

A Rating-Based Sovereign Credit Risk Model: Theory and Evidence*

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January 21, 2014

Abstract

We develop a rating-based continuous-time model of sovereign credit risk with closed-form solutions for a wide range of credit derivatives. In our model, rating transition follows a continuous-time Markov chain, and countries with same credit rating share similar level of default risk. A parsimonious version of our model, with only 16 parameters, one common and one country-specific factor, can simultaneously capture the term structure of CDS spreads of 34 in-sample and 34 out-of-sample countries well. On average, the common factor explains more than 60% of the variations of the CDS spreads of both the in-sample and out-of-sample countries, and 80% of the variations of the common factor is explained by the CBOE VIX index, the 5-year US Treasury rate, and the CDX NA IG Index.

Keywords: Credit Rating, Sovereign Credit Risk, Credit Default Swap, Systematic Risk
JEL Classification: G22, G33

Current Version is available at <http://ssrn.com/abstract=2381665>.

*We thank Stephen Figlewski, Masaaki Kijima, and seminar participants at Kyoto University, Nanjing University, Shanghai Finance University, the University of Tokyo, the PKU-Tsinghua-Stanford Joint Conference in Quantitative Finance, and the 2014 Econometric Society Winter Meeting for helpful comments and suggestions. We are responsible for any remaining errors.

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