

Bank Ratings and Lending Supply: Evidence from Sovereign Downgrades*

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Abstract

We study the impact of bank rating downgrades on the supply of bank lending to the private sector. We exploit the asymmetric impact of sovereign downgrades on the ratings of banks at the sovereign bound versus banks below the bound as a result of credit rating agencies' sovereign ceiling policies. We find that sovereign downgrades lead to greater reductions in loan amounts and greater increases in loan spreads of banks at the sovereign bound than of otherwise similar banks below the bound. Lending to foreign borrowers is also significantly affected, confirming a causal interpretation of the results.

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1. Introduction

The impact of sovereign crises on the financial sector has been at the center of academic and policy debates as a consequence of the recent European sovereign debt crisis. Recently even some of the most economically and financially developed countries in the world suffered ratings downgrades. For example, Standard & Poor's (S&P) downgraded the rating of the United States from AAA to AA+ in August 2011, and France's rating from AAA to AA+ in January 2012 and then to AA in November 2013. We ask whether sovereign-related bank rating downgrades cause reductions in bank lending to the private sector. This question is hard to answer because changes in ratings are generally correlated with changes in macroeconomic and individual bank fundamentals, as well as changes in credit demand that are likely to impact the volume of credit extended by banks.

We employ a novel empirical strategy to study the effect of bank rating downgrades on bank lending supply. Sovereign ceiling policies applied by credit rating agencies provide a unique opportunity to identify the effects of rating downgrades. These policies imply that a bank's rating is bounded by the sovereign rating of its country of domicile.¹ Following a sovereign downgrade, banks that have ratings at the sovereign bound may be downgraded not because of a deterioration of banks' own fundamentals, but because of the constraint imposed by the rating agencies.² Rating downgrades can affect a bank's access to wholesale funding and public bond markets because market participants such as banks, insurance companies, and pension funds are subject to investment restrictions and capital requirements that are based directly on ratings. Rating downgrades can also lead to increases in bond coupons and loan interest rates, and trigger debt covenant violations.

¹ While credit rating agencies have been gradually moving away from a policy of never rating a firm above the sovereign, sovereign ratings remain a significant determinant of private credit ratings (Borensztein, Cowan, and Valenzuela (2013)).

² We focus on rating downgrades only because the sovereign ceiling policy does not have asymmetric implications in the case of sovereign upgrades. In fact, the decision to upgrade individual banks is much more likely to be related to bank fundamentals, which would weaken the rationale for our empirical approach. Additionally, upgrades happen in good times when financial constraints matter less.

We quantify the effects of rating downgrades on the lending supply by comparing banks that have ratings at the sovereign bound prior to a downgrade (treatment group) with otherwise similar banks that have ratings below the sovereign bound (control group). While sovereign downgrades are likely to be accompanied by simultaneous macroeconomic shocks that affect the entire financial sector, we expect the credit ratings of the treatment group to be affected *disproportionately more* than the ratings of the control group due to the sovereign ceiling policy. The benchmark empirical specification employs a difference-in-differences estimator that exploits this asymmetric impact on bank ratings and compares changes in the volume and prices of syndicated loans made by treated banks versus control banks to identify the causal effect of the rating downgrade.

We start the analysis by establishing that sovereign downgrades lead to a larger reduction in the ratings of banks at the sovereign bound than in the ratings of banks below the bound. A sovereign downgrade causes a treated bank to suffer a 1.5 notch greater rating reduction than a control bank. Furthermore, there is a significantly higher probability of a rating downgrade for treated banks as a consequence of a sovereign downgrade. This means that treated banks (that have *better* credit quality) are more likely to be downgraded and are downgraded by larger magnitude when there is a shock to the sovereign rating. This indicates that our findings are explained by the sovereign ceiling channel, rather than endogenous changes in bank credit quality.

We show that treated banks reduce lending significantly more than control banks following a sovereign downgrade. The total number of loans made by treated banks (as lead arranger or participant) declines by about 30% more than the loans by control banks. Such a relative decline is also seen for number of loans or dollar volume of loans as lead arranger. Sovereign downgrades also affect loan pricing. We find that treated banks increase interest rate spreads significantly more than control banks following a sovereign downgrade. The differential effect in spreads is between 17 and 45 basis points. There is also a significant effect of sovereign downgrades on the extensive margin.

The probability of making a loan in a given quarter is about one percentage point lower for treated banks than for control banks (the unconditional probability of making a loan is 7%).

One concern about difference-in-differences estimates is whether treatment and control groups follow parallel trends prior to the rating downgrade. We show that prior to the sovereign downgrade loan activity had grown at about the same rate for both treated and control banks and that the relative decline for the treatment group occurs at exactly the time of the sovereign downgrade.

Finally, we explore whether the reduction in the bank lending supply can be attributed to a change in the funding of treated banks versus control banks following a sovereign downgrade. That is, we see which components of the bank's total funding are most affected by rating downgrades – retail deposits, non-deposit short-term funding, interbank funding, and long-term funding (as a percentage of total funding). Financial institutions worldwide have increasingly relied on wholesale funding to supplement retail deposits as a source of funds, making them more vulnerable to a sudden dry up in liquidity during financial crises (see Rajan (2006), Brunnermeier (2009)). Wholesale funding and long-term funding should be the most sensitive to rating downgrades. We find that long-term and interbank funding for treated banks are reduced by 3 to 5 percentage points more than for control banks following a sovereign downgrade. We also show that credit default swaps (CDS) spreads of treated banks increase by 45 to 65 basis points more than those of control banks.

We face three major identification challenges. First, deterioration in macroeconomic fundamentals can cause sovereign downgrades, and simultaneously increase the cost of funding for banks. This possibility is unlikely to contaminate our results because the treatment group contains more highly rated banks that should be less sensitive to macroeconomic shocks than control banks, so we would expect a potential bias to work against finding an effect using our experiment. To further reduce such concerns, we control for changes in macroeconomic conditions using a large set of variables including public debt-to-GDP, GDP growth, inflation, private credit-to-GDP, and

indicators for crises (currency, inflation, sovereign debt, and banking) and recession.

Second, sovereign downgrades may reduce both the lending supply and the demand for loans on the part of borrowers. Supply might decline because of bank-specific liquidity shocks, but demand could fall contemporaneously because firms have changed their expectations about investment opportunities and returns, and their cost of capital is higher. Moreover, the identification strategy requires orthogonality between *ex-ante* bank health and borrower characteristics. It is possible that firms more affected by sovereign downgrades may borrow more from banks that are disproportionately more affected by the downgrade, even though treated banks have *better* initial credit quality than control banks, and so they should not be more affected by a decline in lending demand associated with sovereign downgrades in the same country and period.

To address this concern, the empirical tests control for a large set of observed pre-treatment lender and borrower characteristics: lender size, profitability, capital-to-assets, deposits-to-assets, and cash and marketable securities-to-assets; borrower size, Tobin's Q, leverage, tangibility, foreign sales, and credit rating; past lending relationships; and loan-specific controls. Because lending can vary across firms and across banks for reasons that are not captured by the controls, we also estimate models with lender-by-borrower fixed effects. This alleviates concerns about sample selection, such as bank-firm sorting (i.e., "good" firms borrow from "good" banks, or vice versa) and potential unobserved differences between firms that seek bank loans and firms that do not after a sovereign downgrade. Under a lender-borrower fixed effects approach, the effect of sovereign downgrades on bank lending is identified only by changes in lending within borrowers that take out loans from the same bank both before and after the sovereign downgrade. We also control for time trends using time fixed effects. Results are robust when we employ non-parametric methods such as the Abadie and Imbens (2011) matching estimator of the average effect of the treatment on the treated (ATT).

To address any remaining concerns about a differential change in firms' demand for loans from

treated and control banks, as well as time-varying country-level factors that drive both bank loans and sovereign downgrades, we re-run our tests using a sample that includes only foreign borrowers (i.e., borrowers domiciled in countries other than the country of the lender). For this subsample, changes in demand for credit and changes in country-level factors caused by sovereign downgrades are unlikely to play any direct role. We find similar effects of sovereign downgrades on loan activity in treated banks versus control banks when we focus on the sample of foreign borrowers. This finding also provides evidence of international transmission of sovereign risk to the financial and private sectors, which is consistent with Cetorelli and Goldberg (2012), and Schnabl (2012).

Finally, given that we use a shock to the sovereign rating and its effect on banks as experiment, we have to distinguish the direct effect of ratings from both sovereign-to-bank and bank-to-sovereign effects. On the one hand, sovereign distress can trigger fragility in the banking sector by eroding the value of its direct holdings of government debt and explicit and implicit government guarantees (a Greek-style crisis as in Gennaioli, Martin, and Rossi (2014a)). On the other hand, a distressed financial sector can force governments to bail out banks. The costs of these bailouts can result in a further deterioration of the sovereign's creditworthiness, which feeds back to the financial sector (an Irish-style crisis as in Acharya, Drechsler, and Schnabl (2013)). We perform a series of tests to ensure that these channels are not driving the results. As before, the fact that the treatment group contains banks of better quality and, at least *ex ante*, those less likely to rely on government support, helps with the identification of the effect of ratings. Both the bank-to-sovereign and the sovereign-to-bank effects are likely to be most relevant for banks with low credit quality. Furthermore, we control for banking crises, "too big to fail" and state-owned banks, value of government support (using rating uplift, a measure of how much a bank's rating depends on government support), and banks' holdings of government debt. We also conduct a placebo test in which we examine changes in bank loans for treated and control banks around banking crises that

are not accompanied by sovereign downgrades. This placebo test can detect whether treated banks are more likely to require a bailout than control banks. We find no difference between treated and control banks during banking crises that are not accompanied by sovereign downgrades, which supports the link from sovereign to bank ratings. Taken together, our setting seems to capture the effect of bank ratings on lending supply through the sovereign ceiling channel, rather than bank-to-sovereign transmission of risk.

We contribute to three strands of the literature. First, this work is related to the literature on credit ratings. Research shows that ratings incorporate information not imbedded in prices of bonds and stocks (e.g., Hand, Holthausen, and Leftwich (1992)).³ Ratings are also shown to affect a firm's cost of capital (Kisgen and Strahan (2010)) and corporate decisions such as capital structure (Faulkender and Petersen (2006), Kisgen (2006, 2007, 2009)), and investment (Sufi (2009), Tang (2009), Lemmon and Roberts (2010), Chernenko and Sunderam (2012), Almeida, Cunha, Ferreira, and Restrepo (2013), Harford and Uysal (2014)). To the best of our knowledge, we are the first to identify the effect of exogenous changes in banks' ratings on bank lending supply.

Second, this paper is related to empirical work on the bank lending channel, in particular whether shocks to the financial position of a bank affect lending supply and real economic activity. The literature first used time-series correlation between changes in liquidity and changes in loans or output to show that liquidity shocks have real effects (Bernanke (1983), Bernanke and Blinder (1989)). Concerns about confounding macro effects have led to the use of cross-sectional variation in liquidity supply across banks (Kashyap, Lamont and Stein (1994), Jayaratne and Strahan (1996), Kashyap and Stein (2000), Black and Strahan (2002), Campello (2002), Ashcraft (2006)) or natural experiments (Peek and Rosengren (2000), Ashcraft (2005), Khwaja and Mian (2008), Paravisini

³ Recent work shows that credit ratings are not a sufficient statistic for risk in structured finance markets, in particular during the 2007-2009 financial crisis (Adelino (2009), Griffin and Tang (2012), and He, Qian, and Strahan (2012)). Other work focuses on the incentives of ratings agencies to provide accurate ratings (e.g., Bolton, Freixas, and Shapiro (2012)).

(2008), Chava and Purnanandam (2011)). In particular, the 2007-2009 global financial crisis has been used as an experimental ground to study the effects of bank distress on private credit supply (e.g., Ivashina and Scharfstein (2010), Santos (2011), Iyer, Lopes, Peydro, and Schoar (2013)) and firm valuation and real outcomes (Carvalho, Ferreira, and Matos (2013), Chodorow-Reich (2014)).

Finally, this work is related to the literature on the transmission of sovereign credit risk to the private sector. Gennaioli, Martin, and Rossi (2014a) show that sovereign defaults are followed by declines in private credit in countries where banks hold a significant share of their assets in government bonds and financial institutions are more developed. Acharya, Drechsler, and Schnabl (2013) show that banks' bailouts triggered the rise of sovereign credit risk using credit default swaps (CDS) rates on European sovereigns and banks in the 2007-2011 period. Moreover, changes in sovereign CDS spreads explain changes in bank CDS spreads in the post-bailout period, consistent with a loop between sovereign and bank credit risk. Fischer, Hainz, Rocholl, and Steffen (2012) show that government guarantees (and being "too big to fail") have significant effects on bank risk taking incentives. Others study empirically the effects of sovereign credit risk on corporate credit risk (Durbin and Ng (2005), Borensztein, Cowan, and Valenzuela (2013)), and foreign borrowing (Arteta and Hale (2008), Ağca and Celasun (2012)). Recent work studies the effects of the European sovereign debt crisis on local and cross-border bank lending (Correa, Saprizza, and Zlate (2012), Bofondi, Carpinelli, and Sette (2013), De Marco (2013), Popov and Van Horen (2013), Becker and Ivashina (2014)) and firm real outcomes (Acharya, Eisert, Eufinger, and Hirsch (2014)).

Our focus on the consequences of the deterioration of sovereign creditworthiness for the financial sector has important policy implications. Our findings suggest that public debt management has important effects on bank lending supply by affecting banks' credit ratings and their access to wholesale and long-term funding. Governments should be aware of the potential adverse effects that deteriorating sovereign creditworthiness has on private credit markets. Our

global financial architecture that relies on national-based financial safety nets, backstops, regulation, and supervision only strengthens the sovereign-bank link, impairing monetary policy transmission, and exacerbating economic downturns. This issue is at the heart of ongoing discussions on the establishment of a European Banking Union, which would help to delink sovereigns and banks and restore proper transmission of monetary policy.

2. Methodology and Data

2.1. Quasi-Natural Experiment: Sovereign Ceiling and Downgrade

Credit rating agencies play an important role in providing information about the ability and the willingness of issuers, including governments and private issuers, to meet their financial obligations. The three major agencies – Standard & Poor’s (S&P), Moody’s, and Fitch – assign different types of ratings depending on the maturity (short-term or long-term) and currency denomination of an issue (foreign currency or local currency). Rating agencies usually do not grant private issuers a rating higher than the rating given to the sovereign bonds of the country where the issuer is domiciled, a policy usually referred to as sovereign ceiling. Although the sovereign ceiling policy has been gradually relaxed by the rating agencies starting in 1997 and some private issuers may receive ratings higher than the sovereign, the sovereign rating is still an important determinant of private ratings (Borensztein, Cowan, and Valenzuela (2013)).⁴ Standard & Poor’s (2012) reports that only 113 private issuer ratings worldwide exceed the rating on their sovereign, on a foreign-currency basis, and only three are commercial banks (Gulf International Bank, Banco Espanol de Credito, Banco Santander).⁵ The fact that governments often act as emergency liquidity providers (backstops) to domestic banks in distress by providing bailouts provides an economic rationale for the sovereign

⁴ Rating agencies follow a policy that banks cannot have a rating more than one notch above the sovereign rating.

⁵ There are also a number of subsidiaries and branches of banks located mainly in Ireland that have ratings above the sovereign. These cases are not considered in this study as we run the analysis at the parent bank level.

ceiling policy (Gorton and Huang (2004), Brown and Dinc (2005), Laeven (2011), Duchin and Sosyura (2012), Philippon and Schnabl (2013)).

We focus on foreign currency long-term issuer ratings, in which agencies use a sovereign's rating as a strong upper bound on the ratings of issuers located within each country. We prefer S&P's rating history over other agencies' history because S&P tends to be more active in making rating revisions, and tends to lead other agencies in re-rating (Kaminsky and Schmukler (2002), Gande and Parsley (2005)). Rating announcements by S&P also seem to convey a greater own-country stock market impact and not to be fully anticipated by the market (Reisen and von Maltzan (1999), Brooks, Faff, Hillier, and Hillier (2004)). S&P is also the agency least likely to assign corporate ratings above the sovereign rating.

Because of the sovereign ceiling policy, there are different predictions for the effect of a sovereign downgrade on banks that have pre-downgrade ratings equal to (or above) the sovereign rating (treated banks) and those that have rating below the sovereign rating (control banks). A sovereign downgrade should have a much greater effect on treated banks' ratings, potentially a one-for-one effect, than on control banks, as the sovereign ceiling is non-binding for the latter. For example, if a country with an AAA rating is downgraded to AA+, banks with ratings of AAA are much more likely to be downgraded than otherwise similar banks with ratings below AAA before the sovereign downgrade. Our identification strategy uses this asymmetry in the relation between bank ratings and sovereign ratings to isolate the effect of sovereign downgrades on bank lending. This asymmetry helps to distinguish the effects of credit ratings from confounding common macro effects, as macro shocks associated with sovereign downgrades should affect all banks equally. If there were any differential macro effects, better-quality banks (the treatment group) should be *less* affected than poorer-quality banks (the control group), controlling for differences in borrower characteristics.

2.2. Data

The loan market data come from the Thomson Reuters Dealscan database. Dealscan collects loan-level information on syndicated loans, including the identity of the lead arranger and participant banks and the borrower, as well as a variety of loan contract terms (amount, all-in drawn spread, maturity, structure, purpose, and type). The sample covers all loans initiated from January 1, 1982 through December 31, 2012. Syndicated loan deals include multiple tranches (or facilities) that differ in price, type, and maturity. We perform tests at the facility level; that is, we treat the facilities in each deal as different loans. In the case of facilities with multiple participants and lead arrangers, we consider each facility multiple times to capture differences across the participants and lead arrangers. We treat loans granted by a parent bank and loans granted by a subsidiary or branch of this bank as loans originating from the same bank. For example, we classify loans arranged by branches like Santander Brasil and subsidiaries like Abbey National as loans made by Banco Santander.

In the loan-level tests, the outcome variables are the log of the *Loan Amount* in U.S. dollars (Dealscan item Facility Amount) and the *Loan Spread* over the LIBOR rate (Dealscan item All-in Spread Drawn). We measure the impact on loans in the treatment and control groups using a six-month window before the loan date, i.e., if there was a sovereign downgrade in the six-month period prior to the loan date.

We use several loan characteristics as control variables. *Secured* is a dummy variable that takes a value of one if the loan is secured by collateral, and zero otherwise (DealScan item Secured). *Senior* is a dummy variable that takes a value of one if the loan is senior, and zero otherwise (DealScan item Seniority). Dummy variables for the *Purpose* of the loan (DealScan item Primary Purpose) include general purpose, debt repayment, working capital, and takeover. *Term Loan* is a dummy variable that takes a value of one if the loan is a term loan and zero if it is a credit line (DealScan item Specific Tranche Type). *Dividend Restriction* is a dummy variable that takes a value of one if the loan has

restrictions on paying dividends, and zero otherwise (DealScan item Covenants: General-Material Restriction). *Prior Participant* and *Prior Lead* are dummy variables that take a value of one if the bank served as a participant and lead arranger, respectively, for the borrower's previous loan.

We match the lender in Dealscan (lead arranger and participant banks) to Bloomberg using country, ticker, and name. We obtain both the lender rating and its sovereign rating using S&P long-term foreign currency issuer ratings. Sovereign and bank ratings are mapped into 22 numerical categories, where 22 is the highest rating (AAA) and one the lowest (default). Table A1 in the Internet Appendix presents the scale. We also match the lender to Bankscope to obtain bank characteristics. We are able to obtain lender ratings and characteristics for 91% of the total amount of loans in Dealscan. The final sample is restricted to lenders that have ratings because our identification strategy exploits shocks to the lender rating due to sovereign downgrades.

We use several bank characteristics as control variables in the tests. Bank controls are measured prior to the loan facility date. *Size* is defined as the log of total assets in billions of U.S. dollars (Bankscope item 2025). *Profitability* is proxied by return on assets (ROA), defined as operating income divided by total assets (Bankscope item 4024). *Capital* is defined as the ratio of common equity (Bankscope item 2055) to total assets. *Liquidity* is the ratio of cash and marketable securities (Bankscope item 2075) to total assets. *Deposits* is the ratio of deposits and short-term funding (Bankscope item 2030) to total assets. We control for bank's nationality using country fixed effects and for unobserved time-invariant bank heterogeneity using bank fixed effects.

We also control for several time-varying lender country effects (at the annual frequency): GDP Growth, Inflation, and Private Credit-to-GDP taken from the World Bank/World Development Indicators database. Public Debt-to-GDP and indicators for Crises (currency, inflation, sovereign debt external and internal, and banking) are taken from the Reinhart and Rogoff (2009) database.⁶

⁶ The database covers the period through 2010 and we update it for 2011 and 2012 using similar data and criteria.

