed in a given period are the same as those observed in the next period. After a permanent mortality shock, say, caused by some policy intervention, a transition phase starts during which the population pyramid mechanically adjusts. After this transition phase, the long-run consequences of the shock are reached and the society is again stationary. Indicators should get it right when comparing these long-run "equilibrium" consequences.

Also, in a stationary society, we can compute a cohort's average lifecycle utility from the poverty and mortality observed in the period of its birth. Indeed, the poverty and mortality observed in that period perfectly reflect the poverty and mortality that its members will be confronted with throughout their lives (Baland et al., 2021b). This insight has general validity. For simplicity, we illustrate it using an example. Consider a stationary society for which two individuals are born in each cohort, one living only for one period in poverty and the other living for three periods out of poverty, i.e. $n = 2$, $l_1 = (P)$ and $l_2 = (NP, NP, NP)$. In period t, four individuals are alive: the poor born in t, the non-poor born in t, the non-poor born in $t-1$ and the non-poor born in $t-2$. This shows that, in a stationary society, it is possible to match each person-year in C_t, i.e. in the profile of lives of the cohort of newborns, to an individual who is alive and has the same consumption status in t. Also, two individuals die at the end of period t: the poor born in t and the non-poor born in $t-2$. Hence, poverty and mortality in C_t are perfectly reflected by the poverty and mortality observed in t.

3) THE QUANTITY AND QUALITY OF LIFE

Indicators combining mortality and poverty may be used as summary indices for human development. There is a longstanding quest for such an index (Stiglitz et al. 2009). The multi-dimensional nature of well-being has led to the development of composite indices such as the Human Development Index of the UNDP. Two major critiques have been raised against standard composite indices. First, they aggregate different dimensions in an ad-hoc fashion. Second, they rely on arbitrary or implausible weights (Ghislandi et al 2019). In order to escape these critics, some authors even suggested to narrow down the number of dimensions to just one, mortality (Hicks and Streeten 1979; Silber 1983).

Baland et al. (2021b) propose a summary index that aggregates poverty and mortality while making progress on these two critiques. Their proposal is based on social well-being understood as the expected lifecycle utility of a newborn drawn at random (Harsanyi 1953). They simplify the sophisticated formulations of Becker et al. (2005) and Jones and Klenow (2016) by making quality of life a binary variable: being poor or non-poor. When normalizing the period utility of not being alive to 0 and assuming that $u(NP) \geq u(P) \geq 0$, the only remaining normative parameter is θ, the fraction of period utility lost when poor

$$\theta = \frac{u(NP) - u(P)}{u(NP)}. \qquad (4)$$

Baland et al. (2021b) show that, for any $\theta \in [0, 1]$, the average lifecycle utility of newborns can be normalized in a stationary society as follows

$$\frac{W_\theta(S_t)}{u(NP)} = (1-\theta)\frac{W_0(S_t)}{u(NP)} + \theta\frac{W_1(S_t)}{u(NP)},$$

$$= LE^t(1 - \theta HC^t),$$

where $W_\theta(S_t) = W(C_t)$. They call this index the poverty-adjusted life-expectancy (PALE). Importantly, PALE is a normalization of the average lifecycle utility of newborns even when mortality is selective.

The PALE index penalizes years spent in poverty by a factor θ. When assuming that θ = 0, i.e. being poor is the same as being non-poor, Eq. (1) reduces in a stationary society to $\frac{W_0(S_t)}{u(NP)} = LE^t$, i.e., to life-expectancy at birth. In contrast, when assuming that θ = 1, i.e. being poor is the same as being dead, Eq. (1) reduces in a stationary society to $\frac{W_1(S_t)}{u(NP)} = LE^t(1 - HC^t)$, i.e., to the Poverty-Free Life-Expectancy index proposed by

Riumallo-Herl et al. (2018). Clearly, these two cases are based on “extreme” views on the value for parameter θ.

In general, the comparison of two societies with PALE depends on the arbitrary value selected for parameter θ. Baland et al. (2021b) show that the comparison with PALE is sometimes robust to all plausible values for θ, even for some pairs of societies for which HC and LE yield opposite comparisons. Hence, the PALE index ranks more pairs of societies than a dashboard made of HC and LE would, even when there is no consensus on the value that its weight θ should take. In their application on developing countries, they find that poverty and mortality follow opposite trends in 28% of cases, and PALE is able to solve 38% of these ambiguous cases.

Of course, societies are seldom stationary, and the poverty and mortality observed in *t* may not be reliable guides for the expected lifecycle utility of a random newborn in *t*. Yet, Baland et al. (2021b) argue that, whether or not a society is stationary, PALE provides a meaningful aggregation of the poverty and mortality observed in period *t*. In their view, it is as meaningful as using life-expectancy at birth in order to aggregate the mortality observed in period t in a society that is not stationary.

