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Bank/sovereign risk spillovers in the European debt crisis ☆

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ABSTRACT

This paper investigates contagion between bank and sovereign default risk in Europe over the period 2007–2012. We define contagion as excess correlation, i.e. correlation between banks and sovereigns over and above what is explained by common factors, using CDS spreads at the bank and at the sovereign level. Moreover, we investigate the determinants of contagion by analyzing bank-specific as well as country-specific variables and their interaction. Using the EBA's disclosure of sovereign exposures of banks, we provide empirical evidence that three contagion channels are at work: a guarantee channel, an asset holdings channel and a collateral channel. We find that banks with a weak capital buffer, a weak funding structure and less traditional banking activities are particularly vulnerable to risk spillovers. At the country level, the debt ratio is the most important driver of contagion. Furthermore, the impact of government interventions on contagion depends on the type of intervention, with outright capital injections being the most effective measure in reducing spillover intensity.

1. Introduction

Due to the absence of a common European policy framework for handling the banking crisis as well as missing bank resolution mechanisms, several European governments were forced to rescue troubled banks headquartered in their countries during the financial crisis. Various measures have been taken, ranging from equity injections in troubled banks to the setting-up of bad banks (Petrovic and Tutsch, 2009; Stolz and Wedow, 2010). Invariably, these rescue operations have increased national debt burdens and caused a deterioration of public finances (IMF, 2009). One consequence of the risk transfer from the private sector to sovereign treasuries has been an increased interdependence of banks and countries, causing negative feedback loops between their financial conditions. With the rise of the sovereign debt crisis in Europe, the link between bank and country risk has intensified further, especially for the countries that were quickly identified as vulnerable, namely Greece, Ireland, Italy, Portugal, and Spain (the GIIPS countries). This increased interdependence is depicted in Fig. 1. The two panels of Fig. 1 respectively show the CDS spreads of the 15 countries in our sample and the average bank CDS spread for each country. The graphs illustrate that heterogeneity is present in both the level of and the comovement between sovereign and bank CDS spreads.

The link between the risk profile of banks and countries varies over time and is partly influenced by shocks in the economy or the banking system. A major shock stemming from the banking system was the demise of Lehman Brothers in September 2008, which provoked a substantial increase of CDS spreads for banks and also for certain countries, typically smaller countries with large banks or countries where banks had to be rescued. The sovereign debt crisis further intensified the link between bank and country risk. The sovereign debt crisis is usually considered to have

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started at the end of 2009, when the newly elected Greek government announced that the country's budget deficit was much larger than previously reported. In the case of Greece, two bailout packages were put together under the surveillance of the "troika" (European Commission, ECB and IMF), one of them including a substantial write-off of Greek debt in the books of private investors. Later, further rescue packages were implemented for Portugal and Ireland, both under the supervision of the troika. A series of credit rating downgrades of the affected countries followed, causing bond and CDS spreads to widen considerably (see IMF, 2009; IMF, 2010; IMF, 2011).[1]

During the sovereign debt crisis, banks in Europe were and remain confronted with stress in their capital and liquidity positions. A substantial number of banks had to rebuild their capital buffers after the losses they incurred in their securities (mainly asset-backed) and lending portfolios, especially those with real estate exposures. A general lack of trust hampered the access of banks to money market funding, which was eventually alleviated, at least temporarily, by non-conventional longer-term refinancing operations set up by the ECB. Further, the European Banking Authority (EBA) decided to conduct a sovereign stress testing exercise and required that banks execute detailed capital rebuilding plans before mid-2012. The disclosure of detailed information on banks' exposures to sovereign risk in the EBA (and former CEBS) stress testing exercises provided valuable information to market participants to gauge the risk profile of European banks. Overall, the consequence of the continued stress in the banking system and the vulnerability of certain European sovereigns is that the financial conditions of banks and sovereigns became increasingly intertwined.

