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Abstract

Sovereign debt crises have been recurrent events over the past two centuries. In recent years, the timing of sovereign crises has coincided or has directly followed banking crises. The link between sovereigns and banks tightened as the contingent liability that the banking sector represents for the sovereign grew, as financial “safety nets” became more common. This chapter analyzes the transmission channels between sovereigns and banks, with a focus on the effect of sovereign distress on bank solvency and financing. It then highlights the notable cost to the real economy of the close connection between sovereigns and banks. Breaking the “feedback loop” between these two sectors should be an important policy priority.

Keywords: Sovereign default, banking crises, government guarantees, financial safety net, bank regulation.

JEL Classification: E44, F34, G01, G28

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1. Introduction

Sovereign debt crises have been recurrent events over the past two centuries (Reinhart and Rogoff, 2009). In the earlier days, these crises were mostly associated with large and costly endeavors like wars and with fluctuations in commodity prices. More recently, sovereign debt crises have been increasingly linked to the banking sector. As noted in Reinhart and Rogoff (2011), banking crises typically precede or coincide with sovereign debt crises. Although the frequency of “twin” sovereign debt and banking crises is not as high as that of episodes that include a currency crisis (Laeven and Valencia, 2012), the recent European sovereign turmoil has shown that the economic impact of this type of “twin” crisis can be deep and prolonged.

Figure 1 provides a schematic characterization of the link between sovereigns and banks. Problems in the banking sector, which could lead to a full fledged crisis, can have a notable effect on the sovereign’s condition (the left arrow in the figure). There are two main channels through which this transmission can take place. First, a more encompassing banking “safety net” increases the contingent liability associated with banking failures for the sovereign. In a banking crisis, the government may assume a sizeable portion of banks’ liabilities, affecting its own solvency. Second, the transmission of banking shocks to the sovereign can also take place indirectly. The role of banks as the primary financial intermediaries in a country implies that problems at these institutions may affect aggregate macroeconomic conditions, and subsequently lead to deterioration in the fiscal position of the sovereign.

[Insert Figure 1]

The connection between sovereigns and banks can also flow in the opposite direction (the right arrow in Figure 1). Doubts about the fiscal soundness of the sovereign, unrelated to the banking system, can also affect banks’ performance. In the extreme case of a sovereign default,

losses incurred by the banks due to their holdings of government issued securities could threaten their solvency. Similarly, as sovereign stress leads to an increase in debt yields, funding costs for banks will likely rise and impact bank profitability. In some cases, the effect of sovereign stress on funding costs may be larger for those banks that are deemed to be “too-big-to-fail” by the market. As the ability of the government to support these banks is questioned by investors, funding costs can increase relative to those of other banks.

Although these linkages between sovereigns and banks may act separately and with a causal direction, it is also possible that they devolve rapidly into a “feedback loop”. Problems in one of the two sectors can be amplified by the interconnections and negative effects noted above. In these circumstances, the outcome of this type of “twin” crisis can have deep implications for aggregate economic activity (the bottom arrow in Figure 1).

The deep linkages between banks and sovereigns are, in some cases, exacerbated by banking regulation and the prevalence of a bank “safety net”. To weaken the “feedback loop” between sovereigns and banks, there has to be a reassessment of these policies. The focus should be on reducing the contingent liability to the sovereign that represents its connection to the banking sector. Policy actions like establishing a clear and transparent resolution framework for banks of all sizes should contribute to break this loop. Similarly, policies that enhance market discipline and the accurate assessment of sovereign risk should lead to more resilient bank balance sheet that could absorb a wider array of shocks arising from sovereign distress.

Section 2 provides a historical overview of sovereign debt crises. It also describes the causal connection from banking crises to sovereign stress. Conversely, sovereign crises can impact banks’ solvency and funding conditions, and the channels that explain this connection are reviewed in Section 3. The “feedback loop” between sovereigns and banks can amplify shocks

affecting one of the two sectors, and then impact the real economy, a topic that is covered in Section 4. Lastly, Section 5 discusses some adjustments to the financial “safety net” that could break the link between sovereigns and banks.

2. Transmission from banking sector stress to the sovereign

2.1 An overview of sovereign debt crises

Sovereign debt crises are a recurring feature in the international financial landscape. For example, Reinhart, Rogoff, and Savastano (2003) report that France defaulted on its sovereign debt eight times between 1500 and 1800, while Spain defaulted thirteen times between 1500 and 1900. Tomz and Wright (2007) document 250 sovereign defaults by 106 countries between 1820 and 2004.

From a legal perspective, a default episode is an event in which a scheduled debt service is not paid beyond a grace period specified in the debt contract. Sovereign defaults do not necessarily imply a total repudiation of the outstanding debt, and any sovereign restructuring offer containing less favorable terms than the original debt contract is considered a “technical” default by credit-rating agencies. Most sovereign default episodes are followed by a settlement between creditors and the debtor government. The settlement may take the form of a debt exchange or debt restructuring, and the new stream of payments promised by the government generally involves some combination of lower principal, lower interest payments, and longer maturities (Cruces and Trebesh, 2013). Credit-rating agencies define the duration of a default episode as the time between the default event and when the debt is restructured, even if there are holdout creditors.

Default episodes have occurred in clusters, often following lending booms and large capital inflows. Subsequent periods of quiet typically reflect both more cautious behavior of borrowers and the loss of capital market access for riskier borrowers. The wave of defaults associated with the Great Depression and the Second World War marks the last period of default in Western Europe during the twentieth century. Developing countries defaulted in even greater numbers during that period, and they did not access capital markets for several years afterward. Lending to developing countries resurged in the seventies in the form of syndicated bank loans, in contrast to previous periods, when bond issuance had been the main borrowing vehicle. A spate of sovereign defaults followed in developing economies, beginning in the 1980s. The amount of sovereign debt in default peaked at more than \$335 billion in 1990. This debt was issued by 55 countries (Beers and Chambers 2006). Soon after the Russian sovereign debt crisis in 1998, several emerging markets experienced sovereign debt episodes. These emerging market episodes and the European sovereign debt crisis of 2009-2012 invigorated the study of sovereign defaults and motivated several policy initiatives intended to improve the international financial architecture, including the effectiveness of crisis resolution.

