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Recourse as Shadow Equity: Evidence from Commercial Real Estate Loans*

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Abstract

We study the role that recourse plays the in commercial real estate loan contracts in the portfolios of the largest US banks. We find that recourse is valued by lenders and is treated as a substitute for conventional equity. At origination, recourse loans receive loan rate spreads that are at least 20 basis points lower and loan-to-value ratios that are at least 3 percentage points higher. Dynamically, recourse affects loan modification negotiations by providing additional bargaining power to the lender. Loans with recourse were half as likely to receive accommodation during the COVID-19 pandemic, and the modifications that did occur entailed a relatively smaller reduction in payments.

Keywords: commercial real estate, recourse, LTV

JEL Classification: G21, G22, G23, R33

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1. INTRODUCTION

Commercial mortgages are heterogeneous contracts, with terms settled through a back-and-forth negotiation between the lender and the borrower. Loans that appear risky along one dimension, such as loan-to-value (LTV) ratios, often have other characteristics to mitigate those risks.[1] One of these contractual terms—recourse—can act as a type of "shadow equity," providing lenders access to borrowers' assets beyond the pledged collateral, thus reducing some of the risks of borrower leverage.[2]

In theory, recourse can provide significant value to banks (Childs et al., 1996). Prior to liquidation, the presence of recourse can dampen agency problems that arise as borrowers near default,[3] offer better incentives to borrowers to avoid default if they have the means to make loan payments, and provide lenders bargaining power in loan modification negotiations. However, the magnitude of such effects is unclear; by the time a borrower nears default, he or she may have little in the way of other assets to insulate the bank from losses. Moreover, recourse may provide little benefit if the potential recovery from a deficiency judgment is outweighed by foreclosure and liquidation costs.

In this paper, we take advantage of detailed loan-level data on the commercial real estate (CRE) portfolios of the largest US banks to perform a comprehensive analysis of the value of recourse to lenders both at loan origination and during loan modification negotiations. Unlike other CRE lenders, which overwhelmingly provide non-recourse loans, banks offer both recourse and non-recourse financing.[4] This heterogeneity in bank CRE loan contracts allows us to use within-lender variation to study how recourse clauses affect loan terms and outcomes relative to otherwise similar non-recourse loans.

Our analysis makes four contributions to the literature. First, we provide some basic empirical facts about the prevalence of recourse in bank CRE loan portfolios, and the observable differences between loans with and without recourse. Roughly three-quarters of bank CRE loans have full or partial recourse. The most notable difference between recourse and non-recourse loans is in size; the average origination amount of a recourse loan is \$9 million, compared to \$43 million for a non-recourse loan. This implies that only 45 percent of these bank CRE loans by value have recourse.

[1] See Ambrose and Sanders (2003), Harrison et al. (2004), Titman et al. (2005), and Grovenstein et al. (2005) for examples.

[2] State laws limiting the use of recourse apply to owner-occupied residential properties. While they may apply to small multi-unit properties where the owner resides in one unit, they do not apply to the vast majority of commercial real estate.

[3] For example, the debt overhang problem (Myers, 1977) can naturally affect commercial real estate decisions: if a borrower expects to default, he or she may cut capital expenditure because he or she expects to lose the property and not benefit from the investment.

[4] CMBS loans are bankruptcy remote by design and therefore non-recourse outside of "bad boy" clauses, which trigger recourse in the event of a particular bad act (such as fraud) on the part of the borrower.

Second, we show that recourse enables borrowers to receive meaningfully lower loan rate spreads. Controlling for observable loan and property characteristics, we find that recourse loans command spreads that are 20 basis points lower than otherwise similar loans. As banks may require recourse on some loans to address unobserved risk characteristics, this estimate likely provides a lower bound of the true effects. Indeed, when we instrument for recourse using the lending bank's tendency to require recourse for observably similar loans—thus identifying off lender preferences rather borrower-specific underwriting—we estimate that recourse loans command spreads that are 52 basis points lower. These findings suggest that lenders place significant value on the addition of recourse to a loan contract.

Third, we show that recourse substitutes for more conventional forms of equity. Using a similar approach to our analysis of rate spreads, we find that recourse is associated with LTV ratios at origination that are 2.8 percentage points higher (3.4 percentage points in the IV specification). Therefore, in addition to lowering interest costs, recourse provides property owners with a means of increasing their leverage. Higher leverage may be desirable for investors that either seek a higher return on equity or lack the liquid assets to make a down payment satisfying normal underwriting metrics.

Lastly, we demonstrate that recourse enhances lenders' bargaining power in loan modification negotiations. Historically, recourse loans are modestly less likely to receive a modification or credit rating downgrade. During the COVID-19 pandemic, credit rating downgrades for recourse and non-recourse loans increased in parallel. However, despite having similar rates of stress, recourse loans were half as likely to receive modifications as non-recourse loans. In other words, borrowers with recourse were not less likely to need a modification during the pandemic, but were much less likely to receive one. Recourse loans that did receive modifications received modifications that were less beneficial to the borrower.[5]

Our paper is closely related to the literature on the use of recourse in real estate lending. Most empirical work on the use of recourse is in residential mortgage lending, most notably Ghent and Kudlyak (2011).[6] The existing literature on this topic for commercial

[5]The implication that recourse provides the lender with more bargaining power in loan modification negotiations is economically important. As shown by Black et al. (2017), banks are much more likely than securitized lenders to modify loans in order to mitigate losses. Renegotiations of commercial mortgages are also much more frequent than what is seen in residential mortgages, probably because there is less asymmetric information between borrowers and lenders (Adelino et al., 2013).

