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Life insurance, precautionary saving and contingent bequest

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Abstract

We present a model of life-insurance purchase that takes into account the age of the beneficiary. The beneficiaries considered herein are young children with no resources whose consumption needs are protected by purchasing life insurance if the breadwinner dies. We show that income transfer grows as the child ages; however, the size of contingent bequest shrinks because the need for protection diminishes. Consequently, among the beneficiaries, the younger one would receive a larger bequest. The aggregate demand for life insurance is positively related to the number of children, their consumption needs, and the length of time to independence.

Keywords: Loading factor; Birth order; Actuarial rate of interest; The age of independence

JEL classification: G22; D91

1. Introduction

The standard model of demand for life insurance, e.g., Fischer (1973), assumes that the breadwinner maximizes his expected utility over an uncertain lifetime by choosing the optimal level of consumption and life insurance.[1] The model assumes that beneficiaries

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[1]The emphasis in Fischer is comparative statics. Other theoretical works in the area include, for example, Richard (1975), Campbell (1980), Pissarides (1980), and Karni and Zilcha (1985). Richard extended Merton's (1971) consumption and portfolio rules to include life insurance. Campbell used the technique of stochastic calculus to derive an explicit demand for life insurance function. Pissarides studied the age–bequest (with life insurance) relationship. Karni and Zilcha studied life insurance and the measures of risk aversion within a state-dependent framework. Also see Borch (1990) for the institutional development of life insurance.

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will receive bequests if the breadwinner dies and nothing if the breadwinner survives. The demand for life insurance thus obtained is derived from the bequest function alone. Shorrocks (1979, p. 415) points out that such a model is unsatisfactory because, among other things, "the bequest function is independent of the number or circumstances of the recipients, the utility associated with a transfer arises purely from the act of donation." Subsequently, Lewis (1989) presents a model of the demand for life insurance in which the breadwinner maximizes the beneficiaries' utility, not own utility. He argues that the results of his model are appealing because they simulate the actual calculation of insurance purchase the household makes.

Many questions arise from Lewis' findings. First, computing the needs of beneficiaries is not the only decision that the breadwinner makes. An altruistic breadwinner chooses his own consumption, decides on the size of bequests, and *allocates resources to his heirs while he is alive*. Can we incorporate these decisions in a single model? Second, the role of child's age in the breadwinner's decision making has not been thoroughly studied in the literature. This is an important issue because the breadwinner purchases life insurance to protect his beneficiaries by providing them financial assistance in the event of his death. Since the need for protection changes with a child's age, so does the decision on contingent bequest. What, then, is the bequest–age relation? Third, we must inquire into the relationship between the age of each child and the distribution of bequests when there are multiple children. Is it based on an equity principle, on primogeniture, or on something else? Last, we have to address Shorrocks' criticism. What role does the number of children play in deciding income transfer and insurance purchase? This paper provides some answers to these questions.

The approach is to extend Lewis' model such that life insurance purchase is *jointly* determined with the breadwinner's own consumption and with inter vivos income transfer to heirs. To accomplish this, we include in the objective function of the breadwinner's optimization problem each recipient's utility function and a bequest function for each child. In other words, we assume the breadwinner is altruistic toward his dependents while he is alive, not just after his death. We also assume that each child will become independent at some point. In the model, each child's utility function enters the breadwinner's objective function at birth and exits it after the age of independence; bequests to adult children are an act of donation.

Our proposed theory of intergenerational transfer is different from other models in at least two aspects. First, in other models that emphasize the interaction between generations, beneficiaries have income and engage in strategic actions. Those models apply mainly to adult offspring, and usually exclude young children from the analysis. For example, in testing the altruistic theory,[2] Wilhelm (1996) excluded children under the age of 25. In contrast, the beneficiaries in our model are financially constrained young children who have no significant strategic options. Second, we contend that the tender age of the dependent plays an important role in breadwinner's decision making. Other models simply

[2]There is a debate on whether intergenerational transfer is derived from altruism or self-interest. See, for example, Becker (1974, 1981), Bernheim et al. (1985), Cox (1987), Gale and Scholz (1994), Wilhelm (1996), Laitner and Juster (1996), and Altonji et al. (1997). Most of these models are cast in an overlapping generation framework.