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Default risk, bankruptcy procedures and the market value of life insurance liabilities

An Chen[a,*], Michael Suchanecki[b]

[a] Bonn Graduate School of Economics, University of Bonn, Adenauerallee 24–26, 53113 Bonn, Germany
[b] Department of Statistics, University of Bonn, Adenauerallee 24–26, 53113 Bonn, Germany

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Abstract

The topic of insolvency risk in connection with life insurance companies has recently attracted a great deal of attention. In this paper, the question is investigated of how the values of the equity and of the liability of a life insurance company are affected by the default risk and the choice of the relevant bankruptcy procedure. As an example, the US Bankruptcy Code with Chapter 7 and Chapter 11 bankruptcy procedures is used. Grosen and Jørgensen's [Grosen, A., Jørgensen, P.L., 2002. Life insurance liabilities at market value: An analysis of insolvency risk, bonus policy, and regulatory intervention rules in a barrier option framework. J. Risk Insur. 69 (1), 63–91] contingent claim model, implying only a Chapter 7 bankruptcy procedure, is extended to allow for more general bankruptcy procedures such as Chapter 11. Thus, more realistically, default and liquidation are modelled as distinguishable events. This is realized by using so-called standard and cumulative Parisian barrier option frameworks. It is shown that these options have appealing interpretations in terms of the bankruptcy mechanism. Furthermore, a number of representative numerical analyses and comparative statics are performed in order to investigate the effects of different parameter changes on the values of the insurance company's equity and liability, and hence on the value of the life insurance contract. To complete the analysis, the shortfall probabilities of the insurance company implied by the proposed models are computed and compared.

JEL classification: G13; G22; G33

Subject and Insurance Branch Codes: IM10; IE10; IE50; IB10

Keywords: Equity-linked life insurance; Default risk; Liquidation risk; Contingent claims pricing; Parisian options; Bankruptcy procedures

1. Introduction

The topic of insolvency risk in connection with life insurance companies has recently attracted a great deal of attention. Since the 1980s a long list of defaulted life insurance companies in Europe, Japan and the United States has been reported. A few examples from the United States are First Farwest Corp., Integrated Resource Life Insurance Co. and Pacific Standard Life Insurance Co. in 1989, Mutual Security Life Insurance Co. in 1990, First Executive

* Corresponding author. Tel.: +49 228 739229; fax: +49 228 735048.
E-mail addresses: an.chen@uni-bonn.de (A. Chen), michael.suchanecki@uni-bonn.de (M. Suchanecki).

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Table 1
Some defaulted insurance companies in the United States

American defaulted companies	Year	Bankruptcy code	Days spent in default
Executive Life Insurance Co.	1991	Ch. 11	462
First Capital Life Insurance Co.	1991	Ch. 11	1669
Monarch Life Insurance Co.	1994	Ch. 11	392
ARM Financial Group	1999	Ch. 11	245
Penn Corp. Financial Group	2000	Ch. 11	119
Conseco Inc.	2002	Ch. 11	266
Metropolitan Mortgage & Securities	2004	Ch. 11	n/a

Life Insurance Co. (this constituted the 12th largest bankruptcy in the United States in the period 1980–2005), First Stratford Life Insurance Co., Executive Life Insurance Company of New York, Fidelity Bankers Life Insurance Co., First Capital Life Insurance Co., Mutual Benefit Life Insurance Co. and Guarantee Security Life Insurance Co. in 1991, Fidelity Mutual Life Insurance Co. in 1992, Summit National Life Insurance Co., Monarch Life Insurance Co. and Confederation Life Insurance Co. in 1994, ARM Financial Group in 1999, Penn Corp. Financial Group in 2000, Conseco Inc. in 2002 (this constituted the 3rd largest bankruptcy in the United States in the period 1980–2005)[1] and Metropolitan Mortgage & Securities in 2004.[2] Table 1 provides more detailed information on the bankruptcy procedure and the number of days spent in default for some exemplary bankruptcies of life insurance companies in the United States.[3]

In Japan, the following life insurance carriers defaulted: Nissan Mutual Life in 1997, Chiyoda Mutual Life Insurance Co. and Kyoei Life Insurance Co. in 2000 and Tokyo Mutual Life Insurance in 2001. In Europe, there were the following most noticeable insolvency cases: Garantie Mutuelle des Fonctionnaires in France in 1993, the world's oldest life insurer Equitable Life (in the end only saved by a House of Lords' ruling) in the United Kingdom in 2000 and Mannheimer Leben (failed a fair value based solvency test, but recovered) in Germany in 2003. As the biggest corporate bankruptcy in Australia, HIH Insurance defaulted in 2001 mainly because of the inability to correctly estimate its liabilities (see Jørgensen (2004)).

Hence, it is worth having a close look at the bankruptcy procedures. We take the United States' Bankruptcy Code as an example. Similar bankruptcy laws are also applied in Japan and in France. In the US Bankruptcy Code, there are two possible procedures: Chapter 7 and Chapter 11 bankruptcy. It is generally assumed that a firm is in financial distress when the value of its assets is lower than the default threshold. With Chapter 7 bankruptcy, the firm is liquidated immediately after default, i.e., no renegotiations or reorganizations are possible. With Chapter 11 bankruptcy, first the reality of the financial distress is checked before the firm is definitively liquidated, i.e., the defaulted firm is granted some "grace" period during which a renegotiation process between equity and debt holders may take place and the firm is given the chance to reorganize. If, during this period, the firm is unable to recover, then it is liquidated. Hence, the firm's asset value can cross the default threshold without causing an immediate liquidation. Thus, the default event is only signalled. For the above mentioned cases from the United States for which data were available, all of the life insurance companies filed for Chapter 11 bankruptcy and the "grace" period lasted from 119 days up to 1669 days. Such a bankruptcy procedure with a given "grace" period does not only exist in the United States, but also in Japan and in France. In France, a legal three-month observation period before a possible liquidation is systematically granted to firms in financial distress by the courts. This period can be renewed once and can be exceptionally prolonged in the limit of six months. As these examples show, it is important to consider bankruptcy procedures that are explicitly based on the time spent in financial distress and to include such a "grace" period in the model if one wants to capture the effects of an insurance company's default risk on the value of its liabilities and on the value of the insurance contracts more realistically.

[1] Data taken from http://www.bankruptcydata.com.

[2] The life insurance insolvency cases up to 1994 are taken from the 1999 Special Comment "Life After Death" by Moody's Investors Service, Global Credit Research, available at http://www.moodys.com. The other cases are taken from the source mentioned in Footnote 1.

[3] These data are taken from Lynn M. LoPucki's Bankruptcy Research Database, http://lopucki.law.ucla.edu/index.htm.