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On the importance of indirect banking vulnerabilities in the Eurozone

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ABSTRACT

This paper investigates banking and sovereign distress in the Eurozone and the importance of direct and indirect financial exposures. We use BIS cross-border banking claims to link member states in a GVAR framework and jointly model sectoral CDS premia. Based on balance sheet positions of an intermediate debtor country, we calculate indirect exposures and asses how the level of interconnectedness is impacted when indirect links are accounted for. We notice a general slowdown in financial integration and a reduction in cross-border assets in the hope of limiting international contagion. By differentiating between direct and indirect links, we show that the impact of reduced weights on core member states is mostly insignificant and that deleveraging strategies are not generally able to successfully reduce risk.
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1. Introduction

A recent report of the ECB on ''Financial integration in Europe'' from April 2012 points to the slowdown in financial integration during the sovereign debt crisis. Following the increase in risk in the Eurozone, banks are trying to significantly reduce their ties to distressed sovereigns and their ailing banks.[1] Exposures to Greece and other peripheral countries have already brought significant losses for financial institutions and, through balance sheet channels fostered by cross-border banking, negative shocks have also been transmitted internationally to other sectors. The recent decline in cross-border credit activity and exposures to foreign sovereign debt has reversed some of the integration that the Single Market fostered. An important question to ask at this point is wether diminishing banking links are significantly decreasing the level of interconnectedness and are successful in eliminating risk. Are these deleveraging strategies reducing the effect of foreign shocks on the domestic economy? What is the role of globalized financial intermediaries in the transmission of shocks?

Our aim is to analyze international links and sectoral spillovers in the Eurozone arising from integrated banking systems. The paper relates to the extensive research on banking and debt crises (e.g. Reinhart and Rogoff, 2011) and to the balance sheet approach to financial crises literature (e.g. Allen et al., 2002). Based on cross-border banking data, we want to differentiate between direct and indirect exposures, i.e. balance sheet connections that are created through a third party. We believe that the indirect risk of banks in the Eurozone is as important as what direct asset or liability positions would imply. We expect indirect exposures to be a significant channel for risk transfer and we believe that disregarding such links would severely understate the vulnerability of a country's banking and sovereign sectors. By acknowledging these balance sheet connections we are able to better understand the channels of risk transfer during times of stress. Methodologically, our empirical analysis relies on the recent Global Vector Autoregressive (GVAR) methodology introduced by Pesaran et al. (2004). This framework allows us to jointly model sectoral Eurozone data and connect member states through links created via the balance sheets of financial intermediaries.

A key economic question during this period of increased risk and uncertainty would be whether strategies of deleveraging through balance sheet asset reduction are effective. Does moving

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[1] Significant decreases in cross border banking claims between 2011:Q3 and 2011:Q4 had as counterparties financial institutions in Italy ($-65 billion) and Spain ($-45 billion). Total banking sector holdings of PIIGS government debt securities also experience a strong decline between July and December 2011, with France deleveraging by 18.5% and Germany by 9.4%.

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away from risky positions insulate the domestic banks from negative shocks and, through balance sheet channels, the sovereign sector? Anticipating on our results, we find that indirect exposures are significant and that cumulated vulnerabilities of domestic banking sectors are much larger than expected. Considering the high level of interdependence across the Eurozone and the uncovered indirect balance sheet links, we find that in most cases decreasing financial exposures does not significantly reduce the effects of foreign shocks and that deleveraging strategies are not always successful in eliminating risk. We draw attention to the destabilizing role of cross-border banking: financial links between sectors and countries potentially have an important role in fostering the transmission of the crisis. The existing framework has not been able to detect the recent buildup in vulnerabilities and, through a deficient early warning mechanism, has to some degree enabled the escalation of the crisis. Supervision appears insufficient and significant deficiencies in regulation that were not obvious during good times have now been highlighted.

This paper is organized as follows. Section 2 reviews the recent literature on sovereign and banking distress in the Eurozone. In Section 3 we present the GVAR framework and discuss how variables are connected directly and indirectly in this setting. Section 4 describes the data used. Section 5 presents the results of our baseline and counterfactual analysis, with a series of robustness checks in Section 6. Section 7 concludes.

2. Related literature

The on-going Euro debt crisis has brought attention to the strong links between the sovereign and the banking sector, inside as well as across borders. Regarding the origin of the distress, the causality can go in both directions: from sovereign to banking through balance sheet accumulation of risky domestic and foreign country debt[2] as well as from banking to sovereign, through a risk transfer after government bailouts (asset purchases, debt guarantees, liquidity injections) and the resulting fiscal deficits.[3] There is also a high level of uncertainty regarding future developments in the sovereign debt crisis, a possible systemic bank crisis and the balance sheet channels through which these shocks are transmitted across an integrated market.