OECD Recession indicators for each country drawn from the Federal Reserve Economic Data (FRED) database.⁷ Bank Bondholdings proxies for domestic banks' holdings of government debt using financial institutions' net claims on the government relative to their total assets, following Kumhof and Tanner (2008) and Gennaioli, Martin, and Rossi (2014a), taken from the International Monetary Fund/International Financial Statistics database.⁸

We match the borrowers in Dealscan to the WRDS-Factset Fundamentals Annual Fiscal (North America and International) and Compustat databases to obtain borrower characteristics. The Factset database includes firms from 80 countries and Compustat includes U.S. firms for the 1982-2012 period. We use the Dealscan-Compustat linking table to obtain identifiers (ISIN, SEDOL, CUSIP) from Compustat.⁹ We use these identifiers to match borrowers to the corresponding entity in Factset. For borrowers without a match, we search for a match between Dealscan and Factset using ticker, country, and name. We are able to obtain borrower characteristics for 81% of the total amount of loans in Dealscan.¹⁰

We use several borrower characteristics as control variables in the regression tests. Borrower controls are measured prior to the loan facility date. *Size* is defined as the log of total assets (Factset item FF_ASSETS, Compustat item AT). *Tobin's Q* is defined as the ratio of total assets plus market capitalization (Factset item FF_MKT_VAL, Compustat item CSHO \times PRCC_F) minus common equity (Factset item FF_COM_EQ, Compustat item CEQ) to total assets. *Leverage* is defined as the ratio of total debt (Factset item FF_DEBT, Compustat items DLC + DLTT) to total assets. *Tangibility* is defined as the ratio of net property, plant, and equipment (Factset item FF_PPE_NET, Compustat item PPNT) to total assets. *Foreign sales* is defined as the ratio of foreign sales to total

⁷ We classify a country as being in a recession in a given year if it has suffered more than six months of recession.

⁸ If a country variable is missing for some countries, we assume it takes the value of zero and add indicators for missing variables to the regression.

⁹ We thank Michael Roberts for providing the Dealscan-Compustat match, used in Chava and Roberts (2008).

¹⁰ The majority of the unmatched loans correspond to private borrowers.

sales (Factset item FF FOR SALES PCT). *Unrated* is a dummy variable that takes a value of one if a borrower does not have a credit rating, and *Rating* is the borrower's S&P long-term foreign currency issuer rating mapped into 22 numerical categories (see Table A1 for details). We also control for borrower fixed effects and lender-borrower fixed effects. The lender-borrower fixed effect alleviates concerns about sample selection, such as potential unobserved differences between firms that borrowed from banks and firms that did not around sovereign downgrades. The effect of sovereign downgrades on loan amounts and spreads is identified only by the changes within firms that took out loans from the same bank both before and after the sovereign downgrade.

To address any remaining concerns with demand-side effects, in some tests, we restrict the sample to foreign loans, i.e., loans in which the bank's nationality is different from the borrower's country of domicile. These tests using only foreign borrowers are a powerful way to rule out demand-driven effects in our tests.

We aggregate the loan-level data to run some tests by lender-quarter and lender-borrower quarter. In the lender-quarter panel, the outcome variables measure the level of activity of each bank in the syndicated loan market in a quarter between the first quarter and the last quarter plus four quarters in which the bank made a loan.¹¹ In a quarter with no loans by a lender, the outcome variables take a value of zero. We measure the impact on lending in the treatment and control groups two quarters after versus the quarter before the sovereign downgrade because banks are already committed to loans signed before the downgrade. We obtain similar estimates but with less precision when we measure the effect in the quarter immediately following the sovereign downgrade.

We calculate the *Total Number of Loans* made by a bank (as participant or lead arranger) in each quarter. The lead arranger banks of each loan facility usually hold the largest share of the syndicated

¹¹ We assume that a bank is not active in the syndicated loan market if it does not make any loan during the four quarters after the quarter of the last loan granted as reported in the Dealscan database.

loans (e.g., Sufi (2007)). The lead arranger is also frequently the administrative agent, with a fiduciary duty to other syndicate members to monitor the borrower, calculate loan payments, and enforce covenants. For these reasons, we also calculate the *Number of Loans as Lead* only taking into account loans in which the bank acted as lead arranger. An alternative outcome variable is the total amount of loans in which the bank acted as lead arranger (*Amount of Loans as Lead*). The Dealscan database rarely reports the actual loan shares of an individual lead arranger bank in a loan, so we instead use pro-rata shares. If a bank is a sole lead arranger, it gets a 100% share of the loan, and if there are M lead arrangers, each gets $1/M$ share of the loan. We also run tests using growth rates of loans around sovereign downgrades using the lender-quarter panel. The growth rate is defined as the percentage change of outcome variables (*Growth Total Number of Loans*, *Growth Number of Loans as Lead*, *Growth Amount of Loans as Lead*) from the quarter before to two quarters after the sovereign downgrade.

We also run some tests using as an alternative a lender-borrower-quarter panel that let us control for borrower heterogeneity. The outcome variables (*Total Number of Loans Dummy*, *Number of Loans as Lead Dummy*) are indicators that take a value of one if there is at least one loan (as a lead arranger or participant) in the lender-borrower pair (i, j) . For each pair, the sample period is between the first quarter and the last quarter plus five years (the typical maturity of a syndicated loan) in which lender i made a loan to borrower j . In a quarter with no loans in a lender-borrower pair we assume that the variables take a value of zero. Because there are many observations with a zero, we restrict the sample to pairs with at least one loan as lead arranger over the whole sample period.

We also study the effects of sovereign downgrades on the bank's sources of funding using a lender-quarter panel. A first outcome variable is *Retail Deposits*, defined as the ratio of total customer deposits (Bankscope item 2031) to lagged total funding (Bankscope item 11650). Other variables measure how much the bank relies on wholesale funding: *Non-Deposits Short-Term Funding*, defined as the ratio of total funding minus the sum of retail deposits and long-term funding (Bankscope item

11620) to lagged total funding; and *Interbank Funding*, defined as the ratio of deposits from banks (Bankscope item 2185) to lagged total funding. The final variable measures how much the bank relies on public debt markets as a source of funding: *Long-Term Funding*, defined as the ratio of long-term funding to lagged total funding. We measure the impacts on funding in treatment and control groups two quarters after the sovereign downgrade, with the exception of *Long-Term Funding*, where we measure four quarters after the downgrade. The rationale is that banks access public debt markets less frequently than short-term funding markets (i.e., we expect the effect to take longer to materialize).

2.3. Summary Statistics

The sample covers 933,126 loan facilities taken out by 60,436 borrowers from 480 lenders (participants or lead arrangers) between 1982 and 2012. If we restrict the sample to lead arrangers only, we have 629,594 loan facilities taken out by 58,250 firms from 473 lead arrangers. There are 230,147 lender-borrower pairs in the sample, of which 133,152 have at least two loans (corresponding to 33,980 borrowers and 443 lenders).

Table 1 provides summary statistics for the lender-quarter panel. Panel A provides statistics for observations where the bank has a rating below the sovereign bound (control banks), and Panel B provides statistics for observations where the bank has a rating at the sovereign bound (treated banks). The average control bank has a credit rating of 16.6 and a median rating of 17, which corresponds to a rating of A. The highest rated banks have a rating of AAA, and the lowest-rated banks are in default. In about 20% of the lender-quarter observations the bank is at the sovereign bound in the quarter prior to the sovereign downgrade (17% of these are equal to the sovereign rating). The sample includes a sovereign downgrade in about 2% of the observations. Table A2 in the Internet Appendix provides details on the countries and the timing of sovereign downgrades, and Table A3 lists treated banks (i.e., those at the sovereign bound when a country is downgraded),

as well as the average rating of treated banks one quarter prior and two quarters after the sovereign downgrade.

The outcome variables (*Total Number of Loans*, *Number of Loans as Lead*, and *Amount of Loans as Lead*) consider separately all loans and only loans made to foreign borrowers. Control banks make nearly 60 loans on average per quarter, with a median of 14 loans. The distribution is highly skewed, with a maximum of 1,122 loans. Control banks make about 40 loans as lead arrangers, with a median number of 6. Loans in which a bank acts as lead arranger total about \$2.9 billion per quarter on average, with a median of \$132 million. Control banks participate in a significant number of loans outside their own country. On average, banks make 31 loans to foreign borrowers in a quarter (22 as lead arrangers), although the median is just 3 (one as lead arrangers). The growth rate of the total number of loans is, on average, 18%, with a median of zero. The growth rate is slightly lower (average at 13%) for number of loans in which the bank acts as lead arranger.

Given that we rely on syndicated loans, it is not surprising that our control banks are large, on average, with total assets of over \$200 billion and a median of \$65 billion. The smallest bank in the sample has assets of about \$100 million, while the largest bank has more than \$3 trillion. The return on assets of all the banks is on average 1%. The average common equity ratio (*Capital*) is 7% of assets, which is in line with regulatory requirements. Cash and marketable securities (*Liquidity*) represent about 18% of assets and deposits and short-term funding (*Deposits*) about 69%, on average.

Panel B shows that treated banks make fewer loans per quarter (a median of 3 versus 14 for the control group) and act as lead arranger on fewer loans (a median of 2 versus 6 for the control group). There is less of a difference, although in the same direction, when we look only at loans made to foreign borrowers. The treated banks are somewhat smaller than those in the full sample, with median assets of \$54 billion. The fact that these banks appear smaller and less active in the

syndicated loan market than those in the full sample is because of a composition effect: the effect is reversed when we consider differences within a country.

The final two rows of Table 1 show summary statistics for the loan-level outcome variables (*Loan Amount* and *Loan Spread*). The average dollar amount of loans in the control group is \$514 million (with a median of \$161 million), and the average loan spread is about 180 basis points. We see higher spreads and smaller loans (average of \$453 million and median of \$125 million) for loans made by banks with ratings at the sovereign bound.

Figure 1 uses a numerical scale to show how often there is a difference between the sovereign rating and the rating of each bank. A difference of zero means that the bank is exactly at the sovereign bound; a positive difference means that the bank is below the sovereign bound; and a negative difference means that a bank is above the sovereign bound. The figure shows a significant mass of banks (17.9%) exactly at the sovereign bound. All the bank-year pairs to the right make up 79.5% of all observations, which are the banks in the control group (i.e., those with a rating below their sovereign). Our empirical strategy relies on the fact that there is almost no mass to the left of zero in this figure – that is, there are very few cases of banks with a rating above the sovereign – which creates the asymmetric effect of a sovereign downgrade on treated banks (at the bound) relative to those below the bound.

Figure 2 provides additional detail on the distribution of bank ratings relative to the sovereign. The top panel shows each bank-country rating pair. Each observation in the figure is proportional to the frequency of each pair in the data. The 45-degree line corresponds to banks exactly at the sovereign bound. As in Figure 1, there are a significant fraction of banks on the 45-degree line, and it is also clear that there are very few banks with a rating above the sovereign (i.e., those above the 45 degree line). The bottom panel shows the frequency of each country rating in the data. About 53% of all bank-year observations are in AAA countries, with about 24% in the AA rating level (19,

20, and 21 on the numerical scale), 9% in the A rating level, and 7% in the BBB rating level. About 6% of observations are in countries rated below the BBB rating level.

Table A2 in the Internet Appendix shows the number of treated banks in each country and year. The countries that appear most prominently are Argentina (mostly due to the 2000-2001 crisis), Egypt, Greece, Italy, Japan, and Spain. The treated observations are distributed evenly over the late 1990s. They peak in 2001 and 2002, and then rise again between 2008 and 2012 at the time of the global financial and Eurozone sovereign debt crises. In 447 lender-quarter observations there is a sovereign downgrade; 110 of these are banks that have ratings at the sovereign bound (89 have ratings exactly equal to the sovereign rating). These treated observations include 53 unique banks. The percentage is consistent with that in Panel B of Table 1 – in about 20% of the lender-quarter observations the bank has a rating at the sovereign bound.

3. Results

3.1. Bank Ratings and Sovereign Downgrades

The first test compares the effect of sovereign downgrades on the rating of banks that are at the sovereign bound (the treated banks) in the quarter prior to the sovereign downgrade (the treatment) and the rating of banks below the bound (the control banks). We measure the impact on ratings in treatment and control groups in the quarter of the sovereign downgrade.

We run ordinary least squares (OLS) regressions using the lender-quarter panel. Standard errors are clustered at the country level to correct for within-country residual correlation. We estimate a difference-in-differences regression of lender rating (converted to a numerical scale) where the explanatory variable of interest is the interaction of the *Sovereign Downgrade* dummy with a dummy for treated banks ($Lender\ Rating \geq Sovereign\ Rating$):

$$\begin{aligned}
Lender\ Rating_{it} = & \beta_1(Lender\ Rating_{i,t-1} \geq Sov.\ Rating_{i,t-1}) + \beta_2(Sov.\ Downgrade_{i,t}) \\
& + \beta_3(Lender\ Rating_{i,t-1} \geq Sov.\ Rating_{i,t-1}) \times (Sov.\ Downgrade_{i,t}) + \beta_4 X_{i,t-1} \\
& + \eta_t + \eta_i + \varepsilon_{it}
\end{aligned} \tag{1}$$

where $X_{i,t-1}$ is a vector of lender controls (*Size*, *Profitability*, *Capital*, *Liquidity*, and *Deposits*) and time-varying (lender) country controls; η_t are quarter fixed effects; and η_i are either country or lender fixed effects. The coefficient of interest β_3 measures the extent to which higher-rated banks (those that we call treated) suffer more with a sovereign downgrade than lower-rated banks due to the sovereign ceiling policy. A greater impact of a sovereign downgrade on higher-quality banks allows us to distinguish the effect of the downgrade on bank lending from alternative hypotheses: a reduction in demand for bank loans from corporations in the same country; reverse causality (i.e., the possibility that it is the deterioration of the risk of banks that causes the sovereign downgrade); and confounding macro effects.

Table 2 presents the estimates of regression equation (1). Column (1) includes country and quarter fixed effects. Column (2) also includes lender controls and time-varying macroeconomic country controls. We find that, on average, a sovereign downgrade causes treated banks to suffer a 1.4- to 1.5-notch larger rating reduction than control banks. The treated bank indicator ($Lender\ Rating \geq Sovereign\ Rating$) is associated with a rating that is approximately three notches higher than that of other banks in the same country (as we would expect from the way we define treated banks), and the *Sovereign Downgrade* dummy is associated with lower ratings of about 0.5 to 0.9 notches. The effects are all significant at the 5% level. In columns (3) and (4), we include lender fixed effects. This reduces the differential effect between treated and control banks slightly to about 1.0 to 1.2 notches, but the effect remains significant in both specifications. Table A4 in the Internet Appendix shows that statistical significance is almost identical when we use a two-way clustering procedure by country and quarter, rather than by country alone. Table A5 in the Internet Appendix presents

consistent results using a logit model for the probability that a bank will be downgraded. Treated banks are again much more likely to be downgraded than control banks; the marginal probability of a rating downgrade is 12 percentage points higher for treated banks (the unconditional probability of a bank suffering a downgrade is 3%).¹²

Figure 3 compares the effect of sovereign downgrades on treated bank and control bank ratings from four years before the sovereign downgrade and up to four years after. The estimates come from the regression in column (2) of Table 2, replacing the interaction term with dummies for whether a lender-quarter is in the treated group t years after or in the treated group t years before. We see that treated banks have somewhat higher ratings three or four years before the downgrade, but then there are no significant changes in the two years prior to the sovereign downgrade. The treated banks then suffer a significantly greater downgrade at the time of the sovereign downgrade, a difference that persists for up to two years afterward. The effect is reversed about three years after the sovereign downgrade, suggesting that we are dealing with a temporary shock that lasts two years.

Overall, the evidence so far shows an important asymmetry in the reaction of bank ratings to sovereign downgrades between the treatment and control groups, because of the sovereign ceiling. This asymmetry is essential to our strategy to identify supply effects in credit markets due to bank rating downgrades.

3.2. Bank Lending and Sovereign Downgrades

3.2.1. Lender-Quarter Tests

To examine the impact of sovereign downgrades on bank lending, we first measure the impact on loan activity in treatment and control groups two quarters after the sovereign downgrade, because banks are already committed to some loans signed before the sovereign downgrade. We run

¹² Banks with ratings above the sovereign may be systematically different from banks exactly at the bound. In untabulated results, we exclude banks above the bound even though including these banks works against finding a drop in ratings and lending for the treatment group. Not surprisingly, the effect is even stronger when we do this.

OLS specifications using the lender-quarter panel. Standard errors are clustered at the country-level to correct for within-country residual correlation. We estimate a difference-in-differences regression of the number and amount of loans:

$$\begin{aligned}
 Lending_{it} = & \beta_1(Lender\ Rating_{i,t-1} \geq Sov.\ Rating_{i,t-1}) + \beta_2(Sov.\ Downgrade_{i,t}) \\
 & + \beta_3(Lender\ Rating_{i,t-1} \geq Sov.\ Rating_{i,t-1}) \times (Sov.\ Downgrade_{i,t}) + \beta_4 X_{i,t-1} \\
 & + \eta_t + \eta_i + \varepsilon_{it}
 \end{aligned} \tag{2}$$

where *Lending* is the log of one plus *Total Number of Loans*, *Number of Loans as Lead*, or *Amount of Loans as Lead* (the coefficients can be interpreted as growth rates); and other variables are defined as in equation (1).¹³ The coefficient of interest β_3 measures the extent to which treated banks reduce lending more than control banks following a sovereign downgrade.

Table 3 shows the results. All columns include quarter and lender fixed effects, which take into account overall time trends in the data as well as time-invariant differences between lenders. Treated banks show a large and statistically significant reduction in total number of loans, number of loans as lead arranger, and total dollar amount of loans as lead arranger following a sovereign downgrade. In column (1) the interaction term (*Lender Rating* \geq *Sovereign Rating* \times *Sovereign Downgrade*) coefficient is -0.31, significant at the 1% level, which indicates that banks in the treatment group make about 30% fewer loans as a result of the sovereign downgrade relative to the control group. The estimated differential reduction in lending activity is approximately 26% in column (2) when we include bank controls as well as time-varying country macro controls.

We see a similar reduction for the *Number of Loans as Lead* variable. The reduction in the amount lent suffers a more drastic reduction than the number of loans. In fact, treated banks cut the amount

¹³ The addition of one in the log of the lending variables accounts for the fact that some banks do not make any loan in a given quarter. The number of observations that take a value of zero is 3,031 (19% of the sample) in the *Total Number of Loans* and 4,424 (27% of the sample) in the *Number of Loans as Lead*. We obtain qualitatively similar estimates if we run the tests excluding lender-quarters with zero lending.

lent by 81% to 83% relative to control banks (the point estimates in the regressions that use the log of *Amount of Loans as Lead* as the dependent variable are approximately -1.6 to -1.8). Coefficients of the control variables have the expected sign. Larger banks make, on average, more loans and lend larger amounts, as do more profitable banks and banks that are better capitalized.

Columns (7)-(12) in Table 3 show the estimates when we restrict the sample to loans to foreign borrowers. Any effects of a sovereign downgrade on bank lending to foreign borrowers are very unlikely to be explained by a reduction in the demand for credit. The estimates are similar in direction, but reduced in magnitude and statistical significance when we consider this subset of loans. On average, treated banks reduce the number of loans made by about 11% to 20%. As before, the impact on the amount of loans is more severe, and point estimates suggest a reduction of about 90% compared to the control group.¹⁴

A concern about inferences from the treatment-effects framework is whether the processes generating the treatment and control group outcomes follow parallel trends prior to the treatment. Differences in the post-treatment period can be attributed only to the treatment when this assumption holds. The best way to address this concern is to look at the evolution of the outcome variables in the years leading to the treatment for both treatment and control groups.

Figure 4 graphs the equivalent of columns (2) and (8) in Table 3 where the dependent variable is *Total Number of Loans*, but including yearly leads and lags of the interaction term. The specification is otherwise identical to that used in Table 3. Panel A of Figure 4 shows that, in the four years prior to the sovereign downgrade, treated and control banks were making about the same number of loans (or somewhat higher) per quarter. We then see a significantly lower number of loans in the year of

¹⁴ These economic magnitudes are confirmed in Table A6 of the Internet Appendix, in which we run a two-stage least squares (2SLS) model for the effect of ratings on banks' lending behavior. We use the interaction of the sovereign downgrade and the dummy for whether a bank is at the sovereign bound as the instrument for bank rating. We find magnitudes for the causal effect of a one notch downgrade that are in line with those in Tables 3 and 4. This is expected, as the estimate from the 2SLS model is, in this case, equivalent to a Wald estimator that divides the coefficients of interest in Tables 3 and 4 by the effect of the sovereign downgrade on the ratings of banks at the sovereign bound in Table 2.

the downgrade and subsequent year, and then the difference reverts to close to nothing by the second year after the downgrade. Similarly, Panel B of Figure 4 shows no differences between treated and control banks in the number of loans made to foreign borrowers, with a sharp difference emerging in the year of the downgrade and persisting for the two subsequent years. This figure looks essentially the same if we consider the number of loans made as lead arranger instead of all loans. Thus, it is hard to argue that the lending processes of banks in the two groups follow different trends before the downgrade. Furthermore, we can see that lending falls dramatically for the treatment group versus the control group in the year of the sovereign downgrade.