Many circumstances can lead to a sovereign debt crisis. Political factors can be important determinants of sovereign debt events, as evidenced by the recent European crisis. There is a large literature discussing the links between political risk and sovereign defaults (Bilson, Brailsford, and Hooper, 2002; Cuadra and Sapriza, 2008; Hatchondo, Martinez, and Sapriza, 2009). Empirical studies have also highlighted the importance of external factors in raising the borrowing cost of countries, and thus increasing the likelihood of a sovereign default. For instance, Arora and Cerisola (2001) and Uribe and Yue (2006) find that the interest rates

paid by sovereigns in emerging markets have tended to move in the same direction as U.S. interest rates.

Empirical evidence also indicates that a sovereign tends to default in periods of low available resources. Government resources are low during a cyclical downturn. Tomz and Wright (2007) report that 62 percent of defaults over the last 200 years occurred in years when the output level in the defaulting country was below its long run trend. Fluctuations of terms of trade (ratio of the price of exports to the price of imports) are an important driving force behind the business cycles in some emerging economies (Mendoza 1995, Broda 2004). At the same time, several emerging economies strongly rely on commodity taxation as a source of public revenues and depend largely on imported intermediate goods that have no close substitutes. Some authors find that terms of trade fluctuations are a significant predictor of sovereign default and interest rate spreads in emerging economies (Caballero, 2003; Cuadra and Sapriza, 2006). Events adversely affecting a country's productivity, such as wars or civil conflicts, can also lead to sovereign defaults (Sturzenegger and Zettelmeyer, 2006).

Defaults may also be triggered by a devaluation of the local currency when a relatively large fraction of the sovereign's debt is denominated in foreign currency and its revenues rely heavily on the taxation of nontradable goods. The magnitude of crises triggered by a devaluation of the local currency can be amplified by currency mismatches of households, the non-financial corporate sector, or the banking sector. The next section discusses in more depth how stress in the banking sector may lead to a sovereign debt crisis.

2.2 Sovereign debt crisis as a result of banking crises

Banking crises are very frequently followed by or concurrent to sovereign debt crises, as documented by Reinhart and Rogoff (2011). Banks lie at the heart of the payments system, so a downturn in this sector can readily spread through the rest of the economy, with far reaching consequences for both the private and public sectors. As a result, governments have very strong incentives to avoid disruptions in the banking system. The recent European crisis offers the latest evidence as to the large extent to which governments may go to rescue their banks, making it clear that financial sector problems tend to become fiscal sector problems. In that way, banking crises commonly set the stage for sovereign debt crises. Banking crisis episodes like those in Ireland in 2008 and in Spain in 2012 showcase how the liquidity and solvency troubles of the banking sector can radically turn into a fiscal burden sufficiently large to lead into a sovereign debt crisis that requires external assistance for its containment.

Banking crises may translate into sovereign debt crises through two types of risk transmission channels. A first set of channels is associated to the role of the government as the provider of a “safety net” to the financial system, and the resulting presence of government contingent liabilities. A second set of channels relates to the existing domestic structural macroeconomic conditions at the time of the crisis.

The government plays the role of a “safety net” to the banking system via three mechanisms: first, a government’s commitment to provide support to the banking sector through explicit or implicit bank liability guarantees can saddle the government with substantial debt from private banks, and thus leave it financially vulnerable. For instance, the 27 member countries of the European Union (EU) approved government guarantees on bank liabilities totaling about 30 percent of 2011 EU GDP from the first quarter of 2008 to the third quarter of

2012. There is an important dispersion in the value of guarantees across these countries, with Ireland providing the most guarantees at about 250 percent of 2011 GDP. As Acharya, Drechsler, and Schnabl (2013) highlight, Ireland's provision of blanket guarantees on deposits of six of its largest banks on September 30 of 2008 was immediately followed by a sharp decline in the credit default swap (CDS) premiums for banks and an equally marked increase in the government's CDS premium, which over the next month more than quadrupled from about 100 basis points to 400 basis points within six months. The sharp increase and opposite move in the sovereign CDS premium in Ireland strongly suggests that the provision of guarantees by the government to the banking sector resulted in an important risk transfer from the banking sector to the government. The sovereign interest rate spread of Irish bonds over comparable German debt instruments rose to historically high levels, and Ireland eventually needed a bailout in 2010. Acharya, Drechsler, and Schnabl also point out that this episode is not isolated to Ireland.

Second, sovereign bailouts are a major source of concern about fiscal sustainability. The extent to which the liabilities of the banking sector are socialized and the costs are transferred to taxpayers depends significantly on the resolution regime adopted for the stressed banks (Laeven and Valencia, 2010). Moreover, the lack of schemes to resolve insolvent institutions can result in the banking sector generating a large contingent liability for the sovereign. Hence, governments often contemplate a wide range of measures to aid the banking sector, including recapitalizations, asset relief interventions, and liquidity measures other than guarantees. For example, all the different forms of state aid approved by European Union member countries from the first quarter of 2008 to the third quarter of 2012 add up to about 5 trillion euros, or about 40 percent of 2011 EU GDP.

Third, balance sheet holdings of sovereign securities by the banking sector can represent a substantial fraction of total bank assets in many economies, and can largely magnify bailout costs for the government by reinforcing adverse asset price dynamics during banking crises. A bailout of the banking sector lowers government debt prices, and the further deterioration of the balance sheets of those banks holding public debt can induce a broader, more costly, public bailout or even a sovereign debt default (Bolton and Jeanne, 2011).