The impact of banking-sovereign linkages can be evaluated and interpreted using the balance sheet approach (BSA) to financial crises approach. As summarized in Allen et al. (2002), the BSA offers a theoretical basis for the observed risk transfer. Inter-sectoral transmission channels within as well as across borders are highlighted in Rosenberg et al. (2005), with the authors pointing out that an asset for one sector is a liability for another one (domestic or foreign). In a globalized and integrated market, the "international finance multiplier" as described by Krugman (2008) highlights that distress and losses are transmitted internationally through the balance sheets of leveraged financial institutions. The paper of Ahrend and Goujard (2011) on systemic banking crises also defines a series of potential cross-border contagion effects transmitted through interconnected balance sheets of banks and other agents. They refer to "lending-country spillovers" and "common-creditor contagion shocks" to encompass possible channels of risk transfer, either directly through exposures to risky counterparts or indirectly through a reduced credit flow to other debtors respectively. Both of these last two papers identify financial institutions as the core source of interdependence between countries and markets.

There are a few empirical papers discussing the banking-sovereign connection during the on-going euro debt crisis. Studies focusing on sovereign risk, proxied by bond yields or credit default swap spreads (*CDS*), usually find a strong connection between the size and health of the financial sector and deteriorating country specific risk measures across the Eurozone (Gerlach et al., 2010; Dieckmann and Plank, 2011; Mody and Sandri, 2011 inter alia). In a study on contagion in the government debt market, Puig-Gomez and Rivero (2011) track cross-border BIS banking flows and identify dynamically the strength of causality between pairs of countries and the determinants of contagion.[4] Papers on interaction and feedback effects in between the sovereign and banking sectors identify an increasing interconnectedness resulting from government interventions and the subsequent risk transfer (Acharya et al., 2011; Alter and Schuler, 2011). All of these papers deal with the inter and intra-sectoral risk interactions on a country by country or bivariate basis and are not suited for an integrated analysis of the Eurozone. Using an extensive panel of bank and sovereign *CDS* spreads, Ejsing and Lemke (2011) also analyze feedback effects in between the two sectors and observe a stronger comovement between banking and sovereign *after* the bailouts (Oct. 2008). Their estimation is however based on a strict homogeneity assumption, as the parameter capturing the strength of the relationship is not allowed to vary across countries. The paper of Bolton and Jeanne (2011) proposes a theoretical model for debt distress and contagion and takes into account banking to sovereign exposures provided by the 2009 stress tests.[5] Their model however only includes two countries, one safe and one risky, and cannot capture the heterogeneity and complexity characterizing the Euro debt crisis.

Significant contagion effects from distressed peripheral member states have had without a doubt an important role in the on-going crisis. Based on balance sheet exposures and investor sentiment, economies with relatively sound fundamentals have been negatively influenced by foreign shocks originating in Greece and Ireland. At the same time, bank bailouts and purchases of sovereign debt have created strong links in between the banking and sovereign sector inside country borders. Considering these complex transmission channels, one can therefore not analyze country specific data independently and disregard cross-border and inter-sectoral spillovers. The recent debt crisis has helped emphasize the central role of these links in the transmission of negative shocks. Most of the papers cited focus on one sector at a time or use bivariate systems for country specific analyses. When dealing with an integrated common currency area, such segmented approaches are inappropriate and disregard significant transmission channels and co-movement properties of the data.[6] We would like to join countries and sectors in the Eurozone using balance sheet connections created by an integrated financial system. By modeling feedback effects inside as well as across borders we aim at joining together the inter and intra-sectoral connections highlighted in the literature.

An important contribution of our paper is the identification of direct and indirect risk factors in the balance sheets of banking institutions. To further motivate the central role of banking and inter-sectoral links, we now proceed with a more detailed description of cross-border banking in the Eurozone and with defining direct and indirect exposures.

[2] For example in the case of Greece, Italy, Spain and more recently Belgium and France.

[3] Ireland is the most representative.

[4] Significant increases in causality are interpreted as signs of contagion and a probit model is used for determining the contribution of debt (private and public) and the health of the financial system.

[5] The data provided by the stress tests is only partial considering that securities held until final maturity on the balance sheet were excluded from risk calculations.

[6] In an economic and monetary union, dynamics are mainly driven by common factors and the impact of idiosyncratic elements is significantly reduced, see for e.g. Bicu and Candelon (2011).

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