

What Motivates Insurers to use Derivatives: Evidence from the United Kingdom Life Insurance Industry

Yung-Ming Shiu*

Abstract

Using firm-specific variables that proxy for the motivations of life insurers' decision to participate in derivative transactions, we examine existing theories of corporate hedging behavior. Our findings support the evidence of previous research that risk management and scale factors explain the use of derivatives. We also find that insurers view derivatives and reinsurance as complements. Our data support the underinvestment hypothesis. We observe a substitution effect that insurers use on-balance-sheet hedging through structuring their assets and liabilities to reduce price risks.

Keywords: Derivatives; Hedging; Life insurers

Introduction

Insurers are in the business of risk. In order to meet the obligations to their policyholders, insurers actively and effectively manage the underwriting and investment risks to which they are exposed. The common approaches employed by insurance firms to managing underwriting risks include reinsurance, coinsurance, and geographic/product diversification. Like other financial and non-financial firms, insurers also use derivatives to hedge investment risks. Moreover, capital market traded derivative instruments can also be utilized to cover the risks associated with insurance products. For example, life insurers may use interest rate derivatives to hedge the interest rate exposure arising from products embedded with guaranteed annuity options, and/or use currency derivatives to hedge the foreign exchange risk arising from overseas revenues.

Associate Professor

Department of Business Administration,

National Cheng Kung University, Taiwan

Tel: +886-6-2757575 ext. 53330

Fax: +886-6-2080179

Email: yungming@mail.ncku.edu.tw

The United Kingdom (UK) life insurance industry generated annual premiums of £106.342 billion (US\$ 159.758 billion), accounting for 9.26 percent of total worldwide life insurance premium income, and this market was ranked first in the Europe and third in the world (Swiss Reinsurance Company, 2004, pp. 36-37). During the analysis period 1994 to 2002, the changes in legislations in the UK do not have significant effects on how insurers operate. Moreover, the UK insurance markets are relatively less regulated compared with other main insurance markets across the world (Wang, 2002). The associated potentially confounding legal effects are accordingly minimized.

UK insurers are only allowed to hold derivative contracts either for reducing investment risks or for efficiently managing portfolios (Philpott, 2009). This rule gives insurers a certain degree of flexibility when engaging in derivative transactions. A derivative transaction which does not reduce investment risks may still be regarded as being for the purpose of efficient portfolio management if it will assist the insurer to achieve its investment goals.

Our data are statutory returns from 2002 SynThesys Life (Version 3.63s). The derivative data contained in this data set are year-end accounting values of assets and liabilities reported by UK life insurers. As at the end of a given financial year, derivative contracts are reported as assets or liabilities depending on their value to the insurer is positive or negative respectively. As shown in Figure 1, the derivative participation rate, measured as the number of insurers that use derivatives divided by the number of insurers, remains steady and average 27 percent during the period from 1994 through 2002. The extent of derivative use, measured as the sum of the derivative values of assets and liabilities, is clearly on the upward trend. In 1994 the total value of derivatives is only £0.5 billion, while in 2002 this number increases more than 6 times. After examining the data, we find that the number of life insurers that use derivatives does not clearly increase, while these derivative users gradually increase their derivative use as time passes.

(Insert Figure 1 about here)

According to Form 17 of the statutory returns, derivative instruments can be classified into three main types of contract: futures contracts, options (including warrants), and contracts for differences (including swaps).¹ Figure 2 shows that the participation rate of options generally is higher than that of futures or contracts for differences. This figure also displays that there is an increasing trend towards utilizing options since life firms gradually employ options at balance sheet management level to change their exposures to asset classes and currencies, and to ensure the solvency of a life fund.

(Insert Figure 2 about here)

In Form 17, derivatives contracts can also be classified by underlying asset. The underlying assets include fixed-interest securities, equity shares, land, and currencies. Except Eagle Star Life Assurance Co Ltd in 1997, none of the insurers included in this data set report using derivatives whose underlying asset is land during the analysis period. Figure 3 thus depicts the trends of derivative use by underlying asset except land. This figure shows that equity shares and currencies related derivatives are the main instruments, implying that the risk of share price fall and the foreign exchange risk are two main risks that life insurers use derivatives to hedge.

(Insert Figure 3 about here)

As discussed later, Hardwick and Adams (1999) also examine the determinants of derivative use by UK life insurers. However, several major differences exist. First, Hardwick and Adams (1999) only use a sample of 88 life insurers in 1995, while we use 2,194 firm-year observations for 314 life firms from 1994 through 2002. Our sample covers a wider range of life insurers and a longer period of time. Moreover, we divide our sample period into two subperiods and examine whether the determinants of derivative use will change from epoch to another. Second, our study reveals information on participation and extent of derivative use by contract type and underlying asset, while Hardwick and Adams (1999) do not. Third, in our analysis we consider more possible determinants than Hardwick and Adams (1999). Specifically, we take account of the solvency, interest rate risk, asset structure, and product mix variables that do not appear in their model.

Our study adds to the literature on several grounds. First, this paper fills in the gap in the literature on derivative use. Most of prior studies which have attempted to examine derivative use have focused on US firms. A study on corporate derivative

¹ The contracts for differences can be futures, options, and swaps. However, these contracts can only be settled in cash.

use by life insurers over a long period of time has not yet been conducted before. Our results can then be compared with those of previous studies in the insurance industry or other financial sectors across the world. Second, this research can update insurance managers and regulators on derivative use in the market. The identification of the determinants is instrumental in providing insights into the relations between the decision to use and the determinants, which could help actuaries to make relevant decisions and industry regulators to evolve new policies on the derivative use by life insurance firms.

The paper proceeds as follows. In the following section, we review literature to examine the motives for the corporate use of derivatives. We describe the data in the subsequent section, and the empirical results and robustness checks are provided thereafter. The final section concludes.

Motives for the use of derivatives by insurers

Most prior studies on derivative determinants have focused on non-financial firms (e.g., Berkman and Bradbury, 1996; G