Considering this increased interaction between sovereign and bank credit risk, the objective of this paper is threefold. First, we analyze whether we find empirical evidence of contagion. We investigate the time-varying intensity of the risk spillovers using excess correlations as our preferred contagion metric.[2] Second, we attempt to explain the contagion effect by investigating the relationship between excess bank/sovereign correlations and both bank and country characteristics. While there have been several papers investigating the determinants of either bank risk or sovereign risk in isolation, there is less evidence on the potential mutual contagion effects. Although these excess correlations themselves do not give an indication of the direction of the spillover, the particular structure of our database will allow us to relate bank- and country-specific characteristics to the excess correlations. By analyzing a number of relevant variables and the interplay between bank and country characteristics, we are able to identify critical interactions that are related to bank/country contagion. This allows us to tackle a series of relevant policy questions concerning the banking system as well as the financial condition of sovereigns. Third, our setup allows us to analyze the existence of channels through which default risk can spread between banks and countries. As a result, we contribute to the literature on the sovereign debt crisis by empirically confirming the importance of an asset holdings channel, collateral channel and guarantee channel.

The main findings of this paper can be summarized as follows. We document significant empirical evidence of contagion between bank and sovereign credit risk during the European sovereign debt crisis. In 2009, when the sovereign debt crisis emerged, we find significant spillovers between banks and their home country for either 51%, 65% or 73% (depending on the year of comparison) of the banks in our sample. We find similar results when focussing on the relationship between non-resident banks and sovereigns or when analyzing the relationship between banks and GIIPS countries. Second, we are interested in business models that can allow banks to minimize contagion exposure. We find that the degree of contagion is significantly linked to bank capital adequacy, and this effect is economically very significant. Furthermore, the higher a bank's reliance on short-term funding and the lower the involvement in traditional banking activities, the higher the intensity of spillovers between banks and sovereigns. Third, making use of the EBA stress test disclosures, which include bank-specific information on sovereign debt holdings, we find evidence in favor of an asset holdings channel and a collateral channel. Higher sovereign debt exposures lead to more contagion, and this effect is more pronounced for banks that excessively rely on short-term funding. Fourth, our results also confirm the presence of a guarantee channel. Average excess correlations are higher between a bank and their home country. Furthermore, the default risk of large banks is more strongly related to the default risk of the home country. Additionally, the default risk of banks in countries with higher debt levels is more strongly related to the default risk of the home country. Taken together, these observations indicate that there is a guarantee channel at work.

The remainder of this paper is structured as follows. Section 2 reviews the literature on contagion and more specifically the European sovereign debt crisis. In Section 3 we describe the data and the methodology. Section 4 reports our empirical findings, including robustness checks. Section 5 summarizes the conclusions and policy implications.

2. Bank/Sovereign contagion: literature overview

This paper is closely related to three strands of the existing literature. First, our paper is linked to work on the European sovereign debt crisis and the transmission channels through which it propagates. Second, our empirical analysis is closely related to work on financial contagion. The third strand of relevant literature investigates the risk profile of bank business models.

Regarding the risk transmission channels, the BIS (2011b) identifies four main channels through which sovereign risk can have an impact on financial institutions. First, there is an *asset holdings channel*, since the asset side of banks' balance sheets may directly be weakened through losses on holdings of sovereign debt. This channel is investigated by Angeloni and Wolff (2012), who study whether banks' sovereign exposure to GIIPS countries had an effect on their stock market values. They find that banks' market performance in the period July–October 2011 was impacted by Greek debt holdings, and in October–December 2011 by Italian and Irish sovereign exposures. Spanish exposure did not appear to have an impact on banks' stock market values. The second transmission channel is a *collateral channel*. Sovereign risk can potentially spread to banks when the value of collateral that banks hold in the form of sovereign debt is reduced. This relates to studies such as Kiyotaki and Moore (2005) and Kaminsky et al. (2003), who describe how negative shocks in one market can directly affect collateral values or cash flows associated with securities in other markets. Additionally, Correa et al. (2012) show that European banks were less able to attract dollar funding from U.S. money market funds during the European sovereign debt crisis, potentially indicating collateral problems. Related to this, a *rating channel* may impact banks' funding conditions, since downgrades of sovereigns may influence the rating of domestic banks negatively. This may in turn affect banks' funding costs and possibly worsen their access to money market and deposit markets. Arezki et al. (2011), for example, focus on European sovereigns between 2007 and 2010 and show that

[1] Throughout the paper we use the terms contagion and risk spillover interchangeably.

[2] There is a broad discussion in the literature on the definition of contagion and how to measure it. We use excess correlation to measure contagion, as it has been an established measure in the academic literature. For more information on the definition and measurement of contagion, see Moser (2003), Forbes and Rigobon (2002), and Forbes (2012).