The Loan Covenant Channel: How Bank Health Transmits to the Real Economy*

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Abstract

We document the importance of covenant violations in transmitting bank health to nonfinancial firms using a new supervisory data set of bank loans. More than one-third of loans in our data breach a covenant during the 2008-09 period, providing lenders the opportunity to force a renegotiation of loan terms or to accelerate repayment. We find that lenders in worse health are less likely to grant a waiver and more likely to force a reduction in the loan commitment. Quantitatively, the reduction in credit to borrowers with long-term credit but who violate a covenant accounts for an 11% decline in the volume of loans and commitments outstanding during the 2008-09 crisis, slightly larger than the total contraction in credit during that period. We conclude that the transmission of bank health to nonfinancial firms occurs largely through the loan covenant channel.

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1. Introduction

A large literature documents the importance of the health of the banking sector for nonfinancial firm outcomes such as investment and employment.[1] Most recently, the 2008-09 period contained both a financial crisis and the deepest recession in the United States in 60 years. Yet, at the start of the financial panic in 2008 only 10% of bank loans had remaining maturity of less than one year. This fact raises a puzzle: why didn't long-term credit insulate existing borrowers from the health of their lenders during the panic?

We document the role of loan covenant violations in transmitting the health of the financial system to outcomes at corporate borrowers. Loan covenants, also known as non-pricing terms, appear in nearly all commercial loan contracts. They circumscribe the set of actions a borrower may take (nonfinancial covenants) or specify minimum or maximum thresholds for cash flow or balance sheet variables (financial covenants). Breaching of a covenant threshold puts a borrower into technical default and gives the lender the right to accelerate repayment of the loan. Far from unusual events, roughly one-quarter of corporate loans breach a covenant during a typical year before the 2008-09 financial crisis and one-third of loans breach a covenant each year during the financial crisis. Thus, loan covenant violations increase lenders' bargaining power and provide them broad opportunity to renegotiate contract terms when their own internal cost of funds rises. We refer to the transmission of lender health to existing borrowers through the forced renegotiation of contract terms as the loan covenant channel.

We quantify the covenant channel in the context of the 2008-09 financial crisis using a new

[1] See e.g. Peek and Rosengren (2000); Lin and Paravisini (2012); Chodorow-Reich (2014); Benmelech et al. (2015) for evidence from the United States and Gan (2007); Amiti and Weinstein (Forthcoming); Bentolila et al. (2016) for evidence in other countries.

supervisory data set of syndicated loans. The data contain the identities of borrowers and lenders and follow individual loans over time, including compliance with covenants. Following the violation of a covenant, a lender may accelerate repayment, force a renegotiation of the loan contract, or simply waive or reset the covenant with no further impact on the loan. Our data track each of these potential outcomes. Importantly, the supervisory data contain vastly more loan observations per year and more accurately identify covenant violations than do other existing data sets. Our main sample consists only of loans not due to mature within the year. Absent changes, these loans should have insulated borrowers from the immediate consequences of the financial condition of the lenders providing them.

The 2008-09 financial crisis offers a useful laboratory to assess the covenant channel. The write-downs on assets linked to real estate loans led to an enormous decline in the market equity of the U.S. financial sector and coincided with a sharp increase in bank funding costs. Both factors increased the internal cost of funds at lenders. A body of evidence documents the transmission from the reduction in credit supply at lenders to outcomes at nonfinancial firms during the crisis (Campello et al., 2010; Duchin et al., 2010; Campello et al., 2011; Chodorow-Reich, 2014; Duygan-Bump et al., 2015; Siemer, 2016). However, banks varied greatly in their exposure to the crisis.

Our empirical exercises test whether the outcome of a covenant violation during the 2008-09 crisis depends on the lead lender's financial health. We measure lender health by combining three measures constructed in Chodorow-Reich (2014). These measures capture banks' exposure to the crisis through counterparty risk, mortgage-related writedowns, and funding stability. Identification requires that covenant violators of less healthy and healthier lenders have otherwise

similar characteristics. We show that borrowers of healthy and less healthy lenders have similar propensities to violate a covenant, similar overall leverage, and similar supervisory ratings.

We find strong evidence of less healthy lenders using covenant violations to contract credit. Conditional on breaching a threshold, the likelihood of a reduction in the loan balance rises by 24 p.p. for borrowers of the least healthy lenders relative to the healthiest lenders and the average loan commitment falls by 23%. Smaller, more concentrated syndicates and syndicates with a larger lead lender share exhibit greater sensitivity to lender health in determining the outcome of a covenant violation, consistent with increased incentive and ability for the lead lender to organize a response in these syndicate structures.

A number of results further support the causal interpretation of these findings. First, we find no reduction in credit from unhealthy lenders to borrowers with long-term credit who do not violate a covenant, suggesting that borrowers of less healthy lenders did not experience a correlated decline in loan demand. Second, adding borrower and loan-level controls increases the explanatory power of the regressions but, consistent with ex ante balancing of firms and borrowers, the point estimates remain extremely stable. Third, the lead lender's share of the loan commitment declines after a violation if the lead has poor health, providing "within-loan" evidence that what shifts is the lead lender's credit supply function. Fourth, we conduct placebo exercises in which we reestimate the baseline specification in the non-crisis period of 2006-07. We do not find any differential treatment of borrowers who breach a covenant in 2006-07 based on lender health in 2008-09. Fifth, we show robustness to plausible alternative definitions of lender health including using the health of the pre-crisis lender to address concerns of endogenous sorting of lenders and borrowers after the crisis started.

We next turn to the consequences of the credit contraction for the borrower. If a borrower whose previous relationship lender contracted credit could easily switch to a new lender, idiosyncratic fluctuations in bank health would have little real effect. The concentration of credit contraction on covenant violators makes such switching difficult because of the difficulty of obtaining new credit while in technical default. Indeed, covenant violators of unhealthy lenders appear unable to substitute at all toward other lenders or toward non-bank credit. Instead, we show that these borrowers increase the utilization on their existing credit lines, draw down cash holdings, and reduce investment and employment relative to firms which violate a covenant but have a healthier lender. These results echo previous literature which has found an adverse effect of a covenant violation on debt issuance (Roberts and Sufi, 2009a; Nini et al., 2012), investment (Chava and Roberts, 2008; Nini et al., 2012), and employment (Falato and Liang, 2016), but with the added twist that the health of the lender crucially affects the consequences for the borrower.

Finally, we perform an aggregation calculation to assess the macroeconomic importance of the loan covenant channel. We find that total credit and commitments outstanding contracted by 5.8% in 2008 and 5.9% in 2009 solely as the result of borrowers who started the year with a long-term loan contract but nonetheless had their borrowing limit lowered by an unhealthy lender following a covenant violation. This magnitude is economically significant; for example, it exceeds the contraction in the total stock of credit (including commitments) outstanding between 2007 and 2009. We conclude that the transmission of bank health to nonfinancial firms occurs largely through the loan covenant channel.

We discuss related literature next. Section 2 describes the data. Section 3 provides summary

statistics and balancing tests and compares our measure of covenant violations to previous work. Section 4 reports borrower and loan level effects of lender health on the aftermath of a covenant violation. We perform the aggregation exercise in section 5. Section 6 concludes.

Related literature. A first related literature studies the transmission of bank health to the real economy and the importance of firm-bank relationships. Bernanke (1983) is a seminal reference and Chodorow-Reich (2014) overviews more recent papers. As discussed above, the prevalence of long-term contracts poses a challenge for this literature insofar as they insulate many borrowers from the health of their lender. We show how covenant violations create a transmission channel even to borrowers with nominally long-term contracts. Other explanations include lumpiness or granularity in the economy together with strong effects in exactly the subset of borrowers needing to refinance or new credit (Almeida et al., 2012; Benmelech et al., 2015; Siemer, 2016) and precautionary saving by firms anticipating future credit contraction (Almeida et al., 2004; Bacchetta et al., 2014; Melcangi, 2016; Xiao, 2017). We view these channels as complementary and our contribution as highlighting the quantitative importance of the covenant channel. Additionally, since lower quality borrowers are more likely to violate covenants, the covenant channel offers a novel explanation for why many papers find empirically that the effects of bank health concentrate on smaller, lower quality borrowers.

A second literature, already cited, documents the negative consequences to the firm of violating a covenant (Chava and Roberts, 2008; Roberts and Sufi, 2009a; Nini et al., 2012; Falato and Liang, 2016). Our results suggest that the overall effect reported in these studies may mask important response heterogeneity based on the health of the lender.

A third related literature concerns the renegotiation of debt contracts and the purpose

and consequences of including covenants. The theoretical literature has traditionally viewed covenants as a means to overcome the agency problem inherent in lending contracts by limiting the possible actions taken by the borrower and shifting control to the lender if the borrower's financial condition deteriorates (Aghion and Bolton, 1992; Nini et al., 2009; Gârleanu and Zwiebel, 2009; Acharya et al., 2014; Bradley and Roberts, 2015). Yet, covenant violations occur routinely, and lenders often provide waivers for the violation while taking minimal additional action. Our paper complements the borrower-centric view by showing that covenants also allow lenders to adjust loan terms when *lender* health deteriorates, consistent with the symmetric view of incomplete contracting in Hart and Moore (1988).

More broadly, as emphasized by Roberts and Sufi (2009b), Mian and Santos (2011), Denis and Wang (2014), and Roberts (2015), almost all long-term debt contracts undergo renegotiation prior to maturity. Roberts and Sufi (2009b), Denis and Wang (2014), and Roberts (2015) find evidence of borrower characteristics affecting the timing and outcome of such negotiations but do not consider individual lender health as a determinant. The sharp shift in bargaining power toward lenders following a covenant violation creates a natural means for lender health to affect the renegotiation process. The ubiquity of renegotiation even in the absence of a violation suggests lender health could affect recontracting for an even larger set of borrowers.