[6]Ghent and Kudlyak (2011) show that many residential mortgages are subject to recourse, depending on the state. Exploiting these state differences in the legality of recourse, the authors find that recourse acts as a strategic default deterrent and induces more lender-friendly default when default does occur, among other findings. Interestingly, the authors find higher interest rates on mortgages in recourse states, which they leave as a puzzle. With the more granular loan-level heterogeneity in recourse from our data, we show that recourse is associated with lower spreads, consistent with theory.

mortgages is largely theoretical. The models of Childs et al. (1996) and Lebret and Quan (2017) demonstrate that borrowers can achieve lower spreads or higher leverage by taking out recourse loans.[7] To our knowledge, the only other paper that empirically studies recourse in commercial mortgages is Binder and Kim (2019), who show that recourse has little ability to predict future defaults.

More broadly, we also contribute to the literature examining the underwriting and performance of commercial mortgages. This work shows that the joint determination of various underwriting characteristics can complicate analysis of the effects of borrower leverage. Loans may have low LTVs to offset other unobserved risks, and thus not have lower default risk (Grovenstein et al., 2005; Ambrose and Sanders, 2003) or lower spreads (Titman et al., 2005). Likewise, borrowers may choose low LTVs if default is more costly (Harrison et al., 2004). Consistent with this literature, we show empirically that recourse can compensate for having a high LTV and mitigate some of the risks associated with higher leverage.

The rest of the paper is structured as follows. In Section 2, we discuss the data used in our analysis. In Section 3, we review the prevalence of recourse in bank CRE portfolios and discuss observable differences between recourse and non-recourse loans. In Section 4, we analyze the effects of recourse on rate spreads and leverage for CRE loan originations. In Section 5, we investigate the relationship between recourse and loan performance. In Section 6, we conclude.

2. DATA

We use supervisory data collected to support the Federal Reserve stress tests, which contain loan-level information on the commercial real estate portfolios of the largest banks in the United States. The reporting panel consists of banks with consolidated assets of $100 billion or more, which report information for all loans with a committed balance of $1 million or more.[8] The data include construction and land development (CLD) loans, as well as loans secured by non-owner-occupied income-producing properties.[9]

The data include an array of information on banks' portfolio loans: the interest rate,

[7] In addition, Corbae and Quintin (2015) explore the role of leverage in inducing foreclosures in the Great Recession and its aftermath. The authors include an extension of their model, finding that recourse can play an important role in mitigating foreclosures by reducing the incentive for strategic default.

[8] As part of their capital assessment and stress tests, banks file regulatory forms called the Y-14Q on a quarterly basis. The commercial real estate data can be found through Schedule H.2. Our sample also includes some loans from banks with $50-$100 billion in assets due to the lower asset threshold before 2019. The data are at the facility level, and a facility can include multiple loans to the same entity; nonetheless, most facilities have only one loan, so we treat the data as loan level.

[9] Information on loans secured by owner-occupied commercial properties is collected on a separate schedule along with corporate loans.

committed exposure (drawn plus undrawn credit), loan balance, dates of origination and maturity, amortization (for example, interest-only versus fully amortizing), whether there is a prepayment penalty, and the interest rate variability type (fixed versus floating).[10] It also includes information on the property securing the loan: the appraised value, the type (for example, hotel versus retail), and geographic location information at the ZIP code level, which we map to core-based statistical areas (CBSA).[11] We construct the loan-to-value ratio using the loan balance and appraised value. The spread between the loan interest rate and the bank's cost of funds is calculated using the interest rate, the dates of origination, and term.[12]

The data also include loan-level risk measures. First, banks provide a standardized version of their internal borrower risk rating for each loan. Banks have their own internal risk categorizations, but provide a mapping from these internal ratings to a common scale along the lines of what is used for bond ratings. Internal ratings can sometimes span multiple ratings on the common scale, so there is a mininum and maximum rating provided on the common scale. When constructing an indicator for whether a borrower is rated the equivalent of BBB+ or higher, we take the maximum rating. A subset of stress test banks are also "advanced approaches" institutions. These banks are required to report their estimates of loan probability of default and loss given default, the product of which is the expected loss of the loan. For loans from banks that do not report these variables, we impute expected loss using the average value for the loan's particular borrower risk rating, so as to not limit our sample.

Key to our analysis, banks also provide information on whether a loan has recourse. As of September 2014, the recourse field indicates whether the loan has full, partial, or no recourse. Prior to that date, banks only indicated whether a loan had any form of recourse and did not distinguish between full and partial recourse. We label any loan that has partial or full recourse as having recourse.[13]

We exclude from our sample all loans that are missing key information or that contain outliers. This includes all loans with a negative or missing committed balance, all loans

[10] Interest rates and interest rate variability are not reported for fully undrawn loans. For these fields, we backfill information from the first instance when non-zero or non-missing values occur (typically the time of the first draw on the credit facility).

[11] For loans with a ZIP code that does not map to a CBSA, we assign a CBSA code of 0.

[12] For floating rate loans, we use one-month LIBOR as the reference rate. For fixed-rate loans, we compute the maturity-matched swap rate. For loans with terms under two years, we linearly impute between one-month LIBOR and the the two-year swap rate. For terms above two years, we linearly impute between available swap rates. For floating rate loans that are undrawn at the time of first reporting, we use one-month LIBOR as of the reporting date rather than origination date as the reference rate.

[13] To give a sense of what the data look like before combining partial and full recourse loans, in Table A.2 in the appendix we provide a parallel table to Table 1, breaking out loans by whether they have full or partial recourse. Note that this table only uses data from 2015 on, due to the later inclusion of the more detailed recourse field in the data.

with an LTV greater than two or less than zero, all leveraged loans, all acquired loans, all loans to foreign borrowers, and all loans secured by properties outside the United States. We also drop loans that have missing values for recourse, cross-collateralization, loan value, origination or maturity date, state code on the property, whether the loan is floating rate, or whether the loan is the first lien on the property. Lastly, we drop loans if they are the only observation for that lender-state-year-property type combination.[14]

We also adjust our measure of LTV for cross-collateralized loans. For cross-collateralized loans, banks report as the property value the total value of all cross-collateralized properties. For example, two cross-collateralized 80 percent LTV loans on two different $10 million properties would be reported as loans of $8 million against $20 million in collateral. Since collateral is double-counted and loan amounts are not, we adjust property values and LTVs to only reflect the portion of the collateral applicable to that loan. Therefore, the LTVs in the example loans would be treated as 80 percent rather than 40 percent.

