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Time-varying co-movements and volatility spillovers among financial sector CDS indexes in the UK

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ABSTRACT

This article investigates co-movements and volatility spillovers between the three UK financial sector CDS indexes over time. We find sharp increases in the dynamic conditional correlations for all pairs after the Lehman shock, indicating evidence of contagion, and decreases for two pairs (banking-life insurance and life insurance-other financial) after the zenith of the European debt crisis, implying the emergence of diversification opportunities. Dynamic spillover index measures suggest that, although the banking sector was a dominant net transmitter of volatility, other financial sectors also became net transmitters for some periods, highlighting the importance of appropriate regulation of these two sector areas.

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1. Introduction

The global financial crisis of 2007–2008 caused the sudden global spread of instability in the financial industry as several main financial institutions sought government bailout or collapsed. The financial sector in the UK was not an exception, with its first bank run observed in the case of Northern Rock in September 2007. Moreover, the government resorted to the bailout of three banks, acquiring a substantial amount of equity stakes for the Royal Bank of Scotland, Lloyds TSB, and HBOS. The [Bank of England \(2011\)](#) reported that, by the end of 2010, the level of output in the financial sector decreased to 10% below peak levels prior to the crisis, implying the severity of damage borne by the sector. In late 2009, the crisis in Europe entered a new phase as market participants casted doubt on the solvency of several peripheral countries resulting in the outbreak of the European sovereign debt crisis. The UK financial system was not completely excluded from these adverse developments because the UK banks were heavily exposed to the sovereign debt of Ireland, which faced the collapse of its banking system and received 85 billion euros through the financial support of the Eurozone and the International Monetary Fund.

This paper contributes to the strand of literature on financial crises and their effects with a focus on the CDS indexes for the three financial industries—banking, life insurance, and other financial sectors (i.e., investment funds, finance leasing, and non-bank credit grantors). These financial sector CDS indexes are constructed to reflect an average mid-spread calculation

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of the indexes' constituents, that is, several financial institutions' single-named CDS spreads in each sector. The indexes are considered efficient measures of the credit risks faced by each financial sector (Hammoudeh et al., 2013). Three sector CDS indexes may move closely, reflecting some underlying factor affecting the credit worthiness of the whole financial system in an economy. However, the same indexes may respond differently to changes in credit market conditions because the three sectors' business characteristics differ, such as the degree of regulation and typical position in the CDS markets (i.e., protection buyer or seller). The financial sector is crucial to the smooth functioning of the economy because of its role in providing credit, liquidity, and risk management services to other sectors, as Baily and Elliott (2013) note and as was evident during the recent financial crises that Europe has suffered. Against this background, we contend that understanding the interrelationships among the financial sector CDS indexes is significant for investors who seek diversification or hedging opportunities at the sector level and for regulators who are concerned about setting appropriate regulation levels for each sector.

A growing number of recent studies have addressed the dynamics of financial sector CDS indexes. A majority of these studies focus on the three financial sector CDS indexes (banking, insurance, and financial services) in the US. Hammoudeh and Sari (2011) examined the relationships between these CDS indexes, the stock price index, and the Treasury security rates and found that the three CDS spreads exhibited the highest short-run cross-shock effects. Chen et al. (2011) assessed the adjustment of the three CDS indexes to the long-run equilibrium and found that the speed of adjustment was faster during divergences than convergences, providing support for the presence of asymmetric cointegration. Analyzing the causalities between the three CDS indexes, Hammoudeh et al. (2013) demonstrated that, in the long run, the insurance sector CDS exhibited the highest adjustment and the banking sector played a leading role in the price discovery process in the short run. Arouri et al. (2014) uncovered that for two pairs (the banking-financial services and banking-insurance) of the three CDS indexes, the adjustment process to the long-term equilibrium was characterized by asymmetry and nonlinearities. Tamakoshi and Hamori (2014), who studied return spillovers and volatility spillovers between the three CDS indexes, detected significant causality-in-variance running from the financial services sector CDS index to that of the banking sector, suggesting the existence of information transmission and contagion from the financial services to the banking sector.

In contrast to these US market-focused studies, this article is among the first to investigate the dynamic relationships among UK financial sector CDS indexes. Our sample period ranges from January 1, 2008 to December 31, 2013 and includes the global financial crisis and the European sovereign debt crisis, both of which heavily affected the financial markets of the nation. Benbouzid and Mallick (2013) is a rare study that references the UK banking sector CDS index, but the authors primarily focused on analyzing its main determinants including housing prices. The main contribution of our study is the examination of time-varying co-movement and volatility spillovers among the financial sector CDS indexes. According to Ross' (1989) seminal paper, volatility is related to information flow, implying that changes in rates of information flow among markets may trigger different volatility transmission patterns. Hence, studying the nature of volatility spillovers clarifies the mutual transmission of risks among (and perhaps triggered contagion effects on) the above three financial sectors in response to various credit events during the financial crises. Therefore, our analysis of the time variations of volatility spillovers among the CDS indexes, combined with that of co-movement, will affect decisions on dynamic portfolio allocation, risk management, and regulation establishment of the UK financial sector.

We employ a two-step approach¹ to the analysis of the time-varying co-movement and volatility spillovers among the sector CDS indexes. We examine the dynamic conditional correlations using the DCC-GARCH model developed by Engle (2002). Then, with the estimated conditional volatilities from the DCC-GARCH model, we investigate volatility spillovers employing the spillover index measures advocated by Diebold and Yilmaz (2012). We base this novel methodology on the variance decomposition in a generalized vector autoregressive (VAR) approach and, hence, it is invariant to variable orderings. Moreover, the methodology shows the degrees and directions of volatility spillover effects *over time*, clarifying whether each sector is a net transmitter or receiver of spillovers at each point in time.

In summary, our main findings from our empirical analyses are fivefold: (i) We found evidence of contagion among the three sector CDS indexes, evidenced by sharp increases in the dynamic conditional correlations for all pairs after the Lehman Brothers bankruptcy. (ii) We also detected a substantial decrease in the conditional correlations for the banking-life insurance and life insurance-other financial pairs after the summit of the European debt crisis in September 2011, triggering potential diversification opportunities. (iii) The total volatility spillover index indicated that the spillover effects across the three sector CDS indexes occupied a substantial portion of the forecast error variances on average. Moreover, the spikes coincided with major crisis events during the recent financial turmoil. (iv) The net volatility spillover plots showed that the directions of volatility spillovers from or to each three CDS index substantially altered over time, implying that it is crucial to hedge the credit risks underlying these financial sectors on a real-time basis. (v) We also found that other financial sectors were net transmitters of volatility spillovers during some periods, underscoring the importance of appropriate regulatory policies for that specific sector and the banking sector, which was consistently a net transmitter. We discuss the relevancy of these findings to the trading and hedging strategy development of portfolio managers and regulatory framework development by policymakers.

¹ For examples of studies applying such two-step approaches in other fields of study, refer to Antonakakis (2012) and Apostolakis and Papadopoulos (2014).

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