Finally, a macroeconomic literature studies the link between banks and the real economy in dynamic general equilibrium models (Gertler and Kiyotaki, 2010; He and Krishnamurthy, 2013; Brunnermeier and Sannikov, 2014). These models typically assume one period or continuously updated contracts. Our results provide some justification for this simplification by showing that even long-term contracts have de facto much shorter horizons due to loan covenants. These

models also have the implication that unhealthy banks will especially want to reduce credit to riskier borrowers because the value of a marginal dollar of losses rises as the bank moves closer to its default boundary. Because covenant violators are riskier than the overall population of firms, through the lens of these models loan covenants allow banks to reduce credit to exactly those borrowers to whom they most value a reduction in exposure.

2. Data and Main Variable Definitions

We describe the main features of our data and provide additional details in the online appendix.

2.1. Loan and Covenant Data

SNC. The Shared National Credit Program (SNC) data set is a joint supervisory data set of the Federal Reserve, FDIC, and Office of the Comptroller of the Currency. Employees of these institutions may use the data for research purposes. The SNC collects information on all loans of at least $20 million shared by three or more unaffiliated financial institutions under the regulatory purview of one of the SNC supervisors. For each loan in the data set, SNC reports the borrower, loan type, drawn and undrawn balance on December 31st of the reporting year, and the ownership shares of the syndicate lead lender and all participants including institutions not regulated by a SNC supervisor.[2]

Beginning in 2006, SNC began collecting detailed information on non-price terms and covenant compliance for a subset of loans covering about 1/3 of the loan volume in the SNC

[2]The official term for the unit of observation in the SNC data set is a credit. A credit may consist of multiple facilities jointly arranged by the same syndicate and signed on the same date. The corresponding term in DealScan is a package. For simplicity, in the text we use "loan" interchangeably with SNC credit.

universe. We refer to loans in this subset as the covenant sample.[3] For each loan in the covenant sample, SNC obtains information on covenants and compliance from loan documentation augmented by supervisory inquiries to the banks when information is missing or incomplete.

Covenant violations. For each loan in the covenant sample, SNC reports whether the loan remains in compliance throughout the year. If the loan remains compliant, SNC reports whether it would have been noncompliant but for a covenant waiver or reset granted by the lender. We consider a covenant to bind in either circumstance. We therefore define the variable $Bind_t$ to equal 1 if a loan breaches any covenant threshold during year t. Following a violation, a lender may choose to waive or reset the covenant or may force either repayment or restructuring of the loan. In practice, the resolution of a loan restructuring process can take a few months to achieve. We therefore use as our main measure the variable $Bind_{t-1:t} = \max\{Bind_{t-1}, Bind_t\}$ which equals 1 if a loan breached a covenant in either the current or previous year.[4]

Comparison to other data sets. The SNC covenant sample offers important advantages over previous data sets. Unlike the Thomson Reuters DealScan database which collects information on newly originated syndicated loans, SNC carefully tracks loans after origination including subsequent modifications and covenant violations. A number of papers have started from the DealScan database and hand-collected information on subsequent loan outcomes from public filings or by matching to Compustat. Relative to these data sets, and crucial to a cross-sectional study, SNC contains many more observations per year and contains comprehensive information

[3] SNC parlance also refers to this subset as the "Review sample."

[4] Loans often contain cross-default provisions by which a covenant breach on one loan triggers technical default on another. We have experimented with defining $Bind_{t-1:t}$ based on whether any loan to the borrower breaches a covenant with no meaningful changes in our loan-level analysis. Similarly, our results remain quantitatively similar if we use $Bind_t$ as our main measure of a violation.

on the lender's response to a violation.[5] Third, the SNC data identify a covenant breach even if it results in a waiver. Such violations may not appear in data sets constructed from public filings. Fourth, SNC contains a representative share of non-public borrowers, whereas data sets based on either public filings or matching to Compustat contain publicly-traded borrowers.

2.2. Lender Health Measures

The 2008-09 period offers a useful laboratory for studying the transmission from banks to corporate borrowers because the origins of the financial distress lay outside the corporate loan sector. Rather, prominent explanations include the exposure of financial institutions to real estate markets and toxic assets, counterparty risk and network proximity to failing institutions, and liability structure and susceptibility to shadow bank runs (see e.g. Ivashina and Scharfstein, 2010; Cornett et al., 2011; Erel et al., 2011; Fahlenbrach et al., 2012; Santos, 2011). Our measures of lender health, adopted from Chodorow-Reich (2014), reflect each of these forces.

The first measure, originally proposed by Ivashina and Scharfstein (2010), identifies a bank's exposure to Lehman Brothers through the fraction of the bank's syndication portfolio in which Lehman Brothers had a lead role. This exposure affected banks directly through the syndicated market as firms with credit lines provided by Lehman Brothers drew down the remainder of their credit line as a precautionary measure following the Lehman bankruptcy, resulting in a draining of liquidity from other syndicate members. The second lender health variable measures a bank's exposure to private-label mortgage-backed securities through the correlation of its daily

[5]For example, the data hand-collected from SEC filings by Nini et al. (2009) and extended in Freudenberg et al. (2015) follow roughly 400 originations per year and do not include comprehensive information on the lender's response to a violation. Denis and Wang (2014) and Roberts and Sufi (2009b) collect some of this information but for subsets of roughly 100 originations per year, while Roberts (2015) collects information on renegotiations over the life of a loan contract but for a sample of 114 firms. Studies which rely on matching to Compustat (Chava and Roberts, 2008; Falato and Liang, 2016) or scrape SEC filings (Nini et al., 2009, 2012) to identify financial covenant violations do not have information on the lender's response to a violation.

stock return with the return on the ABX AAA 2006-H1 index in the fourth quarter of 2007. The ABX AAA 2006-H1 index follows the price of residential mortgage-backed securities issued during the second half of 2005 and with a AAA rating at issuance. The correlation indicates the market's perception of the bank's exposure to the mortgage crisis. The third measure combines a variety of balance sheet items: 2007-08 trading revenue as a share of assets, 2007-08 real estate net charge-offs, and the 2007 ratio of bank deposits to assets, weighted using regression loadings for predicting loan growth.[6]

The validity of these measures requires that they have predictive power for bank lending behavior and that assignment of borrowers and lenders before the crisis be "as good as random". Regarding predictive power, Chodorow-Reich (2014) shows that each measure can explain a substantial part of the cross-section of new lending during the 2008-09 period. The origin of the 2008-09 crisis outside of the corporate loan sector makes "as good as random" assignment a priori plausible. Nonetheless, sorting of banks and borrowers might occur. However, Chodorow-Reich (2014) finds that borrowers of different lenders appear ex ante similar along observable characteristics such as the employment declines in the borrower's industry and county. We report below similar ex ante balancing using variables available only in the SNC data, including importantly the fraction of loans which breach a covenant and ex ante risk rating, and also show that balancing holds within the subset of covenant violators. Chodorow-Reich (2014) further shows balancing holds along unobserved characteristics using a specification with borrower fixed effects. Finally, financial markets before the crisis, as embodied in spreads on credit default swaps, did not predict which banks would become most distressed, making it unlikely higher

[6]We use the version of these measures provided at http://scholar.harvard.edu/files/chodorow-reich/files/final_bank_variables.xlsx.

quality borrowers could have purposefully chosen more stable lenders.

For brevity of presentation, we extract the first principal component of the three measures of lender health and create a rank-normalized variable *Bad Lender* as the rank of the first principal component relative to all lenders divided by the number of lenders. The variable *Bad Lender* therefore lies on the unit interval, with the lender in worst health receiving a value of 1. Our main results are not sensitive to using this measure or one of the three subcomponents.

Syndicated loans such as those in the SNC data include a lead lender and participant lenders. The lead lender manages the servicing of the loan, provides the largest share of the funds, and typically cannot sell its share of the loan in the secondary market. Most loan contracts require the agreement of lenders providing at least 51% of the commitment to accelerate repayment or modify loan terms following a covenant breach. Because the lead lender retains the largest share of the loan, plays an organizing role among syndicate members, and as the servicing agent has responsibility for carrying out any renegotiation, in our main results we assign lender health on the basis of the lead lender only.[7] Effectively, we assume the lead lender is always pivotal in resolving a covenant violation. Our main results are robust to broader definitions of the health of the syndicate as we show in section 4.1.3.

3. Summary Statistics and Balancing Tests

Our main sample consists of all term loans and credit lines to nonfinancial borrowers in the SNC covenant sample with a lead lender in the Chodorow-Reich (2014) data set and which

[7] Unlike in DealScan where many loans list multiple lead arrangers, the SNC supervisors always identify a single lead arranger as the servicing agent.

start the year with at least one year of maturity remaining.[8] The last restriction means that our empirical exercises focus only on loans which, absent a covenant violation, would have been insulated from the health of the lender over the course of the year.

Sample comparison. Syndicated lending accounts for a large share of total lending volume in the U.S. economy. As shown in figure A.1, the full SNC universe (including all loan types and loans to financial borrowers) contained $1.2 trillion of loans drawn and $2.79 trillion of loans drawn and unused commitments outstanding as of the end of 2007. For comparison, the Consolidated Reports of Condition and Income (Call Reports) contained $1.44 trillion of commercial and industrial loans drawn and $2.37 trillion of unused commitments not associated with real estate or credit cards from all U.S. commercial banks on that date.[9]

Table 1 reports summary statistics for the pre-crisis and crisis periods for the full SNC universe of term loans and credit lines to nonfinancial borrowers (columns 1 and 4), for the subset of these loans in the covenant sample (columns 2 and 5), and for those loans in the covenant sample for which we have a measure of the health of the lead lender (columns 3 and 6). Table 1 and figure A.2 show that the coverage of the SNC covenant sample has increased over time. During the crisis years of 2008-09, the covenant sample contains about one-third of the number of loans and loan volume as the full SNC universe, up from roughly one-quarter

[8] Chodorow-Reich (2014) constructs measures of lender health for the 43 most active lead lenders in the DealScan data prior to the 2008-09 crisis. However, about one-quarter of these lenders are foreign-owned or otherwise not under the regulatory purview of the SNC supervisors and therefore excluded from the SNC data unless the participants include multiple supervised lenders.

