Embedded Options in Insurance Contracts: Guaranteed Annuity Options

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ABSTRACT

Insurance companies sometimes include financial guarantees and other embedded options in their products. Under a GAO an insurer guarantees to convert a policyholder's accumulated funds to a life annuity at a fixed rate. If the annuity rates provided under the guarantee are more beneficial to the policyholder than the prevailing rates in the market, the insurer has to make up the difference. These guarantees were popular in the UK in the 1970's and 1980's when long term interest rates were high. At that time, the options were very far out of the money and insurance companies assumed that interest rates would remain high and thus that the guarantees would never become active. In the 1990's, when long term interest rates began to fall, the liabilities under these guarantees began to rise. Two other factors added to the cost of these guarantees. First, strong stock market performance meant that the amounts to which the guaranteed applied increased significantly. Second, the mortality assumption implicit in the guarantee not anticipate the improvement in mortality which took place. We describe these guarantees and analyze their pricing and risk management. We will discuss some lessons that can be learned from this episode.