Table 4 provides a similar analysis, but using growth rates based on the number and total dollar amount of loans by lender and quarter (*Growth Total Number of Loans*, *Growth Number of Loans as Lead*, *Growth Amount of Loans as Lead*). In these specifications, the growth rate equals the percentage change from the quarter prior to two quarters after the downgrade. All regressions include quarter and country fixed effects and time-varying country macro controls in some specifications. Table A7 in the Internet Appendix presents similar estimates when we include lender fixed effects. Table A8 of the Internet Appendix shows that the statistical significance of the regression estimates using levels (and lender fixed effects) and growth rates are similar when we use a two-way clustering of standard errors by country and year.

A sovereign downgrade reduces growth rates by 30 to 50 percentage points more for treated banks than for control banks in the sample of all loans and the sample of foreign loans. This compares to an average growth rate of 17%, which means that treated banks suffer an economically significant reduction in the number of loans relative to control banks. The estimate also reflects that many banks simply leave the syndicated loan market altogether (implying a growth rate of -100%).¹⁵

¹⁵ If a bank does not make any loan after the sovereign downgrade, the growth rate is -100%. The number of observations that take a value of -100% is 1,175 in the case of the *Growth Total Number of Loans* and 1,503 in the case of the *Growth Number of Loans as Lead*. We obtain qualitatively similar estimates if we run the tests excluding lender-quarters

Another concern is that the sample contains both credit-line facilities and term loans. The credit-line facilities allow firms to borrow up to a certain amount at a pre-set interest rate (usually a spread over the LIBOR). Borrowers might be concerned about the bank's ability to advance funds when the borrower wants to draw down on the line of credit (Ivashina and Scharfstein (2010)). Thus, an alternative demand-side story is that borrowers became reluctant to get lines of credit from the affected banks following a downgrade. Furthermore, firms may not use the full amount of the line of credit and we may be overestimating the impact on the amount and cost of borrowing. To address these possibilities, we run the regressions in Tables 3 and 4 using the sample of term loans only (i.e., we exclude lines of credit). Table A9 in the Internet Appendix shows that estimates remain similar.

A final potential concern is that almost 50% of the treated observations in our sample are from the 2011-2012 period, which includes the Eurozone sovereign debt crisis. Naturally, the effects on bank lending are more pronounced in this period, which, in fact, supports our interpretation of a supply effect originated by the government sector rather than the financial sector. Nevertheless, Table A10 in the Internet Appendix shows qualitatively similar results if we exclude the 2011-2012 period from the sample, although the coefficients are imprecisely estimated.

3.2.2. Matching Estimator

Our benchmark specification uses a parametric linear regression that estimates the outcome difference for the group of treated banks versus other observations is estimated by the coefficient on a group dummy. Bank controls are added to the specification to capture additional sources of banks heterogeneity, but the inclusion of controls per se does not address the fact that the groups being compared may have very different characteristics (e.g., Roberts and Whited (2012)).

with growth rates of -100%. Other growth rate measures that can handle exit, such as the log change in lending variables, also yield similar results.

An alternative is a non-parametric strategy that combines a natural experiment with the use of matching estimators. The idea of this estimator is to first isolate treated observations (in our application, banks with ratings at the sovereign bound) and then, from the population of non-treated observations (banks with ratings below the sovereign bound), find observations that best match the treated ones on multiple dimensions (covariates). In this framework, it is assumed that in the absence of the treatment (sovereign downgrades), the treatment group would behave similarly to the control group. The matches are made so that treated and control observations have distributions for the covariates that are as similar as possible to each other, in the pre-downgrade period.

We use the Abadie and Imbens (2011) estimator, which minimizes the (Mahalanobis) distance between a vector of observed covariates across treated and non-treated banks to find control banks (we select four matched control observations for each treated observation). The estimator allows control banks to serve as matches more than once, which reduces the estimation bias but can increase the variance. The list of covariates can include categorical and non-categorical variables. The estimator produces exact matches on categorical variables, but naturally the matches on continuous variables will not be exact (although they should be close). The procedure recognizes this difficulty and applies a bias-correction component to the estimates of interest. In our application, the categorical variables are quarter and country. The non-categorical variables are banks' *Size*, *Profitability*, *Capital*, *Liquidity*, and *Deposits*.

We estimate the average effect of the treatment on the treated (ATT) by performing difference-in-differences estimations. That is, rather than compare the outcome variables (*Growth Total Number of Loans*, *Growth Number of Loans as Lead*, and *Growth Amount of Loans as Lead*) of the treatment and control groups, we compare the changes in the outcome variables between the groups around the sovereign downgrade (from the quarter prior to two quarters after the downgrade). We do so because loan activity of the treated and controls could be different before the treatment, and

continue to be different after that, in which case our inferences could be potentially biased by these uncontrolled bank-specific differences.

Panel A of Table 5 compares mean and median of the covariates between the 46 treated lender-quarters and the 184 control lender-quarters in the quarter prior to the sovereign downgrade.¹⁶ The Pearson chi-square statistic tests for differences in the medians of the covariates between the treatment and control groups. After the matching procedure, there are still some statistically significant differences in the pre-downgrade median values of the covariates across treatment and control groups. Median *Profitability*, *Capital*, and *Liquidity* are higher for banks in the treatment versus the control group. These differences, however, cannot explain our findings since we expect banks with higher profitability, capital, and liquid assets to be less affected rather than more affected by a sovereign downgrade. In addition, the differences are economically small. Panel A also compares the entire distributions of the various matching covariates (pre-treatment) across the two groups of firms using the Kolmogorov-Smirnov test of distributional differences. Similarly to the median tests, there are some statistically significant differences in the pre-treatment covariates between treated and control groups.

Panel B of Table 5 shows that treated banks reduce loan activity significantly more than control banks following a sovereign downgrade. We present both the difference-in-difference estimate and the ATT estimate with bias correction. The ATT for the *Growth Total Number of Loans* variable is -27 percentage points, which is statistically and economically significant. The ATT is even greater, at more than 50 percentage points, when the outcome variables are the growth rates in the number of loans and the amount of loans as lead arranger. Table 5 shows similar estimates when we consider the sample of loans made to foreign borrowers. The ATT is statistically significant for the total

¹⁶ The number of treated observations is restricted to cases for which we can calculate the growth rate, i.e., there is at least one loan in the quarter prior to the downgrade. Other growth rate measures that can handle exit, such as the log change in lending variables, also yield similar results using the matching estimator.

number of loans and number of loans as lead arranger, while it is imprecisely estimated for the amount of loans as lead arranger.

3.2.3. Loan-Level Tests

While we control for a number of time-varying and time-invariant lender and country characteristics, the lender-quarter analysis does not control for borrower and loan characteristics. One remaining concern is that, even though we are comparing higher-quality to lower-quality banks, treated banks might experience a greater drop in demand for loans than control banks.

To address this issue, we perform a loan-level analysis using as outcome variables *Loan Amount* and *Loan Spread*. We measure the impact in the treatment and control groups in the six-month period after the sovereign downgrade. We obtain similar estimates when we use a three-month or one-year window. Some studies (e.g., Khwaja and Mian (2008)) find no effects on loan pricing due to disruptions to bank liquidity. They argue that the margin of adjustment for banks is more likely to be in the number of loans. We revisit this issue by testing whether shocks to bank ratings due to sovereign downgrades also impact the pricing of loans made by affected banks.

We run OLS specifications using the loan-level data. Standard errors are clustered at the (lender) country-level to correct for within-country residual correlation. In this setting, we control for time-varying lender and borrower characteristics and lender-borrower pair fixed effects. This specification eliminates any concerns that endogenous lender-borrower matching might drive our results. Using a lender-borrower fixed effects approach, the effect of sovereign downgrades on lending is identified only by changes in lending within borrowers that take out loans from the same lender both before and after the sovereign downgrade. The regression equation for a loan facility of lender i (participant or lead arranger) and borrower j in year t is as follows:

$$\begin{aligned}
\text{Loan Amount(Spread)}_{ijt} = & \beta_1(\text{Lender Rating}_{i,t-1} \geq \text{Sov. Rating}_{i,t-1}) \\
& + \beta_2(\text{Sov. Downgrade}_{i,t}) + \beta_3(\text{Lender Rating}_{i,t-1} \geq \text{Sov. Rating}_{i,t-1}) \\
& \times (\text{Sov. Downgrade}_{i,t}) + \beta_4 X_{i,t-1} + \beta_5 X_{j,t-1} + \eta_t + \eta_{ij} + \varepsilon_{ijt}
\end{aligned} \tag{3}$$

where $X_{i,t-1}$ is a vector of lender controls and time-varying (lender) country controls; $X_{j,t-1}$ is a vector of borrower controls; η_t are year fixed effects; and η_{ij} are lender-borrower pair fixed effects. The coefficient of interest β_3 measures the extent to which sovereign downgrades lead treated banks reduce loan amounts and increase spreads more than control banks. As before, we also perform all tests on a subsample of foreign borrowers, which further reduces the possibility that local demand shocks might explain the effects on bank lending.¹⁷

Panel A of Table 6 shows the results for the log of *Loan Amount* and *Loan Spread* in the sample of all borrowers. The results show that loans made by treated banks are between 13% and 24% smaller than loans made by control banks following a sovereign downgrade. These results are consistent with the reduction in the total amount loaned by treated banks in Tables 3 and 4. Column (3) includes loan-level controls such as *Secured*, *Senior*, *Purpose*, *Term Loan*, *Dividend Restriction*, *Prior Participant*, and *Prior Lead*. The interaction coefficient in column (3) is similar to that in column (2).

Panel A of Table 6 also shows a strong effect of a sovereign downgrade on loan spreads in the sample of all borrowers. The effect is about 45 basis points with no lender controls, dropping to 17 to 20 basis points when the regressions include lender, borrower, and loan controls. All these estimates are statistically significant at the 5% level. The impact on loan spreads represents between 10% and 25% of the average loan spread in the sample.

When we restrict the sample to foreign borrowers (Panel B of Table 6), we find an interesting asymmetry between the results for loan amounts and for loan spreads. The differential effect on the

¹⁷ All point estimates are basically unchanged when we use quarter fixed effects rather than year fixed effects, but the variance covariance matrix becomes highly singular in this setup.

loan amount of treated banks versus control banks in the sample of foreign borrowers is of similar size as in the sample of all borrowers, i.e., a drop of 11% to 19%. We find no differential effects, however, on the pricing of loans made by treated banks relative to control banks in the sample of foreign borrowers. The point estimates are economically low, at between zero and 3 basis points, and they are statistically insignificant. This suggests that banks are more likely to act as price takers, or at least have less influence on the pricing of loans, when they deal with foreign rather than domestic borrowers.

Table A11 in the Internet Appendix shows that the results in Table 6 are almost unchanged if we exclude borrowers in the financial sector (SIC codes 6000-6999) and public sector (SIC codes 9000-9999).

3.2.4. Lender-Borrower-Quarter Tests

In the last set of tests, we use a lender-borrower-quarter panel to assess how the probability of observing a loan for a given lender-borrower pair changes for treated banks versus control banks as a consequence of the sovereign downgrade. This panel extends the lender-quarter tests and allows us to control for borrower heterogeneity.

We run logit regression models where the dependent variable is a dummy that takes a value of one if there is at least one loan in a lender-borrower pair and quarter in which the lender is a participant (*Total Number of Loans Dummy*) or lead arranger (*Number of Loans as Lead Dummy*). All regressions include quarter and lender-borrower fixed effects.

Table 7 shows the results. Panel A shows the results for the sample of all borrowers and Panel B for the sample of foreign borrowers. We find a statistically significant negative effect in the probability of observing a loan in a quarter for a lender-borrower pair for treated banks versus control banks. The effect is similar when we define the dependent variable using the total number of loans or the number of loans as lead arrangers. The reduction in marginal probability is

approximately 0.9-1.1 percentage points, for an unconditional probability of observing a loan in a given quarter for a lender-borrower pair of about 7%.¹⁸ We obtain similar estimates in columns (2) and (4) when we include lender and borrower controls as well as time-varying (lender) country macro controls. The magnitude of the effect is similar in the sample of foreign borrowers.

We conclude that sovereign downgrades have significant adverse effects on bank lending both on the intensive and extensive margins. The intensive margin effects are a reduced amount of lending and increased interest rate spreads to firms borrowing at the time of sovereign downgrades. The extensive margin effects are a reduced probability of obtaining a new loan.

3.2.5. Effect on Bank Funding

We argue that credit ratings affect the ability of a bank to access wholesale funding and public debt markets for several reasons. Ratings directly affect whether some institutional investors such as banks, insurance companies, and pension funds are allowed to invest in a bank's debt securities, as well as Basel capital requirements for holding such securities on their balance sheets. Rating downgrades can also generally lead to increases in bond coupons and loan interest rates, as well as trigger debt covenant violations. Additionally, ratings can impact customer and employee relationships and operations including a bank's ability to enter long-term contracts.

We examine whether sovereign downgrades differentially affect the funding sources of the treated banks versus control banks. We expect treated banks to be particularly affected in more "sensitive" funding categories, namely, wholesale funding, interbank loans, and public debt markets following a sovereign downgrade, while other sources such as retail deposits should not be affected as much. We also expect treated banks to face more of an increase in the cost of funding than control banks.

¹⁸ We are not able to compute marginal effects in the logit models due to the large number of fixed effects, so the marginal effects are obtained using a linear probability model with the same controls.

We run OLS specifications using a lender-quarter panel and estimate a difference-in-differences regression of bank funding sources:

$$\begin{aligned}
 Funding_{it} = & \beta_1(Lender\ Rating_{i,t-1} \geq Sov.\ Rating_{i,t-1}) + \beta_2(Sov.\ Downgrade)_{i,t} \\
 & + \beta_3(Lender\ Rating_{i,t-1} \geq Sov.\ Rating_{i,t-1}) \times (Sov.\ Downgrade)_{i,t} + \beta_4 X_{i,t-1} \\
 & + \eta_t + \eta_i + \varepsilon_{it}
 \end{aligned} \tag{4}$$

where *Funding* is *Retail Deposits*, *Non-Deposit Short-Term Funding*, *Interbank Funding*, and *Long-Term Funding* (all variables are scaled by lagged total funding); and other variables are defined as in equation (1). The coefficient of interest β_3 measures the extent to which treated banks are more affected following a sovereign downgrade than control banks. We measure the impact on funding sources in treatment and control groups two quarters after the sovereign downgrade, with the exception of *Long-Term Funding*, which we measure four quarters after because banks access public debt markets less frequently than short-term funding markets.

Table 8 shows the results. The interaction term (*Lender Rating* \geq *Sovereign Rating* \times *Sovereign Downgrade*) coefficient is statistically insignificant in column (1), which indicates no differential effect on retail deposits of treated versus control banks. There is also no evidence of a differential effect on non-deposit short-term lending in column (3). Column (5), however, shows that treated banks face a decline in interbank funding of about 5 percentage points, which is statistically significant at the 1% level. Additionally, column (7) shows that the interaction term coefficient is -0.03, significant at the 5% level, which indicates that banks in the treatment group face a reduction of 3 percentage points in long-term funding as a result of the sovereign downgrade compared to the control group. The estimated differential effects on funding sources are similar in columns (2), (4), (6), and (8) when we include bank controls, as well as time-varying country macro controls. We conclude that sovereign downgrades adversely affect the access of treated banks to wholesale funding and public debt markets, and therefore their ability to make new loans as compared to control banks.

We also estimate regression equation (4) using the change in credit default swap (CDS) spreads around sovereign downgrades (from the quarter before to one quarter after) as the dependent variable. We use five-year senior *CDS Spreads* taken from Bloomberg. We measure the impact on CDS spreads in treatment and control groups one quarter after the sovereign downgrade. Table 9 shows the estimates. The interaction term ($Lender\ Rating \geq Sovereign\ Rating \times Sovereign\ Downgrade$) coefficient indicates a positive and significant differential effect of 45 to 65 basis points on the CDS spreads of treated banks versus controls bank. Results are similar when we include lender fixed effects in columns (3) and (4). Taken all together, our findings on the effects on different sources of funding and CDS spreads suggest an asymmetric effect of sovereign downgrades on the cost of funding of treated banks versus control banks, which is consistent with an impaired ability to make new loans.

3.2.6. Alternative Channels

Our experiment – the asymmetric impact of sovereign rating downgrades on the ratings of banks at the sovereign bound versus banks below the sovereign bound – is well suited to identify the causal effect of ratings on bank lending, but there are channels other than ratings that could lead to an effect of sovereign downgrades on bank lending. The first alternative is a potential direct effect on the value of government support to banks that might have deteriorated along with the sovereign downgrade. This could directly impact bank lending supply without a direct effect on ratings per se.

The second alternative is reverse causality, i.e. the possibility that deteriorating bank credit quality can lead to sovereign downgrades. While this channel is likely to be important, (Acharya, Drechsler, and Schnabl (2013) and Strahan (2013)), this is not the channel that our setting is picking up, as we show that *higher*-quality banks are more affected than lower-quality banks by the sovereign downgrade. If bank credit risk leads to sovereign downgrades, this effect is more likely to be driven

by lower-quality than higher-quality banks. Additionally, we include indicators for banking crises in our specifications. To address any remaining concerns that these alternative channels drive our results, we implement several additional tests.

First, in order to further isolate the impact of ratings from the value of the government support to banks, we perform tests that focus on a sample of banks that are *not* “too big to fail,” as these are the ones that are most likely to benefit from the government backstop. These banks are also much more likely to “drag” the country to a sovereign downgrade if they become distressed. We define banks as “too big to fail” if they are above the 75th percentile of the distribution of the ratio of bank total liabilities (Bankscope item 11750) to GDP. The threshold is 9.7%, which closely matches the 10% threshold used in Demirgüç-Kunt and Huizinga (2010).

We re-run the lender-quarter level tests in Table 3 (the dependent variables are the level of *Total Number of Loans*, *Number of Loans as Lead*, *Amount of Loans as Lead*) and Table 4 (the dependent variables are the corresponding growth rates) excluding from the sample the banks that are “too big to fail.” We present only the estimates using the most complete specifications, with lender and country controls as well as lender and quarter fixed effects. Panel A of Table 10 shows that the results are similar to (or even slightly stronger than) those in Tables 3 and 4, indicating that banks with higher systemic risk do not explain our results.

Second, we check whether the results are driven by state-owned banks. The rationale is that these banks may benefit more from government guarantees, and may be more reflective of the credit quality of the sovereign. We should note, however, that it is not *ex ante* clear that these banks should reduce lending more than others, as it is possible that governments force these banks to *increase* lending to make up for the reduction in credit supply from the rest of the financial system. Still, we re-run our tests excluding banks that are state-owned, i.e. those where the government owns (directly and indirectly) more than 50% of the equity (the data source is Bankscope). There are 44

state-owned banks in our sample, which corresponds to about 11% of the number of banks. Panel B of Table 10 shows that our results are largely unaffected when we drop state-owned banks from the sample. Additionally, in Table A12 of the Internet Appendix we show that the matching estimator results in Table 5 are largely unchanged when we add a dummy for state-owned banks as covariate.

Third, we use a direct measure of the value of explicit and implicit government guarantees to banks based on credit ratings data. Moody's provides ratings for banks with and without the effect of government support. We interpret the difference between the two ratings as a measure of the value of government support for each individual bank (in line with the interpretation in Lindh and Schich (2012), Acharya, Drechsler, and Schnabl (2013), and Afonso, Santos, and Traina (2014)). To construct this bank-level measure, we use the Long-Term Issuer Rating, which incorporates government support, and Bank Financial Strength Rating, which does not. The difference between the two ratings is therefore the estimate of the value of government support to banks (*Rating Uplift*) in that a higher number indicates a higher value of government support.¹⁹

We re-run the lender-quarter level tests of Tables 3 and 4 separately for the subsamples of banks with low and high rating uplift (split at the median of the value of rating uplift). The results are shown in Table 11. If government support explains our results, we should find stronger effects in the subsample of banks with high rating uplift. The effect of sovereign downgrades on treated banks versus control banks is, in general, stronger in the subsample of low rating uplift (Panel A of Table 11) than in the subsample of high rating uplift (Panel B).

Table A13 in the Internet Appendix shows that the results are not affected when we re-run the tests in Tables 3 and 4 including the three measures above as controls (the size of the bank liabilities to GDP, the share of the bank owned by the government, and the rating uplift), as well as the

¹⁹ We assign 22 numerical categories to the Moody's Long-Term Issuer Ratings, where 22 is the highest rating (Aaa) and one is the lowest (default). We use the Moody's conversion table to transform stand-alone ratings (Bank Financial Strength Rating) into long-term issuer equivalent ratings (Moody's (2007)). We then compute the rating uplift as the difference between the two variables.

interaction of these three variables with the sovereign downgrade dummy, rather than running tests in subsamples. We conclude that the potential reduction in the value of government guarantees to the financial sector due to a sovereign downgrade does not explain our results.

Fourth, we perform a placebo test that aims to address the issue of whether the results are driven by banking crises and the impact of deteriorating bank credit quality on sovereigns. We replicate exactly the same experiment that we run for sovereign downgrades but using a placebo period. That is, we use bank and sovereign ratings to sort banks into treatment and control groups as before, but we use banking crises as the treatment rather than sovereign downgrades. In this placebo, we create a *Banking Crisis* indicator that is equal to one if a country suffers a banking crisis that is not accompanied by a sovereign rating downgrade in the last four quarters.