[9] Besides the $20 million threshold and syndication requirement for inclusion in the SNC data, totals in the Call Reports and SNC may differ because SNC includes the part of loans provided by non-bank lenders if they are part of a syndicate covered by SNC, because SNC may include some lending not classified as commercial and industrial in the Call Reports, and because the residual category for unused commitments in the Call Report data may contain non commercial and industrial loans. While these differences affect the levels, figure A.1 shows that the growth rates of aggregates in the two data sets track each other closely. As an alternative benchmark, since November 2012 the Federal Reserve Survey of Terms of Business Lending has reported the fraction made under syndication of all origination volume of commercial and industrial loans made by commercial banks; averaged across all months from November 2012 through August 2016, this fraction is 47.5%.

before the crisis. Loans in the covenant sample are of similar average size and maturity, exhibit a similar breakdown between term loans and credit lines, have similar utilization rates, and have similar propensities to get modified as those in the full universe. While the covenant sample purports to overweight loans rated below best quality or "pass," the composition of borrower credit quality remains similar to the SNC universe.[10] More than 90% of the loan volume in the covenant sample comes from loans with lead lenders in our lender data set. Loans from these lenders appear similar to the full covenant sample along all dimensions.

Maturity. The vast majority of bank loans are of long maturity. In both the full SNC data and the covenant sample, roughly 90% of all loans and commitments outstanding at the end of 2007 had at least 1 year of maturity remaining and more than three-quarters had maturity remaining of at least 2 years.[11] The long maturity of bank debt constricts the channels through which bank health can transmit to borrower outcomes. As a corollary, imposing the sample restriction of only including firms with 1+ year maturity remaining in order to focus on seemingly insulated borrowers has only a small practical effect on our results.

Covenant violation frequency. Covenant violations occur routinely. Roughly one-quarter of loans in the SNC covenant sample violate a covenant during a typical year before the 2008-09

[10]Not shown in the table, the share of credits rated as best (worst) quality or "pass" ("loss") is about 83% (0.29%) in the SNC universe and about 82% (0.33%) in the covenant sample. The sector composition of loans in the covenant sample is also similar to the SNC universe and broadly representative of the sectoral composition of the U.S. economy – more than one-quarter of loans are to firms in the services sector and roughly one-third are to firms in manufacturing or retail. Loans to bank borrowers ($< 0.5\%$) and loans to non-bank financial borrowers (8%) make up a small share of SNC and our results are robust to not excluding them.

[11]The maturity of loans in SNC closely resembles the maturity structure of all long-term debt. Of firms in Compustat with positive long-term debt outstanding, the median amount due in less than one year is about 5% of the total and the 75th percentile is less than 20%. Across all firms in Compustat, the median firm has long-term debt of less than 0.2% of assets maturing within a year and the 75th percentile firm has maturing debt of less than 2% of assets. These ratios are roughly the same for debt due in each of 2007, 2008, and 2009. The ratios are based on all firms in the Compustat Annual file with non-negative revenue, assets, investment, or cash, with assets greater than each of cash, investment, and property, plant, and equipment, and with assets of at least $10 million and asset growth of lower than 200%.

Table 1: Summary Statistics

Sample:	Pre-crisis (2006-07)			Crisis (2008-09)		
	Universe	Covenant	Lender-covenant	Universe	Covenant	Lender-covenant
	(1)	(2)	(3)	(4)	(5)	(6)
			Loans of any maturity			
Fraction 1+ year remaining	0.91	0.92	0.92	0.88	0.88	0.89
			Loans with 1+ year maturity remaining			
Loan characteristics						
Mean maturity (years)	3.30	3.34	3.36	2.61	2.78	2.75
Fraction 2+ years remaining	0.85	0.88	0.89	0.74	0.79	0.79
Mean log total committed	18.66	18.85	18.95	18.74	18.76	18.91
Fraction credit line	0.61	0.59	0.60	0.51	0.49	0.49
Fraction *Credit reduced*	0.27	0.26	0.26	0.37	0.38	0.38
Fraction *Waiver*		0.32	0.32		0.37	0.36
Fraction *New credit*	0.17	0.15	0.14	0.08	0.06	0.06
Mean lead lender share	0.19	0.14	0.15	0.18	0.14	0.14
Mean loan utilization rate	0.53	0.56	0.55	0.61	0.64	0.63
Borrower characteristics						
Fraction publicly-traded	0.37	0.38	0.40	0.36	0.37	0.39
Mean log assets		12.58	12.76		12.68	12.82
Mean leverage		0.49	0.49		0.53	0.50
Fraction passing risk rating		70.78	70.68		47.17	45.96
Covenant violation frequency						
$Bind_t$		0.25	0.24		0.34	0.33
$Bind_t$, private borrowers		0.27	0.27		0.36	0.34
$Bind_t$, excluding waivers		0.09	0.08		0.11	0.10
$Bind_{t-1:t}$		0.29	0.28		0.39	0.37
Loan-year observations	11,247	2,676	2,478	11,979	4,059	3,420
Unique borrowers	4,769	1,309	1,166	4,992	1,704	1,409
Total committed ($Tr)	2.01	0.55	0.50	2.04	0.72	0.65

Notes: The table reports summary statistics for the pre-crisis (2006-07) and crisis (2008-09) periods and for three samples. Columns with header "Universe" report summary statistics for the universe of credit lines and term loans to nonfinancial borrowers in the full SNC data set. Columns with header "Covenant" report summary statistics for the subset of these loans in the SNC covenant sample. Columns with header "Lender-covenant" report summary statistics for our final sample of all credit lines and term loans in the covenant sample to nonfinancial borrowers and where the lead lender is in the Chodorow-Reich (2014) lender health data set. *Credit reduced* equals 1 if either the loan is terminated before maturity or the loan commitment is reduced. *Waiver* equals 1 if the lender grants a covenant waiver or modifies the covenant. *New credit* equals 1 if the borrower obtains new credit. $Bind_t$ and $Bind_{t-1:t}$ are indicator variables equal to 1 if a loan breached a covenant in the current or either the current or previous year, respectively. Total committed is the sum of loans outstanding and unused commitments averaged over the two year period.

financial crisis and one-third violate a covenant in each crisis year. This violation frequency exceeds that reported in previous studies and it is instructive to compare to two prominent earlier approaches. Dichev and Skinner (2002), Chava and Roberts (2008), and Falato and Liang (2016) use Compustat to follow current ratio and net worth covenants reported at inception in DealScan. Dichev and Skinner (2002) report that roughly 30% of loans violate one of these covenants at some point during the life of the loan. However, this approach mechanically understates the frequency of total violations because it considers only two types of covenants.[12] In an innovative approach, Roberts and Sufi (2009a), Nini et al. (2009), and Nini et al. (2012) scrape SEC 10-Q and 10-K filings of all publicly-traded firms looking for phrases associated with violations. Roberts and Sufi (2009a) find just 1% of firms rated A or above report a violation in a typical year, rising to 9% for B rated borrowers and 18% for borrowers rated CCC or worse. Nini et al. (2012) use an improved version of the text-scraping algorithm and find roughly 12% of all loans to publicly-traded firms are in violation during each of 2006 and 2007, or roughly half the frequency in the SNC data. Yet, while their data cover all covenant types, firms do not need to report violations if they obtain an amendment or waiver before the end of the reporting period. Indeed, while each year roughly 25% of loans in the SNC covenant sample violate a covenant during 2006 or 2007, only 9% of loans violate a covenant and do not receive a waiver.[13] Finally, both previous approaches necessarily cover only publicly-traded

[12]It also contains measurement error because covenant thresholds change after the initial loan contract (Denis and Wang, 2014; Roberts, 2015).

[13]On the other hand, to the extent the SNC covenant sample overweights lower quality loans, the sample propensity may exceed that of the typical loan in the U.S. economy. We can distinguish these possibilities by making a direct comparison of firm-years appearing in both the Nini et al. (2012, hereafter NSS) data set and the SNC covenant sample. In the 601 overlapping firm-years covering the period 2006-2008, the violation propensity in SNC is roughly double that in NSS, reflecting 140 firm-years in which SNC identifies either a covenant violation or a covenant waiver while according to the NSS data the firm made no mention of such a violation or waiver in a regulatory filing. (There are 26 firm-years in which NSS identify a violation where SNC does not. These reflect cases where a firm obtained a preemptive waiver, for example in anticipation of missing a filing deadline or taking

borrowers. In the SNC data, private borrowers exhibit slightly higher violation propensities than publicly-traded borrowers.

Balancing. Table 2 assesses the balancing of covariates by lender health. The left panel includes all loans in our sample, while the right panel restricts to loans which violate a covenant. Starting with the left panel, borrowers of lenders below and above the median of crisis lender health had statistically indistinguishable mean assets, leverage, and supervisory risk rating at the start of the crisis. The balancing along these variables, all drawn from SNC data, complements the similarities in geography and industry reported in Chodorow-Reich (2014). Of particular interest here, loans from lenders in good and bad health exhibit similar propensities to violate a covenant.

