

Catastrophe Bonds

May 1, 2007

A catastrophe bond (also known as a CAT bond) is a high-yield debt instrument that is used to raise money in anticipation of a catastrophe such as an earthquake or hurricane. These instruments transfer a particular set of risks from the sponsor to the investors. They work like floating-rate corporate bonds whose principal is either deferred or completely forgiven if specified trigger conditions are met. For example, if an insurer has built up a portfolio of risks by insuring homes in California, they might wish to pass on some of the risk in case an earthquake occurs, thus leaving them insolvent. In this case, they could choose to sponsor a CAT bond, which would pass the risk on to investors. In sponsoring a CAT bond, the insurer would issue this bond in consultation with an investment bank and investors would buy it with a much higher than normal return. It might pay them a coupon of LIBOR plus up to almost 20% in some cases. If no earthquake hit California, the investors would make a good return on their investment. However, if an earthquake does hit and the triggers the CAT bond, the principal paid by the investors is used to pay the sponsor's claims.

The way in which the trigger conditions are met, causing the principal to be deferred or completely forgiven, is specified by the sponsor and investment bank who structured the CAT bond. These bonds are typically categorized into four trigger types: indemnity, modeled loss, indexed to industry loss, and parametric. Bonds of the "indemnity" type are triggered by the issuer's actual losses. For example, if the layer indicated in the CAT bond is \$50 million in excess of \$300 million, then the bond will be triggered if losses add up to more than \$300 million. Bonds of the "modeled loss" type are triggered if modeled losses are above a certain threshold. The modeled losses are calculated from an exposure portfolio that is made to work with catastrophe modeling software. When an event occurs, the event

parameters are run against the exposure database in the CAT model. Bonds of the “indexed to industry loss” type are less correlated to the insurer’s actual losses. They are triggered when the insurance industry loss reaches a certain threshold. Bonds of the final type, or “Parametric” type, are indexed to the natural hazard cause by nature. The parameter from which data is collected could be ground acceleration or wind speed. If the data collected indicates ground acceleration or wind speed greater than a specified amount, the CAT bond is triggered.

After Hurricane Andrew, securitizing catastrophe risks became much of interest. In addition to catastrophe reinsurance, there was the desire to bring more risk-bearing capacity. In the mid 90s, AIG, St. Paul Re and others made the first experimental transactions in CAT bonds. The market grew to over \$1 billion of issuance per year at the end of the 90s to over \$2 billion per year after the terrorist attacks on September 11, 2001. Following Hurricane Katrina, issuance has practically doubled.

Catastrophe bonds have mainly covered severe wind storm and earthquake risks, but as of late there is interest in using these bonds for the potential risk of pandemics. Swiss Re sold \$762 million in catastrophe bonds in two issues in 2003 and 2005. According to Shiv Kumar of Goldman Sachs, this rising interest in CAT bonds may be due to all the discussion in the media surrounding a potential influenza pandemic. In addition to increased interest in transferring mortality, CAT bonds have also become popular because their return is highly uncorrelated with the return on equities and other investments, thus helping investors achieve diversification.