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Modeling Sovereign Yield Spreads: A Case Study of Russian Debt

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In this paper, we construct a model for pricing sovereign debt that accounts for the risks of both default and restructuring, and allows for compensation for illiquidity.

We build on an earlier paper by Duffie and Singleton, which showed that cash flows promised by a sovereign bond can be discounted using a default-adjusted short-term discount rate that reflects the mean arrival rate, and associated losses in market value upon arrival, of several types of credit events. Since a sovereign credit event is often not a “liquidation event,” the model allows for continued trading (and pricing) of sovereign debt through credit events.

We also accommodate the possibility that comparable bonds issued by the same sovereign may be priced in the market using different discount factors. For example, sovereign issuers may default on one bond but not others. Some have issued bonds in different legal jurisdictions. A political regime may feel, or be perceived to feel, less obligated to make payments on debt issued by others. Different bonds may have different illiquidity.

As an illustration of our valuation framework, we estimate a model of the term structure of credit spreads for bonds of the Russian Ministry of Finance over a sample period that includes the default on domestic Russian GKO bonds in August 1998.

Using a new and relatively efficient method, we consider the determinants of the Russian yield spread, the yield differential across different Russian bonds, and implications for market integration, relative liquidity, relative expected recovery rates and implied expectations of different default scenarios.

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