The balancing of ex ante characteristics of borrowers and loans which violate a covenant most directly affects the validity of our analysis below. Comparing the left and right panels, covenant violators overall tend to be smaller and have ex ante riskier loans and higher pre-crisis leverage. Crucial to our identification assumption, violators who had borrowed from healthier and less healthy lenders have nearly identical size and pre-crisis leverage and similar risk ratings. We cannot reject equality of means for any variable. Together, these results all suggest that any differential outcome for covenant violators of healthier and unhealthy lenders was due to the lenders' response to a covenant violation and not ex ante characteristics of the borrowers.

a one-time charge-off on earnings, where a firm had multiple loans and violated a covenant on a loan not in the SNC sample, and a few cases where we could not identify from the SEC filing why the NSS procedure assigned a violation.) Since the relative frequency of identified violations is similar in the overlapping sample to the relative frequencies in the respective full samples, it appears that the higher overall violation propensity in SNC reflects violations missed by the NSS public filing procedure. We are grateful to Amir Sufi for providing us with the Nini et al. (2012) data set.

Table 2: Balancing

	All borrowers			$Bind_{t-1:t} = 1$		
	Less healthy lenders	Healthier lenders	t-stat. of equality	Less healthy lenders	Healthier lenders	t-stat. of equality
Variable mean:						
$100 \times Bind_{t-1:t}$ (crisis)	37.96	36.59	0.82			
Log assets (pre-crisis)	12.72	12.81	1.17	10.98	11.11	0.35
Leverage (pre-crisis)	0.50	0.49	1.21	0.54	0.53	0.93
Risk rating (pre-crisis)	70.04	71.51	0.56	42.20	44.69	0.93
Observations (crisis)	1,673	1,747	3,420			
Observations (pre-crisis)	1,215	1,263	2,478	358	335	693

Notes: The table reports selected summary statistics by lender health. "Healthier lenders" are those for which *Bad Lender* <median and "Less healthy lenders" are those for which *Bad Lender* >median, where *Bad Lender* is the rank of the lead lender's health normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender.

4. Empirical Results

We present empirical results at the borrower and loan level. First, we use linear probability models to show how a lender's response to a covenant violation depends on its own health. Placebo exercises and a "within borrower" estimator bolster our causal interpretation of the results. We also show the response is larger for credit lines than term loans and for smaller, more concentrated syndicates and where the lead has a larger share. Next, we measure the change in total credit at the loan and borrower level and show that affected borrowers do not substitute toward other sources of credit. Last, we report evidence of transmission of the covenant channel to balance sheet and real outcomes such as investment and employment.

4.1. Loan-Level Outcomes

We start with linear probability models to explore how loan terms change following a covenant violation, depending on lender health. Our main outcome variable, *Credit reduced*, equals 1 if either the loan is terminated before maturity or the loan commitment is reduced. The structure of SNC allows us to follow a loan through amendments, modifications, and refinancing in constructing this variable. We consider *Credit reduced* to be the broadest measure of whether a loan changes in a way unfavorable to the borrower. As a caveat, we do not observe in SNC whether the interest rate changes, an issue we return to briefly below.

4.1.1. Non-parametric Evidence

Table 3 shows a non-parametric version of our first main result using the variable *Credit reduced* and comparing loans with lenders in the top and bottom quartile of lender health. Roughly one-third of loans which do not have a covenant violation undergo an unfavorable modification. This number may reflect renegotiation forced by the lender before a covenant violation occurred, a mutually agreed reduction in credit limit, or an offsetting decline in the interest rate which we do not observe. The propensity is similar for borrowers of healthy and less healthy lenders, suggesting bad lender health by itself does not negatively affect the provision of credit to borrowers who already have a loan. Borrowers who violate a covenant have a higher likelihood of experiencing a bad loan outcome. For borrowers of healthier lenders, the likelihood rises by 5.3 percentage points. For borrowers of less healthy lenders, the likelihood rises by 18.6 percentage points. The additional 13.3 percentage points rise in the probability of a bad outcome is the non-parametric difference-in-difference estimate of the effect of having a lender in bad health

Table 3: Non-parametric Evidence

	Fraction *Credit reduced* = 1		
	$Bind_{t-1:t} = 0$	$Bind_{t-1:t} = 1$	Difference
Healthiest lenders (*Bad Lender* <25th percentile)	0.316 [N=529]	0.369 [N=319]	0.053
Least healthy lenders (*Bad Lender* >75th percentile)	0.320 [N=489]	0.506 [N=365]	0.186
Difference	0.004	0.137	0.133

Notes: The table reports the fraction of loans in each cell terminated before maturity or experiencing a decline in the loan commitment (*Credit reduced* = 1). The sample consists of all loans in the SNC covenant sample at the start of 2008 or 2009, with at least one year maturity remaining, and with a lead lender in the lender health data set. *Bad Lender* is the rank of the lead lender's health normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender. *Bind* is an indicator variable which equals 1 if a borrower violated a covenant in either the current or previous year. The brackets report the number of observations in each cell.

following a covenant violation on receiving a bad loan outcome.

4.1.2. Baseline Regression Evidence

Table 4 reports the regression version of the difference-in-difference estimator. The regression version allows us to make lender health a continuous rather than binary variable and to control for covariates. The specification takes the form:

$$Y_{l,b,f,t} = \beta_0 + \beta_1[Bad\ Lender_b] + \beta_2\,[Bind_{l,t-1:t}] + \beta_3[Bad\ Lender_b \times Bind_{l,t-1:t}] + \gamma' X_{l,f,t} + \epsilon_{l,b,f,t}, \quad (1)$$

where $Y_{l,b,f,t}$ denotes an outcome in period t for loan l to firm f with lead bank b and $X_{l,f,t}$ may include borrower or loan covariates. We report standard errors two-way clustered by borrower and lead lender.[14] For readability, all coefficients in table 4 are multiplied by 100.

[14]We cluster along the lead lender dimension because the treatment *Bad Lender* is homogeneous across loans from the same lead lender. The borrower dimension accounts for borrowers with multiple loans in the sample each

Table 4: Loan Commitment Terminated or Reduced

	Dependent variable: *Credit reduced*			
	(1)	(2)	(3)	(4)
Bad Lender	−4.1	−3.0	−3.2	−0.8
	(5.8)	(5.6)	(5.7)	(5.2)
Bind	6.1**	4.6	4.2	5.2**
	(2.6)	(3.1)	(2.9)	(2.6)
Bad Lender × *Bind*	23.9***	25.2***	25.1***	23.7***
	(6.4)	(6.5)	(6.5)	(6.3)
Year, Industry FE	No	Yes	Yes	Yes
Borrower controls	No	No	Yes	Yes
Loan controls	No	No	No	Yes
R^2	0.066	0.085	0.087	0.116
Observations	3,420	3,420	3,420	3,420

Notes: The table reports linear probability model regressions of the form: $Y_{l,b,f,t} = \beta_0 + \beta_1[Bad\ Lender] + \beta_2\,[Bind] + \beta_3[Bad\ Lender \times Bind] + \gamma' X_{l,b,t} + \epsilon_{l,b,f,t}$. The sample consists of all loans in the SNC covenant sample at the start of 2008 or 2009 with at least one year maturity remaining and a lead lender in the lender health data set. The dependent variable *Credit reduced* equals 1 if either the loan is terminated before maturity or the loan commitment is reduced. *Bad Lender* is the rank of the lead lender's health normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender. *Bind* is an indicator variable which equals 1 if a borrower violated a covenant in either the current or previous year. Reported coefficients are multiplied by 100. Borrower controls: log assets, leverage, risk rating. Loan controls: loan purpose, loan type. Standard errors two-way clustered by borrower and lead lender reported in parentheses. *,**,*** indicate significance at the 10, 5, and 1 percent levels, respectively.

The first column of table 4 repeats the exercise of table 3 with no additional covariates but the continuous measure of lender health. Since we have normalized the lender health measure to lie on the unit interval, the coefficient on the interaction *Bad lender* × *Bind* of 23.9 has the interpretation of a borrower of the lender in worst health is 23.9 percentage points more likely to receive a credit reduction following a covenant violation than a borrower of the healthiest lender. The difference is statistically significant at the 1% level. In column (2) we add year and industry fixed effects, in column (3) control additionally for borrower size, leverage, and risk rating, and in column (4) control for the borrower covariates and loan purpose and type. While

with a different lead lender. The sample contains relatively few such borrowers and the standard errors are virtually unchanged if we cluster by lead lender only.

the explanatory power of the regression rises with the controls, the magnitude and statistical significance of the interaction coefficient remains quite stable. The stability of the coefficient reflects the sample balancing in table 2 and is consistent with the identification requirement that borrowers be "as good as randomly assigned" to lenders. Because the coefficient remains stable, in the remainder of the paper we report only specifications including the full set of borrower and (if applicable) loan controls and year and industry fixed effects. As in table 4, we find very similar quantitative results whether or not we include these control variables.

The small and statistically insignificant estimate of β_1, the coefficient on the main effect for *Bad Lender*, also merits comment. The near zero (indeed slightly negative) coefficient indicates that borrowers attached to bad lenders but who did not violate a covenant did not experience any higher likelihood of having their credit diminished. This result makes sense if the positive estimate of the interaction term coefficient β_3 stems from covenant violations providing an opportunity for distressed lenders to reduce credit; borrowers who did not breach a covenant started the year with a loan contract with maturity remaining of at least one year and the long-term contract insulated them from the health of their lender. If alternatively the positive estimate of β_3 obtains simply because borrowers of more distressed lenders experienced a correlated decline in loan demand and voluntarily reduced their credit lines, we would have found both β_1 and β_3 to be positive.[15]

Table 5 reports difference-in-difference results for two other binary outcomes, receiving a

[15]The economic interpretation of the main effect on *Bad Lender* explains why we include it in the regression rather than a lender fixed effect. Nonetheless, if we replace the term $\beta_1[Bad\ Lender_b]$ in equation (1) with a lender fixed effect α_b, we obtain nearly identical estimates of the main effect on *Bind* β_2 and the interaction coefficient β_3. For example, in the specification with full controls, we obtain $\beta_2 = 5.2$ (s.e.=2.4) and $\beta_3 = 23.6$ (s.e.=6.1). We also find in unreported regressions based on merging the SNC data with loan pricing information in DealScan an increase in interest costs for covenant violators of unhealthy lenders, a result again inconsistent with a voluntary reduction in loan amount.