A second set of channels that help explain how banking crises can affect sovereign debt sustainability relates to the macroeconomic conditions in the crisis country: first, as discussed in Kaminsky and Reinhart (1999), banking crises commonly precede currency crises. As a result, a large sovereign or banking sector exposure to foreign currency liabilities weakens the ability of the government to act as a “safety net” for the banking sector, and increases the likelihood that banking problems lead to a sovereign debt crisis.

Second, banking crises tend to induce severe economic downturns that weaken the fiscal position of the government. A crisis in the banking sector translates into credit rationing and higher borrowing costs for firms. For instance, non-financial firms may have to switch their source of funding and tap bond markets, an option that may not be available to medium and smaller firms especially during a crisis. Similarly, companies will likely have to rely more heavily on more expensive working capital financing from other non-financial firms. The collapse in tax revenues and the increase in public expenses from automatic stabilizers are generally accompanied by a surge in public debt, sovereign credit rating downgrades and, on occasions, sovereign debt defaults. Laeven and Valencia (2012) and Gennaioli, Martin and Rossi (2013a) show and explain that the output losses and the increases in public debt tend to be larger in advanced economies in part because deeper financial systems lead to more disruptive

banking crises. Interestingly, fiscal costs relative to GDP, or to the financial system assets, are larger in developing economies, but while the fiscal outlays in developing countries are largely associated to bailouts, in advanced economies they represent a small fraction of the increase in public debt, with discretionary fiscal policy and automatic fiscal stabilizers constituting the largest component.

3. Transmission from sovereign stress to banks

The previous section discussed the effect of banking crises on the sovereign's solvency. Sovereign stress can also have significant effects on banks' solvency and their access to funding. This section outlines some channels through which sovereign troubles can affect banks.

3.1 Sovereign debt holdings and bank solvency

The most direct channel for the transmission of sovereign stress to the banking sector is through the banks' holdings of sovereign debt. Banks maintain a portion of their assets in sovereign debt for different reasons. In several countries, sovereign securities are the most liquid asset available, and banks can use them to store their liquid reserves to satisfy deposit redemptions (Gennaioli, Martin, and Rossi, 2013a). Banks also hold sovereign debt for investment purposes. Traditionally, bank regulators have considered sovereign debt less risky than corporate debt, allowing banks to fund a lower proportion of their sovereign debt holdings with capital (Hannoun, 2011).¹ As we discuss later, banks also use sovereign debt for secured

¹ Prior to the introduction of the Basel III capital requirements, supervisors followed the guidelines on risk weights for sovereign exposures proposed under the Basel II capital accord (BCBS, 2006). Under these guidelines, debt securities issued by a AA- rating or above would receive a 0 risk weight, while securities rated between A- and A+ would receive a 20 percent risk weight. However, the guidelines also stated that "at national discretion, a lower risk weight may be applied to banks' exposures to their sovereign (or central bank) of incorporation denominated in domestic currency and funded in that currency". Some countries relied on this statement to deviate from the proposed guideline and assign different risk weights to sovereign exposures. For example, European Union

funding transaction like repurchase agreements. Similarly, government debt may also be pledged as collateral in derivatives transactions. Some banks also maintain sovereign bonds in their balance sheet as part of their market-making role in the sovereign debt market.

Exposures to sovereign debt can lead to losses for the banks if the domestic or foreign government that issued the debt becomes distressed. This type of bank loss has been common in sovereign debt crises in both emerging and advanced economies. The most recent example is the crisis that affected several euro-area countries starting in 2010. Before and during the crisis, banks amassed large holdings of sovereign debt, some of it issued by countries with weak fundamentals and large sovereign debt outstanding (Bolton and Jeanne, 2011; Acharya and Steffen, 2013). As the crisis deepened, countries like Greece restructured their sovereign debt, triggering material losses on those banks with these types of claims on their balance sheets.

In episodes of sovereign default, the solvency of the banking sector is greatly affected due to its sovereign holdings. However, the empirical evidence on the effect that sovereign holdings have on banks during periods of sovereign stress, excluding defaults or restructurings, is mixed. Some studies find that there is a significant correlation between sovereign holdings and banks' stock prices and CDS premiums in periods of heightened sovereign stress (Angeloni and Wolff, 2012), while others find that the effect of sovereign holdings on stock returns is weaker when focusing on sovereign rating events. Using a sample of banks that participated in the 2011 EU-wide stress test, Correa et al. (2013) test whether the stock returns of banks with more own-sovereign debt holdings had a significant reaction after the rating of their own-sovereign debt changed, or was placed on watch for a future change. For this sample of banks, the authors do not find that the stock returns of banks with larger sovereign exposures react

regulators transposed this requirement into European regulation in the Capital Requirements Directive (CRD), which assigned a 0 percent risk weight on sovereign debt issued by a member state and denominated and funded in domestic currency (Directive 2006/48/EC of the European Parliament and of the Council).

significantly to negative rating changes in a window of one day prior and after the ratings announcement.

These mixed results are not surprising, as sovereign debt can be used in most circumstances, as collateral in transactions with domestic central banks (Bank for International Settlements, 2013), the lender of last resort. Thus, in periods of broad liquidity stress, banks can substitute private market funds for central bank financing using their sovereign debt holdings as collateral, and remain viable institutions (Drechsler et al. 2013). However, as noted in the next section, stress at the sovereign level may affect bank financing through some additional channels.

3.2 Cost and availability of funding

The link between banks and sovereigns is not limited to the potential losses that banks may face in the event of a sovereign's default. Banks' funding costs may increase even in cases when sovereign debt holdings do not lead to losses in their balance sheets. There are at least three channels through which sovereign stress can affect banks' funding costs: the collateral channel, the ratings channel, and the government support channel.