4) POLICY EVALUATION AND HYBRID SHOCKS

In this section, poverty and mortality are still considered as two different sources of well-being losses. However, whereas the last section compared different societies based on their observed poverties and mortalities, we now compare one society with a counterfactual situation. Such comparison with a counterfactual situation is necessary when evaluating costly policies that save lives – e.g. investments enhancing the safety of transport infrastructures, health policies or some environmental policies – or when evaluating the welfare impact of a shock affecting both poverty and mortality, like a pandemic.

A priori, the indicator W_θ could readily be used to perform these comparisons. However, mortality is a particularly sensitive topic and we will discuss the implications of the idea that the lives of all individuals should count the same. W_θ violates this idea when comparing the respective values of a year of life lost by the poor and the non-poor. Decerf et al. (2021) and Ferreira et al. (2021) address this point when evaluating the welfare losses associated to the poverty and mortality impacts of the Covid-19 pandemic.

Traditionally, the method used when performing such counterfactual comparisons is the value of a statistical life (VSL) (Viscusi 1993). In a nutshell, the VSL method compares mortality losses with economic costs by attributing a price to a human life (or to a year of human life). Once both dimensions are expressed in monetary units, their respective sizes can be compared. Decerf et al. (2021) and Ferreira et al. (2021) argue that the VSL method cannot provide the basis for a fruitful public debate because many people reject the mere idea of attributing a price to a human life. Another major shortcoming of the VSL method is that the distribution of economic costs is not taken into account. As a result, trade-offs between mortality and economic costs are seldom publicly discussed, and the view that human lives should be saved "whatever the costs" dominates by default in the media.

To help overcome these limitations, Decerf et al. (2021) propose an alternative normative method that could complement the VSL approach. They assess the welfare impact of the direct mortality and economic consequences of the Covid-19 pandemic using a method based on W_θ. Instead of comparing the two dimensions in monetary units, they use years of human life as a common metric. The impact of mortality is measured by the number of years of life lost and the economic impact is measured by the number of additional years spent in poverty. This method requires a unique normative parameter: the number of poverty-years that yields the same well-being loss as one lost year.

Formally, Decerf et al. (2021) assess the impact of the pandemic on the welfare of the population that is alive at the period t during which this hybrid shock occurs. For each individual i, the pandemic may have two impacts. First, the pandemic may change the consumption status of person i from being non-poor to being poor for one or more years following the outbreak. The period utility loss for each additional "poverty-year" is denoted by $\Delta u_p = u(NP) - u(P)$. Second, the pandemic may kill person i in period t, in which case i loses a number of years of life corresponding to her expected residual longevity in t. The period utility loss for each "lost-year" is Δu_d.

The definition of Δu_d is the key normative consideration. An observed outcome, i.e., one lost-year in some period *t'* following *t*, is contrasted with a counterfactual outcome, i.e. the consumption status the person would have had in *t'* if she did not die in *t*. Using a model in order to predict whether the person would have been poor or non-poor yields the normatively unappealing consequence of valuing the cost of premature mortality differently for the poor and the non-poor. Avoiding this requires attributing the same value for Δu_d to all lost-years.

Denoting by LY the total number of lost-years for the population alive in t and by PY the total number of additional poverty-years, the impact on social well-being of the pandemic can be expressed as a weighed sum of poverty-years and lost-years

$$\frac{\Delta W}{\Delta u_p} = PY + \underbrace{\frac{\Delta u_d}{\Delta u_p}}_{\alpha} \mathrm{LY} \qquad (5)$$

where the normative parameter α captures how many poverty-years have the same impact on social well-being as one lost-year. This social parameter should ideally be some aggregation of the answers that individuals might give to the following hypothetical question: "how many years of your remaining life would you be willing to spend in poverty in order to increase your remaining lifespan by one year?"

Eq. (5) can be used to compare the sizes of the two sources of well-being loss. Decerf et al. (2021) and Ferreira et al. (2021) estimate for each country how many additional poverty-years have been generated for each lost-year, which we denote by $\hat{\alpha} = \frac{PY}{LY}$. Any social observer can then contrast the empirical value of $\hat{\alpha}$ with her preferred value for the normative parameter α. She concludes that the mortality costs are higher than the poverty costs if and only if $\hat{\alpha} < \alpha$. Eq. (5) can also be used in order to contrast well-being costs across countries or well-being costs for alternative policy scenarios.

