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Identifying and measuring the contagion channels at work in the European financial crises ☆

Massimo Guidolin [a,*], Manuela Pedio [b]

[a] Bocconi University, Dept. of Finance, IGIER and BAFFI CAREFIN Centers, Via Roentgen, 1 (2nd Floor), 20136 Milan, Italy
[b] Bocconi University, Dept. of Finance, Via Roentgen, 1 (2nd Floor), 20136 Milan, Italy

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ABSTRACT

We investigate the phenomenon of contagion with a special focus on the recent financial crisis, distinguishing four alternative channels, namely the flight-to-quality, flight-to-liquidity, risk premium, and correlated information channels. Specifically, we employ the differences among estimates and impulse response functions across linear and nonlinear models to identify and measure cross-asset contagion. An application to weekly Eurozone data for a 2007–2014 sample reveals that a two-state Markov switching model shows economically weak, though accurately estimated, contagion effects in a crisis regime. These findings are mainly explained by a flight-to-quality channel. Furthermore, we extend our analysis to explore whether European markets may or may not have been subject to contagion when exposed to external shocks, such as those originated from the US subprime crisis.

1. Introduction

Was the 2010–2011 European sovereign debt crisis a prototypical case of cross-country, cross-asset contagion, in which shocks spread from low credit-quality government bonds to corporate bonds and stock markets? To what extent did the observed behavior of nominal yields and spreads (over a risk-free rate) reflect spillovers that went over and beyond what could have been expected in "normal" times, that is before financial markets were hit by sizeable shocks, such as the Greek's debt restructuring and Portugal and Ireland's recourse to the IMF and EU bailout funds? Can we establish a link between the asset-backed securities (ABS) crisis, which hit the US in 2007–2009, and the subsequent sovereign jitters in Europe? In this paper, we use state-of-the-art econometric methods applied to weekly data to answer these questions and disentangle the

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* Corresponding author.
E-mail addresses: massimo.guidolin@unibocconi.it (M. Guidolin), manuela.pedio@unibocconi.it (M. Pedio).

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channels of contagion at work in the Eurozone during the tumultuous years marked by the subprime turmoil in the US and then by the European debt crisis (2010–2011, see Lane, 2012).[1]

Before the recent crisis outbreaks, the literature had mostly focused on the dynamics of cross-country contagion applied to homogeneous asset markets (see, e.g., Forbes and Rigobon, 2002; Markwat et al., 2009). However, since the 2007–2009 US subprime crisis, researchers have been showing an increasing interest in cross-asset contagion. The subprime turmoil represents an ideal episode to analyze this variant of contagion, because the effects of negative shocks to the US ABS market spilled over to other markets. Indeed, some papers have attempted to investigate the dynamics of such cross-asset contagion (see, e.g., Longstaff, 2010; Guo et al., 2011), in addition to cross-country contagion from US to foreign markets (see, e.g., Samarakoon, 2011).

Longstaff (2010) has captured the effects of the US crisis by analyzing how the linkages between asset-backed CDO returns and Treasury, corporate bond, and stock market returns, and changes in the level of the VIX index had modified over time, in three different periods: the pre-crisis, the subprime turmoil, and the global crisis periods. In his paper, he demonstrated the existence of an increase in the linkages in 2007, when the sub-prime induced credit crunch started, compared to the pre-crisis and (subsequent) global crisis periods. Similarly to ours, the analysis conducted by Longstaff also aims at identifying the key contagion mechanisms, making a distinction among flight–to–quality, flight-to-liquidity, risk premium, and correlated information channels (see Section 2.1 for a definition). However, Longstaff's approach is based on simple regressions that assume breaks to be exogenously given, while we deal with the instability in the data using (Markov) regime-switching models. In addition, we do not limit our analysis at pinpointing contagion episodes, but we also attempt to measure the effects of a shock to one asset class to different national and international markets, by means of impulse response functions (IRFs).

