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# A Reduced Form CoCo Model With Deterministic Conversion Intensity

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Since 2009, a number of financial institutions have issued contingent convertible bonds (CoCos) to cushion their capital reserves in times of crisis. All of these bonds convert into equity if a prespecified trigger event occurs — that is, they convert if a given accounting ratio falls below a certain level.

A CoCo is exposed to the first two or all three of the following types of risk: interest rate risk, conversion risk and equity risk. The goal of this paper is to build a CoCo model with a minimum of stochastic factors that can be calibrated to market prices of related securities such as the issuing company's stock, interest rate swaps and CDS's.

The authors do not specify the dynamics of interest rates. They contend that it is not needed for pricing and calibration, and to hedge one can just immunize against the most common movements of the yield curve. The stock price is assumed to follow a geometric Brownian motion before it jumps at conversion. The direction and size of the jump will depend on the specifics of the CoCo contract and the particular circumstances the firm will find itself in upon conversion.

According to the authors' model, the main contribution to the value of the two types of CoCos studied in this report — Enhanced Capital Notes and Senior Contingent Notes — comes from future coupon payments and the possible redemption of the principal.

The model introduced in this paper can be extended by making the conversion intensity stochastic, specifying the dynamics of the interest rate or adding more factors to the equations describing the stock price.

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