Table 12 shows the results of this placebo test. Panel A presents the results for the sample of all borrowers and Panel B for the sample of foreign borrowers. The negative treatment-control difference in bank lending outcomes does not appear in banking periods that are not accompanied by sovereign downgrades, as shown by the coefficients on the interaction term ($Lender\ Rating \geq Sovereign\ Rating \times Banking\ Crisis$). If anything, we observe that treated banks are *less* affected in banking crises than control banks (see columns (1) and (2) of Panel A). This falsification test helps to rule out alternative explanations for the results such as a bank-to-sovereign effect.

Fifth, we show that banks' holdings of government debt do not explain our results. Acharya, Drechsler, and Schnabl (2013) and Gennaioli, Martin, and Rossi (2014a) show that sovereign distress can trigger fragility in the banking sector due to holdings of government debt. In our main tests, we control for country-level bank holdings of government bonds. To further rule out this possibility, we re-run the lender-quarter tests using bank-level holdings of government securities, including Treasury bills, bonds, and other government securities (Bankscope item 29272), divided by total assets, as an additional control (*Government Bondholdings*). The mean of the *Government Bondholdings*

variable is 6% (among positive holdings), which is in line with figures in Gennaioli, Martin, and Rossi (2014b).²⁰ They find that government bondholdings are accumulated in normal times, but there is some further accumulation of bonds during sovereign debt crises among the larger and more profitable banks. While government bondholdings are associated with more loans, consistent with a liquidity view (i.e., banks bought more bonds in the past to tap future investments opportunities) they do not seem to affect bank lending at the time of sovereign defaults.²¹

Table 13 reports the estimates including *Government Bondholdings* as a control, as well as the interaction of the government bondholdings with the sovereign downgrade. This controls both for the direct effect of bank holdings of government debt on credit supply and for a potential differential response at a time of a sovereign downgrade that might be due to a deterioration of banks' balance sheets. The results are quantitatively and qualitatively similar to the main finding in Table 3 and Table 4 of reduced bank lending following a sovereign downgrade. The total holdings of government securities variable from Bankscope does not break down securities by nationality, in particular the holdings of own-government securities. To better control for holdings of government bonds, we collect bank-level data on holdings of different sovereign government bonds released as part of the European Banking Authority (EBA) European Union-wide stress test exercises in December 2010. Acharya, Drechsler, and Schnabl (2013) document a significant home bias in banks' holdings of sovereign bonds, as 70% of the holdings were in local sovereign bonds (roughly one-sixth of banks' risk-weighted assets).

We re-run the lender-quarter tests using a sample of 54 European Union banks in 2008-2012 and including the gross direct long exposures to own country (bonds and loans), divided by total assets, as a control variable (*Exposure to Own Country*). The mean of the *Exposure to Own Country*

²⁰ We assume that the holdings of government securities are zero if information is missing.

²¹ Gennaioli, Martin, and Rossi (2014b) find that government bondholdings accumulated during the crisis do not impair bank lending, but the stable component of bondholdings has a negative effect on bank lending at the time of sovereign defaults.

variable is 11%, which is in line with figures reported in Acharya, Drechsler, and Schnabl (2013). Table A14 in the Internet Appendix reports the estimates when we include both the exposure to own country and the interaction of this variable with the sovereign downgrade. We still find that the interaction ($Lender\ Rating \geq Sovereign\ Rating \times Banking\ Crisis$) coefficient is negative, but it is imprecisely estimated because of the much smaller sample size (about 800 lender-quarter observations). The *Exposure to Own Country* coefficient is negative and the interaction with the sovereign downgrade dummy is positive, but both are statistically insignificant.

Finally, we perform lender-quarter panel regression tests using a sample of countries that offer high creditor rights. Gennaioli, Martin, and Rossi (2014a) predict that sovereign credit risk should have more of an effect on banks in countries where creditor rights are better protected.²² Thus, if a sovereign-to-bank effect explains our results, we should find more pronounced effects of sovereign downgrades on the sample of (lender) countries with high creditor rights. We split the sample into countries above and below the median creditor rights measure of Djankov, McLiesh, and Shleifer (2007). Consistent with the results in Gennaioli, Martin, and Rossi (2014a), Table A15 in the Internet Appendix shows that our estimates of the differential effect of sovereign downgrades are concentrated in countries with above-median creditor rights.

4. Conclusion

Our study of the impact of bank ratings on the supply of bank credit takes advantage of the exogenous variation in bank ratings created by sovereign downgrades because of sovereign ceiling policies that the rating agencies use. We show that banks with ratings at the sovereign bound reduce their lending volume and increase interest rate spreads significantly more than otherwise similar banks with ratings below the sovereign bound. We show that this reduction in lending supply can be

²² See Corollary 2 in Gennaioli, Martin, and Rossi (2014a) for a detailed discussion of this prediction.

attributed both to an impaired ability to access wholesale funding and public debt markets and to an increase in the cost of funding following a rating downgrade.

An important feature of our empirical strategy is that treated banks are of better credit quality than control banks, which rules out several alternative explanations such as confounding economy-wide shocks, which should affect all banks equally. The effect of sovereign downgrades can be attributed to the bank lending channel, and not to the firm borrowing channel, and such downgrades are unrelated to variation in bank-specific characteristics. We also rule out the possibility that a bank-to-sovereign channel could be driving the effect of sovereign downgrades. Results relying exclusively on loans to foreign borrowers and on a placebo test using banking crises confirm our causal interpretation.

Our findings show that the sovereign-to-bank channel for the transmission of shocks has important effects on private credit markets. Public debt management can affect credit markets through sovereign rating downgrades and ceilings, and not only through fundamentals such as interest rates and crowding-out effects. When the sovereign has a rating that is not at the high end of the scale, ratings for even healthy banks from that country will tend to suffer with deteriorating sovereign credit quality. Following a sovereign downgrade, rating agencies often downgrade banks at the sovereign bound even if these banks do not actually receive a greater shock to their credit quality than banks below the bound. Additionally, the sovereign ceiling rule can produce effects even outside periods of sovereign downgrades as banks at the bound would deserve ratings that are higher than they actually are. Governments should be aware of the potential adverse effects of rating announcements on credit markets, and they should factor these negative externalities into their borrowing decisions. Future work should examine the financial and real effects for firms with lending relationships with banks affected by the sovereign ceiling rule.

References

- Afonso, Gara, João Santos, and James Traina, 2014, Do “Too Big To Fail” Banks Take on More Risk?, Working paper, Federal Reserve Bank of New York.
- Abadie, Alberto, and Guido Imbens, 2011, Bias-Corrected Matching Estimators for Average Treatment Effects, *Journal of Business and Economic Statistics* 29, 1-11.
- Acharya, Viral, Itamar Drechsler, and Philipp Schnabl, 2013, A Pyrrhic Victory? Bank Bailouts and Sovereign Credit Risk, *Journal of Finance*, forthcoming.
- Acharya, Viral, Tim Eisert, Christian Eufinger, and Christian Hirsch, 2014, Real Effects of the Sovereign Debt Crisis in Europe: Evidence from Syndicated Loans, Working paper, New York University.
- Adelino, Manuel, 2009, How Much Do Investors Rely on Ratings? The Case of Mortgage-Backed Securities, Working paper, Duke University.
- Ağca, Senay, and Oya Celasun, 2012, Sovereign Debt and Corporate Borrowing Costs in Emerging Markets, *Journal of International Economics* 88, 198-208.
- Almeida, Heitor, Igor Cunha, Miguel Ferreira, and Felipe Restrepo, 2013, The Real Effects of Credit Ratings: Using Sovereign Downgrades as a Natural Experiment, Working paper, Nova School of Business and Economics.
- Arteta, Oscar, and Galina Hale, 2008, Sovereign Debt Crises and Credit to the Private Sector, *Journal of International Economics* 74, 53-69.
- Ashcraft, Adam, 2005, Are Banks Really Special? New Evidence from the FDIC-Induced Failure of Healthy Banks, *American Economic Review* 95, 1712-1730.
- Ashcraft, Adam, 2006, New Evidence on the Lending Channel, *Journal of Money, Credit and Banking* 38, 751-776.

- Becker, Bo, and Victoria Ivashina, 2014, Financial Repression in the European Sovereign Debt Crisis, Working paper, Harvard University.
- Bernanke, Ben, 1983, Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression, *American Economic Review* 73, 257-276.
- Bernanke, Ben, and Alan Blinder, 1989, Credit, Money, and Aggregate Demand, *American Economic Review* 78, 435-439.
- Black, Sandra, and Philip Strahan, 2002, Entrepreneurship and Bank Credit Availability, *Journal of Finance* 57, 2807-2833.
- Bofondi, Marcelo, Luisa Carpinelli, and Enrico Sette, 2013, Credit Supply during a Sovereign Crisis. Working paper n° 909, Bank of Italy.
- Bolton, Patrick, Xavier Freixas, and Joel Shapiro, 2012, The Credit Ratings Game, *Journal of Finance* 67, 85-111.
- Borensztein, Eduardo, Kevin Cowan, and Patricio Valenzuela, 2013, Sovereign Ceilings Lite? The Impact of Sovereign Ratings on Corporate Ratings in Emerging Market Economies, *Journal of Banking and Finance* 37, 4014-4024.
- Brooks, Robert, Robert William Faff, David Hillier, and Joseph Hillier, 2004, The National Market Impact of Sovereign Rating Changes, *Journal of Banking and Finance* 28, 233-250.
- Brown, Craig, and Serdar Dinc, 2005, The Politics of Bank Failures: Evidence from Emerging Markets, *Quarterly Journal of Economics* 120, 1413-1444.
- Brunnermeier, Markus, 2009, Deciphering the Liquidity and Credit Crunch 2007-2008, *Journal of Economic Perspectives* 23, 77-100.
- Campello, Murillo, 2002, Internal Capital Markets in Financial Conglomerates: Evidence from Small Bank Responses to Monetary Policy, *Journal of Finance* 57, 2773-2805.

- Carvalho, Daniel, Miguel Ferreira, and Pedro Matos, 2013, Lending Relationships and the Effect of Bank Distress: Evidence from the 2007-2008 Financial Crisis, *Journal of Financial and Quantitative Analysis*, forthcoming.
- Cetorelli, Nicola, and Linda Goldberg, 2012, Banking Globalization and Monetary Transmission, *Journal of Finance* 67, 1811-1843.
- Chava, Sudheer, and Amiyatosh Purnanandam, 2011, The Effect of Banking Crisis on Bank-Dependent Borrowers, *Journal of Financial Economics* 99, 116-135.
- Chava, Sudheer, and Michael Roberts, 2008, How Does Financing Impact Investment? The Role of Debt Covenants, *Journal of Finance* 63, 2085-2121.
- Chernenko, Sergey, and Adi Sunderam, 2012, The Real Consequences of Market Segmentation, *Review of Financial Studies* 25, 2041-2069.
- Chodorow-Reich, Gabriel, 2014, The Employment Effects of Credit Market Disruptions: Firm-Level Evidence from the 2008-09 Financial Crisis, *Quarterly Journal of Economics* 129, 1-59.
- Correa, Ricardo, Horacio Saprizza, and Andrei Zlate, 2012, Liquidity Shocks, Dollar Funding Costs, and the Bank Lending Channel during the European Sovereign Crisis, Working paper, International Finance Discussion Series
- De Marco, Filippo, 2013, Bank Lending and the Sovereign Debt Crisis, Working paper, Boston College.
- Demirguc-Kunt, Asli, and Huizinga, Harry, 2010, Are Banks Too Big to Fail or Too Big to Save? International Evidence from Equity Prices and CDS Spreads, Discussion Paper n° 7903, CEPR.
- Djankov, Simeon, Caralee McLiesh, and Andrei Shleifer, 2007, Private Credit in 129 Countries, *Journal of Financial Economics* 84, 299-329.
- Duchin, Ran, and Denis Sosyura, 2012, The Politics of Government Investment, *Journal of Financial Economics* 106, 24-48.

- Durbin, Erik, and David Ng, 2005, The Sovereign Ceiling and Emerging Market Corporate Bond Spreads, *Journal of International Money and Finance* 24, 631-649.
- Faulkender, Michael, and Mitchell Petersen, 2006, Does the Source of Capital Affect Capital Structure? *Review of Financial Studies* 19, 45-79.
- Fischer, Markus, Christa Hainz, Jörg Rocholl, and Sascha Steffen, 2012, Government Guarantees and Bank Risk Taking Incentives, Working paper, Goethe University Frankfurt.
- Gande, Amar, and David Parsley, 2005, News Spillovers in the Sovereign Debt Market, *Journal of Financial Economics* 75, 691-734.
- Gennaioli, Nicola, Alberto Martin, and Stefano Rossi, 2014a, Sovereign Default, Domestic Banks, and Financial Institutions, *Journal of Finance* 68, 819-866.
- Gennaioli, Nicola, Alberto Martin, and Stefano Rossi, 2014b, Banks, Government Bonds and Default: What Do the Data Say, Working paper, Purdue University.
- Gorton, Gary, and Lixin Huang, 2004, Liquidity, Efficiency, and Bank Bailouts, *American Economic Review* 94, 455-483.
- Griffin, John, and Dragon Tang, 2012, Did Subjectivity Play a Role in CDO Credit Ratings? *Journal of Finance* 67, 1293-1328.
- Hand, John, Robert Holthausen, and Richard Leftwich, 1992, The Effect of Bond Rating Agency Announcements on Bond and Stock Prices, *Journal of Finance* 47, 733-752.
- Harford, Jarrad, and Vahap Uysal, 2014, Bond Market Access and Investment, *Journal of Financial Economics* 112, 147-163.
- He, Jie, Jun Qian, and Philip Strahan, 2012, Are All Ratings Created Equal? The Impact of Issuer Size on the Pricing of Mortgage-Backed Securities, *Journal of Finance* 67, 2097-2137.
- Ivashina, Victoria, and David Scharfstein, 2010, Bank Lending During the Financial Crisis of 2008, *Journal of Financial Economics* 97, 319-338.

- Iyer, Rajkamal, Samuel Lopes, José-Luis Peydró, and Antoinette Schoar, 2013, The Interbank Liquidity Crunch and the Firm Credit Crunch: Evidence from the 2007-09 Crisis, *Review of Financial Studies* 27, 347-372.
- Jayaratne, Jith, and Philip Strahan, 1996, The Finance-Growth Nexus: Evidence from Bank Branch Deregulation, *Quarterly Journal of Economics* 111, 639-670.
- Kaminsky, Graciela, and Sergio Schmukler, 2002, Emerging Market Instability: Do Sovereign Ratings Affect Country Risk and Stock Returns? *World Bank Economic Review* 16, 171-195.
- Kashyap, Anil, Owen Lamont, and Jeremy Stein, 1994, Credit Conditions and the Cyclical Behavior of Inventories, *Quarterly Journal of Economics* 109, 565-592.
- Kashyap, Anil, and Jeremy Stein, 2000, What Do a Million Observations on Banks Say About the Transmission of Monetary Policy? *American Economic Review* 90, 407-428.
- Khwaja, Asim, and Atif Mian, 2008, Tracing the Impact of Bank Liquidity Shocks, *American Economic Review* 98, 1413-1442.
- Kisgen, Darren, 2006, Credit Ratings and Capital Structure, *Journal of Finance* 61, 1035-1072.
- Kisgen, Darren, 2007, The Influence of Credit Ratings on Corporate Capital Structure Decisions, *Journal of Applied Corporate Finance*, 19, 65-73.
- Kisgen, Darren, 2009, Do Firms Target Credit Ratings or Leverage Levels? *Journal of Financial and Quantitative Analysis* 44, 1323-1344.
- Kisgen, Darren, and Philip Strahan, 2010, Do Regulations Based on Credit Ratings Affect a Firm's Cost of Capital? *Review of Financial Studies*, 23, 4324-4347.
- Kumhof, Michael, and Evan Tanner, 2008, Government Debt: A Key Role in Financial Intermediation, in Carmen Reinhart, Carlos Végh, and Andres Velasco, eds.: *Money, Crises and Transition, Essays in Honor of Guillermo A. Calvo*.
- Laeven, Luc, 2011, Banking Crises: A Review, *Annual Review of Financial Economics* 3, 17-40.

- Lemmon, Michael, and Michael Roberts, 2010, The Response of Corporate Financing and Investment to Changes in the Supply of Credit, *Journal of Financial and Quantitative Analysis* 45, 555-587.
- Lindh, Sofia, and Sebastian Schich, 2012, Implicit Guarantees for Bank Debt: Where Do We Stand? *OECD Journal: Financial Market Trends*, 1-22.
- Moody's, 2007, Incorporation of Joint-Default Analysis into Moody's Bank Ratings: A Refined Methodology, March.
- Paravisini, Daniel, 2008, Local Bank Financial Constraints and Firm Access to External Finance, *Journal of Finance* 63, 2161-2194.
- Peek, Joe, and Eric Rosengren, 2000, Collateral Damage: Effects of the Japanese Bank Crisis on Real Activity in the United States, *American Economic Review* 90, 30-45.
- Philippon, Thomas, and Philipp Schnabl, 2013, Efficient Recapitalization, *Journal of Finance* 68, 1-42.
- Popov, Alexander, and Neeltje Van Horen, 2013, The Impact of Sovereign Debt Exposure on Bank Lending: Evidence from the European Debt Crisis, Working paper, De Nederlandsche Bank.
- Rajan, Raghuram, 2006, Has Finance Made the World Riskier? *European Financial Management* 12, 499-533.
- Reinhart, Carmen, and Kenneth Rogoff, 2009, *This Time Is Different: Eight Centuries of Financial Folly*. Princeton University Press, NJ.
- Reisen, Helmut, and Julia von Maltzan, 1999, Boom and Bust and Sovereign Ratings, *International Finance* 2, 273-293.
- Roberts, Michael, and Toni Whited, 2012, Endogeneity in Empirical Corporate Finance, *Handbook of the Economics of Finance* 2, 493-572.
- Santos, João, 2011, Bank Corporate Loan Pricing Following the Subprime Crisis, *Review of Financial Studies* 24, 1916-1943.

- Schnabl, Philipp, 2012, The International Transmission of Bank Liquidity Shocks: Evidence from an Emerging Market, *Journal of Finance* 67, 897-932.
- Standard & Poor's, 2012, Corporate and Government Ratings that Exceed the Sovereign Rating, RatingsDirect, October.
- Strahan, Philip, 2013, Too Big to Fail: Causes, Consequences, and Policy Responses, *Annual Review of Financial Economics* 5, 43-61.
- Sufi, Amir, 2007, Information Asymmetry and Financing Arrangements: Evidence from Syndicated Loans, *Journal of Finance* 62, 629-668.
- Sufi, Amir, 2009, The Real Effects of Debt Certification: Evidence from the Introduction of Bank Loan Ratings, *Review of Financial Studies* 22, 1659-1691.
- Tang, Tony, 2009, Information Asymmetry and Firms' Credit Market Access: Evidence from Moody's Credit Rating Format Refinement, *Journal of Financial Economics* 93, 325-351.

Figure 1 – Distribution of Difference between Sovereign Rating and Bank Ratings

This figure shows the relative frequency of the difference between the sovereign rating and the rating of each individual bank. Ratings are converted to a numerical categories, where 22 is the highest rating (AAA) and one the lowest (default). A difference of zero means that the bank is exactly at the sovereign bound, a positive difference means that the bank is below the sovereign bound, and a negative difference means that the bank is above the sovereign bound.

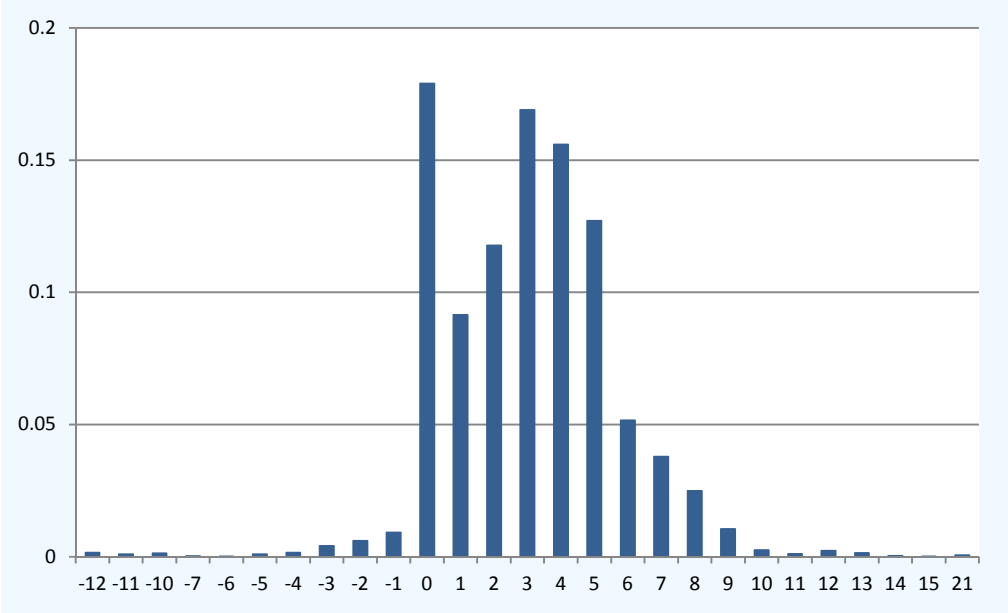


Figure 2 – Sovereign Ceiling Rule

The top panel shows the relation between the sovereign rating and the rating of each individual bank. Ratings are converted to a numerical categories, where 22 is the highest rating (AAA) and one the lowest (default). The 45 degree line corresponds to bank-year observations in which the bank is at the sovereign bound. The area of each observation is proportional to its frequency. The bottom panel shows the relative frequency of each sovereign rating level.