Table 5: Waiver and New Credit

Dependent variable:	*Waiver*	*New credit*
	(1)	(2)
Bad Lender	3.8	3.9
	(3.3)	(2.4)
Bind	75.3***	−1.5
	(1.7)	(1.9)
Bad Lender × *Bind*	−66.5***	−8.9*
	(10.7)	(4.7)
Year, Industry FE	Yes	Yes
Borrower, Loan Controls	Yes	Yes
R^2	0.511	0.224
Observations	3,420	3,420

Notes: The table reports linear probability model regressions of the form: $Y_{l,b,f,t} = \beta_0 + \beta_1[Bad\ Lender] + \beta_2\,[Bind] + \beta_3[Bad\ Lender \times Bind] + \gamma' X_{l,b,t} + \epsilon_{l,b,f,t}$. The sample is the same as table 4. In column (1) the dependent variable $Waiver$ equals 1 if the lender grants a covenant waiver or modifies the covenant. In column (2) the dependent variable *New credit* equals 1 if the borrower obtains new credit. *Bad Lender* is the rank of the lead lender's health normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender. *Bind* is an indicator variable which equals 1 if a borrower violated a covenant in either the current or previous year. Reported coefficients are multiplied by 100. Borrower controls: log assets, leverage, risk rating. Loan controls: loan purpose, loan type. Standard errors two-way clustered by borrower and lead lender reported in parentheses. *,*** indicate significance at the 10 and 1 percent levels, respectively.

waiver or reset on a covenant violation and having the loan commitment increased. In column (1), the dependent variable $Waiver$ equals 1 if the lender grants a covenant waiver or modifies the covenant. Usually such waivers occur only after a violation, but they can also happen without a violation imminent. Not surprisingly, the probability of receiving a waiver rises sharply if the loan would otherwise be in technical default. The main effect on *Bind* indicates that for the healthiest lender, 75% of violations receive a waiver. The coefficient on the interaction of -67 means that only about 8% of loans from lenders in the worst health receive a waiver.

Column (2) examines whether violating a covenant and having a lender in bad health also affects the likelihood of a borrower receiving an expansion in credit available. Specifically, *New credit* equals 1 if the existing loan commitment increases or the borrower obtains new

credit not connected to its existing outstanding loans. Unlike a reduction or canceling of a credit line, which a lender may have a statutory right to do following a violation, an expansion of credit constitutes a positive outcome for a borrower. Nonetheless, violating a covenant may restrict the borrower's outside option in obtaining financing from a different source and lenders can exploit their bargaining power against such borrowers by refusing to negotiate a refinancing or offer additional credit. The regression evidence is consistent with this theory. Breaching a covenant causes a roughly 9 p.p. lower probability of the borrower obtaining an expanded credit commitment if the loan came from the least healthy lender.

4.1.3. Robustness and Specification Tests

Table 6 reports robustness to the measure of lender health. As a benchmark, column (1) reproduces column (4) of table 4 and shows our baseline regression of the effect of lender health and a covenant violation on the likelihood that a borrower receives a credit reduction. Column (2) replaces the measure of lender health with the health of the pre-crisis lead lender, defined using loans outstanding in June 2007.[16] Therefore, it uses only information on borrower-lender matches made before lender health during the crisis became apparent. In practice, the stickiness of bank-borrower relationships makes lender health in June 2007 highly correlated with lender health at the start of 2008 or 2009 and we obtain very similar quantitative results using the June 2007 health variable.

Columns (3)-(6) demonstrate the robustness to including the health of syndicate participants, in columns (3) and (4) using a commitment share-weighted mean of syndicate health and in

[16]This date falls a few weeks before the implosion of the two Bear Stearns hedge funds which marked the start of the subprime crisis, but at a point when few observers expected significant financial disruption. For example, the Federal Reserve meeting statement from June 28, 2007 acknowledges "ongoing adjustment in the housing sector" but expects the economy to expand "at a moderate pace over coming quarters" and sees the "risk that inflation will fail to moderate as expected" as the "predominant policy concern."

Table 6: Robustness to Lender Health Measure

Lender health based on:	Dependent variable: *Credit reduced*					
	Crisis lead (baseline)	June 2007 lead	Crisis syndicate-weighted mean		Crisis syndicate-weighted median	
	(1)	(2)	(3)	(4)	(5)	(6)
Bad Lender	−0.8	−9.8	−16.5	−4.7	−10.4	−2.2
	(5.2)	(6.3)	(10.4)	(9.7)	(6.6)	(7.2)
Bind	5.2**	8.2**	−2.6	1.9	3.2	5.9
	(2.6)	(3.3)	(7.6)	(4.4)	(5.3)	(4.2)
Bad Lender × *Bind*	23.7***	27.3***	33.0**	27.2***	21.6**	19.0**
	(6.3)	(5.1)	(15.3)	(9.5)	(10.5)	(8.6)
Impute non-bank using lead	n.a.	n.a.	No	Yes	No	Yes
Year, Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower, Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,420	2,844	3,420	3,420	3,420	3,420

Notes: The table reports linear probability model regressions of the form: $Y_{l,b,f,t} = \beta_0 + \beta_1[Bad\ Lender] + \beta_2[Bind] + \beta_3[Bad\ Lender \times Bind] + \gamma' X_{l,b,t} + \epsilon_{l,b,f,t}$. Column (1) reproduces column (4) of table 4. In column (2) the sample and variable definitions are the same as in column (1) except that the sample excludes loans to borrowers without a loan in SNC as of June 2007 and lender health assignment is based on the lead lender as of June 2007. In columns (3)-(6) the sample and variable definitions are the same as in column (1) except that lender health assignment is based on the weighted mean health of banks in the crisis syndicate (column 3), the weighted mean health of the crisis syndicate imputing the health of the lead for non-banks (column 4), the weighted median health of banks in the crisis syndicate (column 5), or the weighted median health of the crisis syndicate imputing the health of the lead for non-banks (column 6). In all columns, the dependent variable *Credit reduced* equals 1 if either the loan is terminated before maturity or the loan commitment is reduced; *Bad Lender* is normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender; and *Bind* is an indicator variable which equals 1 if a borrower violated a covenant in either the current or previous year. Reported coefficients are multiplied by 100. Borrower controls: log assets, leverage, risk rating. Loan controls: loan purpose, loan type. Standard errors two-way clustered by borrower and lead lender reported in parentheses. *,**,*** indicate significance at the 10, 5, and 1 percent levels, respectively.

columns (5) and (6) using a commitment share-weighted median. The weighted mean is a natural alternative to the health of the lead. Recalling that the standard loan contract requires the agreement of lenders providing at least 51% of the commitment to accelerate repayment or modify loan terms following a covenant breach, the weighted median assigns *Bad Lender* based on the health of the marginal lender required to build a coalition to renegotiate the loan. As a caveat, we lack a measure of the health of non-bank participants such as hedge funds,

pension funds, or CLOs. For the average loan, these non-bank participants provide 40% of the total commitment. However, non-bank participants typically play a relatively passive role in syndicate management. We therefore assume they either follow the banks in the syndicate (columns 3 and 5) or follow the direction of the lead (columns 4 and 6) and impute a health measure for the non-banks accordingly. Using either the weighted mean or weighted median measure and either assumption for the non-banks yields similar (and statistically significant) point estimates of the coefficient on *Bad Lender* $\times$ *Bind*, β_3, as the baseline coefficient in column (1). The larger standard errors for β_3 in columns (3)-(6) compared to column (1), however, accord with our baseline assumption that the lead lender health alone best captures the health of the pivotal member in resolving a covenant violation.[17]

Table 7 reports three additional specification tests which further support a causal interpretation of our main result. First, in column (1) we estimate the difference-in-difference specification (1) with the dependent variable $Y_{l,b,f,t}$ the change in the lead lender's share of the loan commitment. If a decline in its health caused the lead lender to force a tightening of credit provision following a covenant violation, we should expect the lead lender's share of the renegotiated loan to decline on average. If instead the tightening of credit reflected only some unobservable attribute of the borrower, the lead lender share should remain constant or even increase due to enhanced agency problems between the lead and the other syndicate members. Notably, using the change in the lead's share as the dependent variable in equation (1) is akin to having bilateral credit to a borrower as the dependent variable but including a borrower-loan fixed effect. This specification therefore closely resembles the "within estimator" of Khwaja and

[17]The correlations of the four alternative measures of lender health shown in columns (3)-(6) with the baseline measure are 0.48, 0.80, 0.42, and 0.77.

Table 7: Specification Tests

Dependent variable:	Change in lead lender share	*Credit reduced* in 2006-07 (Placebo exercises)	
Lender health based on:	Crisis lead	Crisis lead	2006/2007 lead
	(1)	(2)	(3)
Bad Lender	1.2	3.5	−2.2
	(2.5)	(3.9)	(6.4)
Bind	−4.1*	13.9**	16.1***
	(2.4)	(5.7)	(5.3)
Bad Lender × *Bind*	−10.9**	2.9	10.3
	(5.2)	(10.5)	(11.5)
Year, Industry FE	Yes	Yes	Yes
Borrower, Loan Controls	Yes	Yes	Yes
Observations	2,289	2,047	2,478

Notes: The table reports regressions of the form: $Y_{l,b,f,t} = \beta_0 + \beta_1[Bad\ Lender] + \beta_2\,[Bind] + \beta_3[Bad\ Lender \times Bind] + \gamma' X_{l,b,t} + \epsilon_{l,b,f,t}$. In column (1) the sample and variable definitions are the same as in table 4 except that the sample excludes loans which disappear by the end of the year and the dependent variable is the change in the fraction of the loan commitment from the lead lender. In columns (2) and (3) the sample consists of loans in the SNC covenant sample at the start of 2006 or 2007 with at least one year maturity remaining and the dependent variable is based on outcomes in 2006 and 2007. In column (2) lender health assignment is based on the lead lender at the start of the crisis. In column (3) lender health assignment is based on the lead lender at the start of 2006 or 2007. In all columns, the dependent variable *Credit reduced* equals 1 if either the loan is terminated before maturity or the loan commitment is reduced; *Bad Lender* is the rank of the crisis health of the assigned lender as of the period indicated in the table header normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender; and *Bind* is an indicator variable which equals 1 if a borrower violated a covenant in either the current or previous year. Reported coefficients are multiplied by 100. Borrower controls: log assets, leverage, risk rating. Loan controls: loan purpose, loan type. Standard errors two-way clustered by borrower and lead lender reported in parentheses. *,**,*** indicate significance at the 10, 5, and 1 percent levels, respectively.

