Social Insurance and Widowhood in Costa Rica

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Abstract

Numerous studies have documented adverse mortality effects of widowhood. Recent work in Costa Rica, however, has found the absence of such an effect. This paper investigates the role of social insurance in explaining these phenomena, given Costa Rica's extensive social insurance coverage. Costa Rica increased social health insurance coverage from 40% to over 70% during the 1970s, a period of relative female mortality improvement. Using both aggregated county-level vital statistics and individual women-level census data, we analyze this insurance expansion as a natural experiment, employing county fixed effects models to estimate the causal insurance effects on the relative mortality outcomes of widows.

Introduction

In societies throughout the world a husband's death has severe repercussions for the well-being of surviving wives. In particular, studies have documented substantially higher mortality rates among widowed women than among otherwise similar married women (e.g,. Goldman 1984; Rahman, Foster, and Menken 1992; Thierry 2000). A number of theoretical explanations have been suggested to explain this phenomenon, including psychological trauma, financial loss, and mal-treatment by children-in-law. In this paper we test the importance of one particularly policy-relevant hypothesis: that social insurance coverage for widows can improve their relative mortality outcomes.

The setting for our study is Costa Rica, a developing country with exceptionally high life expectancy that is now superior to the United States life expectancy. The rationale for choosing Costa Rica for this study is the existence of a "natural experiment" in social health insurance that facilitates the causal study of insurance effects on widows. This insurance was phased in during the 1970s, expanding social health insurance coverage from approximately 40% of the population in 1973 to over 70% by 1980. Furthermore, there was considerable variation in the size of this insurance expansion across counties and demographic groups, arising from the fact that pre-expansion insurance was primarily available only to families of civil servants. This natural experiment has been previously exploited to study child mortality effects in Costa Rica, with findings indicating a small but statistically significant protective effect of insurance (Dow and Schmeer 2002; Dow, Gonzalez, and Rosero-Bixby 2003).

During the period of this insurance expansion there were also shifts in relative male versus female adult mortality rates. Although adult female mortality rates were superior to those of males in Costa Rica even prior to the 1970s, there was a widening of this difference during the 1970s and 1980s. During the 1960s female mortality rates dropped only two percentage points more than male mortality rates, but during the 1970s female mortality rates dropped 15% while male mortality rates dropped by only 9% (Rosero-Bixby 1994). Thus there is a prima facie case that it may be reasonable to hypothesize that social health insurance could have improved relative widow outcomes. Intriguingly, however, in a cohort of 900 Costa Ricans aged 60+ in 1984 (after social insurance coverage was widespread) whose mortality was tracked through the year 2002, widows were at no higher risk of mortality than married women (Rosero-Bixby, Dow, and Lacle, 2003). The present paper is designed to better investigate the extent to which this unusual finding could be due to Costa Rica's extensive social insurance system.

Data and Methods

The strengths of available Costa Rican data are two-fold. First, vital statistics mortality data are of high quality, particularly compared with other developing countries, with very low under-registration rates during our study period. Second, census data collected in 1973 and 1984 are unique in that they measure the social health insurance coverage status for every person in the country. Although we do not have longitudinal data on individual

women linked over time, our access to both 100% of the vital statistics mortality microdata and 100% census microdata files is a unique resource for testing our hypothesis of interest.

County-level analysis

We perform two complementary sets of analyses. First, we test the effect of social health insurance on adult mortality rates of females versus males, to explore whether the national level trend relationships continue to hold in more disaggregate analyses. Given our data, we perform this test at a county-level, after matching age and sex-specific insurance and mortality rates for each of the 99 Costa Rican "counties" in 1973, 1984, and 2000. We implement the test using a county fixed-effects model, analogous to the difference-in-differences specifications that have been frequently used in related studies. We can illustrate the model heuristically as a regression of the change in sex-specific age-standardized adult mortality rates for county *c* between 1973 and 1984 as a function of the change in the county's insurance rates over this same period, controlling for other time-varying confounding covariates *Z*. This model has been used in previous work that indicates that insurance is indeed related to adult mortality (Dow and Rosero-Bixby 1999), but without distinguishing male versus female effects. In the present analysis, our main coefficient of interest is β_2 on the interaction between the insurance variable and a female sex indicator:

$$\Delta(m_{c,sex,84} - m_{c,sex,73}) = \beta_1\Delta(ins_{c,sex,84} - ins_{c,sex,73}) + \beta_2\Delta(ins_{c,sex,84} - ins_{c,sex,73}) \times Fem + \beta_3 Fem + \beta_4\Delta(Z_{c,sex,84} - Z_{c,sex,73}) + \beta_5\Delta(Z_{c,sex,84} - Z_{c,sex,73}) \times Fem + \varepsilon_{c,sex}$$

To account for the underlying binomial nature of the dependent variable we use a logistic transform of the mortality rate to estimate the model as a grouped logit model, which has the advantageous feature of also being interpretable as a discrete-time hazard mortality model. The model is weighted by population size, with standard errors corrected for non-spherical attributes.

Individual-level analysis

While the county-level analysis is important for understanding the overall benefits of social health insurance to females in comparison to males, an important goal in and of itself, it cannot explicitly address the relative well-being of *widows*. Thus we next turn to an individual-level analysis of widowhood, based solely on the census microdata samples. Given these census data, we are able to estimate the following county fixed effects logit model among adult ever-married women (where *i* denotes individual woman, *c* county, and *y* census year):

$$Widowed_{icy} = \gamma_1 ins_{icy} + \gamma_2 age_{icy} + \gamma_3 Z_{icy} + \gamma_4 CountyFixedEffect_{icy} + \varepsilon_{icy}$$

If γ_1 is positive, this provides evidence consistent with the hypothesis that social health insurance improves the relative mortality of widows. The logic is as follows. If a man or woman has received insurance through their current or former employment, their spouse

generally also receives this coverage. Under the alternative scenario that this insurance has equal longevity effects for both spouses, insurance should not be related to the probability of widowhood among surviving women, since it would not change the *relative* difference between spousal ages of death. (Note that because insurance affects both spouses, our logic is necessarily different from that of studies such as Hill (1977) that use widowhood as a proxy for male mortality).

However, if a couple's insurance status increases the proportion of ever-married live women of a given age who are widows, this would imply that insurance has increased the longevity of widows relative to their deceased husbands. Although our analysis cannot rule out all possible alternative explanations (though selection effects may be ameliorated in this design to the extent that marriage markets lead to correlated spousal unobservables), a result such as this would be consistent with the hypothesis that women benefit more from the insurance than do their spouses.

Discussion

What are the mechanisms through which social health insurance might be hypothesized to improve widow's relative mortality? In general social insurance operates through several related pathways. First, there is likely to be a direct effect of increased health care due to the price-lowering effects of insurance, and it is possible that certain types of increased health care could be life-extending. Second, even if health care utilization did not change, insurance would financially protect the widows by averting the need to pay out-of-pocket for catastrophic health expenditures, and this increased financial security may have life-extending consequences. Third, for some widows social health insurance is accompanied by direct social security retirement income payments, and again these may contribute to widows well-being, depending on the magnitudes of these payments. Although our data do not allow us to definitively distinguish between these pathways, we will further analyze women's financial well-being and consumption changes over this time period in order to better illuminate our main findings.