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Linkages between financial sector CDS spreads and macroeconomic influence in a nonlinear setting

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ABSTRACT

This paper investigates the asymmetric and nonlinear transmission of financial and energy prices to US five-year financial CDS sector index spreads for the banking, financial services and insurance sectors in the short- and long-run over the recent periods revolving around the global financial crisis. We employ the nonlinear ARDL (NARDL) model to account for the short- and long-run asymmetries in the sensitivity of those CDS sector index spreads to their determinants. Our findings suggest that there is evidence of short- and long-run nonlinearities and asymmetries in the adjustment process of the three CDS variables. There are also short- and long-run asymmetries in the influences of macroeconomic and financial variables on the CDS sector spreads. These findings are important for policymakers who deal with credit risks at the sector levels.

1. Introduction

Many scholars, financial analysts and policymakers hold the financial institutions and government regulators responsible for issuing or allowing too many credit derivatives that generated too much risk in many global economies. The most important part of the credit derivatives are the credit default swaps (CDSs), which have become complicated assets that spread risks around the world's financial sectors instead of serving as hedging instruments. A CDS index is a highly liquid, standardized credit security that trades at a very small bid–ask spread. CDSs can be efficient in processing information on evolving risks in the financial sectors and the rest of the economy (see Norden & Weber, 2004; and Greatrex, 2008 among others). The magnitude of the financial credit spreads gauges the default risk exposure of the institutions that make up the financial sectors. A widening in a CDS spread in response to certain credit events indicates an increase in the level of credit risk in the pertinent financial/economic sector, while a narrowing in the spread reveals a decrease in the credit risk. Moreover, in bad times the risk in the CDS markets can be exponential and in this case the strategy that the premium covers the risk does not work.

During the recent global financial crisis (GFC) the risk initially transmitted from the financial institutions such as AIG to the real sector firms such as GM, followed by counter risk transmission. The problem affected the derivative markets, corporate bond markets and money markets. Given the roles played by the financial institutions and the consequences of the recent GFC,

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this paper is motivated to examine the dynamic behavior of the CDS spread sector indices for the banking, financial services and insurance sectors as well as the comportment of other measures of risk that are related to those financial spreads in the pre- and post-periods of the GFC.

Financial CDS sector indices may be influenced differently by shocks and credit events due to differences in the investment space of banks, financial services companies and insurance companies that make up the financial sectors. Banks receive deposits and specialize in making loans, while financial services companies are not depository institutions and invest in more risky credit assets such as low grade investments and high yield corporate bonds. Insurance companies focus more on less-risky fixed income investments, and thus are more conservative than banks and financial services institutions. They also sell CDS protection contracts as well as they buy them. They issue bonds and also insure the investors who buy them, thus they may have double CDS risk in the case of defaults. Therefore, one sector may react more or less than other sectors to credit events that may affect their own sectors as well as the overall economy. Banks may react less to a business bankruptcy or a financial regulation than other financial institutions. There are several pressures within the financial sectors that lead to different risk reactions. There are pressures related to liquidity which should have differential impacts on the financial sectors' CDS indices. There are also pressures related to inflation expectation and market risks.

The purpose of this paper is to investigate the long- and short-run linkages between the sector CDS index spread dynamics for CDS_Banks, CDS_Financial service and CDS_Insurance in a nonlinear setting that includes a set of explanatory macroeconomic and financial variables namely the 3-month Libor, the federal funds rate, the Treasury bill rate, VIX and WTI. These variables reflect risks in the money, credit and oil markets. In particular, several banks have large exposures to Libor through their interest rate derivative portfolios and have recently profited from the rapid descent of this rate. Insurance companies are not involved in borrowing unsecured funds from other banks, but they may benefit from higher LIBOR as the pricing of loans that reflects the risk-free rate and the CDS spread. Moreover, the federal funds rate can be regarded as the marginal cost of borrowing, and therefore other rates are set according to it. The changes in oil prices also raise uncertainty in the financial markets, and that is reflected in the CDS markets. There is also a theoretical relationship between credit default swap spreads and bond yield spreads. This relationship holds fairly well and can be used to estimate the benchmark five-year risk-free rate used by participants in the credit default swap market (Hull, Predescu, & White, 2004; Snider & Youle, 2009).

To achieve this purpose, we employ the recently developed approach — the Nonlinear Autoregressive Distributed Lags (NARDL) model that allows one to test for long- and short-run asymmetries. Moreover, unlike the standard cointegration techniques (Johansen and Engle–Granger), this model permits one to test for hidden cointegration and use time series that have different orders of integration (i.e., I(1) and I(0)). The computation of asymmetric dynamic multipliers allows one to quantify the respective responses of the sector CDS spreads to positive and negative changes in each of the explanatory variables through estimating the positive and negative partial sum decompositions of these variables.

Therefore, this article contributes to the existing literature by addressing nonlinearity and asymmetry in modeling the time-variations in the financial CDS sector index spreads, taking into account the recent GFC, as well as the influence of economic and financial variables. In contrast to the existing literature on CDS sector indices, this study employs the NARDL model which has all the benefits and advantages described above. Specifically, an important advantage of the NARDL model is that it can combine I(0) and I(1) variables, making the 'bounds test' appropriate to assess the presence of long-run relationships between the variables under consideration (Banerjee, Dolado, & Mestre, 1998; Pesaran, Shin, & Smith, 2001). This approach also allows for computing in a simple manner the responses of CDS sector spreads to a shock in each of the control variables we use. The zero threshold allows assessing accurately the impact of a positive and negative shocks to the control variables on the CDS spreads. Thus, this nonlinear model offers a more general framework than the linear counterpart because it accounts simultaneously for several stylized patterns of financial series including nonlinearity in the short-run, nonlinearity in the long-run and common movements. Including all of these patterns in a unique model is very helpful to analyze the links between the financial time series and their forcing factors, without omitting any relationships that may be defined by an unknown, true data generating process DGP. The study also includes risks in the equity market among the macroeconomic influences on the CDS sector index spreads.

In compassion with the existing literature, we use a novel methodology which accounts for several statistical stylized facts that are largely ignored by previous studies. For instance, Hammoudeh and Sari (2011) employ the linear ARDL model, while our study utilizes the nonlinear ARDL (NARDL) model which is more advantageous than its linear counterpart since it is well known in the literature that financial time series are nonlinear. Asymmetry and structural breaks (e.g., major credit events, bankruptcy) are forms of nonlinearities and are related to the CDS series (Galil, Shapir, Amiram, & Ben-Zion, 2014). Additionally, Hammoudeh, Bhar and Liu (2013) and Hammoudeh, Nandha et al. (2013)use the linear vector error correction model which rules out asymmetries and structural breaks. Both Hammoudeh and Sari (2011) and Hammoudeh, Bhar et al. (2013) and Hammoudeh, Nandha et al. (2013) also use a sample period that ends in 2009 which does not account for the effects of the most recent financial crises, while ours ends in May 2014. Moreover, Annaert, De Ceuster, Van Roy, and Vespro (2013) use multivariate panel rolling regressions to account for the time-varying effects of the risk free rate, leverage, equity volatility, bid–ask spread, term structure slope, swap spread, corporate bond spread, market return and market volatility on the changes in the CDS spreads for 32 Euro-area banks. Differently, we consider the sector CDS index spreads of three indices namely banking, financial and insurance sectors.

This paper is organized as follows. Section 2 provides a review of the related literature. Section 3 presents the methodology and data description. Section 4 discusses the empirical results. Section 5 concludes with a discussion of the limitations of our empirical methodology and provides some possible extensions.