In Sections 3 and 4, where we analyze data as of origination, we exclude loans that appear in the data with a lag in order to avoid selection bias due to differential attrition.[15] Specifically, we drop loans that were originated before the bank began reporting data (2012 for most of the sample, later for some regional banks), originated more than two quarters before they first appear in the data, or have an origination date differing from the earliest origination date (to exclude modified loans). In Section 5, where we analyze the performance of loans over time instead of outcomes at origination, we use the full sample of loan observations between 2012 through 2020, only excluding those with missing values.

We focus our analysis on commercial loans secured by stabilized properties as we are better able to control for key characteristics affecting risk premiums on such loans. Loans against transitional properties—those properties underlying renovation or construction projects—are often valued using an estimate of its future income instead of actual income, making the property value subject to measurement issues.[16] Furthermore, the performance of loans on transitional properties is highly dependent on the business model of a particular borrower, making the loan and property controls employed in our

[14]This last condition is applied for the sake of keeping the sample consistent in OLS and IV specifications. OLS estimates are little changed when including these singleton observations.

[15]Loans that appear in the data with a lag—for example, loans originated before a bank started Y-14 reporting—may not be reflective of the sample of loan originations for that bank-quarter: shorter-term loans may mature, lower quality loans may default, loans might prepay, or loans may be modified so that the terms at the time of reporting do not reflect origination values. However, our results are qualitatively similar with the more expanded sample.

[16]More formally, we define loans on transitional properties as any construction and land development loan or any loan for which the reported property value is an estimate for once the property is completed or stabilized as opposed to the value being reported "as is."

analysis less effective at controlling for risk.

3. THE PREVALENCE OF RECOURSE IN BANK CRE PORTFOLIOS

We present summary statistics on key variables from our cleaned sample of loans at origination—with finer detail broken out by recourse status and property type—in Table 1. These statistics provide information on how often recourse is a feature of bank CRE loans, and how loans with recourse differ from non-recourse loans in terms of observable characteristics.

Recourse is fairly common: 78 percent of loans secured by stabilized properties have recourse.[17] Origination amounts for recourse loans secured by stabilized properties are, on average, only about one-fourth the size of non-recourse loan amounts, implying that the recourse share is smaller on a value-weighted basis, standing at 45 percent.[18] Other terms also differ between recourse and non-recourse loans. Recourse loans have lower spreads, lower LTVs, longer terms, and are less likely to be interest only or floating rate compared with non-recourse loans, on average.

The prevalence of recourse also varies across property types. For example, 82 percent of multifamily loans have recourse, whereas around 66 percent of lodging loans have recourse. On average, the biggest difference in rate spreads by recourse status is for multifamily loans, for which recourse loans carry spreads that are 31 basis points lower than those for non-recourse loans. Recourse loans secured by hotels also carry notably lower spreads, while the average spreads for recourse and non-recourse loans are within 7 basis points of one another for retail, industrial, and office CRE loans.

The use of recourse also differs substantially across lenders. In the top panel of Table 2 we divide lenders into quintiles by the share of their loans that are recourse.[19] The top quintile of lenders have recourse on over 90 percent of their CRE loans, while the lowest quintile of lenders have recourse on 14 percent of such loans. We will exploit this notable heterogeneity in banks' use of recourse in our IV strategy. If a loan has recourse because the lending bank almost always requires recourse, then the recourse clause is less likely to reflect unobserved borrower risks.

Differences in the use of recourse are less stark across states. The bottom panel of Table 2 depicts quintiles of states by recourse share. The residential mortgage literature has focused on state differences in recourse laws (Ghent and Kudlyak, 2011). While

[17] Table A.1 in the appendix has summary statistics for loans on transitional properties. Just under 70 percent of loans secured by transitional properties have recourse.

[18] The median loan amounts are $2.1 million and $7.3 million for recourse and non-recourse loans, respectively.

[19] We use quintiles so that multiple banks are in each bucket, thus preserving their anonymity.

laws allowing or preventing recourse on owner-occupied residential properties do not generally apply to commercial properties, there are still legal differences across states that can make it more or less difficult to obtain a deficiency judgment. Recourse shares for loans secured by stabilized properties range from 56 percent to 83 percent across state quintiles with some variation by property type.

4. DO LENDERS VALUE RECOURSE?

4.1. Recourse and Interest Rate Spreads

Qualitatively, the effect of recourse is straightforward: recourse should act like additional equity and reduce losses in the event of default, offer better incentives to borrowers to avoid default, mitigate the agency problems that can worsen near default, and provide lenders more bargaining power if loans need to be modified or liquidated. The inclusion of recourse in a loan contract should enable borrowers to either achieve more favorable loan pricing or be allowed greater risk along other dimensions, for example, higher LTVs.

However, the quantitative significance of such effects is uncertain. Property investors tend to specialize in particular regions or property types, meaning that the value of an investor's other assets is likely to be highly correlated with the value of the subject property. By the time a borrower has an incentive to default, a borrower's net worth may have declined such that recourse provides little value. Moreover, the costs and difficulties of achieving a deficiency judgment may substantially reduce the value banks place on recourse.