The collateral channel describes changes in banks' funding conditions that are explained by the quality of collateral held by banks. An important portion of banks' financing is done through secured transactions, such as repurchase agreements, or repos for short (CGFS, 2011). And one of the main securities used for these collateralized transactions is sovereign debt (International Capital Markets Association, 2013). In a repo transaction, the amount of funds a bank can borrow against a portfolio of securities will depend on the credit and liquidity risk of that collateral. The "buyer" of these securities may impose a haircut (the difference between the

market value and the purchase price of the asset at the start of the repo) to this collateral to take into account such risks. In normal times, sovereign securities are considered to have very low risk, thus, the haircuts applied to these securities are relatively small. However, in periods of sovereign stress, banks that are reliant on sovereign collateral to conduct their secured financing transactions may face notable funding constraints. The deterioration in the value of sovereign collateral is more likely to affect banks domiciled in countries where the sovereign is in distress, but it could also impact banks with holdings of sovereign debt issued by a foreign government in distress, transmitting the funding shock across borders.

The second channel explains the changes in the cost and access to bank funding that are triggered by the decision of rating agencies to downgrade (or upgrade) the debt issued by the bank's home sovereign. Rating agencies typically revise the ratings assigned to corporate issuers after a review of the home-sovereign's own rating (Borensztein, Cowan, and Valenzuela, 2007; Moody's Investors Service, 2012). Some rating agencies assign countries a ratings ceiling ("country ceiling") which determines the maximum rating that they can assign to a bank's foreign currency denominated liabilities (Fitch Ratings, 2008). This ceiling is closely linked to the sovereign's own foreign currency debt rating and takes into account the risk of exchange controls being introduced or the risk of other interventions by the sovereign that may impair the functioning of the private sector.

As noted by the CGFS (2011), sovereign rating changes are closely followed by bank ratings changes. In turn, bank rating changes have been shown to have an effect on equity prices, affecting banks' funding costs (Gropp and Richards, 2001). The effect of sovereign rating changes on banks may also arise from movements in sovereign yields that later affect aggregate bank borrowing costs (Gande and Parsley, 2005; Kaminsky and Schmukler, 2002).

Black et al. (2013) show that a euro-area sovereign risk premium (the spread between Italian and Spanish sovereign debt yields and comparable German sovereign yields) explains a significant share of the increase in European banks' contribution to systemic risk during the recent euro-area sovereign crisis. This is evidence that a sovereign risk premium is priced into banks' funding costs. It is empirically difficult to disentangle the changes in bank funding costs that are directly explained by sovereign ratings from those explained by actual changes in sovereign yields, but it is clear that sovereign rating events have an important effect on bank funding costs.

This leads to the last transmission channel between sovereign risk and bank funding cost: the government support channel. Several studies have identified a pattern of financing cost advantages for institutions that are deemed to be supported by their domestic sovereign (the so-called "too-big-to-fail" subsidy).² This implicit government support allows "protected" banks to raise funds in capital markets at lower rates than comparable financial institutions not benefitting from this implicit guarantee (Acharya, Anginer, and Warburton, 2013; Schich and Lindh, 2012). Moreover, implicit government support typically translates into explicit support during a banking crisis (Brandao-Marques, Correa, Sapriza, 2013). Both implicit and explicit support of the banking sector depend on three factors: the willingness of the government to support the banks, its ability or fiscal capacity to provide this support, and the size of banks and the banking sector (Demirgüç-Kunt and Huizinga, 2013). Both the willingness and the structure of the banking sector are factors that remain fixed in the short to medium term. Thus, the link between government support and bank financing in the short run is mostly influenced by changes in the ability of the government to provide support to the banks.

² The concept that some banks are too-big-to-fail has been discussed in the academic literature since the 1980s. Morgan and Stiroh (2005) and Flannery (2010) summarize several of the studies that have tried to assess the impact of implicit government guarantees on banks.

Figure 2 shows a measure of government support extracted from bank ratings assigned by Moody's Investor Services, one of the three largest global rating agencies. The "ratings uplift" captures the willingness and ability of a government to provide systemic support to a bank. It is calculated as the difference, in ratings notches, between a bank's foreign (domestic) currency deposits rating and the bank financial strength rating (BFSR). We follow Brandao-Marques, Correa, and Sapriza (2013) and calculate the "ratings uplift" for a sample of roughly 300 banks in 54 countries between 1996 and 2013. This sample excludes subsidiaries of global banks, as most of the "ratings uplift" for these institutions is accounted by the support provided by their parent organizations. In addition, we calculate banks' probability of receiving support from the government based on the same ratings information. The probability of support is defined as $p=1-t_d/d$, where d is the default frequency implied by the BFSR of a bank and t_d the default frequency based on the deposit rating. We map the BFSR rating of a bank and its deposit rating to the historical one-year-ahead default frequencies collected by Moody's Investor Service (2011) to calculate the probability of support.

In figure 2, we show the median "ratings uplift" as well as the implicit probability of government support for this sample of banks. These measures clearly show an increase in expected government support tied to systemic banking crises like the Asian and Japanese crises in the late 1990s and the more recent financial crisis in the late 2000s. Although not captured in the graph, the recent sovereign European crisis, which strained several countries in peripheral Europe, led to a reduction in rating agencies' expectations of government support for banks in the most deeply affected countries (e.g., Greece and Ireland). The reduction in expected support did not arise as a result of the governments' unwillingness to provide support to the banks, but it is largely explained by the lack of fiscal capacity to provide such support.

[Insert Figure 2]

Events in which the sovereign's creditworthiness is in doubt will reduce the markets expectation that the government would be able to support the banks and increase banks' funding costs. This link is not limited to the cost of bank-issued debt, as it affects all components of the capital structure including the cost of equity (Correa et al., 2013). The impact also varies across banks within a country. Financial institutions that are perceived to enjoy more government support will experience larger increases in funding costs. These institutions are typically large banks or banks that are partially or fully owned by the government. As their funding costs increase, banks will adjust their balance sheets to cope with the increased financing costs.