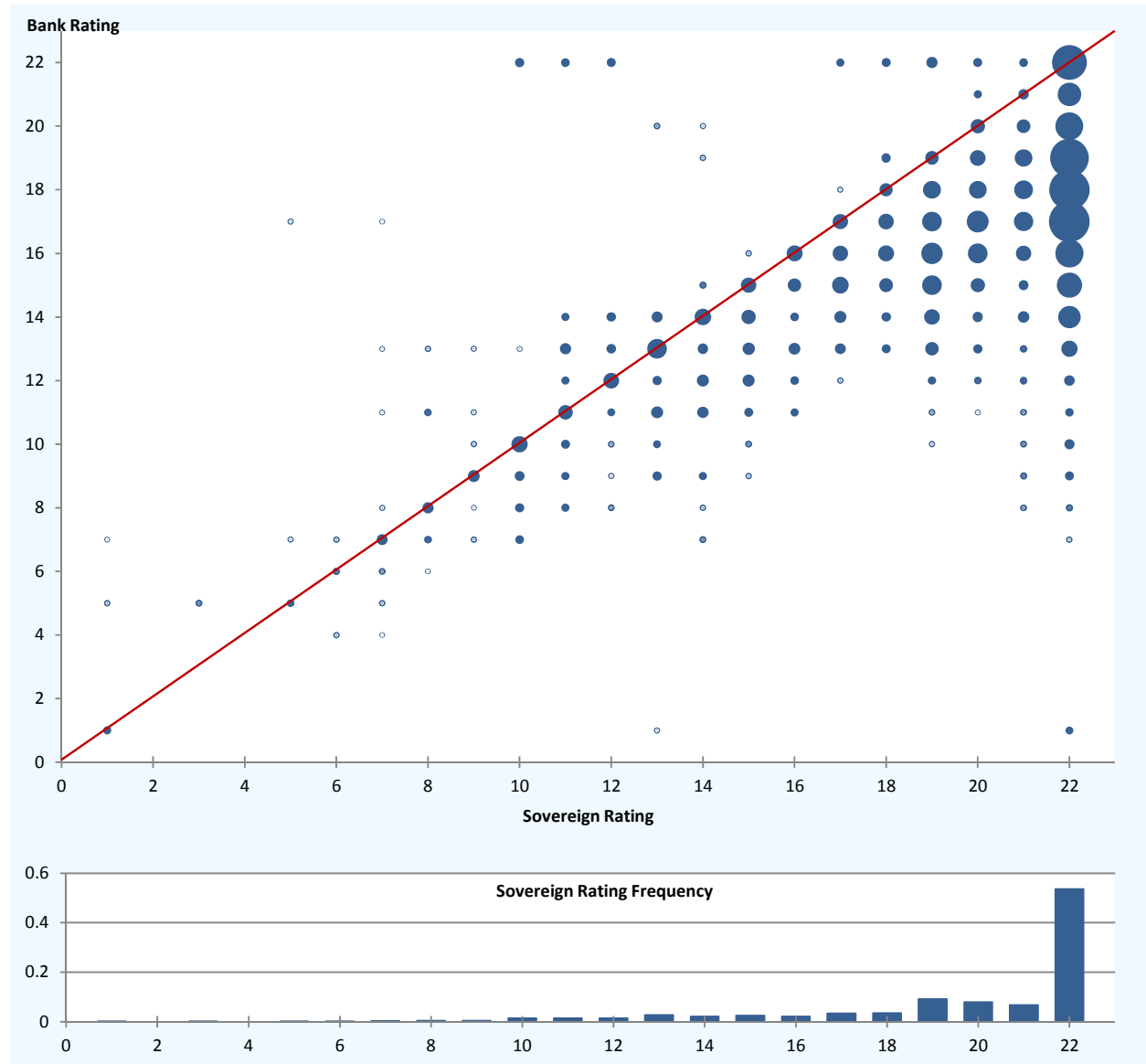


Figure 3 – Bank Rating and Sovereign Downgrade

This figure shows point estimates and 95% confidence intervals for the effect on the rating of a bank that has a rating at the sovereign bound (treated banks) relative to banks below the bound (control banks) around the sovereign downgrade. Control variables are the same as in column (1) of Table 2. Standard errors are clustered at the lender country-level.

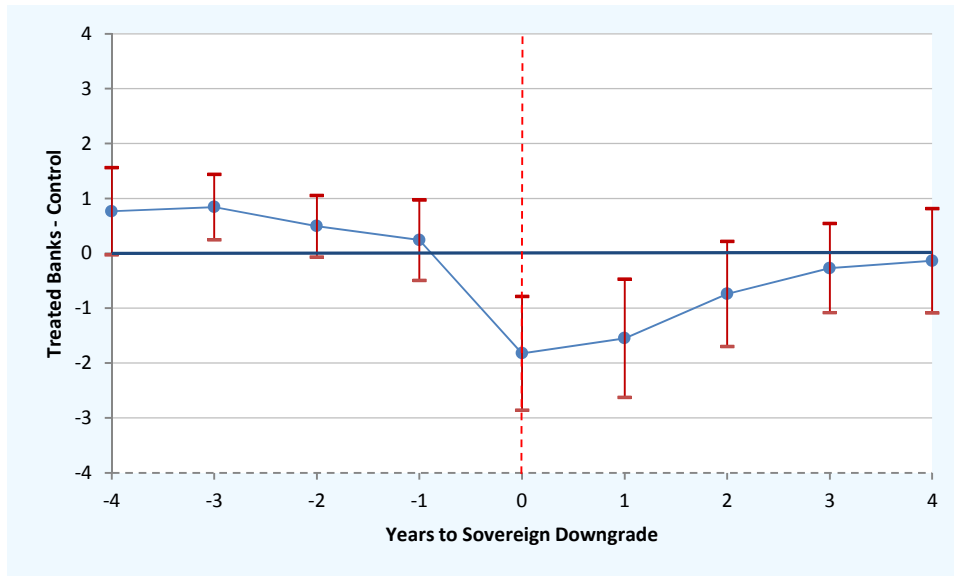
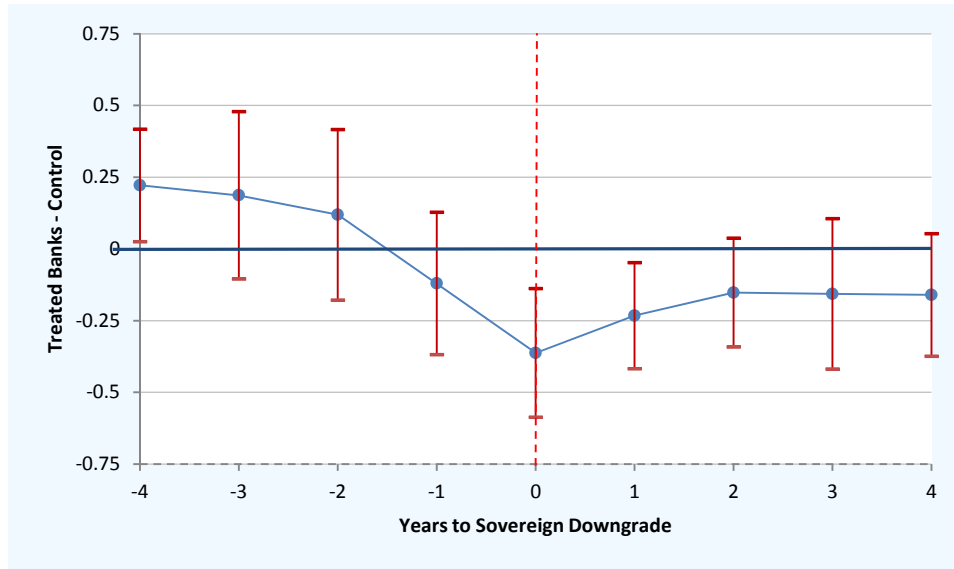


Figure 4 – Bank Lending and Sovereign Downgrade

This figure shows point estimates and 95% intervals for the effect on the total number of loans made by a bank that has a rating at the sovereign bound (treated banks) relative to banks below the bound (control banks) around the sovereign downgrade. Control variables are the same as in column (1) of Table 3. Standard errors are clustered at the lender country level.

Panel A – All Loans



Panel B – Loans to Foreign Borrowers

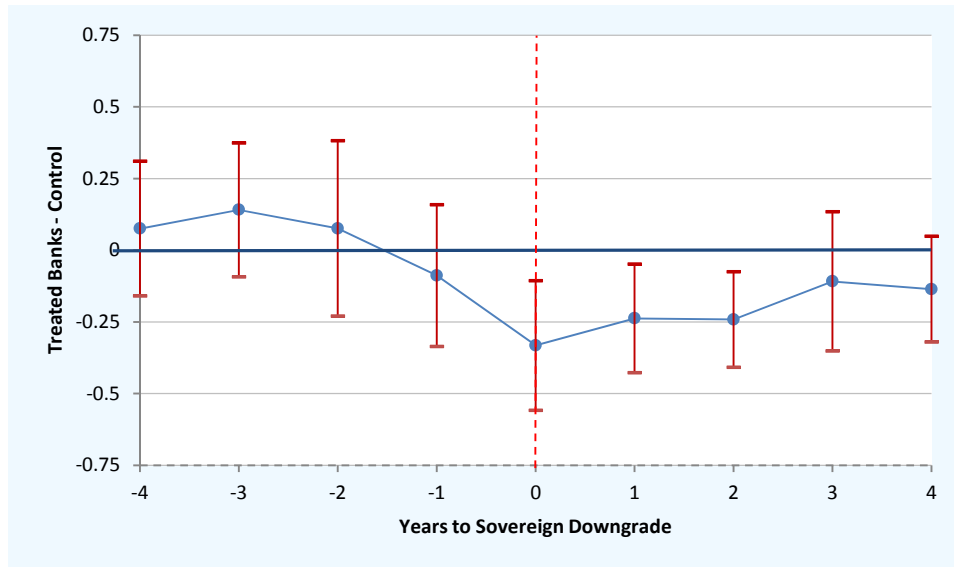


Table 1 – Summary Statistics

This table shows the mean, median, standard deviation, minimum, maximum and number of observations of variables at the lender-quarter level, except the last two in each panel (*Loan Amount* and *Loan Spread*), which are at the loan level.

Panel A – Observations with Bank Rating below the Sovereign Bound

| | Mean | Median | Standard Deviation | Minimum | Maximum | Number of Observations |
|------------------------------------------------|-------|--------|-----------------------|---------|---------|---------------------------|
| Panel A.1 - Lender-Quarter Level Variables | | | | | | |
| Lender Rating | 16.6 | 17.0 | 2.4 | 1.0 | 22.0 | 13,018 |
| Sovereign Downgrade (dummy) | 0.02 | 0.00 | 0.15 | 0.00 | 1.00 | 13,018 |
| Total Number of Loans | 59.5 | 14.0 | 114.4 | 0.0 | 1,122 | 13,018 |
| Number of Loans as Lead | 40.3 | 6.0 | 88.5 | 0.0 | 961.0 | 13,018 |
| Amount of Loans as Lead (\$ million) | 2,910 | 132 | 8,990 | 0 | 174,000 | 13,018 |
| Total Number of Loans - Foreign | 31.1 | 3.0 | 69.1 | 0.0 | 597.0 | 13,018 |
| Number of Loans as Lead - Foreign | 21.9 | 1.0 | 50.4 | 0.0 | 442.0 | 13,018 |
| Amount of Loans as Lead - Foreign (\$ million) | 1,530 | 20 | 4,660 | 0 | 56,700 | 13,018 |
| Number of Loans - Term Loans | 22.1 | 6.0 | 41.3 | 0.0 | 447 | 13,018 |
| Growth Total Number of Loans | 0.18 | 0.00 | 0.89 | -1.00 | 2.67 | 10,563 |
| Growth Number of Loans as Lead | 0.13 | 0.00 | 0.91 | -1.00 | 2.60 | 9,428 |
| Growth Amount of Loans as Lead | 0.50 | -0.03 | 1.77 | -1.00 | 6.35 | 9,426 |
| Growth Total Number of Loans - Foreign | 0.11 | -0.04 | 0.90 | -1.00 | 2.50 | 7,758 |
| Growth Number of Loans as Lead - Foreign | 0.12 | -0.04 | 0.94 | -1.00 | 2.67 | 6,944 |
| Growth Amount of Loans as Lead - Foreign | 0.42 | -0.05 | 1.59 | -1.00 | 5.55 | 6,943 |
| Size (\$ billion) | 225.3 | 65.1 | 415.8 | 0.1 | 3,065 | 13,018 |
| Profitability | 0.01 | 0.01 | 0.01 | -0.05 | 0.05 | 13,005 |
| Capital | 0.07 | 0.06 | 0.05 | 0.01 | 0.57 | 13,018 |
| Liquidity | 0.18 | 0.15 | 0.14 | 0.01 | 0.82 | 13,017 |
| Deposits | 0.69 | 0.74 | 0.19 | 0.06 | 0.95 | 13,015 |
| Too Big Too Fail (dummy) | 0.40 | 0.00 | 0.49 | 0.00 | 1.00 | 12,369 |
| State-Owned (dummy) | 0.07 | 0.00 | 0.25 | 0.00 | 1.00 | 13,018 |
| Rating Uplift | 2.01 | 1.00 | 2.49 | 0.00 | 19.00 | 7,864 |
| Government Bondholdings | 0.01 | 0.00 | 0.04 | 0.00 | 0.38 | 13,018 |
| Retail Deposits | 0.63 | 0.67 | 0.25 | 0.01 | 1.21 | 12,317 |
| Non-Deposit Short-Term Funding | 0.24 | 0.21 | 0.17 | 0.00 | 0.94 | 12,095 |
| Long-Term Funding | 0.17 | 0.11 | 0.18 | 0.00 | 0.96 | 12,762 |
| Interbank Funding | 0.16 | 0.11 | 0.15 | 0.00 | 0.98 | 10,300 |
| CDS Spread (basis points) | 128.4 | 80.4 | 190.1 | 1.2 | 3,350.0 | 3,398 |
| Equity Beta | 1.02 | 1.03 | 0.44 | -0.64 | 4.38 | 8,138 |
| Panel A.2 - Loan-Level Variables | | | | | | |
| Loan Amount (\$ million) | 514 | 161 | 1,230 | 0 | 50,000 | 861,810 |
| Loan Spread (basis points) | 178.2 | 150.0 | 133.6 | 15.0 | 687.5 | 610,100 |

Panel B – Observations with Bank Rating at the Sovereign Bound

| | Mean | Median | Standard Deviation | Minimum | Maximum | Number of Observations |
|------------------------------------------------|-------|--------|-----------------------|---------|---------|---------------------------|
| Panel B.1 - Lender-Quarter Level Variables | | | | | | |
| Lender Rating | 16.8 | 17.0 | 4.7 | 1.0 | 22.0 | 3,311 |
| Sovereign Downgrade (dummy) | 0.03 | 0.00 | 0.17 | 0.00 | 1.00 | 3,311 |
| Total Number of Loans | 17.9 | 3.0 | 48.5 | 0.0 | 470.0 | 3,311 |
| Number of Loans as Lead | 13.2 | 2.0 | 36.5 | 0.0 | 385.0 | 3,311 |
| Amount of Loans as Lead (\$ million) | 714 | 33 | 2,380 | 0 | 30,400 | 3,311 |
| Total Number of Loans - Foreign | 12.1 | 1.0 | 36.1 | 0.0 | 467.0 | 3,311 |
| Number of Loans as Lead - Foreign | 8.7 | 1.0 | 27.2 | 0.0 | 382.0 | 3,311 |
| Amount of Loans as Lead - Foreign (\$ million) | 474 | 7 | 1,820 | 0 | 28,400 | 3,311 |
| Number of Loans - Term Loans | 8.6 | 1.0 | 22.1 | 0.0 | 215.0 | 3,311 |
| Growth Total Number of Loans | 0.10 | -0.07 | 1.01 | -1.00 | 2.67 | 2,206 |
| Growth Number of Loans as Lead | 0.07 | -0.14 | 1.02 | -1.00 | 2.60 | 2,013 |
| Growth Amount of Loans as Lead | 0.51 | -0.23 | 2.01 | -1.00 | 6.35 | 2,013 |
| Growth Total Number of Loans - Foreign | 0.05 | -0.13 | 0.98 | -1.00 | 2.50 | 1,822 |
| Growth Number of Loans as Lead - Foreign | 0.04 | -0.18 | 1.03 | -1.00 | 2.67 | 1,650 |
| Growth Amount of Loans as Lead - Foreign | 0.41 | -0.27 | 1.81 | -1.00 | 5.55 | 1,650 |
| Size (\$ billion) | 130.8 | 53.8 | 212.5 | 0.5 | 1,675 | 3,311 |
| Profitability | 0.01 | 0.01 | 0.01 | -0.05 | 0.05 | 3,309 |
| Capital | 0.11 | 0.08 | 0.10 | 0.01 | 0.57 | 3,311 |
| Liquidity | 0.20 | 0.17 | 0.15 | 0.01 | 0.82 | 3,310 |
| Deposits | 0.54 | 0.63 | 0.28 | 0.06 | 0.95 | 3,308 |
| Too Big Too Fail (dummy) | 0.54 | 1.00 | 0.50 | 0.00 | 1.00 | 3,204 |
| State-Owned (dummy) | 0.33 | 0.00 | 0.47 | 0.00 | 1.00 | 3,311 |
| Rating Uplift | 1.93 | 1.00 | 2.63 | 0.00 | 14.00 | 1,572 |
| Government Bondholdings | 0.01 | 0.00 | 0.05 | 0.00 | 0.38 | 3,311 |
| Retail Deposits | 0.55 | 0.57 | 0.32 | 0.01 | 1.21 | 2,692 |
| Non-Deposit Short-Term Funding | 0.23 | 0.17 | 0.20 | 0.00 | 0.94 | 2,682 |
| Long-Term Funding | 0.31 | 0.17 | 0.31 | 0.00 | 0.96 | 3,203 |
| Interbank Funding | 0.15 | 0.08 | 0.17 | 0.00 | 0.98 | 2,672 |
| CDS Spread (basis points) | 209.3 | 108.8 | 327.7 | 3.4 | 2,494.0 | 501 |
| Equity Beta | 0.99 | 1.04 | 0.38 | -0.12 | 3.35 | 1,281 |
| Panel B.2 - Loan-Level Variables | | | | | | |
| Loan Amount (\$ million) | 453 | 125 | 1,230 | 0 | 48,500 | 68,771 |
| Loan Spread (basis points) | 207.6 | 200.0 | 146.8 | 15.0 | 687.5 | 46,427 |

Table 2 – Sovereign Downgrade and Lender Downgrade

This table shows OLS regression estimates of the effect of a sovereign downgrade on the rating of banks that have pre-downgrade rating at the sovereign bound. The dependent variable is the credit rating of the bank converted to a numeric scale (see Table A1 for details) one quarter after the sovereign downgrade. Observations are at the lender-quarter level. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---------------------------------------------------|--------------------|--------------------|--------------------|--------------------|
| Lender Rating \geq Sovereign Rating | 2.99*** (0.32) | 2.66*** (0.32) | 0.79** (0.35) | 0.80** (0.33) |
| Sovereign Downgrade | -0.91*** (0.33) | -0.53** (0.26) | -0.89*** (0.24) | -0.62*** (0.22) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -1.49** (0.59) | -1.36*** (0.42) | -1.15** (0.46) | -0.94*** (0.36) |
| Size | | 0.47*** (0.10) | | 0.87*** (0.19) |
| Profitability | | 26.11** (12.11) | | 28.36*** (6.74) |
| Capital | | 4.33*** (1.53) | | 3.30 (2.38) |
| Liquidity | | 0.44 (0.89) | | -0.56 (0.64) |
| Deposits | | -0.55 (0.62) | | 0.98** (0.47) |
| Country Macro Controls | | Y | | Y |
| Country FE | Y | Y | | |
| Quarter FE | Y | Y | Y | Y |
| Lender FE | | | Y | Y |
| Number of Observations | 20,850 | 16,329 | 20,850 | 16,329 |
| R-Squared | 0.64 | 0.72 | 0.11 | 0.30 |