Decerf et al. (2021) assume that $\Delta u_d = u(NP)$, i.e. the individual would have been non-poor if the year had not been lost. Hence, they assume a high opportunity cost for mortality. Under this assumption, we have $\alpha = 1/\theta$ and the minimal value that α can take is 1. This seems to be a defensible lower-bound, at least for those who believe that one lost-year is at least as bad as one poverty-year. Then, the mortality loss is larger than the poverty loss for any country for which $\hat{\alpha} < 1$.

5) MULTIDIMENSIONAL POVERTY

The same approach based on years of life has been applied to measuring deprivation in the quantity and quality of life. In this multidimensional poverty framework, individuals may be deprived in their quality of life when their consumption is too low and they can be deprived in their quantity of life when they die before reaching a minimal age threshold, denoted by $\hat{a}$. Under this interpretation, premature mortality induces a deprivation in a key resource: the lifespan. Mortality is intrinsically valued, but only below the age threshold.

Baland et al. (2021a) show that lifespan deprivation is a peculiar dimension that requires a specific treatment. Multidimensional poverty measures cannot simply incorporate this dimension without adapting their methodology. The reason is that lifespan deprivation and poverty are mutually exclusive. In a given period, either the individual is prematurely dead or the individual is poor, but she cannot be both dead and poor. This is unlike other dimensions of deprivation that can simultaneously affect the same individual. Their mutually exclusive nature requires to add a term capturing the lifespan deprivation component.

However, the term capturing lifespan deprivation must be carefully constructed. Baland et al. (2021a) show that composite multidimensional poverty measures, like the Human Poverty Index (Watkins, 2006), are not "consistent". That is, these measures do not hold constant the trade-off between one poverty-year and one prematurely lost-year. As a result, these measures sometimes record the premature death of a poor individual as poverty-increasing and sometimes as poverty-reducing. They show that this problem finds its source in the reference population considered by these measures, which does not account for the prematurely dead.

In the terminology of Baland et al. (2021a), a "total deprivation" measure combines deprivation while alive with lifespan deprivation. They propose two consistent total deprivation measures ("inherited deprivation" (ID) and "generated deprivation" (GD)) and Baland et al. (2021b) propose a third one ("expected deprivation" (ED)). All three have similar expressions and all three are equivalent when comparing stationary societies. We only introduce ID and ED. Let A^t denote the number of individuals alive in period t, i.e. $A^t = \sum_{a=0}^{a*-1} n_{t-a}(a)$. Let P^t denote the number of poor individuals observed in period t, i.e. $P^t = \sum_{a=0}^{a*-1} p_{t-a}(a)$. Let PD^t denote the number of individuals who prematurely lose period t, i.e., $PD^t = \sum_{a=0}^{\hat{a}-1}(n_{t-a} - n_{t-a}(a))$. The inherited deprivation index is defined as

$$ID_{\theta\hat{a}} = \underbrace{\frac{PD^t}{A^t + PD^t}}_{mortality\ term} + \theta \underbrace{\frac{P^t}{A^t + PD^t}}_{poverty\ term} \qquad (6)$$

where parameter $\theta \in [0, 1]$ is the same as that of W_θ, and thus $1/\theta$ captures how many poor are "as bad" as one individual prematurely loosing period t.

The two terms have the same denominator, which corresponds to the reference population. The reference population contains all those who are born less than $\hat{a}$ years before t, plus those who are born more than $\hat{a}$ years before t and are still alive. The numerator of each term counts the number of individuals affected by the deprivation captured by the term.

The expected deprivation at birth index (ED) is based on a secondary indicator aggregating mortality rates. The lifespan gap expectancy measures the number of years that a newborn expects to lose prematurely if confronted by the mortality rates of vector μ^t throughout her $\hat{a}$ first years of life

$$LGE_{\hat{a}}^t = \sum_{a=0}^{\hat{a}-1}\left(\hat{a} - (a+1)\right) * \mu_a^t * \prod_{k=0}^{a-1}(1 - \mu_k^t).$$

ED is based on expectations given the poverty and mortality rates prevailing inperiod t

$$ED_{\theta\hat{a}} = \underbrace{\frac{LGE_{\hat{a}}^t}{LE^t + LGE_{\hat{a}}^t}}_{mortality\ term} + \theta \underbrace{\frac{LE^t * HC^t}{LE^t + LGE_{\hat{a}}^t}}_{poverty\ term} \qquad (7)$$

where θ is the same parameter. The denominator measures a normative lifespan, which is at least as large as LE^t. The numerator of the mortality component measures the number of years that a newborn expects to lose prematurely. The numerator of the poverty component measures the number of years that a newborn expects to spend in poverty. These interpretations require that the society is stationary. Baland et al. (2021b) show that there is a close connection between PALE and *ED*. When all deaths are considered premature ($\hat{a} \geq a*$), the society that has the highest well-being losses according to PALE and the highest total deprivation according to *ED*.