It is difficult to empirically identify the contribution of each of these channels to banks' funding conditions during periods of sovereign stress. However, the European Central Bank (ECB), as part of its "euro area bank lending survey," has collected information on the banks' views on the impact of the euro-area sovereign debt crisis on their funding conditions since the first quarter of 2012.³ There are three factors that may affect banks' funding conditions for which the banks are asked to provide an opinion and that are related to the channels described above, namely: the direct exposure of banks to the sovereign; the value of sovereign collateral available for wholesale funding transactions; and other factors, which include "automatic ratings downgrades affecting your bank following a sovereign downgrade or changes in the value of the domestic government's implicit guarantee." Although this information is available for a short period of time and geographical location, it can provide some insights into the interplay between sovereign risks and bank funding.

³ Results of "the euro area bank lending survey" can be found at this location: <http://www.ecb.europa.eu/stats/money/surveys/lend/html/index.en.html>

Figure 3 presents the euro-area banks' responses to the questions related to the link between sovereign risk and bank funding. The lines in the figure show the difference, in percentage points, between the shares of banks reporting that a factor contributed to a deterioration of the banks' funding conditions and those that reported that it contributed to an easing of funding conditions. The answers are weighted based on the share loans outstanding of each country in total euro-area lending. As shown in the figure, the three factors were significant contributors to banks' funding conditions in early 2012, a period of heightened sovereign stress in the euro area. After that episode, the importance of these factors has decreased substantially, with the exception of mid-2012, when Greece restructured its debt. One important pattern to note is that the "other effects", which are related to bank ratings changes linked to sovereign rating events or changes in a government's implicit guarantee of banks, have remained a drag on banks' funding conditions, underlining that these factors are materially important.

[Insert Figure 3]

The close relationship between sovereigns and banks increases the fragility of the system, as it amplifies shocks that either one of these sectors may suffer independently. As a result, broad domestic economic conditions may suffer and spillovers may affect other countries. The effect of the sovereign-bank negative "feedback loop" on real outcomes will be explored in the next section.

4. Sovereign stress and its effect on banking activity

Sovereign debt crises have significant effects on economic activity (Furceri and Zdzienicka, 2011). The impact is larger when sovereign stress is accompanied by problems in

the banking sector (DePaoli et al., 2009). However, there are very few studies that document the direct contribution of the banking sector in these types of episodes. This is understandable, as crises are broad events in which it becomes difficult to identify the impact of individual contributors. The recent euro-area sovereign debt crisis, with its prolonged duration and heterogeneous effects across countries, has proven to be fertile grounds for analyzing the behavior of banks in periods of sovereign stress. We rely on a set of new studies focusing on this period to analyze the real economic impact of sovereign and banking crises.

4.1 Lending

Banks close relationship to its domestic sovereign may affect its lending activity during periods of sovereign stress. As noted before, there are several channels through which deteriorating conditions for the sovereign may affect banks' level of capitalization and their access to external financing. In turn, these shocks to banks' balance sheets also affect their lending activity. However, it is very difficult to empirically isolate the direct and causal effect of sovereign stress on banks' supply of credit. Sovereign crises are typically accompanied by recession that may affect borrower's demand for credit, and these crises may be triggered themselves, by problems in the banking sector. These confounding effects make it difficult to identify the amplification mechanism provided by banks during a sovereign event.

Despite these identification problems, some studies have attempted to test the impact of sovereign distress on bank lending. Focusing on a cross-country sample of sovereign default episodes, Gennaioli, Martin, and Rossi (2013a) find that aggregate private credit falls more in those countries where the banking system is more exposed to sovereign debt securities. These results are consistent with their theoretical model, in which banks optimally hold public bonds as

an instrument to store liquidity. As the government defaults, domestic banks' liquidity decreases and this affects their ability to lend. In their empirical analysis, their identification strategy focuses on the cross-section. The authors collect information on 110 defaults for 81 countries between 1980 and 2005. The main estimation of the paper tests whether banking sectors with larger net claims on the government reduce their private credit to GDP more severely during sovereign default episodes. The results are economically significant, as a one standard deviation increase in a banking sector's exposure to a defaulting sovereign implies a larger reduction in private credit to GDP of about 2.5 percent.

These results are also significant at the bank level. In a subsequent paper, Gennaioli, Martin, and Rossi (2013b) use a sample of roughly 4000 banks in 140 countries to analyze the effect of individual banks' exposures to government debt on lending during 12 sovereign defaults between 1998 and 2012. The authors find that banks with larger exposures to government debt, in an episode when their own-sovereign defaults, decrease lending by more relative to their total assets. This result is mostly explained by banks' "permanent" holding of government debt, as opposed to "transitory" increases in government debt holdings during these crisis episodes.

As shown by these studies, sovereign debt crises have a significant effect on domestic credit. This negative shock is compounded by the marked effect that sovereign crises also have on firms' access to foreign sources of credit. Arteta and Hale (2008) find that countries enduring a debt crisis have limited access to international debt markets. The impact is stronger for non-financial private firms that do not export their goods and services.

As a whole, these results provide some direct evidence on the effect of sovereign defaults on domestic and cross-border bank lending, which could translate into aggregate macroeconomic

outcomes. However, there is still some room for causality going in the opposite direction, as the macroeconomic conditions that led to the default or debt crisis are perhaps correlated with the characteristics of borrowers from banks that are more exposed to the sovereigns in distress.

The European sovereign debt crisis of the early 2010s has provided some empirical evidence to support the hypothesis that banks amplify the impact of sovereign distress on the economy through their lending behavior. Using micro-level data for Italy, Bofondi, Carpinelli, and Sette (2013) find that Italian banks lending grew by less than the credit provided by foreign banks in Italy during the recent sovereign episode. In addition, the authors show that the interest rate charged by these domestic banks also increased as conditions deteriorated. These results demonstrate that, even without default, the banking sector can amplify sovereign stress by adjusting their lending.

Sovereign financial stress can also be transmitted to other countries through global banks. As banks with large international operations face capital shortfalls due to losses on domestic (or foreign) sovereign exposures, they may pair down their participation in cross-border lending arrangements in the form of syndicated loans. Popov and Van Horen (2013) show that European banks with notable exposures to sovereign securities during the recent European debt crisis increased their global syndicated lending at a significantly lower pace than counterparts with smaller exposures to these countries.

