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A unified approach to investigate pure and wake-up-call contagion: Evidence from the Eurozone's first financial crisis

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A B S T R A C T

This paper simultaneously analyzes wake-up-call and pure contagion of sovereign risk in the Eurozone during its recent financial crisis. Pure contagion of sovereign risk means the transmission of negative effects after a shock to a country which are not reflected in the risk pricing of fundamental determinants of sovereign risk of the recipient country. Wake-up-call contagion is defined as the change of sovereign risk pricing by market participants after negative events in a single country or a group of countries. To examine both types of contagion in a unified framework, we apply an extension of the canonical model for contagion proposed by Pesaran and Pick (2007) and Metiu (2012) in that we allow for time-varying coefficients. Controlling for changes in the risk pricing by investors, we detect several channels of pure contagion between 2008 and 2012 but with decreasing number over time. Further, we find evidence for a disruption of sovereign risk contagion channels from Greece, Ireland and Portugal to Spain, Italy, France and Belgium after their respective bailouts as was desired by policymakers. For all Eurozone countries considered, we observe an increase in the relevance of general risk aversion towards sovereign debt since May 2010. Our model extension yields a device that is suitable to determine whether policy interventions are required and to judge their success ex-post.

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1. Introduction

Until the outbreak of the global financial crisis, sovereign bond yield spreads in the Eurozone saw an unprecedented level of convergence. In 2007 the mean 10-year sovereign bond yield spread in relation to Germany amounted to a mere 24 basis points (bp) for Greece, 16 bp for Portugal and 12 bp for Ireland. At the end of 2008, however, spreads already rose to 201 bp for Greece, 94 bp for Portugal and 121 bp for Ireland. Maximum values were reached at more than 5,500 bp for Greece in March 2012, 1,400 bp for Portugal in January 2012 and more than 900 bp for Ireland in July 2011. What led to such sharp increases of bond yield spreads?

A large body of literature is devoted to the fundamental determinants of bond yield spreads. Bond yield spreads may contain a premium for the credit risk of the underlying debt (Codogno et al., 2003), for the liquidity risk arising in markets without sufficient depth or breadth (Barrios et al., 2009) as well as for the general risk aversion of market participants (Favero et al., 2010). Using time-varying coefficient and dummy variable approaches, respectively, Beirne and Fratzscher (2013), Bernoth and Erdogan (2012), Giordano et al. (2013) and von Hagen et al. (2011) find that changes in the pricing of sovereign risk by market participants after negative events in a single country or a group of countries ("wake-up-call contagion") contribute to explaining increasing yield spreads during the recent financial crisis. Especially, the general risk aversion towards government bonds of Eurozone members in relation to German Bunds and the relevance of fiscal variables that represent credit risk increased considerably.

However, changes in the risk-pricing of fundamentals may not suffice to explain the evolution of bond yields in times of increased market uncertainty. Negative shocks in a single country may directly lead to increasing spreads in other countries ("pure contagion"). Evidence for pure contagion in the Eurozone between 2008 and 2012 is provided by e.g. Afonso et al. (2012), Arezki et al. (2011), Wing Fong and Wong (2012), Kalbaska and Gatkowski (2012), Mink and De Haan (2013) and Missio and Watzka (2011). To identify pure contagion relationships, Pesaran and Pick (2007) propose their "canonical model for contagion" that directly accounts for the fundamentals of bond yields and identifies contagion effects under (observed and latent) interdependence (Metiu, 2012). In their model equation, the significance of positive contagion coefficients implies the existence of shock-transmission channels from one to another entity from an arbitrarily large set of entities (countries, firms etc.).[1]

Applying the model proposed by Pesaran and Pick (2007), Metiu (2012) provides evidence for contagion of sovereign risk in the Eurozone, e.g. from Greece to Belgium, France, Portugal and Spain. Pesaran and Pick (2007) and Metiu (2012) estimate the canonical only once for their entire sample. A time-varying approach, however, is already inevitable due to changes in the risk pricing of yield spread determinants over time, i.e. the presence of wake-up-call contagion (Bernoth and Erdogan, 2012). Further, it is unlikely that contagion effects i) are significant over the entire sample period and ii) occur in the same intensity whenever significant. Instead, policy measures are likely to have an effect on contagion relations, which are rather short-term effects, and may lead to their disruption. Moreover, an assessment of the effect of policy measures at a given time is not feasible when the time-variation of coefficients is not taken into account.

If the researcher interested in testing pure contagion effects does not account for the presence of wake-up-call contagion, pure contagion effects are likely to be overstated as there is no control for the changes in common risk factors in this case. On the other hand, wake-up-call contagion alone is usually not sufficient to explain changes in bond yield spreads in times of market turmoil. It hence becomes necessary to simultaneously analyze wake-up-call and pure contagion effects.

In this work we therefore investigate the effects that arise from a combination of the time-variation in coefficients of yield spread fundamentals as well as in pure contagion relationships. To measure

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[1] The canonical model therefore differs from other high-frequency asset price-based contagion measures such as SRISK proposed by Brownlees and Engle (2012) and Acharya et al. (2012) and CoVaR suggested by Adrian and Brunnermeier (2011) in that it is able to take into account simultaneous contagion effects arising from a multiple set of entities. Using the extension of the canonical model suggested in this paper, it also considers the difference between wake-up-call contagion and pure contagion.

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