Guo et al. (2011) have computed IRFs under a Markov switching Vector Autoregressive (MSVAR) model to investigate the effects of contagion among stock, real estate, credit default swap, and energy markets during the subprime event within two different states of the US economy: a "stable regime" (high mean returns, low volatility), and a "risky regime" (low mean returns and high volatility). Their results support the existence of significant contagion in the risky state, but only weak contagion effects in the stable regime. However, differently from our paper, they do not attempt to disentangle different contagion channels.[2]

Our goal is to carry out an analysis of cross-asset contagion in the European financial markets like the one of Guo et al., but using instead econometric tools that allow us to better identify and characterize the contagion dynamics. Furthermore, we extend our analysis to cross-country and cross-market contagion and test any spillovers effects from the US subprime crisis to the European financial markets. To this purpose, we perform two different simulations: one of a shock to peripheral (an equally weighted portfolio of GIIPS, i.e., Greece, Ireland, Italy, Portugal, and Spain) sovereign yields to mimic the one occurred during the 2010–2011 European crisis; and the other of a shock to US low-quality (Bbb) ABS yields, similar to the one that was allegedly imported to Europe between 2007 and 2008. To measure the effects of these two negative shocks on European assets such as corporate bonds, equity and repo rates, we estimate the IRFs both under a single-state vector autoregressions (VAR) and a multi-state MSVAR model.

We find two key results when we study a shock to peripheral European yields. First, a two-state Markov switching (henceforth, MS) model that dominates simple VARs in a statistical perspective, gives evidence of accurately estimated but economically weak contagion effects, limited to a crisis regime. In particular, Bbb corporate bonds (both short- and long-term) and equity valuations (as captured by the dividend yield) are somewhat affected. Consistent with a common sense prior, the effect on core sovereign yields tends to be modest, it is not precisely estimated, and it declines to show negative effects (as a result of a "flight-to-quality" dynamics) rather quickly. Second, this mild evidence of contagion is predominantly explained by a flight-to-quality channel being active in a few sub-periods of 2010 and 2011, when the yields of "junk", Bbb corporates and of equities increased, whilst the yields of investment grade, Aaa corporate bonds and (at least eventually) core European government bonds declined. We also find evidence of flight–to–liquidity and correlated information channels (measured as the difference between single-state and MS IRFs). On the contrary, we obtain no evidence of a risk premium channel.[3]

A few more papers relate to ours and have found evidence of contagion, especially in what they define to be a "crisis state". De Santis (2014) has used VECM-based IRFs to show that Greek credit downgrades affected other European bond spreads over a sample that goes from September 2008 to August 2011, even though the effects turn out to be economically small. Arghyrou and Kontonikas (2012) have used monthly data on bond spreads over German bunds to prove the existence of contagion effects during the sovereign debt crisis, particularly among EMU peripheral countries. Antonakakis and Vergos

[1] In the paper, we shall use the nouns Europe and Eurozone interchangeably as if the two geopolitical entities were the same. Of course, in a technical sense, we refer to the latter entity. UK data were not considered as they would probably deserve separate attention, see Degryse et al. (2015).

[2] There are few other papers about contagion that, similarly to ours, use regime-switching models to deal with instability in the data. For instance, Kenourgios et al. (2011) have used Markov switching models to test for cross-country contagion among developed and emerging markets. Philippas and Siriopoulos (2013) have used Markov switching to show contagion effects in volatility that occurred beyond simple spillovers caused by integration across the EMU bond markets, during the sovereign debt crisis.

[3] In Section 5, when we extend this analysis to a subprime shock originating from the US, we observe spillover effects from a US ABS shock to European markets, but no evidence of contagion in an economic sense. Indeed, a few European markets do react to US ABS shocks, but moving in an opposite direction. Similarly to ours, the analysis of bond yields by Caporin et al. (2013) points out a change in the intensity of the propagation of shocks in the 2008–2011 post-Lehman sample, but with declining, not increasing coefficients.

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