Liquidity pressures are another source for the transmission of sovereign risk. Global banks with foreign operations (e.g., branches), particularly funded with wholesale financing, may lose access to local funding as their domestic sovereign becomes stressed. The ensuing liquidity shock forces the global bank to replace that local funding with financing sourced at the parent. If the new inflow from the parent is not enough to finance new or existing lending, the foreign

office of the bank will have to adjust its lending. Correa, Sapriza, and Zlate (2013) show that this mechanism was also important during the European sovereign debt crisis. U.S. branches of European banks faced rapid withdrawals from U.S. wholesale investors, mostly U.S. money market funds, triggered by broad fears about the European sovereign crisis. The branches' parents replaced some of the outflows with their own funds, but these resources were not enough to compensate for the reduction in financing from non-related sources. As a result, branches had to decrease their lending, which is mostly done through syndicated arrangements. Firms with links to the affected branches endured real adjustment, as they invested less compared to similar firms that had lending relationships with unaffected branches.

Transmission of sovereign shocks can also take place indirectly through interbank lending. As shown in Schnabl (2012), a sovereign in stress may lead global banks with exposures to that country to pull back on their lending to banks in other countries. In turn, the domestic banks affected by limited access to international debt markets will cut on their lending and their borrowers will reduce their economic activity. This type of contagion risk grew rapidly prior to the financial crisis of the late 2000s, as global banks became more interconnected and increased their involvement in international capital markets.

In sum, sovereign distress can be amplified through the banking sector contributing to the poor macroeconomic outcomes observed after debt crises episodes. Moreover, sovereign debt problems can also be transmitted to third countries through global banks that are directly or indirectly exposed to the sovereign in distress. But lending is not the only activity that banks adjust during debt crises. That will be the subject of the next section.

4.2 Sovereign stress and risk taking

As we outlined before, banks adjust their lending activities during periods of sovereign distress. However, sovereign debt crises may also alter other activities conducted by financial institutions. In some cases, the outcome of this adjustment may lead to a higher level of risk in the system with additional macroeconomic implications.

Bank assets are traditionally composed of loans and securities. These securities are further decomposed between those issued by the private sectors and those issued by the sovereign or local governments. In periods of sovereign stress, banks may have an incentive to shift the composition of their securities' holdings. As noted before, under normal circumstances banks will hold sovereign securities as a means to maintain liquidity and repay withdrawals from depositors or other creditors (Gennaioli, Martin, and Rossi, 2013a,b). In contrast, in periods of sovereign stress, banks may find it desirable to increase their holdings of "risky" sovereign securities to increase their returns (Acharya and Steffen, 2013). This risk-taking behavior may enhance the adjustment that banks will have to perform in the event of a sovereign default.

There are several factors that explain the banks' decision to increase their sovereign debt holdings in periods of stress. First, sovereign securities are perhaps the safest asset for domestic banks, as private sector borrowers may become riskier under weak macroeconomic conditions. However, as shown by Acharya and Steffen (2013), banks without this constraint may also increase their holdings of "risky" sovereign securities. This was the case for some European banks, which purchased debt from foreign sovereigns in distress during the recent European sovereign crisis.

Second, banks may have the incentive to arbitrage regulatory rules. As noted before, risk-weights on sovereign debt securities are zero in most cases. If the bank is faced with the option of making a loan or holding a sovereign security, regulatory requirements may tip the

balance toward the latter. Consistent with this claim, banks with lower regulatory capital levels were also found to increase their “risky” sovereign holdings in the European sovereign crisis.

Third, securities issued by sovereigns are one of the main types of collateral used by central banks in their liquidity operations with banks. As such, banks will have an incentive to hold more of these securities to be able to access the funding provided by the lender of last resort during a crisis. However, banks could take advantage of this arrangement by purchasing and pledging increasingly riskier sovereign debt as collateral in central bank operations. Using micro-level data for euro-area banks, Drechsler et al. (2013) find that both mechanisms are at play in periods of financial and sovereign stress. Banks hold more sovereign debt to be able to access liquidity from the lender of last resort, but they also shift some of their holdings to “riskier” sovereign securities.

Banks’ lending activity is not the only dimension that banks can adjust in periods of sovereign stress. They can also adjust their risk-taking by arbitraging regulatory rules and the role of the lender of last resort. The main consequence of this action is an increase in systemic risk which could deepen a sovereign crisis. The question that arises from these findings is whether policy makers can adjust the system to take into account the negative structural feature embedded in the relationship between sovereigns and banks. That will be the subject of the next section.

5. Breaking the sovereign-bank “feedback loop”

The close connection between banks and sovereigns leads to financial instability by amplifying any shocks that affect either sector. A country’s fiscal position typically becomes strained as it intervenes to support the banking sector during periods of financial turmoil. This in

turn leads to worsening conditions for the banks due to an increase in their cost of financing and a deterioration of their balance sheets. This “feedback loop” between the sovereign and the banks exacerbates any shock that in isolation would have resulted in smaller macroeconomic effects.

Sovereign distress can be the product of a broad spectrum of problems, both structural and cyclical. The factors that impact a government’s finances span from demographic changes to fluctuations in commodity prices that affect the exporting sector in a small open economy. The focus of our analysis will be on just one of those factors, the impact of the financial “safety net” on the sovereign “feedback loop”. The “safety net” is defined as the system of explicit and implicit guarantees provided by the government to protect a country’s financial infrastructure from systemic events (Kane, 2004). The most common component of this “safety net” is the deposit insurance scheme, which is intended to provide a guarantee to depositors in case of a bank’s insolvency. Other guarantees are implicit or implemented during periods of systemic stress. In the event of broad bank insolvencies, these guarantees are likely to become explicit, and lead to a deterioration in the fiscal position of the sovereign (Laeven and Valencia, 2012). Given the features of the current financial “safety net” and its impact on the sovereign, the following question arises: how can a country minimize the macroeconomic impact of a banking crisis, while reducing the fiscal cost to the sovereign?

