



Sovereign CDS spread determinants and spill-over effects during financial crisis: A panel VAR approach



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ABSTRACT

This paper examines the determinants of CDS spreads and potential spillover effects for Eurozone countries during the recent financial crisis in the EU. We employ a Panel Vector Autoregressive (PVAR) model which combines the advantages of traditional VAR modelling with those of a panel-data approach. In addition to variables that proxy for global and financial market spread determinants we also employ variables that proxy for behavioral determinants. We find that the determinants of CDS variance are neither uniform nor stable during different periods and different countries. For instance, as we move from 2008 to 2014 the impact of the slope of the term structure on CDS spread variance is increasing for peripheral countries such as Spain, Portugal, Italy, Greece, Ireland, and decreasing for core countries such as Germany, France, Netherlands, Belgium and Austria. Other findings indicate that investor sentiment was an important CDS spread determinant during the subprime crisis, along with other factors, while spillover effects run from larger peripheral economies such as Spain and Italy to core countries; spillover effects from Portugal, Greece, and Ireland are of minor importance.

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1. Introduction

During the past two decades the Credit Default Swap (CDS) market has undergone a significant expansion. For instance, in early 1998 the value of this market was estimated at a few hundred billion US dollars; however, as of June 2007 the notional amount outstanding for OTC CDS was \$45,179 billion, and by June 2014 at \$19,462 billion (source: Bank for International Settlements). Peltonen et al. (2014) find that the CDS market is clustered around fourteen major dealers and exhibits a “small world” structure, where most CDS investors are net buyers. CDS spreads reflect the perception of market participants about the financial health of creditors and signal warnings about financial stability (Annaert et al., 2013).

Following this market growth, the emergence of CDS as an asset class, and motivated by the role of the CDS market in the global financial crisis, academic research on CDS instruments and spreads flourished. Also, as Ang and Longstaff (2013) argue, there

is an important advantage in using CDS spreads compared to debt spreads when studying credit risk: debt spreads are determined by a plethora of other factors apart from credit risk. The literature on sovereign CDS, however, developed less rapidly compared to the literature on corporate CDS (Doshi et al., 2014). For instance, many recent studies focus on bank or corporate CDS spreads (e.g. Chiaramonte and Casu, 2013; Galil et al., 2014; Annaert et al., 2013; among others), or emerging market CDS spreads (see Hilscher and Nosbusch, 2010; Ammer and Cai, 2011; Fender et al., 2012; among others). Furthermore, the early literature on credit spreads mainly concentrates on bond yield spread determinants and documents the role of common global and financial market factors (Edwards, 1986; Berg and Sachs, 1988; Boehmer and Megginson, 1990; Eichengreen and Mody, 1998; Remolona et al., 2008; among others). In terms of empirical approaches employed to study the CDS market, Doshi et al. (2014) point out that there are two different strands in the recent literature. Many studies employ reduced-form latent models to model credit risk (e.g. Pan and Singleton, 2008; Longstaff et al., 2011), while other studies regress CDS spreads on variables that capture fundamental macroeconomic spread determinants (e.g. Dieckmann and Plank, 2012). For example, spillover effects are often examined with global vector autoregression (GVARs) models of sovereign debt across countries;

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usually a VAR model for each sample country is estimated that includes global variables (Caporale and Girardi, 2013; Eickmeier and Ng, 2011).

This paper examines the determinants of CDS spreads and potential spillover effects for Eurozone countries during the recent financial crisis in the EU. The results may have important implications for policy makers since the effective response to a crisis depends crucially on a deep understanding of the sources and determinants of sovereign credit risk. The paper contributes to the relevant literature in a number of ways. More specifically, we employ a research methodology that is based on a Panel Vector Autoregressive (PVAR) model which combines the advantages of traditional VAR modelling with the advantages of a panel-data approach. According to Love and Zicchino (2006) the PVAR is a combination of the traditional VAR "...which treats all the variables in the system as endogenous, with the panel-data approach, which allows for unobserved individual heterogeneity" (p. 193). Also a main difference between PVAR and Global VAR models is that the coefficients on the foreign variables are restricted to zero, and only one set of coefficients are estimated (not one set for each country, as in the GVAR). In other words, we are able to examine the extent to which CDS spreads in Eurozone countries are due to changes in global or country-specific factors while allowing for a country-specific unobserved heterogeneity in the levels of the variables (fixed effects). We also examine spillover effects, orthogonalized impulse-response functions, and variance decompositions through which we are able to separate the response of CDS spreads to shocks coming from each variable.