Mian (2008) in that it differences out any heterogeneity across borrowers in loan demand. The negative coefficient for the interaction term in column (1) indicates a reduction in lending by the lead lender relative to other syndicate participants, consistent with the tightening of credit reflecting the increase in internal cost of funds for the lead lender. The magnitude, a decline in commitment share of about 11 percentage points, is equal to roughly two-thirds of the sample mean lead commitment share of 15% during the crisis reported in table 1.

Columns (2) and (3) of table 7 report placebo exercises. In column (2), we keep the measure of lender health assigned to each borrower the same as in our baseline specification, but

re-estimate the difference-in-difference regressions from table 4 for the likelihood of a credit commitment reduction in 2006 and 2007. This exercise asks whether borrowers of lenders in worse health during the crisis were treated differently before the crisis upon violating a covenant. In column (3), we keep the measure of lender health the same but reassign borrowers to their lender as of the start of 2006 or 2007. This exercise asks whether banks in worse health in 2008 and 2009 always treat covenant violators worse, or whether the differential treatment occurs only during the financial crisis. In neither case can we reject that the differential treatment occurred only during the crisis. The estimates of the interaction term coefficient β_3 are small in magnitude and statistically indistinguishable from zero. The harsh treatment of covenant violators by unhealthy banks during the crisis appears to reflect the health of the bank and not some time-invariant bank or borrower characteristic.[18]

4.1.4. Heterogeneity

The structure of loan contracts offers predictions for how the intensity of the treatment effect of having an unhealthy lender and violating a covenant may vary by type of borrower and loan. Table 8 explores this treatment heterogeneity. The table reports the coefficients β_3 and $\beta_{3,I}$ from the fully-interacted regression:

$$\begin{aligned} Y_{l,b,f,t} = {} & \beta_0 + \beta_1[Bad\ Lender] + \beta_2\,[Bind] + \beta_3[Bad\ Lender \times Bind] + \gamma' X_{l,b,t} \\ & + \beta_{0,I}[I] + \beta_{1,I}[Bad\ Lender \times I] + \beta_{2,I}\,[Bind \times I] + \beta_{3,I}[Bad\ Lender \times Bind \times I] \\ & + \gamma_I'\,[X_{l,b,t} \times I] + \epsilon_{l,b,f,t}, \end{aligned} \tag{2}$$

[18] In contrast, we find positive and statistically significant evidence that unconditionally having a covenant binding lowers credit in the pre-crisis period ($\beta_2 > 0$ in columns (2) and (3)). Of course, this result does not invalidate the placebo exercise. We would expect lenders to use covenant violations to restrict credit on some loans even outside the crisis. But this outcome should not occur differentially at lenders more impacted by the crisis, exactly as we find.

Table 8: Heterogeneity

Interaction variable I:	Dependent variable: *Credit reduced*			
	Credit line	High lead share	Small syndicate	Concentrated syndicate
	(1)	(2)	(3)	(4)
Bad Lender × *Bind*	17.4***	14.8*	8.4	10.2
	(4.2)	(8.4)	(11.7)	(9.8)
Bad Lender × *Bind* × I	16.6**	25.7**	27.5**	23.9**
	(5.4)	(11.6)	(11.3)	(10.2)
Main effects	Yes	Yes	Yes	Yes
Main effects×I	Yes	Yes	Yes	Yes
Year, Industry FE	Yes	Yes	Yes	Yes
Year, Industry FE ×I	Yes	Yes	Yes	Yes
Borrower, Loan Controls	Yes	Yes	Yes	Yes
Borrower, Loan Controls ×I	Yes	Yes	Yes	Yes
Observations	3,420	3,420	3,420	3,420

Notes: The table reports linear probability model regressions of the form: $Y_{l,b,f,t} = \beta_0 + \beta_1[Bad\ Lender] + \beta_2[Bind] + \beta_3[Bad\ Lender \times Bind] + \gamma' X_{l,b,t} + \beta_{0,I}[I] + \beta_{1,I}[Bad\ Lender \times I] + \beta_{2,I}[Bind \times I] + \beta_{3,I}[Bad\ Lender \times Bind \times I] + \gamma_I'[X_{l,b,t} \times I] + \epsilon_{l,b,f,t}$. The sample is the same as table 4. The dependent variable *Credit reduced* equals 1 if either the loan is terminated before maturity or the loan commitment is reduced. *Bad Lender* is the rank of the lead lender's health normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender. *Bind* is an indicator variable which equals 1 if a borrower violated a covenant in either the current or previous year. In column (1), I is an indicator variable for whether the loan is a credit line. In column (2), I is an indicator variable for whether the lead lender's share of the loan commitment is above the sample median. In column (3), I is an indicator variable for whether the number of syndicate members is below the sample median. In column (4), I is an indicator variable for whether the Herfindahl index of loan commitment shares is above the sample median. Reported coefficients are multiplied by 100. Borrower controls: log assets, leverage, risk rating. Loan controls: loan purpose, loan type. Standard errors two-way clustered by borrower and lead lender reported in parentheses. *,**,*** indicate significance at the 10, 5, and 1 percent levels, respectively.

where I is an indicator variable described in the table header. Thus, β_3 is numerically equivalent to the coefficient from a separate regression including only observations for which variable I takes a value of 0, while $\beta_3 + \beta_{3,I}$ is numerically equivalent to the coefficient from a separate regression including only observations for which variable I takes a value of 1. The statistical significance of $\beta_{3,I}$ answers whether the data reject the null hypothesis of a homogeneous coefficient on [*Bad Lender* × *Bind*] in the two subsamples.

The first column of table 8 explores heterogeneity along the dimension of loan type. Because

reducing the size of a term loan requires immediate repayment while reducing the limit on a credit line can impact only the unused portion of the commitment, the latter may have a less immediately drastic effect on borrowers. If so, lenders may more readily take action when the loan is a credit line than if it is a term loan. Column (1) shows that this heterogeneity holds in the data. While unhealthy lenders reduce credit to covenant violators with both term loans and credit lines, the likelihood of a credit reduction is nearly double if the loan is a credit line and the difference is statistically significant at the 5% level.

Columns (2)-(4) explore the importance of the syndicate structure. In column (2), the interaction variable equals 1 if the lead's share of the total commitment is above the sample median, in column (3) the interaction variable equals 1 if the number of syndicate members is below the sample median, and in column (4) the interaction variable equals 1 if the concentration (herfindahl index) of the lender shares is above the sample median. Smaller, more concentrated, syndicates and those with a larger lead share are more likely to reduce credit. The larger effect for loans with a higher lead share is again indicative of the lead lender having a special role in the syndicate due to its monitoring and organizing responsibilities and responding to greater incentive to organize and oversee a renegotiation when it provides a larger share of the loan commitment.[19] The results in columns (3) and (4) suggest that smaller, more concentrated syndicates may be easier to organize.

[19] Alternatively, since the variable *Bad Lender* reflects the health of the lead lender, the variable may simply better proxy for the true health of the pivotal syndicate member when the lead provides a larger share of the commitment. While we cannot rule out this possibility, in unreported regressions we also find a statistically significant larger treatment effect for loans with a higher lead share even when we define *Bad Lender* using the weighted median lender's health as described in the previous subsection. Thus, the positive interaction term appears to reflect true dependence on the lead's share.

4.2. Effect on Credit Available and Substitution

We have seen that lenders react differently to covenant violations depending on their own health. We now examine the effect on total credit available to the borrower.

Whether the health of a borrower's lender matters to the borrower depends on the ease with which a borrower can substitute new credit from an alternative lender. Previous literature has motivated costly switching from asymmetric information between old and new lenders (Williamson, 1987; Sharpe, 1990; Hachem, 2011; Darmouni, 2016). An even simpler explanation may apply in the case of covenant violators – lenders will not make new loans to borrowers in technical default, as cross-default provisions mean that the triggering of a covenant on one loan puts the borrower in technical default on other loans and uncertain resolution of the violation deters new lenders from offering credit.

Column (1) of table 9 reports estimates of equation (1) where the dependent variable is the percent change in the total amount committed and the sample contains only loans which began the year with remaining maturity greater than one year and remain in existence at the end of the year. Thus, this column shows the intensive margin change in credit at the loan level. The interaction coefficient of -13.2 indicates a 13 percentage points intensive margin decline in loan commitment for loans which trigger a violation and where the lender is in poor health.