To investigate how banks value recourse, we study how recourse affects other underwriting characteristics of CRE loans for stabilized properties. Specifically, we run the following regression:

$$r_{i,b,t} = \beta_1 \text{Recourse}_{i,b,t} + \beta_2 \text{LTV}_{i,b,t} + \gamma' \text{X}_{i,b,t} + \tau_t + \eta_b + \xi_{c(i)} + \varepsilon_{i,b,t}, \tag{1}$$

where $r_{i,b,t}$ is the spread on loan i from bank b in origination year t, $\text{Recourse}_{i,b,t}$ indicates whether that loan has recourse, $\text{LTV}_{i,b,t}$ is the loan-to-value ratio, and $\text{X}_{i,b,t}$ is a vector of loan-level controls. The regressions also include lender (η_b), origination-year (τ_t), and state-by-CBSA fixed effects ($\xi_{c(i)}$).[20] Our baseline set of controls is the natural logarithm of the loan term, the natural logarithm of the committed balance at origination, and indicators for whether the loan is interest only, has a prepayment penalty, has a floating rate, is cross-collateralized, and is the first lien on the property. We also include property

[20]These fixed effects allow us to capture both differences across metropolitan areas and differences in state laws. Counties outside of CBSAs are given a CBSA code of zero; thus, their fixed effect corresponds to all non-urban counties within the state.

type fixed effects, and show the coefficients for industrial, lodging, and office (multifamily is the omitted property type).[21]

The key variables of interest are LTV and the recourse indicator. If recourse is valued by lenders as a form of shadow equity, we would expect $\beta_1 < 0$. Likewise, if regular equity (the down payment) is valued by lenders, we would expect $\beta_2 > 0$.

The presence of recourse on a loan contract is, of course, not random and the OLS coefficients on recourse are likely to be biased. Banks may require recourse on riskier loans much in the way they require lower LTVs on such loans. Consequently, recourse loans likely have unobservable characteristics that make them riskier on average than non-recourse loans. OLS estimates of the effect recourse has on loan pricing therefore arguably provide a lower bound for the true effect.

To shed light on the possible magnitude of this bias, we also estimate equation (1) using two-stage least squares. Specifically, we instrument for a loan's recourse status using the recourse loan share of other originations in that market (property type-state-year) from the given lender.[22] Intuitively, variation in recourse due to differences in lenders' use of recourse is less likely to reflect loan-specific risk characteristics than the differences in recourse clauses for individual loans. Since the IV estimate is likely to be biased itself since banks that more frequently require recourse are also likely to be more risk-averse, resulting in differences in other loan characteristics. As the IV estimate should overstate the impact of recourse, the combination of OLS and IV estimates should provide reasonable bounds for the true effect of recourse.

We estimate that recourse lowers loan rate spreads by between 20 and 52 basis points. These results are presented in Table 3. The first two columns are from OLS regressions. In column (1), which omits the LTV control, we get a value of –0.204 for $\hat{\beta}_{1,OLS}$, with statistical significance at the 1 percent level.

Adding LTV as a control in column (2) does not meaningfully change the estimated effect of recourse; $\hat{\beta}_{1,OLS}$ edges down to –0.206. Although positive, the coefficient on LTV is small and statistically insignificant, implying that, on average, lower LTV loans do not command notably lower interest rates, likely reflecting the endogeneity of LTV choice (Titman et al., 2005).

Column (3) presents the IV estimates, where both recourse and LTV are instrumented

[21]The coefficients on other property types (for example, "mixed" and "condo") are included in the specification but not displayed (due to space constraints).

[22]We exclude the loan of interest when calculating the lender's recourse share for similar loans. We include the full sample of loans on both transitional and stabilized properties to construct the IV. We look at a lender's recourse shares by property type-state-year so as to capture differences in experience or preferences across property types, differences in recourse laws across states, and changes in preferences over time. We also use a similar approach to instrument for the LTV at origination, using the average LTV of loans originated in that market (property type-state-year) for a given lender.

for using the mean LTV and recourse indicator within the particular market segment and lender. We find a value of –0.516 for $\hat{\beta}_{1,IV}$, with the estimate still significant at the 1 percent level. The OLS and IV estimates likely bound the true effect: OLS estimates are likely biased toward 0, reflecting higher recourse on riskier loans, and IV estimates are likely biased away from zero, reflecting differences in banks' risk aversion manifesting in ways besides recourse frequency. Accordingly, the availability of recourse likely lowers loan rate spreads by somewhere between 20 and 51 basis points.

The IV estimate for the effect of LTV on spreads is larger and is statistically significant. It implies that banks provide a 9 basis point rate discount for a 10 percent increase in LTV. This result is also consistent with $\hat{\beta}_{2,OLS}$ being biased toward zero.

In column (4) we add in additional controls for risk based on banks' internal risk ratings for loans to our OLS specification from column (2). We include a dummy variable for whether the internal risk rating is equivalent to that of an investment-grade credit (rated BBB or higher), and the expected loss (probability of default times loss given default).[23] This limits our sample somewhat due to a few hundred observations with a missing risk rating. The interpretation of the coefficients on recourse and LTV is complicated in this specification as recourse, LTV, and other terms are presumably a component of banks' risk ratings and expected loss calculations. This specification thus tests whether banks offer lower spreads on loans with recourse beyond the assessed effect of these variables on risk ratings. The coefficient on recourse declines only modestly when adding these additional controls. The coefficient on LTV, however, switches signs and becomes negative, indicating that the positive relationship between LTV and loan pricing is fully captured by banks' risk ratings.

The other regression coefficients have the expected signs and are fairly similar across the four specifications. One finding worth highlighting is that cross-collateralized loans receive loan rates that are about 11 basis points lower than those on other loans. Cross-collateralization pledges properties securing other loans as collateral. As such, cross-collateralization can serve a function similar to that of recourse, but with the claim on borrowers' other assets in a liquidation limited to the equity in another particular property (Childs et al., 1996). This finding is thus consistent with the primary findings with regard to the effects of recourse.[24]

[23] Adding a full set of fixed effects for credit rating gives similar results.

[24] We focus on recourse in this paper because it is much more widely used. Only about 5 percent of stabilized loans are cross-collateralized.

4.2. Recourse as a Substitute for Conventional Equity

There are other benefits besides loan pricing that borrowers might realize from providing recourse. If recourse allows borrowers to achieve a more favorable loan rate for a given LTV, depending on borrowers' preferences, this shift in available contracts may result in a higher LTV in addition to (or rather than) lower spreads. For an investor seeking an LTV near the upper bound of what a bank is willing to make, perhaps because he or she has limited liquid assets available for a down payment, recourse may predominantly affect a loan's LTVs. Investors may choose to put additional skin-in-the-game in the form of recourse, so that banks are willing to make higher LTV loans than they would have in the absence of recourse.

