

## EARNINGS GROWTH VERSUS MEASURES OF INCOME AND EDUCATION FOR PREDICTING MORTALITY

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Mortality is a key component of models that project the financial status of Social Security and simulate the effects of program changes. Since mortality varies profoundly by socioeconomic status, a greater understanding of how various measures of socioeconomic status affect mortality will improve our ability to predict mortality. This paper examines earnings growth as a predictor of mortality in comparison with the more traditional measures of socioeconomic status, levels of income and education.

### The Relationship between Socioeconomic Status and Mortality

Numerous studies have examined the relationship between mortality and socioeconomic status as measured by education and income. In contrast, earnings growth, as a determinant of mortality, has received scant attention despite theoretical reasons to expect a strong relationship between earnings growth and mortality.

The paper begins with a discussion as to why we might expect a strong correlation between earnings growth and mortality. Three general theoretical frameworks are presented that have motivated work on the relationship between socioeconomic status and mortality. In the first framework, mortality is a function of schooling and income. For instance, schooling is thought to improve health and longevity by increasing health knowledge; income is thought to affect health and mortality via its affect on the consumption of health-relevant goods and services, such as medical care.

In contrast to the first framework wherein mortality is a function of levels of schooling and income, the second and third frameworks suggest that education, income, and health are all a function of individuals' propensity to invest in human capital. This perspective is consistent with mounting empirical evidence of the importance of personal behaviors in determining health and longevity.

If the propensity to invest in human capital is the primary determinant of health and longevity, we would expect that earnings growth would be a better predictor of mortality than income. We would also expect that level of schooling would affect mortality in addition to earnings growth since it provides a measure of the propensity to invest in human capital prior to individuals' experiences with the labor market.

### Income, Education, and Earnings Growth as Predictors of Mortality for Social Security Purposes

One way that information on the socioeconomic determinants of mortality can be used for Social Security forecasting and program evaluation is via microsimulation. Microsimulation models start with a representative sample of the population of interest and simulate socioeconomic behavior on a probabilistic basis for each individual according to research linking relevant behaviors to given characteristics.

Social Security microsimulation models, such as the Modeling Income in the Near Term (MINT) model, use survey data matched to Social Security administrative record data. From the survey data, information on individuals' education and income is available. From the administrative record data, the longitudinal earnings histories of individuals are linked to their mortality. Earnings growth — if it is determined to be a robust predictor of mortality — could easily be incorporated into Social Security microsimulation models given their prior use of earnings histories.

For Social Security forecasting purposes, variables that can predict mortality many years forward are particularly useful. In this regard, we would like to have a predictor, measured in the early years of individuals' working lives, that would project future mortality several years hence.

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## The Data and Analysis

To insure its robustness and general applicability to ongoing Social Security models, the usefulness of earnings growth as a predictor of mortality should be explored in multiple time periods. This paper begins that process by reporting preliminary results for an early time period using the 1973 CPS-SSA-IRS Exact Match file.

A challenge in using Social Security data for various time periods is that the administrative recording of earnings and mortality changed after 1978, requiring careful attention to how best to use the data. In addition to presenting preliminary results, the paper provides a useful overview of data challenges associated with the pre-1978 administrative record data on earnings and mortality and various ways to meet those challenges.

As its name implies, the 1973 CPS-SSA-IRS Exact Match file combines economic and demographic information on individuals, such as years of schooling and marital status, from the 1973 Current Population Survey (CPS), Internal Revenue Service (IRS) income tax return information and Social Security Administration (SSA) longitudinal annual records on individual earnings, disability, and mortality.

With the longitudinal earnings histories, we were able to average earnings and measure earnings growth over individuals' working lives. We also measured average earnings and earnings growth at the beginning of individuals' working lives. Linking the average earnings and earnings growth measures, as well as years of schooling, to subsequent mortality, we compared how these various measures performed as predictors of mortality.

## The Results

This paper begins an exploration to determine whether earnings growth, as a measure of propensity to invest, is a useful variable for predicting mortality in addition to, or instead of, the more commonly used measures of socioeconomic status — levels of income and education.

Keeping in mind the preliminary nature of this investigation, the results of our analyses support the following conclusions:

1. Earnings growth, measured over the entire career of individuals, appears to supersede income's effect as a predictor of mortality.
2. Both education and earnings growth are useful for predicting mortality.
3. Earnings, when measured in the early working years, do not appear to be useful for forecasting subsequent mortality.
4. Earnings growth measured at the beginning of the working career appears to be a viable predictor of subsequent mortality.

If confirmed, the final result would be of particular use in forecasting models that rely only on Social Security's administrative record data since the administrative record data lack information on years of schooling.

## Future Work

The paper ends with a discussion of future work that will build on this initial foray. Of particular importance, future work will lengthen the time over which mortality is measured. This will permit us to explore further to what extent earnings growth measured at the beginning of the working career viably predicts subsequent mortality. The current analysis uses earnings growth measured at ages 25–34 to predict mortality ten years hence. By updating the mortality information on the file, we will learn how earnings growth measured at ages 25–34 predicts mortality beyond the ten-year horizon presented in this paper.

By using more recent matched survey-administrative data, future work will also test the importance of earnings growth for predicting mortality in other time periods. This will test the robustness of earnings growth as a predictor of mortality for Social Security models.

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