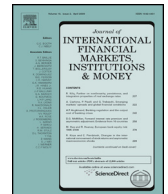




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An anatomy of credit risk transfer between sovereign and financials in the Eurozone crisis

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ABSTRACT

In this paper we assess the effectiveness of large scale bailouts aiming at preventing a financial crisis from further propagating into a systemic risk. We examine the structural changes in the relationship between the sovereign and financial institutions' credit default swap spreads during the European sovereign debt crisis. Before the first Greek bailout by the European Financial Stability Facility (EFSF), the sovereign and financial sectors exhibit a two-way feedback effect for both the short and the long runs. Crucially, we find that after the first Greek bailout, shocks in the financial sector either exert significantly negative impacts or lose influences on the sovereign sector. In contrast, all the later bailouts by the EFSF (the second Greek bailout, Irish and Portugal bailouts) do not show this pattern change in the two-way risk transfer relationship.

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1. Introduction

The unsustainable Greek sovereign debt came to a brink of imminent default in early 2010. Propagated by the Eurozone banks' significant holdings in the Greek sovereign debt, the "Greek crisis" contagiously affected the financial sector and sovereign debt in the other Eurozone countries. Subsequently complicated by the public debt crises of Ireland, Portugal and Spain,¹ the Greek crisis was rolled into a fully-fledged European sovereign debt crisis (the Eurozone crisis). The unprecedented Eurozone crisis has caused significant concerns to the policymakers. A new institution called the European Financial Stability Facility (EFSF) has since been founded by 17 Eurozone countries. The EFSF issued its first rescue package on 9 May 2010 for up to €750 billion to ensure the financial stability of Greece (G1). This is then followed by the rescue packages for Ireland on 25 January 2011 (I), Portugal on 15 June 2011 (P) and the second bailout to Greece on 21 July 2011 (G2).²

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¹ The sovereign debt crisis in Ireland was triggered by the previous Irish banking crisis in 2008 stemming from a property bubble financed by the six state guaranteed banks. The Portugal crisis was caused by the increased public expenses such as high management costs and increased bonuses and wages to the government officers. Spain also had a housing bubble. As the housing bubble burst, the banking crisis transferred to the sovereign debt.

² See the Supplementary documents for details of the EFSF guarantees and the settlements of the bailout packages for these countries.

The goal of this paper is to understand the ways by which default risk is transferred, if any, between the sovereign countries and the domestic financial institutions during the European sovereign debt crisis. We assess the effectiveness of large scale government bailouts that aim at preventing a financial crisis from being further propagated into a two-way systemic risk.

We focus on six Eurozone countries including: Greece, Ireland, Italy, Netherlands, Portugal, Spain (the GIIPS countries) and Germany.³ We use daily credit default swap (CDS) spreads to capture default risk, and analyze the risk transfer between sovereign and domestic financial institutions in each country from November 2007 to October 2012. We examine the structural changes in the relationship between the CDS series of sovereign countries and financial institutions.

First, we explore the dynamic cointegration relationship with endogenous regime shifts using the model of [Hansen and Seo \(2002\)](#). From the analysis, we identify *typical* and *atypical* regimes where these relationships differ. The regime containing higher percentage of observations is identified as the *typical* regime, whereas the other is the *atypical* regime. We find that the identified threshold determines the regime shifts between the *typical* and *atypical* regimes. The *atypical* regime mainly resides during those periods surrounding the global credit crunch (2007–2008) and the Eurozone crisis (2010).

Further, for each of the bivariate relationships between sovereign and financial institutions, we use the model of [Gregory and Hansen \(1996\)](#) to detect the unknown timing of the structural breaks, which are reflected in the changes in the intercept or the slope coefficients of the model. We find that the dates of the significant breakpoints are close to the four bailouts (G1, I, P, and G2) issued by the EFSF. We then use the four EFSF bailouts as the breakpoints for all the countries and investigate the changes in the default risk transfer in the pre- and post-bailout periods.