If ID, GD and ED compare any two stationary societies in the same way, they differ when comparing non-stationary societies. ID and GD can be decomposed by subgroups, whereas it is not the case of ED. ID measures premature mortality taking place before period t whereas GD and ED measure premature mortality taking place in period t. They react with different speeds to permanent mortality shocks: ED exhibits the least inertia and ID the most.

Applying these indices to developing countries, Baland et al. (2021a) show that the mortality term accounts for a non-negligible fraction of total deprivation and that the two terms are far from being perfectly correlated. As a result, the evolution of total deprivation in a country regularly contradicts the evolution of poverty alone in that country. Therefore, ignoring the mortality component leads to severe bias in the measurement of total deprivation.

One limitation of these measures is that they do not account for the overlap that may happen between poverty and mortality. In other words, the premature death of a poor person counts the same as the premature death of a non-poor person, even if the former case "concentrates" different deprivations on the same individual. The same remark is also valid for PALE. The reason is that the social welfare function that underlies these indices is not prioritarian, but purely utilitarian. Baland et al. (2021a) discuss how to adapt these indices in order to account for such concentration. However, such adaptation requires more information, notably on mobility in and out of poverty over the lifespan.

6) LITERATURE ON THE MORTALITY PARADOX

The literature on the mortality paradox starts from the observation that there are two ways to exit poverty: becoming non-poor or dying. The latter case may lead to a mortality paradox. Consider for instance a stationary society for which two individuals are born in each cohort, one living only for two periods in poverty and the other living for three periods out of poverty, i.e. $n = 2$, $l_1 = (P, P)$ and $l_2 = (NP, NP, NP)$. Assume that the health conditions for the poor deteriorate such that they only live for one period, i.e. the new stationary society has $n = 2$, $l_1' = (P)$ and $l_2 = (NP, NP, NP)$. The head-count ratio after this evolution is 1/4 against 2/5 initially. The mortality paradox is that the higher mortality faced by the poor reduces the poverty measure. Observe that the instrumental role that mortality has on the poverty measure follows from the fact that mortality is selective. If mortality rates are the same for the poor and the non-poor, the paradox disappears.

Since selective mortality has an instrumental role on the poverty measure, one may wonder how much of the measured poverty change is explained by the mortality change, rather than by consumption change. Answering this question requires constructing a counterfactual situation for which the instrumental role of selective mortality is neutralized. Two alternative approaches have been proposed: one that relies on standard poverty measures and another that constructs new poverty measures specifically designed for this task.

The simplest approach consists in constructing a counterfactual situation that nets-out the differential mortality change over the time interval and then recalculates poverty. Ravallion (2005) follows this route using the head-count ratio as poverty index. He observes that the head-count ratio would take the same value for the counterfactual situation for which mortality was not selective as the value it would take if there was no mortality at all during the time interval. Therefore, he obtains his counterfactual situation by adding to the population observed at the end of the time interval all individuals who died during this interval, without changing their poverty status. The instrumental role of selective mortality on poverty is obtained by contrasting the observed and the counterfactual head-count ratios at the end of the time interval. His empirical findings show that selective mortality plays a non-negligible role, but that this role does not dominate the evolution of poverty in his data.

A more demanding approach consists in designing new poverty measures that are robust to mortality changes and evaluate the evolution of poverty with these new measures. Kanbur and Mukherjee (2007), Lefebvre et al. (2013) and Lefebvre et al. (2017) follow this approach. Their measures neutralize the effect of selective mortality by assigning fictitious incomes to those who are prematurely dead. They investigate various methods for assigning these fictitious incomes and the ability of these methods to neutralize the effect of selective mortality. These methods differ by the identity of those for whom fictitious incomes are constructed and the procedure used for this construction. In particular, the effect of selective mortality may be neutralized if the fictitious incomes are correctly inferred, i.e. correspond to the "true" incomes that prematurely dead individuals would have earned. Their empirical results show that the impacts of extending the income profiles of the dead vary significantly with different methodological choices and databases.

We conclude by observing that mortality is not the only demographic phenomenon that affects poverty measures. Natality also plays an instrumental role, and one can similarly ask what the impact of selective natality is (Ravallion, 2005). Population growth also raises philosophical questions. There is for instance a debate on whether poverty measures should decrease or increase when the absolute number of poor increases while the fraction of poor decreases (Chakravarty et al., 2006).

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