



The life insurance market: Asymmetric information revisited[☆]

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ABSTRACT

This paper finds evidence for the presence of asymmetric information in the life insurance market, a conclusion contrasting with the existing literature. In particular, we find a significant and positive correlation between the decision to purchase life insurance and subsequent mortality, conditional on risk classification. Individuals who died within a 12-year time window after a base year were 19% more likely to have taken up life insurance in that base year than were those who survived the time window. Moreover, as might be expected when individuals have residual private information, we find that the earlier an individual died, the more likely she was to have initially bought insurance. The primary factor driving the difference between our and the prior literature's findings is that we focus on a sample of potential new buyers, rather than on the entire cross section, to address the sample selection problem induced by potential mortality differences between those with and those without coverage.

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1. Introduction

Empirical testing of contract theory comprises a burgeoning area of economic research (see Chiappori and Salanié, 2003 for a review). Especially important in this literature have been inquiries into whether asymmetric information prevails in particular insurance markets. Much of the literature has adopted the “conditional correlation” approach illustrated in Chiappori et al. (2006), in which the presence of information asymmetry implies that, conditional on risk classification, the risk outcome is positively correlated with insurance coverage. Evidence has been mixed.¹

The life insurance market is of particular interest for asymmetric information tests. It is an important market on account of size alone. In 2004, 77% of American households held life insurance. The industry had overall assets of \$4.5 trillion and invested \$4 trillion in the economy, making it one of the most important sources of investment

capital in the United States (ACLI, 2007a,b). Life insurance contracts also are relatively explicit and simple, and the risk outcomes—policyholders' deaths—are in principle easy to verify and measure.

In an important contribution, Cawley and Philipson (1999) use the Health and Retirement Study (HRS) data to examine cross-sections of individual term life insurance contracts and find a negative or neutral correlation between mortality risk and coverage.² This negative-or-neutral-correlation result, together with their evidence for bulk discounts, has been widely cited as evidence that life insurance markets are free of asymmetric information.³

We find, in contrast, evidence of asymmetric information in these very markets.⁴ With the same HRS dataset, we recover a significant positive correlation between the mortality outcome and the decision to purchase individual term life insurance, conditional on risk classification. In particular, individuals with higher risk (those who died within a 12-year time window after a base year) were 19% more likely to have purchased individual term insurance in that base year than were individuals with lower risk (those who survived beyond the window).

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¹ For example, see Chiappori and Salanié (2000) and Cohen (2005) for the auto insurance market; Finkelstein and Poterba (2004) for the annuity market; Cardon and Hendel (2001) for the employer-provided health insurance market; and Fang et al. (2006) for the Medigap market.

² Using aggregate mortality data from the U.S., U.K., and Japan, McCarthy and Mitchell (forthcoming) also find that life insurance buyers' mortality rates are the same as, or lower than, those in the general population.

³ For example, see Chiappori and Salanié (2000), de Meza and Webb (2001), Hendel and Lizzeri (2003), Fang et al. (2006), Chiappori and Salanie (2008), and Cutler et al. (2008).

⁴ Following Cawley and Philipson, our analysis also focuses on the individual term life insurance market.

Indeed, decomposing the mortality outcome into time-until-death categories, we find that the earlier an individual died, the more likely she was to have initially taken up insurance. Such monotonicity further suggests the prevalence of asymmetric information.⁵

The primary factor driving the difference between our and Cawley and Philipsons' earlier findings is that we focus on a sample of potential new life insurance buyers rather than on the entire cross sectional sample. Potential new buyers are the subset of the total sample who did not own life insurance at the beginning of the sample period. They are not subject to the sample selection problem inherent in cross-sectional samples for asymmetric information tests in life insurance markets. This sample selection problem is as follows. Suppose individuals do have residual private information about their mortality risk. Those for whom the information is unfavorable, and who thus decide to buy life insurance, then are more likely to die early and thus less likely to be found in a cross-sectional sample than are those for whom the information is favorable. High-risk individuals with coverage therefore are under-represented in cross-sectional samples. Sample selection induced by potential mortality differences between the covered and uncovered may bias estimates of the conditional correlation between insurance coverage and mortality risk.⁶

To illustrate, consider the following thought experiment. Four individuals are alive, with the same appearance of good health, at time $t-5$. Individuals 1 and 2 choose not to obtain coverage because they know they are in good health. Individuals 3 and 4 do choose coverage because, despite their healthy appearance, they know they are in poor health. At year $t-1$, individual 4 dies. The remaining three are randomly drawn into a sample and survive the entire sample period from year t to $t+5$. A researcher examining this sample will conclude that asymmetric information is absent: observed mortality in the t through $t+5$ window does not differ between the two individuals without insurance and the one with insurance, inasmuch as all three have survived the five-year sample period. The real story, however, is that half of the covered, and neither of the uncovered, have died within the full ten-year ($t-5$ to $t+5$) horizon.