In column (2), we add to the sample loans which began the year with maturity greater than one year but are prematurely terminated and impute a value of 0 for the end of year commitment on terminated loans. We also add to the end of year commitment any new credit from syndicates with lead bank b to firm f.[20] Thus, column (2) captures the intensive and

[20]While SNC treats amendments or refinancing as a continuation of the same loan, very large changes in loan

Table 9: Effect on Total Credit Available

Dependent variable:	%Δ (Total committed)			$\Delta \frac{\text{Non-SNC debt}}{\text{Assets}}$	$\Delta \frac{\text{Debt issuance}}{\text{Assets}}$
Aggregation:	Loan intensive margin	Loan all margins	Borrower	Borrower	Borrower
	(1)	(2)	(3)	(4)	(5)
Bad Lender	1.1	0.2	12.4	−0.3	1.3
	(2.0)	(4.4)	(9.4)	(6.3)	(1.5)
Bind	−2.6**	−3.2	−8.1***	4.4	0.1
	(1.1)	(4.0)	(2.5)	(3.7)	0.5
Bad Lender × *Bind*	−13.2***	−22.9***	−26.0***	−8.8	−4.5**
	(3.2)	(7.5)	(8.9)	(9.1)	(2.0)
Year, Industry FE	Yes	Yes	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes	Yes	Yes
Loan controls	Yes	Yes	No	No	No
Frequency	Annual	Annual	Annual	Annual	Long-difference
Dep. var. source	SNC	SNC	SNC	SNC	Compustat
Observations	2,289	3,420	1,803	1,525	376

Notes: The table reports OLS regressions of the form: $Y = \beta_0 + \beta_1[Bad\ Lender] + \beta_2\,[Bind] + \beta_3[Bad\ Lender \times Bind] + \gamma' X + \epsilon$. In column (1) the sample is the same as table 4 except it excludes loans which disappear by the end of the year; in column (2) the sample is the same as table 4; in column (3) the sample contains all loans in the SNC universe to a borrower in the table 4 sample and the data are collapsed to the borrower level; in column (4) the sample contains all borrowers in the table 4 sample with at least one SNC loan outstanding at the end of the year; and in column (5) the sample contains all borrowers in the table 4 sample which we match to Compustat. *Bad Lender* is the rank of the lead lender's health normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender. *Bind* is an indicator variable which equals 1 if a borrower violated a covenant in either the current or previous year. In column (1) the dependent variable $Y_{l,b,f,t}$ is the percent change in total committed credit associated with loan l. In column (2) the dependent variable $Y_{b,f,t}$ is the percent change in total committed credit on loans from lead lender b to borrower f. In column (3) the dependent variable $Y_{f,t}$ is the percent change in total committed credit aggregated across all loans to borrower f in the SNC universe. In column (4) the dependent variable $Y_{f,t}$ is the change in total non-SNC debt, defined as total debt less the drawn portion of SNC loans, as a percentage of beginning of period total book assets. In column (5) the dependent variable is the change from 2007 to 2009 in issuance of long-term debt less reduction in long-term debt as a percentage of 2007 total book assets, winsorized at the 1% level. SNC Borrower controls: log assets, leverage, risk rating. Loan controls: loan purpose, loan type. Standard errors two-way clustered by borrower and lead lender (columns 1 and 2) or borrower and worst lead lender (columns 3-5) reported in parentheses. *,**,*** indicate significance at the 10, 5, and 1 percent levels, respectively.

extensive margin of credit available from lead bank b to firm f. Including loan terminations

structure or changes to the syndicate may result in the creation of a new loan identifier. Aggregating to the lender-borrower level ensures we do not erroneously impute a loan termination when in fact the lending relationship continued with a different loan identifier. The aggregation includes loans in the full SNC universe which do not appear in the covenant sample.

causes the interaction coefficient to rise by about two-thirds in absolute value relative to the specification including only the intensive margin. Across these two columns and similar to the results in table 4, we find much smaller coefficients on the main effects for *Bad Lender* and *Bind*, reflecting the insulation of borrowers with long-term loan contracts who do not violate a covenant from the health of their lender in the case of *Bad Lender*, and the pervasiveness of covenant waivers granted by lenders in good health in the case of *Bind*.

Column (3) aggregates to the borrower level. Here and elsewhere, when we aggregate to the borrower level, we define both *Bind* and *Bad Lender* as the maximum across all loans for firms with multiple loans in the covenant sample. The dependent variable is the percent change in all loans to the borrower in the full SNC universe. Analyzing the effect on loan commitment at the borrower level allows for any substitution margin by borrowers toward lenders already servicing different loans or the opening of new loans. We find even larger percent declines in credit available after aggregating to the borrower level. Because the denominator of the dependent variable in column (3) includes all loan commitments to the borrower and therefore (weakly) exceeds the denominator in column (2), the larger interaction coefficient in column (3) indicates that affected borrowers receive *less* credit from other lenders.[21] While this result implies a complete absence of substitution toward other lenders, it is consistent with the result in column (2) of table 5 that affected borrowers are less likely to open a new loan, with cross-default provisions in loan contracts putting borrowers into technical default in their other loans, and

[21]Recall that the SNC universe contains all loans of at least $20 million shared by three or more unaffiliated financial institutions under the regulatory purview of one of the SNC supervisors. If borrowers substitute loans not in the SNC universe, then the result in column (3) could overstate the magnitude of the total bank credit decline. However, we have estimated a similar specification for the number of new loans reported by a borrower in DealScan, which does not condition on the identity of the lender, and also find a reduced likelihood of a new loan reported in DealScan for borrowers of unhealthy lenders who violate a covenant.

with the reluctance of lenders to provide new loans to a borrower with an unresolved covenant violation.

Columns (4) and (5) examine whether borrowers substitute non-bank sources of credit. In column (4), we use the measure of total debt reported in SNC. This variable has the advantage that we observe it for all borrowers, including non-public borrowers, but the drawback that a borrower must appear in SNC at the end of the year for us to observe the debt measure so that the column (4) sample excludes borrowers whose loans were terminated. To isolate substitution toward non-SNC debt, we subtract from the total the sum of SNC term loans and the drawn part of SNC credit lines and compute the difference between the beginning and end of the year as a percentage of beginning of period total assets. We find no evidence of affected borrowers substituting toward non-SNC credit; the coefficient on the interaction term $Bad\ Lender \times Bind$ is statistically insignificant and the point estimate is negative.

In column (5) we study the effect on debt issuance reported in Compustat. While the restriction to firms which we can match to Compustat reduces the number of observations, it avoids the censoring problem of borrowers which leave the SNC data.[22] In all specifications using a dependent variable from Compustat we report long-difference regressions of the form:

$$Y_{f,2007-2009} = \beta_0 + \beta_1[Bad\ Lender_b] + \beta_2 Bind_{f,2007:2009} + \beta_3[Bad\ Lender_b \times Bind_{f,2007:2009}] + \gamma' X_f + \epsilon_{f,2007-2009}, \quad (3)$$

where $Y_{f,2007-2009}$ is the change in a variable between 2007 and 2009 associated with firm f which had loans from bank b. By differencing, we control for any unobserved level differences across

[22]The merge uses company names and the string matching algorithm SAS SPEDIS. We manually review each proposed match for accuracy. The online appendix provides additional details on the merge procedure. We winsorize all Compustat variables at the 1% level.

borrowers. The coefficient β_3 identifies the effect of violating a covenant sometime between 2007 and 2009 and having a bad lender on the outcome. The interaction term in column (5) indicates that long-term debt issuance falls for the affected borrowers. Together, the results in columns (4) and (5) appear inconsistent with any ability to substitute toward non-bank debt for these borrowers, as technical default prevents the issuance of other debt.[23]

4.3. Balance Sheet Adjustment and Real Outcomes

We now turn to how borrowers adjust to lower credit. Previous research has found evidence of both lender health (e.g. Chodorow-Reich, 2014) and covenant violations (Chava and Roberts, 2008; Nini et al., 2012; Falato and Liang, 2016) negatively affecting firm investment and employment. Here we ask to what extent the interaction of these two variables matters above the main effects.

We first discuss financial margins of adjustment which substitute for higher credit limits or loan balances. Column (1) of table 10 shows using SNC data that the credit line utilization rate rises for covenant violators of less healthy lenders.[24] The coefficient of 0.086 indicates an increase in utilization of 8.6 percentage points relative to a baseline utilization rate of 62% during the crisis reported in table 1. Column (2) shows using Compustat data and the long-difference specification (3) that firms also adjust by drawing down cash reserves. Together,

[23]We have also investigated new issuance of public debt using the Mergent FISD database and again find a negative and statistically significant coefficient on new debt issuance for firms which violate a covenant and have a lender in bad health.

[24]Because borrowers with multiple credit lines may substitute across lines, we aggregate all credit lines to the borrower level and compute the change in utilization for borrowers with at least one loan outstanding at the beginning and end of the year. Higher utilization can result either from a draw down of the unused portion of the credit line or a reduction in the credit limit. The evidence in table 9 suggests at least part of the higher utilization reflects the reduction in credit limits by unhealthy lenders. We do not interpret this mechanical effect as innocuous for the borrower, however, as firms value the flexibility and insurance aspects of having unused credit commitments. Otherwise, they would never open credit lines.

