

Literature Review

Erinn Yiran Sun

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Paper "The term structure of sovereign credit default swap and the cross-section of exchange rate predictability" by Calice and Zeng, 2018.

1 Summary

The paper finds that the sovereign CDS (Credit Default Swap) term premia significantly predict the exchange rates out-of-sample. It first establishes the theoretical motivation of the predictive ability of CDS term premia, then provides quantitative evidence for the connection between CDS term premia and country-specific credit risks, and at last evaluates the predictive ability of CDS term premia through portfolio sort and Fama-MacBeth regressions.

2 Definitions

- **CDS level:** the log of 5-year CDS spread
- **CDS term premium:** the log of 10-year CDS spread minus the log of 1-year CDS spread

3 Theoretical Motivation

Consistent Pricing Kernels The sovereign CDS market and the currency market both have pricing kernels that incorporate the factors governing the consumption growth of different countries.

Shared Risk Factor The sovereign CDS market and the currency market are both partly driven by country-specific credit risks. The CDS term premium reflects the relative movement between short- and long-run credit risk. A higher term premium signals either an underlying diminished short-run risk or greater long-run risk. Within the sample used in the paper, the former effect dominates (Section 4.2) and hence increasing sovereign CDS term premium is a good sign and indicates currency appreciations.

Country-specificity CDS term premia is a better predictor for currency exchange rates than CDS levels. CDS levels primarily correlate with global risks as they show co-movements across countries and maturities. CDS term premia, which is calculated as the differences across log CDS spreads, effectively neutralize the impact of the global factors and expose country-specific risks.

4 CDS Term Premia and Country-Specific Credit Risks

4.1 Factor Structures Underlying CDS Levels and CDS Term Premia

Experiment To understand the factor structures of the CDS level and CDS term premium, a PCA (Principal Component Analysis) was run on the covariance matrices of the two signals. The data sample is from 29 countries from December 2007 to June 2017.

Results PCA reveals that 1. the CDS levels share a common factor that explains around 60% of cross-sectional variations. The factor structure weakens after 2013 to around 43%. 2. The CDS term premia share a factor that explains around 36% of cross-sectional variations. The factor structure weakens after 2013 to around 29%. The CDS term premia have a weaker factor structure compared to CDS levels. This shows 1. the global component is less prominent in CDS term premia than in CDS levels 2. CDS term premia are more idiosyncratic compared to CDS levels, potentially revealing country-specific risk information.

4.2 Local Credit Risk and the CDS Term Premium

Experiment To test whether the CDS term premium contains information about local credit risks, the authors ran a regression of a local credit risk proxy on the CDS term premium. The local credit risk proxy is obtained as the residuals by regressing the changes in CDS levels for country i on the first three principal components obtained in the PCA (outlined above). Let the local credit risk proxy of country i at time t be $Local_{i,t}$, the CDS term premium of country i at time t be $\Delta TP_{i,t}$. The regression equation is:

$$Local_{i,t} = \alpha_i + \beta_i \Delta TP_{i,t} + \epsilon_{i,t}$$

Results For four out of seven developed countries in the sample, the CDS term premia account for a significant portion of local credit risk. Twenty out of twenty two developing countries yield significant results, suggesting that the sovereign CDS term premium effectively capture local credit risks. All but one regression coefficients (β_i) are negative (around -0.10), indicating that the CDS term premium is negatively correlated with local credit risks.

4.3 Macroeconomic States and the CDS Term Premium

Experiment To further understand the factors driving the evolution of the CDS term premium, the authors ran a regression of the CDS term premium on macroeconomic states:

$$\Delta TP_{i,t} = \alpha + \beta_1 Stock_{i,t} + \beta_2 \Delta Reserve_{i,t} + \beta_3 FXret_{i,t} + \beta_4 USstock_t + \beta_5 \Delta VRP_t + \beta_6 \Delta LTY_t + \epsilon_{i,t}$$

The first three independent variables are local states: local stock returns denominated in local currency ($Stock_{i,t}$), currency returns ($FXret_{i,t}$), and percentages changes in the dollar value of sovereign foreign currency holdings ($Reserve_{i,t}$). The last three independent variables are global states: U.S. stock returns ($USstock_t$), changes in the U.S. variance risk premium (ΔVRP_t), and U.S. long-term bond yields (ΔLTY_t).

Results The three local variables are all statistically significant at the 1% level. Their regression coefficients are 0.55, 1.18, and 0.42 respectively. Changes in the CDS term premia on average show a positive contemporaneous relationship with domestic stock returns, currency appreciation, and the growth in FX reserves. This shows that the CDS term premium is positively correlated with good domestic news. The only global predictor that is robust and significant is the U.S. stock returns ($\beta = 1.13$), which has a lower t -statistic than that of local stock returns after clustering over time. This suggests that global variables cannot fully explain the CDS term premium.

5 CDS Term Premia for Currency Returns Prediction

5.1 Portfolio Sorts

Experiment At the end of each month, sort currencies based on their sovereign CDS term premia. Assign each currency into one of the three portfolios based on the breakpoints separated by the 30th and 60th quantiles of CDS term premia. Assign equal weights to the currencies within each portfolio and rebalance the portfolios monthly.

Results On average, the higher the CDS term premia, the higher the portfolio returns. The high-minus-low portfolio has an average annualized return spread of 4.84%. This shows that the CDS term premium is an effective predictor of currency returns.

5.2 Fama-MacBeth Regression

Experiment To examine the predictive ability of the CDS term premium with other risk factors under control, the authors ran Fama-MacBeth regressions of currency returns on different combinations of the following variables: the sovereign CDS term premium, the sovereign CDS level, the local stock return, and the local reserve.

Results In all regression results, the CDS term premium significantly and positively predicts future currency returns. The coefficient for the CDS term premium remains largely the same (around 0.44) in all regressions. This shows that the sovereign CDS term premium predictability is strong. The term premium captures risk factors that are uncorrelated with other local risk factors.