Table 3 – Sovereign Downgrade and Bank Lending

This table shows OLS regression estimates of the effect of a sovereign downgrade on the log of one plus the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Columns (1)-(6) include all loans, and columns (7)-(12) include only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | All Loans | | | | | | Loans to Foreign Borrowers | | | | | |
|-----------------------------------------------|-----------------------------|-------------------|-------------------------------|-------------------|-------------------------------|--------------------|-----------------------------|-------------------|-------------------------------|-------------------|-------------------------------|--------------------|
| | Total Number of Loans (log) | | Number of Loans as Lead (log) | | Amount of Loans as Lead (log) | | Total Number of Loans (log) | | Number of Loans as Lead (log) | | Amount of Loans as Lead (log) | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Lender Rating >= Sovereign Rating | -0.06 (0.09) | -0.17** (0.08) | -0.14 (0.09) | -0.17** (0.08) | -0.43 (0.46) | -0.79 (0.49) | -0.09 (0.08) | -0.07 (0.07) | -0.13* (0.08) | -0.06 (0.06) | -0.11 (0.47) | -0.35 (0.42) |
| Sovereign Downgrade | -0.07 (0.11) | 0.01 (0.09) | -0.13 (0.11) | -0.06 (0.08) | -1.18* (0.71) | -0.57 (0.59) | -0.15** (0.07) | -0.05 (0.06) | -0.17** (0.07) | -0.07 (0.07) | -1.68*** (0.63) | -0.97 (0.64) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.31*** (0.12) | -0.26* (0.14) | -0.21** (0.09) | -0.23** (0.10) | -1.62** (0.77) | -1.76* (0.97) | -0.14 (0.09) | -0.20* (0.12) | -0.11 (0.09) | -0.19* (0.11) | -2.00*** (0.71) | -2.44*** (0.80) |
| Size | | 0.35*** (0.11) | | 0.33*** (0.12) | | 1.39* (0.74) | | 0.34*** (0.09) | | 0.30*** (0.08) | | 1.66*** (0.60) |
| Profitability | | 1.13 (2.43) | | 0.66 (2.20) | | 5.70 (11.53) | | 3.02 (1.85) | | 3.21* (1.69) | | 10.56 (9.44) |
| Capital | | 1.99*** (0.69) | | 2.15*** (0.82) | | 11.85*** (4.06) | | 1.55** (0.74) | | 1.26* (0.65) | | 11.01** (4.75) |
| Liquidity | | 0.20 (0.28) | | 0.24 (0.27) | | 2.58 (1.61) | | 0.22 (0.23) | | 0.28 (0.21) | | 3.08* (1.58) |
| Deposits | | 0.41 (0.27) | | 0.35 (0.26) | | 2.41** (1.10) | | 0.43* (0.24) | | 0.26 (0.22) | | 1.70 (1.25) |
| Country Macro Controls | | Y | | Y | | Y | | Y | | Y | | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Number of Observations | 19,877 | 15,502 | 19,877 | 15,502 | 19,877 | 15,502 | 19,877 | 15,502 | 19,877 | 15,502 | 19,877 | 15,502 |
| R-Squared | 0.29 | 0.19 | 0.26 | 0.21 | 0.08 | 0.06 | 0.18 | 0.17 | 0.19 | 0.20 | 0.08 | 0.07 |

Table 4 – Sovereign Downgrade and Growth of Bank Lending

This table shows OLS regression estimates of the effect of a sovereign downgrade on the growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured as the percentage change between the quarter prior to and two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Columns (1)-(6) include all loans, and columns (7)-(12) include only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | All Loans | | | | | | Loans to Foreign Borrowers | | | | | |
|-----------------------------------------------|-----------------------|--------------------|-------------------------|-------------------|-------------------------|-------------------|----------------------------|--------------------|-------------------------|--------------------|-------------------------|--------------------|
| | Total Number of Loans | | Number of Loans as Lead | | Amount of Loans as Lead | | Total Number of Loans | | Number of Loans as Lead | | Amount of Loans as Lead | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Lender Rating >= Sovereign Rating | -0.02 (0.03) | 0.02 (0.04) | -0.02 (0.04) | -0.02 (0.04) | 0.00 (0.06) | 0.00 (0.08) | 0.02 (0.04) | 0.04 (0.05) | 0.00 (0.04) | 0.02 (0.05) | 0.07 (0.06) | 0.07 (0.07) |
| Sovereign Downgrade | -0.08 (0.06) | -0.04 (0.06) | -0.17** (0.07) | -0.10 (0.07) | -0.36** (0.16) | -0.22 (0.16) | -0.17** (0.07) | -0.07 (0.07) | -0.30*** (0.10) | -0.19** (0.09) | -0.35** (0.16) | -0.19 (0.13) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.41*** (0.12) | -0.35*** (0.11) | -0.33*** (0.11) | -0.30** (0.12) | -0.43** (0.22) | -0.36 (0.23) | -0.37*** (0.11) | -0.32*** (0.10) | -0.32** (0.14) | -0.36*** (0.13) | -0.54*** (0.21) | -0.55*** (0.19) |
| Size | | 0.01 (0.01) | | 0.06*** (0.01) | | 0.01 (0.01) | | 0.06*** (0.01) | | 0.09*** (0.02) | | 0.07*** (0.03) |
| Profitability | | -2.44 (1.82) | | -0.23 (2.19) | | -3.12 (3.82) | | 3.06* (1.77) | | 5.31** (2.13) | | 6.85* (3.64) |
| Capital | | 0.38** (0.19) | | 0.53*** (0.20) | | 1.24*** (0.43) | | 0.16 (0.49) | | 0.29 (0.37) | | 0.74 (0.55) |
| Liquidity | | -0.03 (0.08) | | 0.13* (0.07) | | 0.24* (0.13) | | 0.28*** (0.09) | | 0.24* (0.13) | | 0.34* (0.20) |
| Deposits | | 0.17** (0.08) | | 0.01 (0.06) | | 0.00 (0.13) | | -0.03 (0.07) | | -0.09 (0.10) | | -0.19* (0.11) |
| Country Macro Controls | | Y | | Y | | Y | | Y | | Y | | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Country FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Number of Observations | 15,472 | 12,769 | 13,568 | 11,441 | 13,564 | 11,439 | 11,248 | 9,580 | 9,891 | 8,594 | 9,888 | 8,593 |
| R-Squared | 0.10 | 0.11 | 0.11 | 0.12 | 0.06 | 0.06 | 0.15 | 0.17 | 0.16 | 0.18 | 0.08 | 0.09 |

Table 5 – Sovereign Downgrade and Bank Lending – Matched Sample

Panel A shows summary statistics of treated lenders (i.e., banks that have a pre-downgrade rating at the sovereign bound) and control lenders in the matched sample. Panel B shows difference-in-differences estimates of the average treatment effect on the treated banks (ATT) using the Abadie-Imbens nearest-neighbor estimator. The dependent variables are the growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger between the quarter prior to and two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lenders are matched exactly on country and quarter, and other pre-treatment covariates include banks' size, profitability, capital, liquidity, and deposits. *, **, *** denote statistical significance at the 10, 5, and 1% levels, respectively.

Panel A – Summary Statistics

| | Mean | | Median | | Pearson χ^2 p-value | Kolmogorov- Smirnov p-value |
|---------------|--------------------|--------------------|--------------------|--------------------|-----------------------------|-----------------------------------|
| | Treated Lenders | Control Lenders | Treated Lenders | Control Lenders | | |
| Size | 11.46 (0.11) | 11.53 (0.09) | 11.18 | 11.55 | 0.46 | 0.01 |
| Profitability | 0.70 (0.09) | 0.30 (0.04) | 0.66 | 0.37 | 0.00 | 0.00 |
| Capital | 0.10 (0.01) | 0.06 (0.00) | 0.08 | 0.06 | 0.00 | 0.00 |
| Liquidity | 0.16 (0.01) | 0.12 (0.01) | 0.15 | 0.10 | 0.00 | 0.00 |
| Deposits | 0.62 (0.02) | 0.69 (0.01) | 0.62 | 0.64 | 0.14 | 0.00 |

Panel B – Difference-in-Differences Estimates

| | Growth of Bank Lending | | | | Number of Treated Lenders |
|----------------------------------------|------------------------|--------------------|-----------------------------|--------------------|---------------------------------|
| | Treated Lenders | Control Lenders | Difference-in Difference | ATT | |
| Panel B.1 - All Loans | | | | | |
| Total Number of Loans | -0.41*** (0.05) | -0.08 (0.07) | -0.32*** (0.08) | -0.27** (0.13) | 46 |
| Number of Loans As Lead | -0.45*** (0.05) | -0.24*** (0.06) | -0.21*** (0.07) | -0.51*** (0.13) | 42 |
| Amount of Loans As Lead | -0.26** (0.10) | 0.05 (0.11) | -0.32** (0.14) | -0.56*** (0.21) | 42 |
| Panel B.2 - Loans to Foreign Borrowers | | | | | |
| Total Number of Loans | -0.38*** (0.06) | 0.04 (0.09) | -0.42*** (0.11) | -0.52*** (0.18) | 34 |
| Number of Loans As Lead | -0.55*** (0.05) | -0.19** (0.08) | -0.37*** (0.10) | -0.32* (0.17) | 32 |
| Amount of Loans As Lead | -0.45*** (0.08) | 0.08 (0.13) | -0.53*** (0.16) | -0.38 (0.26) | 32 |

Table 6 – Sovereign Downgrade, Loan Amount and Spread – Loan-Level Tests

This table shows OLS regression estimates of the effect of a sovereign downgrade on the log of the loan amount and interest rate spread of banks that have a pre-downgrade rating at the sovereign bound. The effect is measured in the six-month period after the sovereign downgrade. Observations are at the loan level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Borrower controls include borrowers' size, Tobin's Q, leverage, tangibility, foreign sales, an indicator whether the borrower has a credit rating, and credit rating converted to a numeric scale. Loan controls include indicators for secured loan, senior loan, loan purpose (general purpose, debt repayment, working capital, takeover and other), term loan, dividend restrictions, and prior participant or lead arranger (whether the lender was a lead arranger or participant for the same borrower in the prior loan). Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes all loans, and Panel B includes only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – All Loans

| | Loan Amount (log) | | | Loan Spread | | |
|---------------------------------------------------|-------------------|---------|---------|-------------|---------|---------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating \geq Sovereign Rating | 0.09** | 0.05 | 0.05 | -2.38 | -1.45 | -1.80 |
| | (0.04) | (0.04) | (0.04) | (4.58) | (3.99) | (3.32) |
| Sovereign Downgrade | 0.04 | 0.06** | 0.05** | -2.98 | -4.60 | -4.46 |
| | (0.03) | (0.03) | (0.03) | (5.26) | (3.18) | (3.24) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.24*** | -0.15** | -0.13* | 45.39*** | 20.06** | 17.36** |
| | (0.06) | (0.07) | (0.07) | (12.65) | (8.59) | (8.60) |
| Lender Controls | | Y | Y | | Y | Y |
| Borrower Controls | | Y | Y | | Y | Y |
| Loan Controls | | | Y | | | Y |
| Country Macro Controls | | Y | Y | | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y |
| Lender x Borrower FE | Y | Y | Y | Y | Y | Y |
| Number of Observations | 930,581 | 368,412 | 368,412 | 657,254 | 279,259 | 279,259 |
| R-Squared | 0.88 | 0.88 | 0.88 | 0.84 | 0.85 | 0.86 |

Panel B – Loans to Foreign Borrowers

| | Loan Amount (log) | | | Loan Spread | | |
|---------------------------------------------------|-------------------|---------|---------|-------------|---------|---------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating \geq Sovereign Rating | 0.08*** | 0.07** | 0.07** | -4.42 | -3.30 | -3.49 |
| | (0.03) | (0.03) | (0.03) | (4.05) | (4.14) | (3.64) |
| Sovereign Downgrade | 0.05 | 0.01 | 0.02 | -0.03 | -1.63 | -1.14 |
| | (0.03) | (0.02) | (0.02) | (2.59) | (4.51) | (4.19) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.19*** | -0.12* | -0.11* | 2.18 | -0.80 | -2.84 |
| | (0.07) | (0.07) | (0.06) | (7.04) | (7.41) | (7.35) |
| Lender Controls | | Y | Y | | Y | Y |
| Borrower Controls | | Y | Y | | Y | Y |
| Loan Controls | | | Y | | | Y |
| Country Macro Controls | | Y | Y | | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y |
| Lender x Borrower FE | Y | Y | Y | Y | Y | Y |
| Number of Observations | 480,361 | 199,119 | 199,119 | 332,041 | 149,303 | 149,303 |
| R-Squared | 0.83 | 0.83 | 0.84 | 0.85 | 0.86 | 0.88 |

Table 7 – Sovereign Downgrade and Bank Lending – Lender-Borrower-Quarter Logit Model

This table shows logit regression estimates of the effect of a sovereign downgrade on the probability of observing a loan for banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are indicators that take the value of one if there is at least a loan as participant or lead arranger in a lender-borrower pair in each quarter. Observations are at the lender-borrower-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Borrower controls include borrowers' size, Tobin's Q, leverage, tangibility, foreign sales, an indicator whether the borrower has a credit rating, credit rating converted to a numeric scale, and prior participant or lead arranger (whether the lender was a lead arranger or participant for the same borrower in a prior loan). Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes all loans, and Panel B includes only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – All Loans

| | Total Number of Loans Dummy | | Number of Loans as Lead Dummy | |
|---------------------------------------------------|-----------------------------|-------------------|-------------------------------|-------------------|
| | (1) | (2) | (3) | (4) |
| Lender Rating \geq Sovereign Rating | 0.03 (0.02) | -0.01 (0.03) | 0.04* (0.02) | -0.01 (0.03) |
| Sovereign Downgrade | 0.01 (0.02) | -0.05* (0.03) | 0.02 (0.02) | -0.05 (0.03) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.24*** (0.07) | -0.23** (0.10) | -0.25*** (0.07) | -0.28** (0.11) |
| Lender Controls | | Y | | Y |
| Borrower Controls | | Y | | Y |
| Country Macro Controls | | Y | | Y |
| Quarter FE | Y | Y | Y | Y |
| Lender x Borrower FE | Y | Y | Y | Y |
| Number of Observations | 2,530,825 | 1,308,022 | 2,440,768 | 1,249,050 |
| R-Squared | 0.03 | 0.04 | 0.03 | 0.04 |

Panel B – Loans to Foreign Borrowers

| | Total Number of Loans Dummy | | Number of Loans as Lead Dummy | |
|---------------------------------------------------|-----------------------------|------------------|-------------------------------|------------------|
| | (1) | (2) | (3) | (4) |
| Lender Rating \geq Sovereign Rating | -0.01 (0.02) | 0.03 (0.03) | 0.01 (0.03) | 0.05 (0.04) |
| Sovereign Downgrade | -0.07** (0.03) | -0.08* (0.04) | -0.05 (0.04) | -0.06 (0.05) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.31*** (0.09) | -0.21* (0.12) | -0.33*** (0.10) | -0.25* (0.13) |
| Lender Controls | | Y | | Y |
| Borrower Controls | | Y | | Y |
| Country Macro Controls | | Y | | Y |
| Quarter FE | Y | Y | Y | Y |
| Lender x Borrower FE | Y | Y | Y | Y |
| Number of Observations | 1,301,937 | 703,414 | 1,249,009 | 669,496 |
| R-Squared | 0.04 | 0.05 | 0.04 | 0.05 |

Table 8 – Sovereign Downgrade and Bank Funding

This table shows OLS regression estimates of the effect of a sovereign downgrade on retail deposits, non-deposit short-term funding, interbank funding, and long-term funding of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured as a percentage of lagged total funding and two quarters after the sovereign downgrade, with the exception of long-term funding that is measured four quarters after the downgrade. Observations are at the lender-quarter level. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | Non-Deposit Short- | | | | | | Long-Term | |
|---------------------------------------------------|--------------------|--------------------|----------------|-------------------|--------------------|-------------------|-------------------|--------------------|
| | Retail Deposits | | Term Funding | | Interbank Funding | | Funding | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Lender Rating \geq Sovereign Rating | -0.01 (0.02) | 0.00 (0.01) | 0.00 (0.01) | 0.00 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.01 (0.01) | 0.00 (0.01) |
| Sovereign Downgrade | -0.03*** (0.01) | 0.00 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.02 (0.01) | 0.01** (0.01) | 0.02*** (0.01) | 0.01 (0.01) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | 0.00 (0.02) | -0.01 (0.02) | 0.00 (0.03) | 0.00 (0.02) | -0.05*** (0.02) | -0.04** (0.02) | -0.03** (0.01) | -0.03* (0.02) |
| Size | | -0.08*** (0.01) | | 0.04*** (0.01) | | 0.03** (0.01) | | 0.01 (0.01) |
| Profitability | | 0.12 (0.28) | | 0.56 (0.36) | | 0.92*** (0.31) | | -0.29 (0.22) |
| Capital | | 0.30** (0.15) | | 0.27 (0.20) | | 0.52* (0.29) | | -0.21** (0.10) |
| Liquidity | | -0.09** (0.04) | | 0.15** (0.06) | | 0.09* (0.05) | | -0.07** (0.03) |
| Deposits | | 0.26*** (0.03) | | 0.31*** (0.06) | | 0.27*** (0.08) | | -0.48*** (0.05) |
| Country Macro Controls | | Y | | Y | | Y | | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Number of Observations | 12,118 | 11,766 | 11,943 | 11,600 | 12,727 | 12,350 | 12,032 | 11,572 |
| R-Squared | 0.13 | 0.32 | 0.03 | 0.14 | 0.09 | 0.18 | 0.11 | 0.35 |

Table 9 – Sovereign Downgrade and Credit Default Swap Spreads

This table shows OLS regression estimates of the effect of a sovereign downgrade on credit default swap (CDS) spreads of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured as the change between the quarter prior to and two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---------------------------------------------------|--------------------|----------------------|---------------------|----------------------|
| Lender Rating \geq Sovereign Rating | -2.93 (15.28) | 1.29 (13.13) | 1.33 (37.36) | 14.21 (33.88) |
| Sovereign Downgrade | 71.25** (28.41) | 60.54*** (23.05) | 73.99*** (28.18) | 63.43*** (22.46) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | 45.02** (18.29) | 65.31** (28.95) | 44.22** (19.99) | 55.15** (27.57) |
| Size | | -0.16 (1.41) | | 13.88** (6.67) |
| Profitability | | -305.73 (1150.02) | | -416.70 (1284.15) |
| Capital | | 22.40 (74.50) | | 254.30 (207.36) |
| Liquidity | | -37.70* (20.78) | | -30.80 (38.99) |
| Deposits | | -7.42 (13.28) | | 27.56 (55.83) |
| Country Macro Controls | | Y | | Y |
| Country FE | Y | Y | | |
| Quarter FE | Y | Y | Y | Y |
| Lender FE | | | Y | Y |
| Number of Observations | 3,660 | 3,576 | 3,660 | 3,576 |
| R-Squared | 0.31 | 0.32 | 0.28 | 0.29 |

Table 10 – Excluding Too Big to Fail Banks and State-Owned Banks

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A excludes banks that are above the "too big to fail" threshold, defined as a ratio of bank liabilities to GDP above the 75th percentile of the distribution. Panel B excludes state-owned banks. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – Excluding Too Big to Fail Banks

| | Level | | | Growth | | |
|-----------------------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.24** (0.09) | -0.23** (0.11) | -1.96*** (0.72) | 0.03 (0.07) | -0.07 (0.08) | 0.10 (0.12) |
| Sovereign Downgrade | 0.15** (0.06) | 0.03 (0.06) | 0.19 (0.71) | -0.04 (0.10) | 0.01 (0.08) | -0.12 (0.16) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.35* (0.20) | -0.29** (0.15) | -2.39 (1.64) | -0.56*** (0.20) | -0.46** (0.22) | -0.29 (0.56) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 8,439 | 8,439 | 8,439 | 6,555 | 5,456 | 5,455 |
| R-Squared | 0.16 | 0.14 | 0.05 | 0.08 | 0.08 | 0.05 |

Panel B – Excluding State-Owned Banks

| | Level | | | Growth | | |
|-----------------------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.18** (0.09) | -0.18** (0.08) | -0.91* (0.52) | 0.01 (0.03) | -0.05 (0.04) | -0.06 (0.08) |
| Sovereign Downgrade | 0.05 (0.09) | -0.02 (0.07) | -0.59 (0.62) | -0.04 (0.07) | -0.11 (0.09) | -0.18 (0.18) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.31** (0.15) | -0.27*** (0.10) | -2.34** (0.99) | -0.30*** (0.10) | -0.26** (0.11) | -0.25 (0.23) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 13,728 | 13,728 | 13,728 | 11,427 | 10,194 | 10,192 |
| R-Squared | 0.21 | 0.22 | 0.06 | 0.11 | 0.12 | 0.07 |