To estimate to what extent recourse substitutes for convention equity, we run the regression specification described in equation (1) but with LTV as the dependent variable. All controls are as before, but with the loan rate spread included in place of LTV in some specifications. The results of these regressions are in columns (5)–(8) of Table 3. The range of estimated effects of recourse on LTV is narrower than for spreads: estimates range from 2.7 or 2.8 in OLS specifications to 3.4 in the IV specification.

The OLS estimate in column (5) implies that recourse loans have LTVs that are about 2.8 percentage points higher than those of non-recourse loans. That is, borrowers who have equity at stake through a recourse clause are able to have modestly less equity at stake through their down payment. The estimate rises slightly in column (6), when the specification additionally controls for loan rate spreads, consistent with the endogenous response of loan rate spreads biasing the estimated effect of recourse in (5) downward.[25]

Similar to the analysis of rate spreads, unobservable characteristics affecting recourse decisions are likely to bias OLS estimates. If loans with riskier unobserved characteristics are more likely to require recourse and have stricter LTV limits, this pattern will cause a downward bias in our estimate of the effect of recourse on LTV. To address this bias, column (7) estimates the same specification as (6), but instruments for recourse using the frequency with which the lending bank requires recourse for other similar loans. The estimated effect of recourse rises, albeit less than in the spreads regression. The IV estimate implies that recourse loans receive LTVs that are 3.4 percentage points higher.

Lastly, in column (8) we include our loan-level risk measures. The estimated effect

[25]Since recourse loans have been shown to have lower spreads, and lower spreads are associated with lower LTVs, the specification in (5) suffers from omitted variable bias. Recourse shifts out the set of contracts a bank will offer so that a higher LTV is available for a given spread. The full extent of a supply shift is not reflected in our estimated effect on LTV due to movement along the curve to a lower spread. Controlling for spreads attempts to better identify the shift in available LTVs, but is likely insufficient due to the endogeneity of loan rate spreads: loans with riskier unobservables receive higher spreads and lower LTVs.

of recourse on LTVs is only modestly lower than in the other OLS specifications, with recourse loans on average receiving LTVs that are about 2.7 percentage points higher than those of non-recourse loans.

Coefficients on other variables are in line with expectations. Loans with riskier terms or property characteristics typically have lower LTVs to compensate, and loans with high LTVs tend to receive higher spreads and worse risk ratings. The findings regarding cross-collateralization are again worth noting—cross-collateralized loans receive LTVs that are about 3.2 percentage points higher.

Overall, the results indicate that banks value recourse. Loans with recourse receive a combination of lower interest rate spreads and higher LTVs. Consequently, recourse enables borrowers to affordably achieve higher leverage than would otherwise be feasible. Recourse may thus benefit borrowers with limited liquid assets, as it enables them to provide skin-in-the-game in a way other than through a down payment, therefore expanding the set of available loan contracts.

5. DYNAMIC EFFECTS OF RECOURSE

In Section 4 we showed that banks value recourse, charging lower spreads and allowing higher LTVs for recourse loans on average. These findings indicate that banks see recourse as a means of giving borrowers the incentive to maintain payments in times of stress or improving outcomes in the event of default.

In this section, we show that recourse does, in fact, provide value to banks. We document that CRE market stress during the COVID-19 period predominantly manifested itself in the form of higher modification rates and higher rates of downgrading borrower's credit quality, but only modestly higher delinquency rates. We then show that while recourse loans were just as likely to receive a downgrade as non-recourse loans, they were 50 percent less likely to receive a loan modification. The modifications they did receive generally involved smaller reductions in required loan payments. We interpret these results as implying that recourse provides lenders with bargaining power in loan renegotiations.

5.1. *Bank Loan Modifications Were Common during the COVID-19 Pandemic*

Banks tend to modify CRE loans before they become delinquent (Black et al., 2017). Given the high costs of foreclosure in commercial real estate, and the limited contractual impediments to loan modifications, banks are have an incentive to work with borrowers to avoid default.[26]

Incentives for modification were particularly pronounced during the COVID-19 period as the stress was a large unexpected shock, generally outside of borrowers' control, and was considered largely transitory. This limited the moral hazard concerns that can come with modifying troubled loans. Guidance from regulators also encouraged banks to work with borrowers. The interagency statement from bank regulators[27] stated that "[t]he agencies view loan modification programs as positive actions that can mitigate adverse effects on borrowers due to COVID-19."[28]

We identify loan modifications by comparing loan terms over time.[29] Specifically, a loan is considered modified if it switched from being amortizing to being interest only, if the committed balance rises (indicating interest payments are added to the loan balance as part of a forbearance plan), if the committed balance falls in tandem with a positive cumulative charge-off (indicating a write-off), if the maturity date is extended (outside of a pre-negotiated renewal), or if the loan enters troubled debt restructuring.[30] Since we are interested in banks' decisions regarding particular loans, we omit from the analysis a few banks that modified over 30 percent of their CRE loans in 2020:Q1, as such modifications are more likely to reflect blanket policies rather than banks' assessments of the need to modify particular loans.

We additionally assess loan performance based on whether loans receive rating downgrades or become distressed. We consider loans as distressed if they are delinquent, are non-accrual, or are involuntarily liquidated. We define a downgrade as a decline in the lender's internal credit rating in a given quarter.

Our estimates of quarterly modification, downgrade, and distress rates before (2012-2019) and during the COVID period (2020) are in Table 4. CRE loans were modified at a rate of about 5.4 percent per quarter in 2020, up from a rate of 1.5 percent pre-2020.

[26] This is in contrast to loans in commercial mortgage-backed securities (CMBS), where servicers have a more limited ability to modify loans due to REMIC rules and pooling and servicing agreements (PSAs).