It is unrealistic to assume that banking crises can be resolved without any macroeconomic effects. However, some aspect of the “safety net”, if not well designed, may exacerbate these crises through its impact on the sovereign. There are at least three adjustments to the “safety net” that can be implemented to minimize the effect of the sovereign-bank feedback loop: a well-established and transparent bank resolution regime, a deposit insurance

scheme that is optimally priced, and capital requirements that reduce the probability of failure of a bank.

The European Union has adopted some of these measures to deal with the sovereign stresses affecting some countries of the euro area since 2010. A proposed EU “banking union” would include a single supervisor, a well-defined resolution regime, and a consistent structure of deposit insurance schemes across the region. Although progress has been made (Beck, 2013), and this in turn has reduced banks’ funding pressures, there are still several adjustments to the “safety net” that would have to be implemented to break the sovereign-feedback loop.

The first desirable adjustment to the “safety net” is to implement a bank resolution regime that minimizes the cost to taxpayers from banking failures, especially of large banks. Some countries have already moved in this direction by establishing rules that would make it easier to resolve such large financial institutions (FDIC and BoE, 2012). A well-defined resolution regime, which would likely include provisions for the bail-in of subordinated, and in some cases, senior creditors, also has the additional benefit of enhancing market discipline. As governments rely more on this tool to resolve banking crises, rather than bailing out banks through capital injections or other means, investors will price the debt of banks taking into account the credit risk posed by each institution, reducing the so called “too-big-to-fail” subsidy (Acharya, Anginer, and Warburton, 2013).

Deposits insurance schemes are a common feature of the “safety net”. However, a poorly designed scheme may lead to financial instability and significant costs to the sovereign in the event of large or multiple bank failures. Banks operating in an environment with this type of guarantee are prone to increase the riskiness of their assets due to moral hazard, which in turn may increase the likelihood of a banking crisis (Demirgüç-Kunt and Detragiache, 2002). To

limit the cost to the sovereign in the event of a crisis, the deposit insurance scheme should be explicit and it should clearly define the financial institutions and depositors covered (Financial Stability Board, 2012). In addition, to limit banks' risk-taking incentives, the pricing of deposit insurance premiums should be sensitive to each financial institution's own risk, as well as its contribution to systemic risk (Acharya, Santos, Yorulmazer, 2010). These conditions are necessary, yet not sufficient, to reduce the effect of deposit losses on the sovereign's finances.

Lastly, increasing the resilience of banks to shocks is probably the best alternative to insulate the sovereigns from problems arising in the financial sector. A tool available to bank regulators is the imposition of capital requirements for banks. The establishment of high capital requirements can be thought of as a mechanism to internalize the externality posed by the systemic consequences of large bank failures. Increasing the reliance on capital to finance bank assets may be costly (Jiménez et al, 2013), but these costs are outweighed by the social benefits of fewer bank failures and better bank performance during banking crises (Berger and Bouwman, 2013). Additionally, capital regulation should incentivize banks to accurately reflect the risk embedded in sovereign debt. Allowing risk-weights to be sensitive to sovereign creditworthiness may prevent banks from holding large and concentrated exposures to government-issued debt. In general, a banking sector with more capital financing will decrease the cost to taxpayers of resolving banks that are still deemed systemically important.

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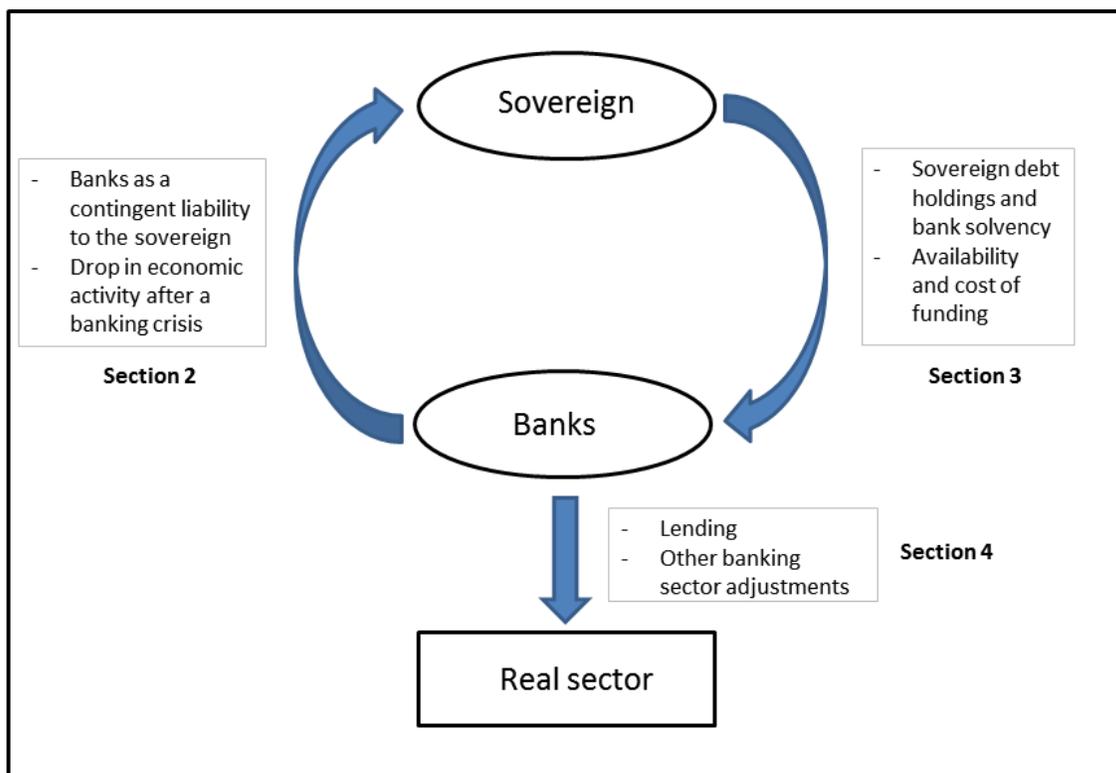


Figure 1. Links between the sovereign, banks, and the real sector.

