



Liquidity spillovers in sovereign bond and CDS markets: An analysis of the Eurozone sovereign debt crisis

Giovanni Calice^a, Jing Chen^b, Julian Williams^{c,*}

^a University of Southampton, School of Management, Southampton, England, UK

^b Swansea University, School of Economics and Business, Swansea, Wales, UK

^c University of Aberdeen, Business School, Aberdeen, Scotland AB24 3QY, UK

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ABSTRACT

At the end of 2009, countries in the Eurozone (euro area) began to experience a sudden divergence of bond yields as the market perception of sovereign default risk increased. The theory of complete markets suggests that sovereign debt and credit default swap (CDS) credit spreads should track each other closely. In addition, liquidity risk should be priced into both instruments in such a way that buying exposure to the same default risk is identically priced. We use a time-varying vector autoregression framework to establish the credit and liquidity spread interactions over the 2009–2010 crisis period. We find substantial variation in the patterns of the transmission effect between maturities and across countries. Our major result is that, for several countries, including Greece, Ireland and Portugal the liquidity of the sovereign CDS market has a substantial time varying influence on sovereign bond credit spreads. This evidence is of particular importance in the current policy context.

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1. Introduction

This paper develops an empirical model of the co-evolution of credit and liquidity spreads in sovereign bond and CDS markets. We apply this model to study the liquidity and credit interactions for Eurozone countries over the January 1, 2007 to October 1, 2010 period.

During November 2009, shortly after the election of a new Greek government, the Greek public sector deficit was revised from 6% to 12.7% of GDP. This event initiated a sovereign debt crisis that has resulted in large financial interventions in Greece, Ireland and Portugal. The resultant fluctuations in financial markets and sudden impact on fiscal policy in the affected states is often referred to as the 'Eurozone sovereign debt crisis'.

The deterioration in government finances, after the credit crisis of 2008, led to a sudden loss of confidence in sovereign debt markets, which revealed itself in the form of widening credit spreads between several euro area members and the Eurozone's largest economy, Germany. The response by Eurozone member states and international bodies such as the International Monetary Fund (IMF) and the European Union (EU) has been a suite of interventions led by the European Central Bank (ECB).¹

* Corresponding author. Tel.: +44 1224 272204; fax: +44 1224 272181.

E-mail addresses: g.calice@soton.ac.uk (G. Calice), jing.chen@swansea.ac.uk (J. Chen), julian.williams@abdn.ac.uk (J. Williams).

¹ After August 2007, several interconnected crises occurred. At points, we will refer to the 'US subprime mortgage crisis' which unveiled in August 2007. For the purposes of this study, we restrict this definition to refer to losses incurred by financial institutions on mortgage-backed securities and associated structured derivatives. We define 'credit crisis' and 'credit crunch' as the explosive growth in interbank lending rates, relative to policy rates, during early

Throughout 2010 the focus of the crisis has been on Greece, Ireland and Portugal where there is concern about the rising cost of financing government debt and the possibility of default on a sovereign debt issuance. On May 2, 2010, the Eurozone countries and the IMF agreed to a EUR 110 billion loan for Greece, conditional on the implementation of a package of severe austerity measures. On May 9, 2010, Europe's Finance Ministers approved the creation of the European Financial Stability Facility (EFSF) aimed at preserving financial stability in Europe by providing financial assistance to Eurozone states in economic difficulty. The objective of the EFSF is to collect funds and provide loans in conjunction with the IMF to cover the financing needs of Eurozone Member States in difficulty, subject to strict policy conditionality. The Greek bailout was followed by a EUR 85 billion rescue package for Ireland in November 2010, and a EUR 78 billion bailout for Portugal in May 2011.

During the crisis, several commentators expressed concern that manipulation of the CDS market by speculative investors was playing a crucial role in exacerbating the liquidity dry up in the market for Greek, Irish, Portuguese and Spanish sovereign debt. In particular, 'naked' CDS positions were blamed for driving bond yields on these countries' sovereign debt higher during the first half of 2010. In this context, Greece was suggested to have been a victim of short-term speculative short selling practices on its national debt and naked shorting practices in the CDS market.