The remainder of the paper is organized as follows. Section 2 describes the dataset. Section 3 discusses the empirical strategy, in which we focus on the sample of potential new buyers together with proper risk classification controls and a 12-year-window ex-post mortality risk measure. Section 4 presents the results. Section 5 concludes.

2. Data

We use the Health and Retirement Study (HRS) dataset. The HRS is a nationally representative longitudinal survey of the elderly and near-elderly in the United States. It contains rich information on health status, insurance coverage, financial measures, demographics, and family structure. Our analysis uses the HRS cohort, which consists of individuals born between 1931 and 1941. This cohort has been interviewed biennially since 1992. Our sample ends in 2004.

We obtain life insurance coverage data from two early waves, 1992 and 1994, in order to simplify comparison with the previous litera-

ture.⁷ The 1992 and 1994 waves also are the only ones in which the HRS explicitly asked whether a respondent held individual term life insurance. Moreover, following up on sample individuals from early waves allows us to observe actual mortality outcome in a sufficiently long time window.

Tracker 2004 provides the mortality data. HRS divides a respondent's vital status in each wave into one of five categories: alive in current wave, presumed alive in current wave, death reported in the current wave, death reported in a prior wave, and vital status unknown.⁸ We code a respondent as alive in 2004 if she falls into category 1 or 2—and dead in 2004 if she falls into category 3 or 4—in wave 2004. We treat those in category 5 as missing observations.⁹ In this way, we observe the actual mortality outcome during a 12-year time window.

Table 1 provides summary statistics of the relevant variables in our sample, based mainly on information from the 1992 wave. Twenty-four percent of the HRS cohort owned individual term life insurance in 1992 and 27% owned it in 1994. Nineteen percent of potential new buyers obtained individual term life insurance between 1992 and 1994.¹⁰ By 2004, about 15% of the cohort had died. The sample was largely balanced in gender, and nearly three-quarters of the respondents were married. High blood pressure, arthritis, and back pain were the most commonly reported medical conditions. About a tenth of the sample had a hospital stay in the past year, and roughly the same portion had been diagnosed with heart disease. Less than 10% of the sample was diagnosed with diabetes, cancer, lung disease, stroke, or asthma. Nearly a third of the sample had healthy weight, 44% were overweight, and 22% were obese.

3. Empirical strategy

An ideal sample would satisfy the following requirements for testing for the presence of asymmetric information in life insurance markets. First, it should constitute a random sample of the population below a certain age threshold such that no individual in the population younger than that age would consider purchasing life insurance. For example, age 20 could be such a threshold if, given the absence of dependents, no individual younger than 20 would demand life insurance. Second, the sample should follow every individual until the last one dies. At the end of the sample period, a researcher could then observe the coverage status, mortality outcome, and complete set of risk classification factors of every sample individual who is a potential customer in the life insurance market. In such a sample, differential mortality would not create a selection problem. A positive correlation, conditional on the risk classification factors, between the decision to purchase insurance and a proper measure of mortality risk would provide evidence of asymmetric information.

3.1. Potential new buyers

Such an ideal sample does not, of course, exist. The HRS sample likely suffers from the selection bias arising from potential mortality differences between those with coverage and those without. The HRS

⁵ Our test is a joint test for the presence of asymmetric information, which may take the form of either adverse selection or moral hazard. Moral hazard can largely be ignored in the life insurance industry because insurance is unlikely to be an incentive for an individual to die sooner than she otherwise would. We therefore believe our results suggest the presence of adverse selection. This claim is, however, based on intuitive insight rather than on rigorous evidence.

⁶ In survival analysis, "left truncation" is used to describe the situation in which the existence of an individual is unknown to the researcher if she dies before the beginning of the observation period. In our case, left truncation cannot be ignored because the mortality risk of those observed in the sample may not be representative of the population of interest. See Kalbfleisch and Prentice (2002), pp. 13–14.

⁷ Cawley and Philipson (1999) obtain life insurance information for the HRS cohort from the 1992 wave.

⁸ For the precise coding criteria, see HRS Tracker 2004, Version 2, January 2007.

⁹ As a robustness check, we also code a mortality upper-bound and a mortality lower-bound variable, as in Cawley and Philipson (1999), treating those in category 5 as dead and alive, respectively. All the Section 4 results remain qualitatively the same.

¹⁰ Considerable measurement error may be associated with the self-reported life insurance ownership data because, assuming a moderate per-wave lapse rate of 4% (based on waves 1996 and 1998 HRS data) and ignoring expired policies, we would otherwise obtain a 37% $[(0.76 \times 0.19 + 0.24) \times 0.96]$, rather than 24%, coverage rate in 1994. Measurement error in a discrete binary dependent variable may produce inconsistent estimates (Hausman et al., 1998) and this is a potential concern with both our and Cawley and Philipson's analyses.

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