

Credit Risk and the Issue Price of Structured Derivatives

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Swiss Banking Institute
University of Zurich

Prof. Alexander F. Wagner, Ph.D.

Jiri Woschitz

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Executive Summary

Problem

Structured products offer retail investors the opportunity to invest in complex option positions with no need for the access to option exchanges. At issuance, structured product arrangers earn the difference between the selling price and the fair value of a structured product. Consequently, the arrangers have an economic incentive to decrease the fair values in order to increase the fair value gaps of those products. This paper examines whether the arranger compensates the structured products investors for bearing higher credit risks in general, as well as before and after the bankruptcy of Lehman Brothers. The study focuses on the question whether or not the investors' raised awareness of credit risks urge issuing banks to change their pricing policies with respect to credit risks.

Method

The main data source forming the basis of this investigation is the combination of a historical database of structured products, provided by Derivative Partners Group, and the Daily Aggregated Market Data Eurex, provided by Deutsche Börse Group. The historical database comprises structured products which were or are quoted at the Scoach Schweiz AG exchange. This analysis focuses on 1,071 structured products belonging to five different product classes and determines their fair value gaps at issuance. The fair value gap is calculated by subtracting the fair value of a structured product from its selling price and dividing the difference by the selling price. The fair values are determined by establishing replication portfolios consisting of bonds and option positions. We use Eurex options in order to determine the option components of structured products. By using the pricing formula suggested by Black and Scholes (1973) and Merton (1973) we compute the implied volatilities of the four Eurex options which enclose the option embedded in a structured product when the strike and maturity are considered. Those implied volatilities are then linearly interpolated to the strike and the maturity of the embedded option. This specific implied volatility is used to calculate market-based values of embedded options again with the pricing formula suggested by Black and Scholes (1973) and Merton (1973). We make use of OLS regressions in order to investigate the relationship between fair value gaps of structured products and credit risks of issuers. The credit risk is measured by EUR and USD credit default swap spreads as well as credit ratings from Standard & Poor's, Moody's, and Fitch. Other explanatory variables are included to control for the market environment, general credit risk and risk aversion, market power of several product issuers, time, issuers, and product classes.

Results

Our hypotheses are supported when using EUR CDS spreads or credit ratings of Standard & Poor's as for the credit risk measures. However, this is not the case for USD CDS spreads and credit ratings of Moody's and Fitch.

By examining the complete sample of structured products which were issued between January 1, 2007 and June 26, 2009 we find negative and significant effects of EUR CDS spreads on relative fair value gaps of structured products. Hence, the results support our prognostication which states that banks generally compensate investors for bearing higher credit risks. Dividing the full sample into products issued before and after the Lehman Brothers default results in a positive and highly significant effect of the EUR CDS spreads on relative fair value gaps for products issued before the bankruptcy. Thus, products issued before the bankruptcy are priced to the disadvantage of investors with respect to credit risks. Investors were not compensated for bearing higher credit risks. They even *paid* for bearing higher credit risks. With the bankruptcy of Lehman Brothers, pricing policies change with respect to credit risks. The results show negative and partly significant effects of EUR CDS spreads on relative fair value gaps for products issued after the bankruptcy. Therefore, with the raised awareness of credit risks after the bankruptcy of Lehman Brothers on September 15, 2008 investors do require a compensation for bearing higher credit risks, which banks now are obliged to provide.

Further, effects of credit ratings of Standard & Poor's generally have a positive and significant effect on relative fair value gaps. Therefore, our hypothesis, which says that investors are generally compensated for bearing higher credit risks, is supported. Dividing the full sample into products issued before and after the Lehman Brothers default results in insignificant and positive effects of the credit rating of Standard & Poor's on fair value gaps for products issued before the default. Thus, our hypothesis, which says that banks do not compensate investors before the bankruptcy, cannot be rejected. After the default of Lehman Brothers, the effect of a change from A and A+ (first category) to AA+ and AAA (third category) is positive and significant. Therefore, with the raised awareness of credit risks after the bankruptcy of Lehman Brothers on September 15, 2008, banks provide a compensation for bearing higher credit risks.

Our hypotheses are not supported if we measure credit risks by USD CDS spreads, credit ratings of Moody's, or credit ratings of Fitch.

Evaluation

The study confirms our suggestion that issuing banks in general compensate investors for bearing higher credit risks. However, the results show that investors were not compensated for bearing higher credit risks before the bankruptcy of Lehman Brothers on September 15, 2008. With the raised awareness of credit risks after the Lehman Brothers default, investors require a compensation for bearing higher credit risks, which banks now are obliged to provide. More precisely, the study confirms the expected influence of credit risks on the calculated fair value gaps of structured products if EUR CDS spreads or credit ratings of Standard & Poor's are used to measure specific issuer credit risk. The investigation does not support the prognostications when using USD CDS spreads or credit ratings of Moody's or Fitch.