Table 11 – Value of Government Support to Banks

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes banks with rating uplift below the median of the distribution and Panel B includes banks with rating uplift above the median. The rating uplift is the difference between the Moody's Long-Term Issuer Rating and the Bank Financial Strength Rating. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – Sample of Banks with Low Rating Uplift

| | Level | | | Growth | | |
|-----------------------------------------------|------------------|------------------|-----------------|--------------------|-------------------|-----------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number | Number of | Amount of |
| | Loans (log) | as Lead (log) | as Lead (log) | of Loans | Loans as Lead | Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.04 (0.12) | -0.09 (0.12) | 0.00 (0.84) | 0.04 (0.06) | -0.05 (0.07) | -0.26 (0.18) |
| Sovereign Downgrade | 0.17 (0.15) | 0.11 (0.13) | -0.07 (1.09) | 0.31* (0.16) | 0.17 (0.13) | 0.20 (0.37) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.44* (0.26) | -0.40* (0.24) | -1.36 (2.10) | -0.70*** (0.20) | -0.50** (0.25) | -0.49 (0.54) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 4,980 | 4,980 | 4,980 | 4,273 | 3,810 | 3,809 |
| R-Squared | 0.19 | 0.19 | 0.05 | 0.14 | 0.14 | 0.07 |

Panel B – Sample of Banks with High Rating Uplift

| | Level | | | Growth | | |
|-----------------------------------------------|------------------|--------------------|-------------------|-----------------|--------------------|--------------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number | Number of | Amount of |
| | Loans (log) | as Lead (log) | as Lead (log) | of Loans | Loans as Lead | Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.16* (0.09) | -0.21** (0.08) | -1.03* (0.60) | 0.01 (0.04) | -0.01 (0.04) | 0.10 (0.10) |
| Sovereign Downgrade | -0.14* (0.08) | -0.19*** (0.06) | -0.76 (0.52) | -0.12 (0.11) | -0.25*** (0.09) | -0.26 (0.24) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.30* (0.16) | -0.17 (0.15) | -2.90** (1.29) | -0.23 (0.15) | -0.27** (0.14) | -0.59*** (0.18) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 3,970 | 3,970 | 3,970 | 3,438 | 3,223 | 3,222 |
| R-Squared | 0.21 | 0.20 | 0.09 | 0.13 | 0.16 | 0.07 |

Table 12 – Placebo Test – Banking Crises without Sovereign Downgrade

This table shows OLS regression estimates of the effect of banking crisis without a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. The treatment is defined as a banking crisis without a sovereign downgrade during the last four quarters. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes all loans, and Panel B includes only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – All Loans

| | Level | | | Growth | | |
|-----------------------------------------------|-----------------|-----------------|-----------------|--------------|---------------|---------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number | Number of | Amount of |
| | Loans (log) | as Lead (log) | as Lead (log) | of Loans | Loans as Lead | Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.21** | -0.20** | -0.93* | 0.03 | -0.01 | -0.01 |
| | (0.09) | (0.08) | (0.48) | (0.03) | (0.04) | (0.08) |
| Sovereign Downgrade | -0.17 | -0.06 | 0.71 | 0.33* | 0.41*** | 0.37 |
| | (0.16) | (0.13) | (0.79) | (0.17) | (0.11) | (0.24) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | 0.35*** | 0.28*** | 1.08 | -0.08 | -0.10 | 0.11 |
| | (0.11) | (0.09) | (0.94) | (0.07) | (0.06) | (0.11) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 12,769 | 11,441 | 11,439 |
| R-Squared | 0.20 | 0.21 | 0.06 | 0.11 | 0.12 | 0.07 |

Panel B – Loans to Foreign Borrowers

| | Level | | | Growth | | |
|-----------------------------------------------|-----------------|-----------------|-----------------|--------------|---------------|---------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number | Number of | Amount of |
| | Loans (log) | as Lead (log) | as Lead (log) | of Loans | Loans as Lead | Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.09 | -0.08 | -0.42 | 0.04 | 0.02 | 0.05 |
| | (0.07) | (0.06) | (0.43) | (0.05) | (0.05) | (0.07) |
| Sovereign Downgrade | -0.05 | -0.06 | 0.69 | 0.27** | 0.32*** | 0.15 |
| | (0.10) | (0.10) | (0.80) | (0.12) | (0.12) | (0.23) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | 0.09 | 0.13 | 0.01 | -0.06 | -0.06 | 0.08 |
| | (0.11) | (0.10) | (0.88) | (0.07) | (0.06) | (0.11) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 9,580 | 8,594 | 8,593 |
| R-Squared | 0.17 | 0.20 | 0.07 | 0.17 | 0.18 | 0.09 |

Table 13 – Government Bondholding Controls

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, deposits, and holdings of government debt (defined as financial institutions' holdings of government debt relative to their total assets). Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | Level | | | Growth | | |
|-----------------------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.17** (0.09) | -0.17** (0.08) | -0.80 (0.50) | 0.03 (0.04) | -0.02 (0.04) | 0.01 (0.08) |
| Sovereign Downgrade | -0.02 (0.09) | -0.07 (0.09) | -0.46 (0.68) | -0.06 (0.07) | -0.12 (0.07) | -0.21 (0.18) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.24* (0.13) | -0.21** (0.09) | -1.77* (1.02) | -0.34*** (0.11) | -0.30** (0.12) | -0.35 (0.22) |
| Government Bondholdings | -0.04 (0.40) | 0.03 (0.49) | 0.91 (2.85) | 0.42 (0.33) | 0.34 (0.40) | 0.33 (0.71) |
| Government Bondholdings x Sovereign Downgrade | 1.41** (0.71) | 0.45 (0.92) | -6.43 (11.37) | 0.65 (0.91) | 0.78 (0.70) | -0.92 (0.91) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 12,769 | 11,441 | 11,439 |
| R-Squared | 0.19 | 0.21 | 0.06 | 0.11 | 0.12 | 0.07 |

**Internet Appendix to
“Bank Ratings and Lending Supply:
Evidence from Sovereign Downgrades”**

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Table A1 – S&P Credit Ratings Conversion to a Numerical Scale

This table shows the conversion of S&P credit rating notations into numerical rating categories.

| Numerical Rating | Rating Notation |
|------------------|-----------------|
| 22 | AAA |
| 21 | AA+ |
| 20 | AA |
| 19 | AA- |
| 18 | A+ |
| 17 | A |
| 16 | A- |
| 15 | BBB+ |
| 14 | BBB |
| 13 | BBB- |
| 12 | BB+ |
| 11 | BB |
| 10 | BB- |
| 9 | B+ |
| 8 | B |
| 7 | B- |
| 6 | CCC+ |
| 5 | CCC |
| 4 | CCC- |
| 3 | CC |
| 2 | C |
| 1 | SD/D |

Table A2 – Sovereign Downgrades in the Sample of Banks at the Sovereign Bound

This table shows the number of banks by country and year that have a pre-downgrade rating at the sovereign bound when a country is downgraded.

| | 1989 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2005 | 2006 | 2008 | 2009 | 2010 | 2011 | 2012 | Total |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Argentina | | | | | 2 | 8 | | | | | | | | | 1 | 11 |
| Australia | 1 | | | | | | | | | | | | | | | 1 |
| Brazil | | | | 1 | | | 3 | | | | | | | | | 4 |
| China | | | | 2 | | | | | | | | | | | | 2 |
| Egypt | | | | | | | 2 | | | | | | | 6 | 7 | 15 |
| France | | | | | | | | | | | | | | | 2 | 2 |
| Greece | | | | | | | | | | | | | 1 | 5 | 4 | 10 |
| Hungary | | | | | | | | | | | 1 | 1 | | 1 | 1 | 4 |
| Indonesia | | | 1 | | 1 | 2 | 2 | | | | | | | | | 6 |
| India | | | 1 | | | | | | | | | | | | | 1 |
| Italy | | | | | | | | | | 1 | | | | 4 | 5 | 10 |
| Japan | | | | | | 3 | 3 | | | | | | | 1 | | 7 |
| Korea, Republic of | | 2 | | | | | | | | | | | | | | 2 |
| Lebanon | | | | | 1 | 1 | 1 | | | | 1 | | | | | 4 |
| Malaysia | | 1 | 1 | | | | | | | | | | | | | 2 |
| Panama | | | | | | 2 | | | | | | | | | | 2 |
| Philippines | | | | | | | | 1 | 1 | | | | | | | 2 |
| Portugal | | | | | | | | | | | | 1 | 1 | 3 | | 5 |
| Russian Federation | | | | | | | | | | | 2 | | | | | 2 |
| South Africa | | | | | | | | | | | | | | | 2 | 2 |
| Spain | | | | | | | | | | | | | | 2 | 5 | 7 |
| Thailand | | | 1 | | | | | | | | | | | | | 1 |
| Turkey | | | | | | 5 | | | | | | | | | | 5 |
| United States | | | | | | | | | | | | | | 1 | | 1 |
| Venezuela | | | | 1 | | | 1 | | | | | | | | | 2 |
| Total | 1 | 3 | 4 | 4 | 4 | 21 | 12 | 1 | 1 | 1 | 4 | 2 | 2 | 23 | 27 | 110 |

Table A3 – List of Treated Banks

This table shows a list of treated banks, defined as banks that have a pre-downgrade rating at the sovereign bound when a country is downgraded.

| Bank Name | Country | Number of Observations | Rating Before Sov. Downgrade (average) | Rating After Sov. Downgrade (average) |
|----------------------------------------------------|---------------|------------------------|----------------------------------------|---------------------------------------|
| Banco de Galicia | Argentina | 5 | 9.0 | 3.6 |
| Banco de Galicia y Buenos Aires | Argentina | 6 | 8.8 | 5.8 |
| State Bank of New South Wales | Australia | 1 | 21.0 | 21.0 |
| Banco do Brasil | Brazil | 1 | 10.0 | 9.0 |
| Uniao de Bancos Brasileiros SA | Brazil | 2 | 10.0 | 9.0 |
| Votorantim Participacoes SA | Brazil | 1 | 10.0 | 9.0 |
| China Development Bank [CDB] | China | 1 | 15.0 | 14.0 |
| Export-Import Bank of China [China Eximbank] | China | 1 | 15.0 | 14.0 |
| African Export-Import Bank [Afreximbank] | Egypt | 4 | 13.0 | 12.3 |
| Banque Misr SAE | Egypt | 1 | 8.0 | 13.0 |
| Commercial International Bank (Egypt) SAE | Egypt | 5 | 10.6 | 11.4 |
| National Bank of Egypt SAE [NBE] | Egypt | 5 | 10.6 | 11.4 |
| Agence Francaise de Development [AFD] | France | 1 | 22.0 | 21.0 |
| Caisse des Depots et Consignations | France | 1 | 22.0 | 21.0 |
| Alpha Bank AE | Greece | 2 | 5.0 | 5.0 |
| Black Sea Trade & Development Bank [BSTDB] | Greece | 2 | 17.0 | 17.0 |
| National Bank of Greece SA | Greece | 4 | 9.3 | 6.8 |
| Piraeus Bank SA | Greece | 2 | 5.0 | 5.0 |
| OTP Bank Rt [National Savings & Commercial Bank] | Hungary | 4 | 13.5 | 12.3 |
| Bank of Baroda | India | 1 | 12.0 | 11.0 |
| Bank Indonesia | Indonesia | 4 | 6.0 | 4.8 |
| Bank Internasional Indonesia | Indonesia | 1 | 12.0 | 4.0 |
| PT Bank Mandiri Persero | Indonesia | 1 | 7.0 | 7.0 |
| Cassa Depositi e Prestiti SpA [CDP] | Italy | 2 | 17.5 | 15.0 |
| Cassa di Risparmio di Parma e Piacenza | Italy | 2 | 17.5 | 15.0 |
| Intesa Sanpaolo SpA [ISP] | Italy | 2 | 17.5 | 15.0 |
| Mediobanca SpA | Italy | 3 | 18.0 | 16.3 |
| UniCredit | Italy | 1 | 17.0 | 15.0 |
| Development Bank of Japan Inc | Japan | 1 | 20.0 | 19.0 |
| Japan Bank for International Cooperation | Japan | 2 | 20.5 | 19.0 |
| Toyota Financial Services Corp | Japan | 4 | 21.5 | 21.3 |
| Export-Import Bank of Korea | Korea (South) | 1 | 19.0 | 12.0 |
| Korea Development Bank | Korea (South) | 1 | 19.0 | 12.0 |
| Banque Audi SAL | Lebanon | 4 | 8.5 | 7.8 |
| Malayan Banking Bhd | Malaysia | 2 | 17.0 | 14.5 |
| Banco General SA | Panama | 1 | 13.0 | 13.0 |
| Bladex [Banco Latinoamericano de Exportaciones SA] | Panama | 1 | 14.0 | 13.0 |
| Asian Development Bank | Philippines | 2 | 22.0 | 22.0 |
| Banco BPI SA | Portugal | 1 | 16.0 | 13.0 |
| Banco Espirito Santo SA [BES] | Portugal | 1 | 16.0 | 13.0 |
| Caixa Geral de Depositos SA [CGD] | Portugal | 3 | 17.7 | 15.7 |
| Vnesheconombank [VEB] | Russia | 1 | 15.0 | 14.0 |
| VTB Bank JSC | Russia | 1 | 15.0 | 14.0 |
| FirstRand Bank Ltd [FRB] | South Africa | 1 | 15.0 | 19.0 |
| Standard Bank Group Ltd | South Africa | 1 | 15.0 | 18.0 |
| Banco Bilbao Vizcaya Argentaria SA [BBVA] | Spain | 3 | 17.3 | 15.0 |
| Banco Santander SA | Spain | 4 | 18.3 | 16.3 |
| Bangkok Bank Public Co Ltd | Thailand | 1 | 14.0 | 12.0 |
| Dogus Holding AS | Turkey | 2 | 8.5 | 7.0 |
| TC Ziraat Bankasi AS | Turkey | 1 | 9.0 | 6.0 |
| Turkiye Is Bankasi AS [Isbank] | Turkey | 2 | 8.5 | 7.0 |
| Inter-American Development Bank | USA | 1 | 22.0 | 22.0 |
| Banco Mercantil CA | Venezuela | 2 | 11.0 | 13.5 |
| Total | | 110 | 14.2 | 12.9 |

Table A4 – Sovereign Downgrade and Lender Downgrade – Clustering by Country and Quarter

This table shows OLS regression estimates of the effect of a sovereign downgrade on the rating of banks that have pre-downgrade rating at the sovereign bound. The dependent variable is the credit rating of the bank converted to a numeric scale (see Table A1 for details) one quarter after the downgrade. Observations are at the lender-quarter level. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Standard errors are clustered at the quarter and lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---------------------------------------------------|----------|----------|----------|----------|
| Lender Rating \geq Sovereign Rating | 2.99*** | 2.66*** | 0.79** | 0.80** |
| | (0.32) | (0.32) | (0.35) | (0.33) |
| Sovereign Downgrade | -0.91** | -0.53* | -0.89*** | -0.62** |
| | (0.35) | (0.30) | (0.27) | (0.25) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -1.49*** | -1.36*** | -1.15*** | -0.94*** |
| | (0.57) | (0.45) | (0.42) | (0.35) |
| Size | | 0.47*** | | 0.87*** |
| | | (0.10) | | (0.19) |
| Profitability | | 26.11** | | 28.36*** |
| | | (11.96) | | (6.89) |
| Capital | | 4.33*** | | 3.30 |
| | | (1.53) | | (2.37) |
| Liquidity | | 0.44 | | -0.56 |
| | | (0.88) | | (0.63) |
| Deposits | | -0.55 | | 0.98** |
| | | (0.62) | | (0.47) |
| Country Macro Controls | | Y | | Y |
| Country FE | Y | Y | | |
| Quarter FE | Y | Y | Y | Y |
| Lender FE | | | Y | Y |
| Number of Observations | 20,850 | 16,329 | 20,850 | 16,329 |
| R-Squared | 0.64 | 0.72 | 0.86 | 0.89 |

Table A5 – Sovereign Downgrade and Lender Downgrade – Logit Model

This table shows logit regression estimates of the effect of a sovereign downgrade on the probability of a rating downgrade for banks that have pre-downgrade rating at the sovereign bound. The dependent variable is an indicator that takes the value of one if the bank suffers a downgrade. Observations are at the lender-borrower-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | (1) | (2) | (3) | (4) |
|---------------------------------------------------|--------------------|---------------------|-------------------|---------------------|
| Lender Rating \geq Sovereign Rating | -0.56*** (0.21) | -0.79*** (0.28) | 0.23 (0.21) | 0.60** (0.25) |
| Sovereign Downgrade | 2.84*** (0.34) | 2.10*** (0.35) | 2.45*** (0.15) | 1.94*** (0.18) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | 4.01*** (0.78) | 5.68*** (1.17) | 2.93*** (0.37) | 3.78*** (0.55) |
| Size | | 0.20*** (0.05) | | 0.44*** (0.15) |
| Profitability | | -35.17*** (8.78) | | -28.93*** (5.86) |
| Capital | | -1.16 (1.93) | | 1.07 (3.26) |
| Liquidity | | -0.55 (0.40) | | -0.41 (0.79) |
| Deposits | | -0.60 (0.42) | | 1.06 (0.76) |
| Country Macro Controls | | Y | | Y |
| Country FE | Y | Y | | |
| Quarter FE | Y | Y | Y | Y |
| Lender FE | | | Y | Y |
| Number of Observations | 17,372 | 12,962 | 15,219 | 11,545 |
| R-Squared | 0.25 | 0.37 | 0.14 | 0.29 |

Table A6 – Two-Stage Least Squares

This table shows two-stage least squares estimates of the effect of bank ratings on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The first stage dependent variable is the lender rating (converted to a numerical scale) and the instrument is the interaction between the sovereign downgrade dummy and the dummy for banks that have a pre-downgrade rating at the sovereign bound. The second stage dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes all loans, and Panel B includes only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – All Loans

| | Level | | | Growth | | |
|-----------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.37** (0.15) | -0.34*** (0.13) | -2.16** (1.03) | -0.48** (0.22) | -0.47** (0.21) | -0.53 (0.37) |
| Sovereign Downgrade | 0.17 (0.17) | 0.08 (0.13) | 0.48 (1.03) | 0.06 (0.10) | 0.00 (0.09) | -0.11 (0.19) |
| Lender Rating | 0.27* (0.16) | 0.23* (0.13) | 1.79* (1.08) | 0.19** (0.08) | 0.18** (0.08) | 0.22* (0.13) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 12,769 | 11,441 | 11,439 |
| R-Squared | 0.83 | 0.83 | 0.55 | 0.00 | 0.05 | 0.04 |

Panel B – Loans to Foreign Borrowers

| | Level | | | Growth | | |
|-----------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.22* (0.13) | -0.21* (0.13) | -2.25* (1.30) | -0.38* (0.21) | -0.45** (0.22) | -0.65** (0.31) |
| Sovereign Downgrade | 0.07 (0.12) | 0.04 (0.12) | 0.49 (1.10) | 0.01 (0.08) | -0.10 (0.10) | -0.05 (0.12) |
| Lender Rating | 0.22* (0.13) | 0.19 (0.13) | 2.45* (1.27) | 0.16** (0.08) | 0.18** (0.08) | 0.28** (0.11) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 9,580 | 8,594 | 8,593 |
| R-Squared | 0.86 | 0.85 | 0.64 | 0.11 | 0.11 | 0.04 |

Table A7 – Sovereign Downgrade and Growth of Bank Lending – Lender Fixed Effects

This table shows OLS regression estimates of the effect of a sovereign downgrade on the growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured as the percentage change between the quarter prior to and two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Columns (1)-(6) include all loans, and columns (7)-(12) include only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | All Loans | | | | | | Loans to Foreign Borrowers | | | | | |
|-----------------------------------------------|-----------------------|--------------------|-------------------------|--------------------|-------------------------|------------------|----------------------------|--------------------|-------------------------|--------------------|-------------------------|-------------------|
| | Total Number of Loans | | Number of Loans as Lead | | Amount of Loans as Lead | | Total Number of Loans | | Number of Loans as Lead | | Amount of Loans as Lead | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Lender Rating >= Sovereign Rating | -0.01 (0.05) | -0.03 (0.04) | -0.02 (0.04) | -0.05 (0.04) | -0.07 (0.11) | -0.10 (0.11) | 0.02 (0.04) | -0.03 (0.04) | 0.00 (0.04) | -0.04 (0.04) | -0.04 (0.08) | -0.10 (0.09) |
| Sovereign Downgrade | -0.07 (0.07) | -0.04 (0.07) | -0.16** (0.07) | -0.11 (0.07) | -0.37** (0.16) | -0.25 (0.16) | -0.15** (0.07) | -0.09 (0.08) | -0.25*** (0.07) | -0.17* (0.09) | -0.32** (0.15) | -0.19 (0.14) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.44*** (0.10) | -0.35*** (0.10) | -0.39*** (0.10) | -0.34*** (0.12) | -0.44** (0.22) | -0.36* (0.21) | -0.44*** (0.10) | -0.35*** (0.10) | -0.46*** (0.12) | -0.43*** (0.14) | -0.66*** (0.24) | -0.60** (0.24) |
| Size | | -0.02 (0.03) | | 0.03 (0.05) | | 0.02 (0.10) | | -0.01 (0.03) | | 0.02 (0.04) | | 0.06 (0.08) |
| Profitability | | -3.17 (2.23) | | -1.31 (2.66) | | -5.02 (4.26) | | 3.48** (1.56) | | 6.51*** (2.27) | | 8.00** (3.94) |
| Capital | | 0.55 (0.35) | | 0.89 (0.56) | | 1.81 (1.14) | | 0.16 (0.55) | | -0.28 (0.64) | | 0.69 (1.04) |
| Liquidity | | 0.13 (0.12) | | 0.06 (0.17) | | 0.43 (0.30) | | 0.37** (0.15) | | 0.42** (0.19) | | 0.89*** (0.32) |
| Deposits | | 0.24*** (0.07) | | 0.21** (0.09) | | 0.39* (0.22) | | 0.07 (0.09) | | -0.05 (0.14) | | -0.03 (0.21) |
| Country Macro Controls | | Y | | Y | | Y | | Y | | Y | | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Number of Observations | 15,472 | 12,769 | 13,568 | 11,441 | 13,564 | 11,439 | 11,248 | 9,580 | 9,891 | 8,594 | 9,888 | 8,593 |
| R-Squared | 0.10 | 0.10 | 0.10 | 0.11 | 0.05 | 0.05 | 0.14 | 0.15 | 0.14 | 0.15 | 0.07 | 0.08 |