[27] The interagency statement from bank regulators regarding loan modifications can be found here: https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200407a.htm.

[28] Furthermore, short-term modifications made in response to the COVID-19 pandemic were not considered troubled debt restructurings, and therefore did not need to be accounted for in the bank's allowance for loan and lease losses.

[29] Our method is similar to that used in Adelino et al. (2013).

[30] We also consider changes in origination dates, which occur when there is a substantial change in a loan's terms, and changes in interest rates on fixed rate loans, but these are rare.

Though modifications rose for all property types, the rise was particularly pronounced for lodging loans, for which the modification rate rose to almost 12 percent per quarter in 2020, compared to roughly 2 percent pre-2020.

Credit rating downgrades also rose during the COVID period: quarterly downgrade rates rose from 2.8 percent pre-2020 to over 6 percent in 2020. Loans secured against lodging properties again rose the most of all property types; lodging loans were downgraded at a rate of 22 percent per quarter in 2020, compared to just under 3 percent pre-2020.

Despite the high rates of downgrades, borrowers for the most part were able to remain current on their loans. Distress rates were at much lower levels compared to modifications and downgrades, even during COVID. They rose from a quarterly rate of just under 0.4 percent pre-2020 to almost 1 percent in 2020. Even loans backed by lodging properties—which saw high rates of both downgrades and modifications—only reached distress rates of about 2.8 percent per quarter during 2020. These low distress rates stand in sharp contrast to loan performance in the CMBS market, where overall delinquency rates surpassed 10 percent in June 2020, and delinquency rates for lodging and retail-backed loans about doubled that average.

5.2. Recourse Loans Were Less Likely to Be Modified

The first step in our analysis of the dynamic effects of recourse is to test whether recourse loans were less likely to be modified, downgraded, or become distressed during the COVID period (that is, in 2020). We run the following regression:

$$\begin{aligned} M_{i,b,t} \times 100 \quad = \quad & \beta_1 \text{Recourse}_{i,b,t} + \beta_2 \text{Recourse}_{i,b,t} \text{xCOVID}_t \\ & + \gamma' \text{X}_{i,b,t} + \psi' \text{X}_{i,b,t} \text{xCOVID} + \varepsilon_{i,b,t}, \end{aligned} \tag{2}$$

where M is an indicator for whether loan i from bank b is modified at time t, $\text{Recourse}_{i,b,t}$ indicates whether that loan has recourse, COVID_t is an indicator for whether the loan-quarter observation is from 2020, and $\text{X}_{i,b,t}$ is a vector of loan-level controls and fixed effects. Each specification includes all of the controls and fixed effects from column (1) of Table 3, as well as year-quarter fixed effects. $\text{X}_{i,b,t}$ is expanded to include LTV and credit rating controls in some specifications. All controls, including LTV, are the current values instead of the values at origination that were used in Section 4. Analogous specifications are run with downgrade or distress indicators as dependent variables.

The coefficient of interest is the interaction between recourse and COVID (β_2), which we expect to be negative. We expect modification rates on recourse loans to be lower for two reasons. First, borrowers with recourse have less incentive to default when property values decline, as they have other assets at stake (Ghent and Kudlyak, 2011). Thus, even

if one property does not generate enough income to service the debt on that property, the borrower may still make payments using other resources or returns from other assets rather than risk those assets. Second, banks may also have less incentive to provide a modification on a recourse loan because they expect to be able to recoup any losses by filing a deficiency judgment post-liquidation.[31]

The coefficient on recourse may suffer from some identification problems similar to those detailed in Section 4. However, since COVID is a large exogenous shock to CRE, whose effects are arguably orthogonal to ex-ante risk assessments, any change in the estimated effect of recourse during COVID should identify the effect of recourse on the outcome variable.[32]

The results are presented in Table 5. The dependent variables are multiplied by 100, so the coefficients are estimates of the effect on the different performance variables in percentage points. In specifications 1, 4, and 7 we consider recourse without the addition of confounding factors such as the interest rate spread and LTV. In specifications 2, 5, and 8, we add in the LTV and interest rate spread. In specifications 3, 6, and 9 we include the indicator for whether the internal risk rating is equivalent to that of an investment-grade credit (rated BBB or higher) and the loan expected loss (probability of default times loss given default). All of these controls are also interacted with the indicator for whether the loan-quarter observation is from the COVID period, thus allowing the effect of controls to vary between the two periods.

The results in columns (1)–(3) of Table 5 imply that recourse loans are modestly less likely to be modified on average but were much less likely to be modified than non-recourse during COVID. In column (1), recourse lowers the likelihood of modification by 0.17 percent in normal times, relative to an average modification rate of 1.5 percent. This estimate implies that recourse loans received modifications about 9 times for every 10 modifications on observably similar non-recourse loans. However, during COVID, the modification rate on recourse loans was 2.4 percent lower than that on non-recourse loans, relative to an overall modification rate of 5.4 percent. This implies that non-recourse loans had a modification rate of almost 7.3 percent, while recourse loans had a modification rate of just under 4.9 percent. In other words, recourse loans received about 2 modifications

[31] Recourse loans could also receive fewer modifications because they are less risky along some unobserved dimension, and therefore less likely to need a modification. However, our results in Section 4.1 imply that the recourse loans likely have, if anything, riskier unobservables.

[32] Recourse is endogenous in that recourse clauses may be included to offset unobserved risks. Consequently, even if the causal effect of recourse is a less frequent need for modification, this effect may be offset by the increased need for riskier loans to be modified. This bias is likely small during COVID, as it is a specific manifestation of an adverse outcome, and sensitivity to the COVID shock is often not aligned with perceived risks at origination. For example, loans in gateway cities were perceived as safer pre-COVID, but were disproportionately affected by the pandemic.

for every 3 modifications on observably similar non-recourse loans.[33]

The coefficient estimates become slightly more negative in column (2), where we control for LTV and rate spreads, and in column (3), where we also add information on loan-level risk. These coefficients on the interaction between recourse and COVID imply that recourse loans were modified at about 60 percent of the rate of non-recourse loans during the COVID pandemic. As we will show below, the difference in modification rates between recourse and non-recourse loans does vary over time, and is almost entirely driven by the last three quarters of 2020, during which recourse loans were modified at half the rate of non-recourse loans.

