Insurance and Reinsurance Contracts as Complex Derivatives: Application to Multiple Peril Policies

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Abstract

Multiple peril insurance schemes (e.g., revenue and earnings insurance) provide protection against adverse movements in several named risks. Their indemnity payoff function resembles that of exotic options with complex contingencies. In this paper we show how the option-based pricing techniques from financial economics can be used to calculate fair premiums for such contracts. Using three existing revenue insurance contracts as examples, we demonstrate the usefulness of this approach. The products we consider are sold by private insurance companies, but are reinsured by US government. We show that the reinsurance contract can also be valued by the same technique. Our valuation methodology is very tractable and may be preferred to other techniques, particularly when the risks underlying the insurance products can be hedged using financial instruments. Our application provides new insights on the valuation of public reinsurance of private risks and can be extended to other areas such as the recently proposed Federal catastrophe reinsurance.

JEL Classification: G13, G22, Q14, Q18

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