Table A8 – Two-Way Clustered Standard Errors by Country and Quarter

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes all loans, and Panel B includes only loans in which the lender and borrower are from different countries. Standard errors are clustered at the quarter and lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – All Loans

| | Level | | | Growth | | |
|-----------------------------------------------|-----------------|-----------------|-----------------|--------------|---------------|---------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number | Number of | Amount of |
| | Loans (log) | as Lead (log) | as Lead (log) | of Loans | Loans as Lead | Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.17** | -0.17** | -0.79 | 0.01 | -0.03 | 0.02 |
| | (0.09) | (0.08) | (0.48) | (0.04) | (0.04) | (0.08) |
| Sovereign Downgrade | 0.01 | -0.06 | -0.57 | -0.03 | -0.06 | -0.13 |
| | (0.07) | (0.06) | (0.58) | (0.08) | (0.08) | (0.18) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.26* | -0.23** | -1.76 | -0.38*** | -0.32*** | -0.40 |
| | (0.15) | (0.11) | (1.17) | (0.14) | (0.12) | (0.26) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 12,769 | 11,441 | 11,439 |
| R-Squared | 0.84 | 0.84 | 0.56 | 0.10 | 0.11 | 0.06 |

Panel B – Loans to Foreign Borrowers

| | Level | | | Growth | | |
|-----------------------------------------------|-----------------|-----------------|-----------------|--------------|---------------|---------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number | Number of | Amount of |
| | Loans (log) | as Lead (log) | as Lead (log) | of Loans | Loans as Lead | Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.07 | -0.06 | -0.35 | 0.02 | 0.00 | 0.06 |
| | (0.07) | (0.06) | (0.41) | (0.04) | (0.04) | (0.06) |
| Sovereign Downgrade | -0.05 | -0.07 | -0.97 | -0.03 | -0.15 | -0.12 |
| | (0.06) | (0.06) | (0.65) | (0.08) | (0.10) | (0.12) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.20* | -0.19* | -2.44*** | -0.28*** | -0.32** | -0.48*** |
| | (0.12) | (0.10) | (0.58) | (0.10) | (0.14) | (0.18) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 9,580 | 8,594 | 8,593 |
| R-Squared | 0.86 | 0.86 | 0.68 | 0.15 | 0.16 | 0.08 |

Table A9 – Sample of Term Loans

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The sample is restricted to term loans. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes all loans, and Panel B includes only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – All Loans

| | Level | | | Growth | | |
|-----------------------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.10 (0.08) | -0.08 (0.08) | -0.44 (0.54) | -0.02 (0.04) | -0.04 (0.05) | -0.09 (0.07) |
| Sovereign Downgrade | 0.01 (0.08) | -0.04 (0.07) | -0.52 (0.60) | -0.03 (0.07) | -0.04 (0.08) | 0.03 (0.20) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.26** (0.12) | -0.19** (0.09) | -2.08*** (0.77) | -0.37*** (0.09) | -0.39*** (0.09) | -0.65*** (0.19) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 11,565 | 9,926 | 9,995 |
| R-Squared | 0.23 | 0.23 | 0.08 | 0.09 | 0.11 | 0.05 |

Panel B – Loans to Foreign Borrowers

| | Level | | | Growth | | |
|-----------------------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating >= Sovereign Rating | -0.03 (0.06) | -0.01 (0.05) | -0.02 (0.49) | 0.01 (0.05) | 0.02 (0.05) | 0.05 (0.06) |
| Sovereign Downgrade | -0.05 (0.06) | -0.06 (0.06) | -0.64 (0.66) | -0.06 (0.08) | -0.22** (0.09) | -0.19 (0.19) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.18* (0.10) | -0.13 (0.09) | -1.75** (0.80) | -0.38*** (0.12) | -0.27** (0.11) | -0.59*** (0.21) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 15,502 | 15,502 | 15,502 | 8,349 | 7,493 | 7,560 |
| R-Squared | 0.18 | 0.20 | 0.08 | 0.15 | 0.16 | 0.07 |

Table A10 – Sample Excluding 2011-2012

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level and includes only loans made before 2011. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes all loans, and Panel B includes only loans in which the lender and borrower are from different countries. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – All Loans

| | Level | | | Growth | | |
|---------------------------------------------------|-------------------|-------------------|-----------------|-------------------|------------------|-------------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number | Number of | Amount of |
| | Loans (log) | as Lead (log) | as Lead (log) | of Loans | Loans as Lead | Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating \geq Sovereign Rating | -0.17** (0.09) | -0.16** (0.08) | -0.68 (0.49) | 0.02 (0.04) | 0.00 (0.05) | 0.02 (0.08) |
| Sovereign Downgrade | -0.07 (0.10) | -0.16* (0.10) | -0.82 (0.83) | -0.18** (0.09) | -0.22* (0.11) | -0.57** (0.23) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.18 (0.17) | -0.19 (0.15) | -1.83 (1.50) | -0.26* (0.14) | -0.21 (0.18) | 0.02 (0.35) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 13,926 | 13,926 | 13,926 | 11,449 | 10,237 | 10,235 |
| R-Squared | 0.20 | 0.22 | 0.06 | 0.12 | 0.13 | 0.06 |

Panel B – Loans to Foreign Borrowers

| | Level | | | Growth | | |
|---------------------------------------------------|-----------------|-----------------|------------------|--------------------|--------------------|--------------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number | Number of | Amount of |
| | Loans (log) | as Lead (log) | as Lead (log) | of Loans | Loans as Lead | Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating \geq Sovereign Rating | -0.08 (0.07) | -0.06 (0.06) | -0.22 (0.42) | 0.05 (0.05) | 0.04 (0.06) | 0.09 (0.07) |
| Sovereign Downgrade | -0.08 (0.08) | -0.07 (0.09) | -0.65 (0.72) | -0.09 (0.11) | -0.16 (0.13) | -0.10 (0.20) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.14 (0.16) | -0.20 (0.14) | -2.36* (1.22) | -0.37*** (0.14) | -0.45*** (0.16) | -0.66*** (0.24) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 13,926 | 13,926 | 13,926 | 8,570 | 7,690 | 7,689 |
| R-Squared | 0.18 | 0.21 | 0.07 | 0.18 | 0.18 | 0.09 |

Table A11 – Sovereign Downgrade, Loan Amount and Spread – Loan-Level Tests Excluding Financials and Public Administration

This table shows OLS regression estimates of the effect of a sovereign downgrade on the log of the loan amount and interest rate spread of banks that have a pre-downgrade rating at the sovereign bound. The effect is measured in the six-month period after the sovereign downgrade. Observations are at the loan level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Borrower controls include borrowers' size, Tobin's Q, leverage, tangibility, foreign sales, an indicator whether it has a credit rating, and credit rating converted to a numeric scale. Loan controls include indicators for secured loan, senior loan, loan purpose (general purpose, debt repayment, working capital, takeover and other), term loan, dividend restrictions, and prior participant or lead arranger (whether the lender was a lead arranger or participant for the same borrower in the prior loan). Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes all loans, and Panel B includes only loans in which the lender and borrower are from different countries. The sample excludes loans taken by borrowers from the financial (SIC 6000-6999) and public sectors (SIC 9000-9999). Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | Loan Amount (log) | | | Loan Spread | | |
|---------------------------------------------------|-------------------|---------|---------|-------------|---------|---------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating \geq Sovereign Rating | 0.08** | 0.04 | 0.05 | -0.40 | -0.85 | -1.15 |
| | (0.04) | (0.04) | (0.04) | (5.44) | (4.42) | (3.67) |
| Sovereign Downgrade | 0.03 | 0.05 | 0.04 | -3.11 | -6.84** | -6.48** |
| | (0.03) | (0.03) | (0.03) | (5.22) | (3.10) | (3.12) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.26*** | -0.18** | -0.15** | 46.72*** | 24.10** | 21.70** |
| | (0.07) | (0.07) | (0.07) | (13.31) | (10.06) | (10.36) |
| Lender Controls | | Y | Y | | Y | Y |
| Borrower Controls | | Y | Y | | Y | Y |
| Loan Controls | | | Y | | | Y |
| Country Macro Controls | | Y | Y | | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y |
| Lender x Borrower FE | Y | Y | Y | Y | Y | Y |
| Number of Observations | 747,752 | 311,341 | 311,341 | 544,051 | 243,160 | 243,160 |
| R-Squared | 0.89 | 0.89 | 0.89 | 0.83 | 0.84 | 0.86 |

Table A12 – Matched Sample Including State Ownership as Covariate

Panel A shows summary statistics of treated lenders (banks that have a pre-downgrade rating at the sovereign bound) and control lenders in the matched sample. Panel B shows difference-in-differences estimates of the average treatment effect on the treated banks (ATT) using the Abadie-Imbens nearest-neighbor estimator. The dependent variables are the growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger between the quarter prior to and two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lenders are matched exactly on country, quarter and dummy variable for state-owned banks, and other pre-treatment covariates include banks' size, profitability, capital, liquidity, deposits. *, **, *** denote statistical significance at the 10, 5, and 1% levels, respectively.

Panel A – Summary Statistics

| | Mean | | Median | | Pearson χ^2 p-value | Kolmogorov- Smirnov p-value |
|---------------|--------------------|--------------------|--------------------|--------------------|-----------------------------|-----------------------------------|
| | Treated Lenders | Control Lenders | Treated Lenders | Control Lenders | | |
| Size | 11.46 (0.11) | 11.29 (0.10) | 11.18 | 11.47 | 0.60 | 0.07 |
| Profitability | 0.70 (0.09) | 0.26 (0.05) | 0.66 | 0.30 | 0.00 | 0.00 |
| Capital | 0.10 (0.01) | 0.07 (0.00) | 0.08 | 0.07 | 0.00 | 0.00 |
| Liquidity | 0.16 (0.01) | 0.13 (0.01) | 0.15 | 0.10 | 0.00 | 0.00 |
| Deposits | 0.62 (0.02) | 0.70 (0.01) | 0.62 | 0.67 | 0.01 | 0.00 |

Panel B – Difference-in-Differences Estimates

| | Growth of Bank Lending | | | | Number of Treated Lenders |
|-----------------------------------|------------------------|--------------------|-----------------------------|--------------------|---------------------------------|
| | Treated Lenders | Control Lenders | Difference-in Difference | ATT | |
| <i>All Loans</i> | | | | | |
| Total Number of Loans | -0.41*** (0.05) | -0.01 (0.08) | -0.40*** (0.09) | -0.52*** (0.14) | 46 |
| Number of Loans As Lead | -0.45*** (0.05) | -0.18*** (0.07) | -0.27*** (0.08) | -0.60*** (0.13) | 42 |
| Amount of Loans As Lead | -0.26** (0.10) | 0.05 (0.11) | -0.32** (0.14) | -0.94*** (0.22) | 42 |
| <i>Loans to Foreign Borrowers</i> | | | | | |
| Total Number of Loans | -0.38*** (0.06) | 0.03 (0.09) | -0.41*** (0.11) | -0.34** (0.17) | 34 |
| Number of Loans As Lead | -0.55*** (0.05) | -0.13 (0.09) | -0.42*** (0.10) | -0.33** (0.16) | 32 |
| Amount of Loans As Lead | -0.45*** (0.08) | 0.01 (0.13) | -0.46*** (0.15) | -0.31 (0.23) | 32 |

Table A13 – Government Relationships Controls

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, deposits, ratio of bank liabilities to GDP, rating uplift (the difference between the Moody's Long-Term Issuer Rating and the Bank Financial Strength Rating), and government ownership (as a percentage of shares outstanding). Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | Level | | | | | | | | | Growth | | | | | | | | |
|-----------------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) |
| Lender Rating >= Sovereign Rating | -0.18** (0.08) | -0.18** (0.08) | -0.76 (0.51) | -0.14 (0.09) | -0.14* (0.08) | -0.50 (0.53) | -0.17** (0.08) | -0.17** (0.08) | -0.79 (0.50) | 0.03 (0.04) | -0.01 (0.05) | 0.04 (0.08) | 0.05 (0.03) | 0.02 (0.04) | 0.02 (0.10) | 0.03 (0.03) | -0.02 (0.04) | -0.01 (0.07) |
| Sovereign Downgrade | 0.13** (0.07) | 0.05 (0.07) | -0.10 (0.65) | 0.24* (0.14) | 0.17 (0.11) | 0.79 (0.88) | 0.05 (0.09) | -0.02 (0.08) | -0.55 (0.63) | -0.01 (0.06) | -0.03 (0.07) | -0.11 (0.17) | 0.27** (0.11) | 0.17 (0.11) | 0.37 (0.32) | -0.02 (0.07) | -0.10 (0.08) | -0.16 (0.17) |
| Lender Rating >= Sov. Rating x Sov. Downgrade | -0.24* (0.14) | -0.21** (0.10) | -1.51* (0.91) | -0.35** (0.15) | -0.29** (0.12) | -1.90* (1.15) | -0.19* (0.11) | -0.16* (0.09) | -1.71* (0.97) | -0.30*** (0.12) | -0.25** (0.13) | -0.28 (0.23) | -0.48*** (0.10) | -0.38*** (0.13) | -0.72*** (0.27) | -0.32*** (0.12) | -0.30** (0.12) | -0.25 (0.21) |
| Bank Liabilities to GDP | 0.02 (0.17) | 0.00 (0.14) | -0.54 (0.59) | | | | | | | 0.04* (0.02) | 0.00 (0.03) | -0.04 (0.04) | | | | | | |
| Bank Liabilities to GDP x Sovereign Downgrade | | | | | | | | | | -0.23 (0.16) | -0.35*** (0.09) | -0.62*** (0.24) | | | | | | |
| Rating Uplift | | | | -0.02 (0.02) | -0.02 (0.02) | -0.11 (0.09) | | | | | | | -0.01 (0.01) | 0.00 (0.01) | -0.01 (0.01) | | | |
| Rating Uplift x Sovereign Downgrade | | | | -0.08** (0.04) | -0.08*** (0.03) | -0.45* (0.26) | | | | | | | -0.09*** (0.03) | -0.09*** (0.02) | -0.15*** (0.04) | | | |
| Government Ownership | | | | | | | | | | | | | | | | -4.12 (4.74) | 1.39 (5.95) | 7.52 (11.53) |
| Government Ownership x Sovereign Downgrade | | | | | | | -42.24 (26.00) | -42.96 (26.45) | -30.53 (139.54) | | | | | | | -17.97 (22.87) | -0.62 (23.20) | -71.11** (27.71) |
| Lender Controls | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Country FE | | | | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Number of Observations | 14,826 | 14,826 | 14,826 | 8,985 | 8,985 | 8,985 | 15,502 | 15,502 | 15,502 | 12,133 | 10,821 | 10,819 | 7,740 | 7,057 | 7,055 | 12,769 | 11,441 | 11,439 |
| R-Squared | 0.20 | 0.21 | 0.06 | 0.19 | 0.18 | 0.05 | 0.19 | 0.21 | 0.06 | 0.11 | 0.12 | 0.06 | 0.13 | 0.14 | 0.07 | 0.11 | 0.12 | 0.07 |

Table A14 – Government Bondholding Controls from the European Union-Wide Stress Tests

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, deposits, and exposure to own government bondholdings (defined as financial institutions' holdings of own-country government debt relative to their total assets). Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. The sample includes loans made by 54 banks in 2008-2012 included in the European Banking Authority (EBA) European Union-wide stress test exercise in December 2010. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| | Level | | | Growth | | |
|---------------------------------------------------|-----------------|-----------------|-------------------|--------------------|-------------------|-------------------|
| | Total Number of | Number of Loans | Amount of Loans | Total Number of | Number of Loans | Amount of Loans |
| | Loans (log) | as Lead (log) | as Lead (log) | Loans | as Lead | as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating \geq Sovereign Rating | -0.15 (0.17) | -0.29 (0.19) | -1.70* (0.93) | 0.07 (0.12) | 0.06 (0.10) | 0.27** (0.12) |
| Sovereign Downgrade | 0.07 (0.08) | 0.02 (0.08) | -0.88 (0.80) | -0.01 (0.18) | -0.02 (0.15) | 0.02 (0.25) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.09 (0.17) | 0.00 (0.18) | -1.08 (1.65) | -0.27*** (0.10) | -0.21** (0.11) | -0.41** (0.19) |
| Exposure to Own Country | -1.90 (3.94) | -4.20 (3.55) | -14.26 (14.67) | -0.39 (0.74) | -0.39 (0.57) | -3.18** (1.33) |
| Exposure to Own Country x Sovereign Downgrade | 0.77 (1.22) | 1.13 (1.00) | 14.82** (6.25) | 0.44 (1.32) | 1.08 (0.91) | 1.41 (1.75) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 848 | 848 | 848 | 779 | 761 | 760 |
| R-Squared | 0.18 | 0.18 | 0.05 | 0.25 | 0.20 | 0.15 |

Table A15 – High and Low Creditor Rights Countries

This table shows OLS regression estimates of the effect of a sovereign downgrade on the level and growth rate of the total number of loans, number of loans as lead arranger, and amount of loans as lead arranger of banks that have a pre-downgrade rating at the sovereign bound. The dependent variables are measured two quarters after the sovereign downgrade and include only loans made to borrowers located in a country different from where the lender is domiciled. Observations are at the lender-quarter level. Lender controls include the banks' size, profitability, capital, liquidity, and deposits. Country macro controls (time varying) include the ratio of government debt to GDP, growth rate of GDP, inflation, ratio of private credit to GDP, banks' holdings of government debt, and indicator variables for whether the country is experiencing a currency crisis, an inflation crisis, a sovereign domestic debt crisis, a sovereign external debt crisis, a banking crisis, or a recession. Panel A includes lenders domiciled in countries with above-median country-level creditor rights from Djankov, McLiesh, and Shleifer (2007), and Panel B includes lenders in countries with below-median creditor rights. Standard errors are clustered at the lender country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A – High Creditor Rights Countries

| | Level | | | Growth | | |
|---------------------------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating \geq Sovereign Rating | -0.18* | -0.19* | -0.90 | 0.04 | 0.00 | -0.03 |
| | (0.10) | (0.10) | (0.63) | (0.03) | (0.03) | (0.08) |
| Sovereign Downgrade | 0.10 | 0.00 | 0.18 | 0.09 | 0.04 | 0.06 |
| | (0.08) | (0.06) | (0.50) | (0.08) | (0.07) | (0.12) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.31* | -0.29*** | -2.25** | -0.48*** | -0.46*** | -0.62** |
| | (0.19) | (0.11) | (1.08) | (0.12) | (0.13) | (0.28) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 9,452 | 9,452 | 9,452 | 7,569 | 6,925 | 6,923 |
| R-Squared | 0.20 | 0.23 | 0.07 | 0.09 | 0.12 | 0.06 |

Panel B – Low Creditor Rights Countries

| | Level | | | Growth | | |
|---------------------------------------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|
| | Total Number of Loans (log) | Number of Loans as Lead (log) | Amount of Loans as Lead (log) | Total Number of Loans | Number of Loans as Lead | Amount of Loans as Lead |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lender Rating \geq Sovereign Rating | -0.21* | -0.21* | -1.36 | -0.10 | -0.14 | 0.09 |
| | (0.12) | (0.11) | (1.00) | (0.12) | (0.17) | (0.25) |
| Sovereign Downgrade | -0.08 | -0.11 | -1.69* | -0.24** | -0.31*** | -0.63*** |
| | (0.13) | (0.13) | (0.96) | (0.10) | (0.09) | (0.20) |
| Lender Rating \geq Sov. Rating x Sov. Downgrade | -0.04 | 0.04 | -0.24 | 0.00 | 0.11 | 0.11 |
| | (0.22) | (0.21) | (2.10) | (0.22) | (0.25) | (0.48) |
| Lender Controls | Y | Y | Y | Y | Y | Y |
| Country Macro Controls | Y | Y | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y | Y | Y |
| Lender FE | Y | Y | Y | | | |
| Country FE | | | | Y | Y | Y |
| Number of Observations | 5,702 | 5,702 | 5,702 | 4,906 | 4,239 | 4,239 |
| R-Squared | 0.22 | 0.21 | 0.05 | 0.18 | 0.15 | 0.09 |