In contrast to modifications, which rose significantly more for non-recourse loans during COVID, the rates of downgrades and delinquencies mostly rose in parallel for recourse and non-recourse loans. Indeed, the coefficients on the interaction between recourse and COVID are statistically insignificant in columns (4)–(9) when downgrades and delinquencies are the dependent variables. In short, recourse reduced the need for banks to modify loans. Although recourse loans received less accommodation from banks, their performance did not disproportionately suffer during COVID, suggesting that recourse motivated borrowers to maintain payments.

To better understand the timing of the results, we show the predicted effects of recourse on these outcomes on a quarter-by-quarter basis in Figure 1. For this figure, we regress each outcome variable on indicators for whether the loan has recourse, including the same controls and fixed effects as in column (2) of Table 5 (that is, controlling for LTV and interest rate spreads, but not banks' internal risk measures). The analysis is run separately for each quarter, and thus generates quarter-specific estimates of the effects of recourse on the different performance measures. For example, the top chart is a plot of the expected modification rate in a quarter if every loan had recourse (the dashed line) or if no loans had recourse (the solid line), holding all other characteristics fixed. The gap between the lines is the quarterly estimate of the effect of recourse on loan modification. Other charts perform the same exercise except they use one of the other outcome measures (distress or downgrades).

Figure 1 makes apparent that modifications, downgrades, and distress all increased during COVID, with modification rates peaking in 2020:Q2. The figure also clarifies the economic impact of recourse. If all loans had been non-recourse, we would have expected an overall loan modification rate of 12 percent in 2020:Q2, compared to a rate of

[33]The predicted effect of recourse during COVID comes from $\beta_1 + \beta_2$. The modification rate for recourse loans relative to non-recourse loans comes from solving the equations $NR - R = \beta_1 + \beta_2$ and $.78R + .22NR = 5.4$ for NR and R, where .78 (.22) is the share of originations that are recourse (non-recourse). The difference in modifications during normal times is calculated analogously, but with the difference between recourse and non-recourse being β_1 and an average overall modification rate of 1.5.

6 percent if all loans had been recourse. While modification rates dropped in 2020:Q3 and 2020:Q4, the relative difference between recourse and non-recourse loans remains stable, with estimated modification rates for recourse loans remaining at about half the level of non-recourse loans.

Figure 1 also clarifies our identification strategy. Broadly, there is little signal in the pre-COVID period, as the coefficients on recourse across loan performance measures are typically modest and frequently switch signs. Though non-recourse loans exhibited higher distress in the early aftermath of the financial crisis, there were no notably different levels or trends for recourse vs. non-recourse loans leading into the pandemic. Since recourse and non-recourse loans were on similar trends, and the pandemic presented an unexpected disruption in cash flows likely to be independent of at origination recourse decisions, the interaction between recourse and COVID should cleanly identify the effect of recourse on loan performance.

The key takeaway from our analysis is that modifications were much lower on recourse loans during COVID. The 50 percent lower modification rate on recourse loans could have potentially been a function of these loans having better performance than non-recourse loans. Yet, downgrades and distress were not lower for loans with recourse during COVID, which effectively rules out this hypothesis. Instead, our interpretation is that borrowers with recourse had significantly less bargaining power in loan modification decisions than those without recourse. We test this hypothesis futher in the subsection below.

5.3. Recourse Loans Receive More Lender-Friendly Modifications

To further examine whether recourse provides lenders with bargaining power in loan modification negotiations, we test whether recourse loans receive more lender-friendly modifications when they do get modified. For this exercise, we limit our sample to loans that received a modification and then run regressions described in equation (2), except with an indicator for the type of modification as the dependent variable.

In Table 6, we provide information the composition of modifications by recourse status both before (2012-2019) and during the COVID period (2020).[34] The most common modification prior to 2020 was an extension. Over 50 percent of all pre-2020 modifications involved an extension. The next most common modification type was an increase in the committed balance (or forbearance), which occurred in 27 percent of modifications. However, in 2020, forbearance became the most common modification type, representing almost 50 percent of all modifications. The share of modifications involving extensions

[34]Modification types are not mutually exclusive (for example, a loan could be extended and transition to interest only simultaneously), so these percentages add up to more than 100.

dropped to 36 percent. The rates of other modification types remained similar before and during COVID, with the exception of new troubled debt restructurings (TDR), which declined. This is almost certainly due to the interagency regulatory guidance that short-term modifications due to COVID did not qualify as TDRs.

We evaluate the three most common types of modification in the regressions: forbearance (an increase in a committed balance), a change to interest only for previously amortizing loans, and an extension. Table 7 shows that modifications of recourse loans were less likely to include forbearance and more likely to involve a switch to interest-only amortization. Each dependent variable is multiplied by 100, so that the coefficients can be interpreted as percentage point effects on the frequency of a modification being of a particular type. The coefficient on the interaction term indicates that, in 2020, recourse loans were 7 percentage points less likely to receive a forbearance and almost 8 percentage points more likely to switch to interest-only amortization. These estimates are little changed by the inclusion of additional controls for loan risk. Differences in modification frequencies by recourse status are generally small during normal times, and small for other types of modifications.

Overall, we interpret these results as further evidence of recourse providing lenders with bargaining power in loan modification negotiations. During the COVID period, recourse loan modifications were more likely to involve loans becoming non-amortizing (interest-only payments), while non-recourse loan modifications were more likely to entail loans becoming temporarily negatively amortizing (interest payments applied to the loan balance). In other words, recourse loans saw a smaller decline in required payments. Since borrowers differed little in terms of downgrade or delinquency rates, the results indicate that borrowers differed in their bargaining power as opposed to the degree of stress due to COVID.