Table 10: Financial and Real Adjustment

Dependent variable:	Credit utilization	Δ Cash/ Assets	Δ Capex/ Assets	Employment growth
	(1)	(2)	(3)	(4)
Bad Lender	−0.023	0.021	0.028	0.010
	(0.030)	(0.036)	(0.020)	(0.070)
Bind	−0.006	0.015	−0.037	−0.008
	(0.009)	(0.016)	(0.030)	(0.047)
Bad Lender × *Bind*	0.086***	−0.071**	−0.077**	−0.112**
	(0.025)	(0.030)	(0.037)	(0.050)
Industry FE	Yes	Yes	Yes	Yes
Borrower controls	Yes	Yes	Yes	Yes
Frequency	Annual	Long-difference	Long-difference	Long-difference
Dep. var. source	SNC	Compustat	Compustat	Compustat
Observations	1,525	376	376	376

Notes: The table reports OLS regressions of the form: $Y = \beta_0 + \beta_1[Bad\ Lender] + \beta_2 Bind + \beta_3[Bad\ Lender \times Bind] + \gamma' X + \epsilon$. In column (1) the sample contains all borrowers in the table 4 sample with at least one SNC loan outstanding at the end of the year and the data are collapsed to the borrower-year level. In columns (2)-(4) the sample is borrowers in the table 4 sample which also appear in Compustat and the data are collapsed to the borrower level. *Bad Lender* is the rank of the lead lender's health normalized to lie on the unit interval, with a value of 1 corresponding to the least healthy lender. *Bind* is an indicator variable which equals 1 if a borrower violated a covenant in either the current or previous year. In column (1) the dependent variable is the annual change in the utilization across all loans to borrower f. In columns (2)-(4) the dependent variable is the change from 2007 to 2009 in: the ratio of cash to total book assets (column 2); the ratio of capital expenditure to total book assets (column 3); or the log of the number of employees (column 4), winsorized at the 1% level. Borrower controls: log assets, leverage, risk rating. Standard errors two-way clustered by borrower and worst lead lender reported in parentheses. *,**,*** indicate significance at the 10, 5, and 1 percent levels, respectively.

the higher utilization of credit lines and the drawing down of cash reserves reinforce our causal interpretation that the decline in credit to these borrowers reflects a supply contraction and not a lower demand for borrowing by covenant violators of unhealthy lenders.

Columns (3) and (4) of table 10 report real outcomes using Compustat data. The harsher treatment of a covenant violation by less healthy lenders transmits into lower investment and employment. For both investment (column 3) and employment growth (column 4), the interaction term is statistically significant and the magnitude is larger than any of the main effects.[25]

[25]The absence in Compustat of private borrowers as well as some borrowers with missing information in either 2007 or 2009 reduces the sample size by a factor of about four. As a result, many of the main effect coefficients are not statistically significant. The exclusion of private borrowers also may reduce the employment effects relative

5. Aggregation

The previous section showed that unhealthy lenders squeeze borrowers who trigger a covenant violation and that this interaction matters to loan and borrower-level outcomes. We now quantify the total decline in the stock of credit, including commitments, during the crisis mechanically attributable to the loan covenant channel.

This calculation takes the following steps. Column (2) of table 9 reported an interaction coefficient of $\beta_3 = -22.9$ for the intensive and extensive margin percent change in loan volume for loans from unhealthy lenders and which violate a covenant. Using this coefficient, the in-sample fitted decline in lending volume (including unused commitments) due to unhealthy lenders squeezing violators is:

$$\text{Fitted decline} = -\left(0.01 \times \beta_3\right) \times \sum_l Bad\ Lender_b \times Bind_{l,t-1:t} \times Commit_{l,t-1}, \qquad (4)$$

where $Commit_{l,t-1}$ is the loan commitment at the end of the previous year. The contribution to total credit growth in the SNC covenant sample is this sum divided by total initial credit committed and is reported in table 11. At the end of 2008, 5.8% of the dollar commitments outstanding as of the end of 2007 had disappeared due to unhealthy lenders contracting credit on loans which violated covenants. The corresponding decline in 2009 is 5.9%. Therefore, by the end of 2009 the loan covenant channel accounted for an 11.4% decline in the stock of credit outstanding relative to 2007.

For comparison, the total stock of credit outstanding (including new loans and commitments)

to Chodorow-Reich (2014), who found the effects of lender health on employment were largest for small borrowers and borrowers without access to public debt markets.

Table 11: Aggregate Importance

	$t = 2008$	$t = 2009$
	(1)	(2)
SNC covenant sample decline due to interaction	5.8%	5.9%

Notes: The table reports the ratio $-(\beta_3 \sum_l Bad\ Lender_b \times Bind_{l,t-1:t} \times Commit_{l,t-1}) \ / \ (\sum_l Commit_{l,t-1})$.

in the full SNC universe contracted by 9.7% between 2007 and 2009. Thus, the reduction in credit due to the loan covenant channel is larger than the total decline in credit outstanding. Of course, total credit likely would not have stayed flat if bank health hadn't deteriorated, as either rising borrower demand (total credit had increased in the years before the crisis) or a decline in credit demand due to the weak economy would have impacted the quantity of credit. Without taking a stand on this counterfactual, we cannot provide an exact contribution share of the covenant channel to the overall transmission of lender health to corporate borrowers. Nonetheless, it seems unlikely that borrower credit demand could have increased much during the severe recession of 2008 and 2009. We conclude that the transmission of bank health to nonfinancial firms occurs largely through the loan covenant channel.

6. Conclusion

We have investigated the importance of lender health in determining the response to a covenant violation. Using a new supervisory data set of bank loans, we document a higher covenant violation propensity than found in previous work, with more than one-third of loans breaching a covenant each year during 2008 and 2009. Lenders in worse financial condition are less likely to grant a waiver and more likely to force a reduction in the loan balance following

a violation. Quantitatively, the reduction in credit to borrowers with long-term credit but who violate a covenant accounts for an 11% decline in the volume of loans and commitments outstanding between 2007 and 2009.

Our results have implications not explored in this paper. We highlight three. First, when writing loan contracts ex ante, do lenders and borrowers internalize the effective option to shorten maturity which covenants offer? Our results suggest they should. However, a body of research finds that managers may be overconfident in their outlook for their firm (Malmendier and Tate, 2015), in which case they may underestimate the likelihood of breaching a financial covenant. Second, our evidence comes from a particularly acute crisis period. While such episodes merit special attention due to their macroeconomic importance, the pervasiveness of covenant violations in non-crisis periods means that this channel may also matter in more tranquil times. Third, because on average lower quality and smaller firms violate covenants, the importance of this channel suggests credit tightening may affect the allocation as well as the quantity of credit. Future research could take up these questions.

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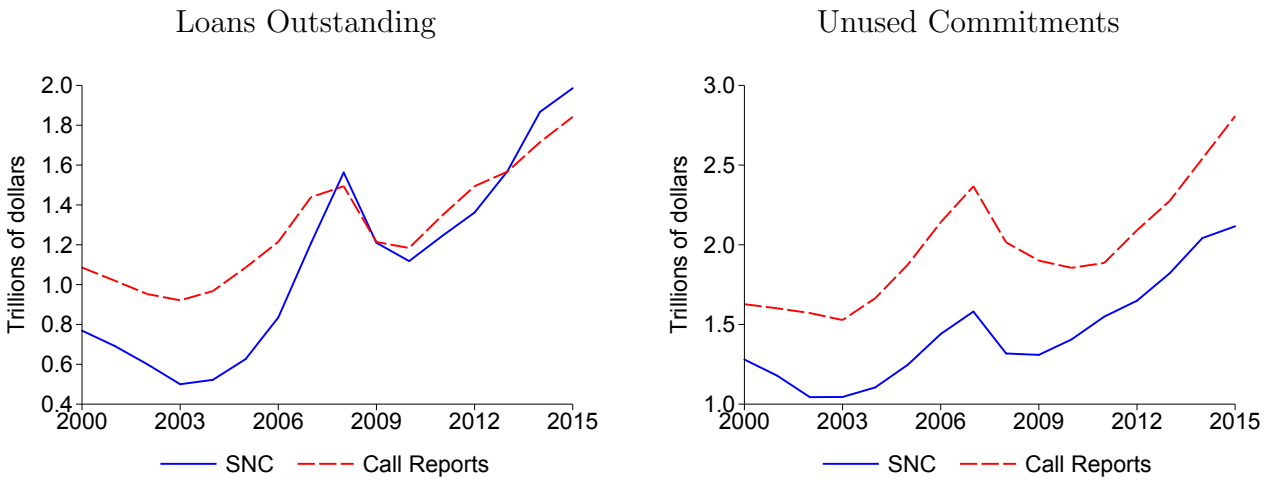
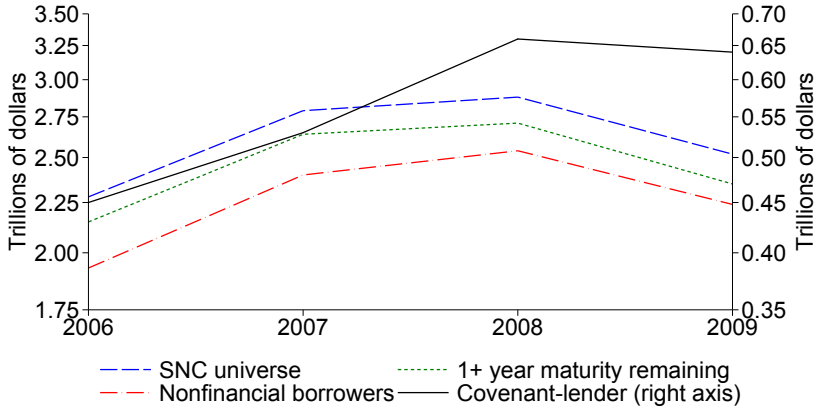
Figure A.1: Comparison of SNC to Call Report Data



Notes: The left panel plots the dollar amount of SNC loans outstanding and Consolidated Reports of Condition and Income (Call Reports) commercial and industrial loans. The right panel plots the dollar amount of SNC unused loan commitments and Call Report unused commitments not associated with real estate or credit cards. SNC data: https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20160729a1.pdf (accessed March 27, 2017). Aggregated Call Report data from the FDIC Quarterly Banking Profile: https://www.fdic.gov/bank/analytical/qbp/timeseries/BalanceSheet.xls (accessed November 2, 2016).

Figure A.2: SNC Sample Comparison



Notes: The figure reports the dollar amount of total loans outstanding and unused commitments in the SNC universe (blue line); the preceding less loans with less than one year maturity remaining (green line); the preceding less loans to financial borrowers (red line); and in our final sample of all term loans and credit lines to nonfinancial borrowers in the SNC covenant sample with a lead lender in the Chodorow-Reich (2014) data set and which start the year with at least one year of maturity remaining.