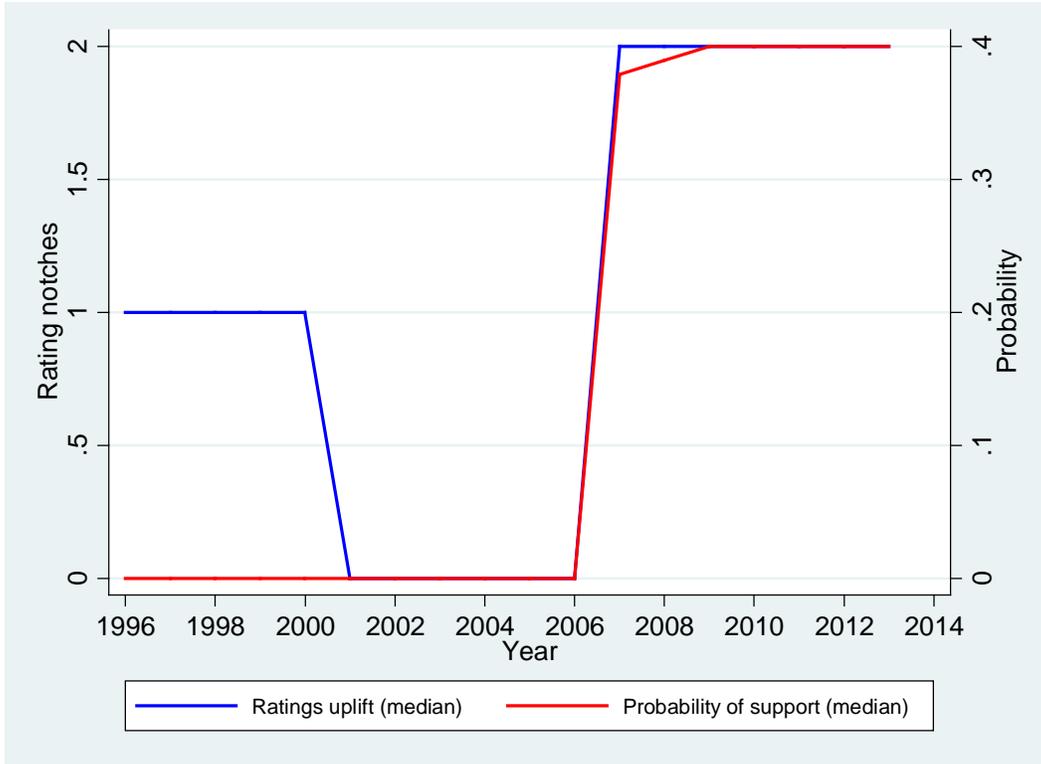


Figure 2. The “ratings uplift” and probability of support are measures of expected government support of banks calculated based on Moody’s Investors Service ratings information.

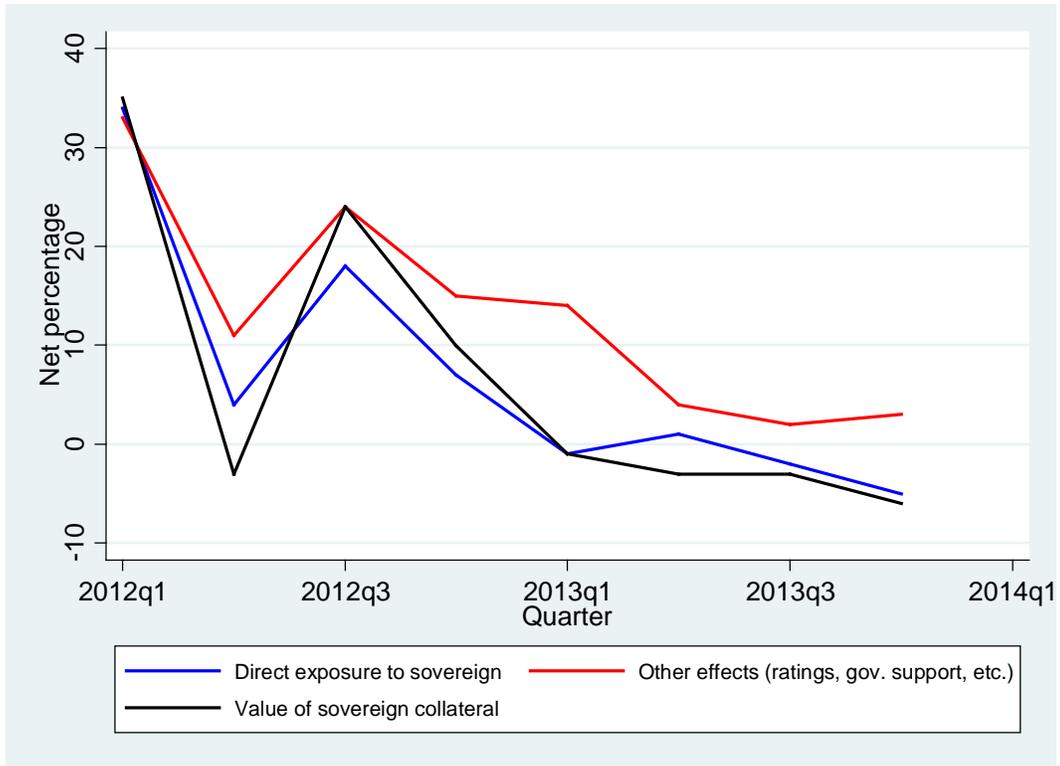


Figure 3. The figure shows the difference, in percentage points, between the shares of banks reporting that a factor contributed to a deterioration of the banks’ funding conditions and those that reported that it contributed to an easing of funding conditions. The answers are weighted based on the share loans outstanding of each country in total euro-area lending.