In this paper, we investigate the potential spillover effects between the credit and liquidity spreads in the Eurozone sovereign bond market and the sovereign credit default swap (CDS) market during the 2010 European sovereign debt crisis. We define two credit spreads, denoted by the suffix CS. First, the difference in the required discount rate on Eurozone members' benchmark sovereign debt issuance against a benchmark (in this case equivalent German benchmark bonds). Second, the difference between the CDS spread on benchmark sovereign debt against the CDS spread on equivalent German sovereign debt. In equilibrium, these should co-move almost precisely. We then use the bid–ask spread on the bond and CDS markets to proxy for market depth and transactions costs and hence market liquidity and enter these four variables into a vector model. This is denoted by the suffix LS for liquidity spread. For brevity we utilise the commonly understood equity/foreign exchange parlance bid–ask spread, to refer to the difference between the yield (spread) bid and the yield (spread) ask for the sovereign bond (CDS) market.

The remainder of the paper is organised as follows. [Section 2](#) provides background information on the Eurozone crisis and reviews the related literature on the pricing and liquidity of the bond and CDS market. [Section 3](#) describes our empirical methodology and [Section 4](#) the data pre-processing used in the study. [Section 5](#) contains our analysis of the results whilst [Section 6](#) offers our concluding remarks.

2. Background and related literature

In our analysis, we utilise a time varying vector autoregression (TV-VAR) to capture the changing relationship between the lagged credit and liquidity spreads for nine countries in the Eurozone. The empirical model treats the evolution of credit spreads and liquidity spreads as being completely endogenous, i.e. the contemporaneous credit and liquidity spreads are on the left hand side of the equation whilst the lagged values and shocks are on the right. The objective is to discern changes in the transmission coefficients (the slope parameters of the model) as the Eurozone crisis has evolved. The model is run on daily indices computed from transaction data and industry reported end-of-day data for the bond and CDS markets. To the best of our knowledge this is the first paper to analyse this data in this context.

Our results are primarily in the form of plots of coefficients on lagged variables that identify particular channels of information. To contextualise our results [Table 1](#) outlines the timeline of the crisis.

The primary risk mechanism involved in triggering the Eurozone sovereign debt crisis is that each individual country, upon joining the Eurozone, effectively gave up the right to inflate (and hence depreciate their currency) their way out of financial distress should the amount and cost of borrowing suddenly rise to unsustainable levels. This implies that countries, in an identical manner to firms, could in theory completely default on sovereign debt issuances. Indeed, the collapse of Lehman Brothers in 2008 revealed that the so-called too-big-to-fail institutions could default on their debt and as a consequence credit spreads on corporate debt increased rapidly during the 2007–2010 period.

Prior sovereign defaults, for instance Argentina in 2001, were caused by a similar ceding of seigniorage revenue and a hard constraint on the expansion of the monetary base. In the case of Argentina, a currency board with the United States was fixed with supposedly 100% US dollar reserves. When the currency board was broken and the Argentinian peso devalued, several US dollar backed sovereign debt issuances defaulted, with low recovery rates.

Notably, the reasons for the high levels of borrowing for certain members of the Eurozone in the aftermath of the financial crisis are not uniform. Countries such as Greece and Italy have consistently recorded high levels of government borrowing to ensure continuation of provision of public services and public sector pay and condition settlements. The major issue for Ireland has been in the form of providing assurances for a large financial sector that has suffered great losses during the financial crisis.

2008. These are obviously interlinked. Finally, we refer to the 'Eurozone sovereign debt crisis' as the period of high growth in late 2009 of credit spreads on sovereign debt for several Eurozone countries. For brevity we often use the capitalised term Eurozone to refer to the collection of countries in the euro area with monetary policy conducted by the ECB and operating under the rules of the Eurosystem. Credit spread, in this context, is the difference in yield between the sovereign bond issuance for a euro area member state and the equivalent maturity German government bond (bund).

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