Essays on Sovereign Credit Risk and Credit Default Swap Spreads

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Foreword

This volume is the result of a research project carried out at the Finance Department of the Stockholm School of Economics (SSE). This volume is submitted as a doctor's thesis at SSE. In keeping with the policies of SSE, the author has been entirely free to conduct and present his research in the manner of his choosing as an expression of his own ideas. SSE is grateful for the financial support provided by the Swedish Bank Research Foundation, the Jan Wallander and Tom Hedelius Foundation and the Luxembourg National Research Fund, which have made it possible to fulfill the project.

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To my brother, Philippe.

Acknowledgements

Writing these words means that I have accomplished a long journey marked by a multitude of emotions, ranging from apocalyptic frustration to utopic euphoria. Being admitted to defend my PhD thesis mirrors being rewarded with a medal at the end of an ultra-marathon. Just like a marathon race could not be completed without the help of all the people preparing the racing track, reaching drinks and cheering along the road, the PhD could not be achieved without the continuous support of people, friends and family around me. My gratitude goes to all of you.

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Introduction

This doctoral thesis consists of four independent research papers, which I wrote during my time as a PhD student at the Department of Finance of the Stockholm School of Economics from September 2008 to June 2013. Part of this work was accomplished when I visited the Finance Department of the New York University, Leonard N. Stern School of Business, during the academic year 2011/2012.

All four papers are self-contained and written with the purpose of eventually being published as separate articles in academic journals. The first three articles share the common theme of sovereign credit risk as reflected in sovereign credit default swaps. The literature in this field is fairly young, but quickly evolving. The fourth article extends the work on credit default swaps to the corporate sector and investigates liquidity frictions which perturb the arbitrage relationship between the synthetic and cash fixed income markets.

The first paper, *Sovereign Credit Default Swap Premia* provides an introduction to the topic by surveying the literature on sovereign credit default swap spreads. Credit derivatives have experienced dramatic growth over the last decade. Far from uncontroversial, they are often blamed as a vehicle for speculation with detrimental effects on countries' borrowing costs. Proponents of the products, on the other hand, cite them as efficient products to enhance risk sharing in financial markets. By emphasizing certain contradictions in the literature and confronting them with stylized statistical facts, I intend to raise some though-provoking questions in light of the changing regulatory landscape surrounding the use of sovereign credit default swap spreads. The spotlight has so far been put on the determinants of spreads, financial market frictions as well as spillover and contagion effects. In addition, I also point to areas which would require further research to allow us to fully understand the implications which would justify recent regulatory initiatives. One big debate in the literature surrounds the question whether sovereign credit default swap spreads are determined relatively more by country-specific factors, or rather by a set of global risk factors unrelated from an individual's country economy. Chapters two and three of this thesis contribute explicitly to this debate.

The second paper, *Real Economic Shocks and Sovereign Credit Risk*, focuses on the nature of global risk factors for the pricing of sovereign spreads. The strong co-movement of country credit spreads has motivated investigations into the role of common factors in explaining time variation in spreads. While the bulk of the literature almost unanimously refers to global financial market factors as the ultimate source of risk, Roméo Tédongap and I provide new empirical evidence that unspanned global macroeconomic risk bears some responsibility for the strong co-movement in sovereign spreads. To rationalize these findings, we embed a reduced-form default process into an equilibrium model with downside risk for CDS spreads. Countries differ through their sensitivity to global macroeconomic forecasts and uncertainty. In addition, we exploit the high frequency information in the CDS term structure across 38 countries to estimate the structural model. Our estimated parameters prove consistent with preference for early resolution of uncertainty. Both the empirical evidence and the model's ability to match stylized asset pricing facts in several dimensions confirm the existence of time-varying risk premia in sovereign spreads as a compensation for exposure to common U.S. business cycle risk. The macroeconomic nature of our global risk factors, namely expected growth and volatility of US consumption growth, thus stand in contrast to the commonly cited role of US financial risk.

The financial crisis of 2008/2009 was accompanied with severe losses by financial institutions. While several governments already struggled with fiscal imbalances, bank bailouts put further strains on sovereign balance sheets. This strengthened the link between sovereign credit risk and the domestic financial sector and put the spotlight back on country-specific factors as determinants of sovereign spreads. In particular, research increasingly emphasized the private-to-public risk transfer as well as feedback effects to the private sector. These may arise when deteriorating sovereign financial health weakens the value of implicit bailout guarantees given to financial institutions and causes collateral damage to the value of their public bond holdings. The third paper, *The Term Structure of CDS Spreads and Sovereign Credit Risk* responds to the previous literature by arguing that in fact both global and country-specific risk factors matter in determining the price of sovereign credit risk. However, they simply matter in different points in time. I argue that the term structure of credit spreads provides an informative signal beyond the level of spreads about the relative importance of global and domestic risk. In particular, global shocks determine spread changes when the slope is positive. Nonetheless, a negative slope indicates that domestic shocks are relatively more important. To draw these conclusions, I develop a recursive preference-based model with long-run risk for credit default swaps. The underlying default process, which modulates expectations about future default probabilities, depends both

on global macroeconomic uncertainty and country-specific risk. Their dynamics and
investor preferences jointly explain time variation in the term structure. I evaluate the
model using a panel of 44 countries and I show empirically that the country-specific
fundamentals explain relatively more spread variation than global factors as countries
become more distressed. The number of months the term structure is inverted proxies
for the duration of distress. One important message of the paper is that we ought to
focus more often on the slope of the term structure, beyond merely looking at the level
of spreads.

The fourth and final paper, *Squeezed Everywhere - Disentangling Types of Liquidity
and Testing Limits-to-Arbitrage*, moves away from sovereign credit risk and investigates
no-arbitrage frictions in the relationship between synthetic and cash fixed income prod-
ucts in the corporate market. Theoretically, the spread on a par floating rate note over
a risk-free interest rate should reflect the same underlying credit risk as an insurance
on the underlying debt obligation. This arbitrage relationship broke severely down,
however, during the financial crisis. The CDS-Bond basis, defined as the difference
between a credit default swap spread and a bond spread over a risk-free benchmark
for the same underlying, turned significantly negative over an extended period of time.
In this article, I focus on disentangling asset-specific, market-wide and funding liquid-
ity in the CDS-Bond basis outside and during the 07/09 financial crisis, stressing the
importance of separating different types of liquidity. I show that while asset-specific
liquidity is cross-correlated in both the cash and derivative market, funding and mar-
ket liquidity matter only for the former. Using different types of liquidity, I also test
several theoretical predictions of limits-to-arbitrage. I find strong evidence in favor of
the margin-based asset pricing theory and flight-to-quality effects. In addition, both
asset-specific and funding liquidity are mutually reinforcing with market-wide liquidity,
while there is little commonality between firm-specific and funding liquidity.

The remainder of this thesis consists of the four papers introduced above. Each
of them represents a separate chapter. Accompanying tables and figures follow each
article and a summarized bibliography follows at the end of the thesis.