Furthermore, in addition to variables that proxy for global and financial market spread determinants we also employ variables that proxy for behavioral determinants. Note that the vast majority of previous studies focuses on macroeconomic or financial information in order to study the determinants of spreads and neglect behavioral variables that may capture investor and economic sentiment; many recent studies, however, show that behavioral biases and/or investor sentiment may affect stock and bond returns, especially during crisis periods (see, among others, Galariotis et al., 2015; Kassimatis et al., 2008; Fisher and Statman, 2003; Kumar and Lee, 2006). The variables we employ to proxy for sentiment are the Economic Sentiment Indicator (ESI) that is published monthly by the European Commission (DG ECFIN) and aims to assess the business and consumer confidence, and the ZEW Economic Sentiment indicator which is an amalgamation of the sentiment of approximately 350 economists and analysts regarding the economic climate in Europe for the next six months. Experts are asked for a qualitative assessment of the direction of inflation, interest rates, exchange rates and the stock market and as a result the indicator provides a medium-term forecast for the Eurozone economy. The ESI combines assessments and expectations stemming from business and consumer surveys for different sectors: industry, consumers, construction, and retail with the weights are as follows: industrial confidence indicator (40%), service confidence indicator (30%), consumer confidence indicator (20%), construction confidence indicator (5%), and the retail trade confidence indicator (5%). Rua (2002) argues that the ESI has information content for the GDP growth rate; in this sense, the domestic ESI may have significant information content for spreads. Note that we also employ a variable that has not been used in previous studies, the number of CDS contracts traded, which may serve as a twin proxy: on the one hand it may proxy for liquidity (for which we also use the bid-ask spread for robustness); on the other hand a measure of trading volume, such as the contracts traded, may capture optimism or pessimism and, thus, it may serve as a market-based proxy for sentiment (see Baker and Stein, 2004; Baker and Wurgler, 2006).

Several interesting results emerge from the analysis. We find that the determinants of CDS variance are neither uniform nor sta-

ble during different periods and different countries. For instance, as we move from 2008 to 2014 the impact of the slope of the term structure on CDS spread variance is increasing for peripheral countries (Spain, Portugal, Italy, Greece and Ireland) and decreasing for the core countries (Germany, France, Netherlands, Belgium and Austria); the effect of VIX, a proxy for global market risk, is not very important for the core countries, however, it is very important for peripheral countries between 2008 and 2012 (it contributes to CDS variance by approximately 31%). We also report evidence that investor sentiment may be an important CDS spread determinant during the period between 2008 and 2010, along with other factors, a result consistent with the results of Spyrou (2013) who reports similar findings for both the level and changes in bond yields (see also, Heinz and Sun, 2014).

Other findings indicate that spillover effects may run from Spain and Italy to core countries while spillover effects from Portugal, Greece, and Ireland are of minor importance. Italy and Spain, being much larger economies, could potentially destabilize the euro area, even though their likelihood of running into financial difficulties was perceived by the markets as comparatively smaller, based on their SCDS spreads. Moreover, following the first Greek debt restructuring in mid-2011, Greek CDS spread was persistently well above 1000 bps and probably carried little information for investors. Our finding is consistent with Kalbaska and Gatkowski (2012) who study contagion among several European countries and find that spillovers from Spain and Italy, especially until July 2012, were of a great importance. The rest of this paper is organized as follows. Section 2, reviews the relevant literature, section 3 discusses the data and methodology, Section 4 presents the results, while section 5 concludes the paper.

2. Previous studies

Longstaff et al. (2011) examine monthly 5-year CDS for 26 countries between 2000 and 2010 and find that sovereign CDS spreads can be explained to a large extent by U.S. equity, volatility, and bond market risk premia. In addition, they find that important determinants are global financial market variables or a global risk premium, while the contribution of local macroeconomic variables is of minor importance; this implies that systemic sovereign risk is more related to financial markets than to country-specific variables. Heinz and Sun (2014) use a panel GLS error correction framework and find that European sovereign CDS spreads are largely driven by factors such as global investor sentiment, macroeconomic fundamentals and liquidity conditions in the CDS market, with their relative importance changing over time (see also Beirne and Fratzscher, 2013; Ejsing and Lemke, 2011).

Caporin et al. (2013) find that contagion in Europe remains subdued during their sample period and suggest that the common shift observed in CDS spreads is the outcome of the usual interdependence. Broto and Perez-Quiros (2015) employ a multivariate model with time-varying correlations and volatilities, and decompose the sovereign CDS spreads of ten OECD economies into three single components: a common factor, a second factor driven by European peripheral countries and an idiosyncratic component. They argue that since the onset of the sovereign debt crisis, contagion has played a role of major importance in the European peripheral countries. Anderson (2011) studies the source of the increase in the correlation CDS spread changes during the crisis and finds evidence suggesting that fluctuations in fundamental credit risk account for only a small fraction of the increase in correlation, and no evidence of increased correlations due to liquidity or counterparty risk. Focusing on contagion between sovereigns and banks, Gross and Kok (2013) document a number of salient facts: firstly, spill-over potential in the CDS market is particularly intense in

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