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The term structure of CDS spreads and sovereign credit risk

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ABSTRACT

The shape of the term structure of credit default swap spreads is an informative signal about the importance of global and domestic risk factors to the time variation of sovereign credit spreads. Exploiting cross-country heterogeneity among 44 countries, I document that the importance of global and country-specific risk in explaining sovereign credit risk varies with the sign of the slope of the term structure and the duration of its inversion. A model is used to show that global uncertainty shocks determine spread changes when the slope is positive, and that domestic shocks are more important when the slope is negative.

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1. Introduction

The defaults of several emerging market economies over the last two decades and the multiple recent European government bailouts have fueled the interest in understanding the pricing of sovereign credit risk.¹ Yet the literature is inconclusive as to the relative importance of global and country-specific risk factors to the time variation in sovereign credit spreads. Until the end of the 2007–09 financial crisis, there appeared to be some consensus that sovereign credit risk is driven by *global* factors (Ang and Longstaff, 2013; Borri and Verdelhan, 2016; Pan and Singleton, 2008) and that it is better explained by U.S. financial market factors than by country-specific fundamentals (Longstaff et al., 2011). Since the start of the sovereign debt crisis in Europe in 2009, Gennaioli et al. (2012) and Acharya et al. (2014), among others, establish a tight link between sovereign risk and the performance of the *domestic* financial sector.

Such differences in findings are intriguing and beg the question of what could explain the divergence in emphasis among these results, and, perhaps, reconcile both parties? One possible explanation could be the focus of the above studies on the level of credit spreads. For many asset classes, the entire *term structure* has been shown to convey valuable economic information on the pricing of risk, including U.S. government bonds (Cochrane and Piazzesi, 2005), equity and dividend derivatives (Binsbergen et al., 2012; 2013), currencies (Lustig et al., 2017; Zviadadze, 2017), inflation (Fleckenstein et al., 2017), and volatility (Gruber et al., 2017), among many others. Thus, incorporating the information from the slope of the

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¹ For example, Greece was bailed out three times (in years 2010, 2011, and 2015) and officially defaulted in 2012. Explicit or implicit bailouts were implemented for Ireland in 2010, Portugal in 2011, Spain in 2012, and Cyprus in 2013.

term structure (henceforth the “slope”) may help us understand why researchers reach different conclusions in the sovereign credit risk literature. The examination of the term structure of credit default swap (CDS) spreads of different countries across time suggests, indeed, that the slope conveys differences in information that cannot be distinguished by the level of spreads. Russia, for example, exhibits an identical 5-year CDS spread in three separate months, despite significant differences in the slope. It is 418 and 270 basis points (bps) in January and June 2002, respectively, and –106 bps (inverted) in March 2009, when many countries had upward sloping term structures.² This suggests that dependence on a common (level) factor alone is insufficient to explain country-specific heterogeneity in the term structure of CDS spreads, and that the shape of the slope may be informative about the underlying sources of risk.

I show that the shape of the term structure of sovereign CDS spreads conveys useful information on the importance of global and domestic risk factors for the dynamics of sovereign credit risk. In particular, global shocks are the primary source of time variation for spreads when the term structure is upward-sloping. A negative slope, in contrast, indicates that local shocks dominate. Importantly, for each country, the relative influence of global and country-specific risk factors can be inferred in real time, as CDS spreads are observable at a daily frequency. These empirical findings are supported by a general equilibrium asset pricing model for CDS spreads with recursive preferences and long-run risk. This model can be used to explore the time-varying dynamics and cross-country heterogeneity of the term structure of sovereign credit risk in relation to common and country-specific shocks.

The informational power of the term structure of sovereign CDS spreads is documented in three ways, using a novel data set on six maturities of sovereign CDS spreads for 44 countries from January 2001 to February 2012. The level of CDS spreads is defined as the 5-year spread, and the slope as the difference between the 10-year and the 1-year spreads. The focus is on the sign of the slope and the number of months that the slope is negative (the duration of inversion). First, using a simple cross-sectional analysis, it is shown that country-specific fundamentals explain a significantly greater fraction of the variation in monthly CDS spread changes for countries with term structure inversions, compared to countries that have never had a negative slope. More importantly, the fraction of variation in spreads due to domestic risk increases monotonically with the duration of the inversion.

Second, the slope is explicitly used as an interaction term in panel regressions to show its power in identifying the importance of global and domestic risk factors in driving the time variation of sovereign credit risk. Country stock market returns proxy for domestic risk, as they are the most significant domestic determinant of CDS spreads in the empirical analysis. The magnitude of the impact of domestic stock market returns on CDS spread changes increases fifteenfold when the slope is negative. It is also greater for larger spread changes, and these impacts are statistically significant primarily for spread innovations that are associated with a flattening of the slope. Furthermore, the slope is shown to significantly explain quarterly real GDP growth, a country-specific measure, only when the slope is negative. An examination of the factor structure of changes in the slope of spreads across countries suggests that the slope exhibits little commonality, in contrast to the strong factor structure documented for the levels (Longstaff et al., 2011; Pan and Singleton, 2008). One factor influences only about 22% of changes in the slope of spreads, while it influences about 57% of changes in the level of spreads, i.e., almost three times as much. Overall, these findings support the view that the slope contains country-specific information not accounted for by the level of CDS spreads, and that this information is useful for understanding cross-country heterogeneity related to the dynamics of sovereign credit spreads.

I next demonstrate that a model with recursive preferences and long-run risk has implications for time variation in the term structure of CDS spreads that are consistent with the observed dynamics of the term structure of spreads. Given the well-documented role of time-varying macroeconomic uncertainty (Jurado et al., 2015) and its impact on asset prices (Lettau et al., 2006), global macroeconomic uncertainty is the common risk factor in each country's default process, which depends both on global macroeconomic uncertainty and on country-specific shocks. Both types of shocks impact the CDS term structure all the time. Common shocks work in two counteracting directions, but the dominating effect is to steepen the slope. Country-specific shocks work in the opposite direction to the global shock. The differential impact on the term structure is due to a differential impact of the shocks on default probabilities and risk premia. Domestic shocks only affect default probabilities because they are unpriced. A negative country-specific shock increases default probabilities more for short maturities and less for long maturities, as conditions are expected to improve over time. As a result, the term structure inverts. Priced uncertainty shocks also command a risk premium, which increases more for longer maturities, due to preference for early resolution of uncertainty. Thus, the term structure steepens, as the increase in the term structure of risk premia outweighs the decrease in the term structure of default probabilities. The mechanism underlying the term structure inversions is consistent with my findings that country-specific shocks have greater explanatory power when the slope is negative.

The model is calibrated to the unconditional moments of all 44 countries in sample. Countries, which, on average, have upward-sloping term structures, load heavily on aggregate risk. For countries that, on average, have downward-sloping term structures, the leverage factor on global risk is small, and the default intensity depends more on idiosyncratic shocks. Simulations suggest that the model describes the data well, as the 5-year spread level always lies within the 5th and the 95th percentiles of the small sample distribution. The model qualitatively fits the slope patterns and, importantly, the frequency of the term structure inversion. The simulated panel also closely matches the factor structure of high commonality in the

² These empirical observations are illustrated graphically in the Online Appendix.

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