We are careful in sample coverage, and our methodology is flexible and robust to accommodate both exogenous and unobservable regime break points. Our sample period extending to 2012 allows a lengthy coverage on recent crisis evolution and a useful time-window for analyzing the effectiveness of the EFSF bailouts. We identify regimes with the model of [Hansen and Seo \(2002\)](#) and verify the break points by using the model of [Gregory and Hansen \(1996\)](#) to detect the unknown timing of structural breaks. We find that the structural breaks coincide with the EFSF bailouts. Consequently, we use the first Greek bailout (May 2010) for the breakpoint, which is after the breakpoint surrounding the bankruptcy of Lehman Brothers in [Acharya et al. \(2014\)](#).

We find that, prior to the first Greek bailout (G1), positive interdependencies exist between the default risk of the sovereign and financial institutions. Specifically, a shock in the sovereign CDS spread of a country is followed by increases in the CDS spread of the financial institutions in that country, and vice versa.

Most importantly we find that, after the first Greek bailout, the financial-to-sovereign risk transfer for the GIIPS countries that have high sovereign default risk becomes either insignificant or negative. This evidence indicates that the default risks of financial institutions lose their positive impacts on the sovereign default risk. In contrast, the strong and positive influences of the sovereign default risk on its domestic financial institutions remain.

On the contrary, Germany as the main EFSF guarantee is not in the two-way feedback loop even before the bailouts issued. Intuitively, the GIIPS countries are the main beneficiaries of the bailouts, the financial-to-sovereign risk transfer in the GIIPS countries breaks down after the bailouts. The evidence suggests that since the G1 bailout is supported by the EFSF guarantee countries, the bank-to-sovereign risk transfer in the two-way feedback breaks down, and the sovereign risk is transferred to the other bailout guarantees.

Moreover, for later bailouts in Greece (the second bailout), Ireland and Portugal, we find that the default risk transfer from financial sector to government becomes insignificant. This evidence supports the initiative of large-scale bailouts by the EFSF: the first Greek bailout (G1) has been a success in breaking the bank-to-sovereign risk transfer, and in ending the two-way feedback loop. These effects are not only beneficial for Greece, but also for the other countries such as Ireland, Portugal and Spain. Our evidence derives a policy implication that a determined large bailout, such as G1, is indeed capable of preventing the exaggeration of risk transfer from the financial to the sovereign sector.

Previous theoretical literature on the bank bailouts mainly focuses on the costs and benefits of the bank bailouts at the individual level ([Mailath and Mester, 1994](#)) and at the aggregate level of the banking sector ([Penati and Protopapadakis, 1988](#); [Acharya and Yorulmazer, 2007](#)). While on the other hand, the theoretical literature on the sovereign default risk focuses on the collateral impacts of sovereign defaulting on the financial sector through bank holdings of the government debt from domestic or foreign countries ([Broner et al., 2008](#); [Acharya and Rajan, 2013](#); [Gennaioli et al., 2010](#)). [Acharya et al. \(2014\)](#) consider the effects from the both sides and define the default risk transfer between the sovereign and financial sectors as a “two-way feedback” effect.

Previous empirical studies on financial crisis before 2010 show that increases in sovereign default risk may reduce foreign credit to the domestic private sectors via a decline in credit supply (see, e.g., [Drudi and Giordano, 2000](#); [Dooley and Verma, 2001](#); [Tomz and Wright, 2008](#)). The increased sovereign default risk also causes a decrease in the aggregate demand of credit. [Kim and Wu \(2008\)](#) show that sovereign credit ratings raise sovereign credit ratings have positive impacts on domestic stock markets and the banking sector. The other related study is [Alter and Schüler \(2012\)](#) who analyze the impacts

³ We also examine the results for Austria, Belgium, France and Netherlands, but due to the limitations of the tables, we only take Germany as the non-GIIPS country for comparison. See Supplementary documents for the detailed results of other countries.

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