6. CONCLUSION

We examine the value of recourse in CRE loan contracts. We show that recourse reduces loan rate spreads for mortgages on stabilized properties by at least 20 basis points and acts as an important substitute for traditional equity, enabling property investors to borrow at LTVs that are about 3 percentage points higher than they could otherwise.

Recourse also provides value to lenders in times of stress. Recourse loans were half as likely as non-recourse loans to receive a loan modification during the COVID-19 pandemic, and the modifications that were made to recourse loans were more lender-friendly. This occurred despite recourse loans facing similar rates of downgrades and distress, implying that recourse increased lenders' bargaining positions in loan renegotiations.

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	Loans (#)	Share of #	Share of $	Orig. Value (Mil.$)	Orig. Amount (Mil.$)	Term (Years)	LTV (%)	Rate Spread (bps)	Prepay Penalty (%)	IO (%)	Floating Rate (%)	1st Lien (%)
Full Sample												
Overall	85,668	100	100	16	8	17	57	198	71	13	34	99
Recourse	67,139	78	45	9	5	19	56	193	75	7	32	99
No Recourse	18,529	22	55	43	20	10	58	216	54	34	41	97
Retail												
Overall	11,434	100	100	18	8	8	57	228	55	17	51	98
Recourse	8,697	76	51	9	5	8	57	226	57	12	51	98
No Recourse	2,737	24	49	45	15	8	58	232	48	31	52	98
Industrial												
Overall	5,634	100	100	14	8	8	58	233	53	16	52	97
Recourse	4,461	79	49	9	5	8	58	234	57	11	50	98
No Recourse	1,173	21	51	34	19	7	59	230	41	35	62	97
Lodging												
Overall	1,882	100	100	46	21	7	57	264	42	26	63	98
Recourse	1,243	66	37	22	12	7	57	258	37	19	66	97
No Recourse	639	34	63	93	39	6	56	275	50	39	56	99
Office												
Overall	9,620	100	100	38	18	7	60	228	54	26	56	98
Recourse	6,689	70	31	15	8	7	60	230	56	16	51	98
No Recourse	2,931	30	69	89	40	6	59	223	50	49	67	98
Multifamily												
Overall	50,807	100	100	10	6	23	56	174	83	8	20	99
Recourse	41,665	82	52	7	4	26	55	168	88	3	19	100
No Recourse	9,142	18	48	27	15	12	59	199	61	29	25	96

Table 1: Summary Statistics for Loan Origination Characteristics. *Notes:* This table presents summary statistics for loans at origination secured by all stabilized properties, and for the largest property types used in our analysis of loans. About 10 percent of loans do not fit into one of the five property types (for example, hospitals). All averages are unweighted.
Source: Authors' calculations using Y-14 H.2 Schedule.

	Quintile				
	1	2	3	4	5
Across Lenders					
Full Sample	14	45	61	80	93
Retail	18	53	68	87	97
Industrial	12	53	68	85	93
Multifamily	8	47	63	82	94
Lodging	15	42	59	78	97
Office	15	45	65	81	93
Across States					
Full Sample	56	63	68	74	83
Retail	64	73	78	82	88
Industrial	63	73	76	80	89
Multifamily	49	58	67	75	85
Lodging	49	64	73	79	86
Office	56	68	72	79	86

Table 2: Variation in Recourse Across Lenders and US States. *Notes:* This table presents unweighted recourse shares at banks split into quintiles for the property types shown in Table 1. Each quintile has about 1/5 of banks (top panel) or states (bottom panel). The banks and states in a given quintile can vary for each property type.
Source: Authors' calculations using Y-14 H.2 Schedule.

	Effect on Rate Spreads (percentage points)				Effect on LTV (percentage points)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Recourse	-0.204***	-0.206***	-0.516***	-0.195***	2.779***	2.848***	3.437**	2.733***
	(0.0298)	(0.0293)	(0.140)	(0.0271)	(0.846)	(0.856)	(1.713)	(0.866)
LTV		0.000579	0.000933***	-0.00112**				
		(0.000344)	(0.000356)	(0.000415)				
Interest Rate Spread						0.337	0.365	-0.623***
						(0.205)	(0.226)	(0.202)
Borrower Rated BBB+				-0.154***				-8.937***
				(0.0555)				(2.238)
Expected Loss				0.0975***				0.973***
				(0.0123)				(0.185)
ln(Origination Amount)	-0.163***	-0.165***	-0.196***	-0.161***	3.124***	3.179***	3.239***	2.921***
	(0.00958)	(0.0101)	(0.0156)	(0.00907)	(0.387)	(0.378)	(0.442)	(0.298)
ln(Maturity in Years)	-0.267***	-0.267***	-0.277***	-0.243***	0.127	0.216	0.242	0.512
	(0.0299)	(0.0298)	(0.0284)	(0.0260)	(0.331)	(0.299)	(0.305)	(0.316)
Cross-Collateralized	-0.112*	-0.114*	-0.111**	-0.113*	3.296**	3.334**	3.329**	3.137**
	(0.0584)	(0.0581)	(0.0548)	(0.0568)	(1.502)	(1.498)	(1.471)	(1.475)
IO Loan	-0.168	-0.166	-0.217	-0.168	-2.322***	-2.265***	-2.163***	-2.622***
	(0.119)	(0.120)	(0.142)	(0.114)	(0.662)	(0.667)	(0.772)	(0.877)
Floating Rate	0.579	0.579	0.618	0.607	-0.0873	-0.282	-0.372	1.082**
	(0.385)	(0.385)	(0.387)	(0.373)	(0.164)	(0.247)	(0.362)	(0.457)
First Lien	-0.337***	-0.344***	-0.330***	-0.304***	13.17***	13.29***	13.26***	12.26***
	(0.0979)	(0.0978)	(0.0948)	(0.0990)	(2.475)	(2.494)	(2.478)	(2.510)
Prepayment Penalty	0.169**	0.168**	0.177**	0.171**	1.569***	1.512***	1.489***	1.318***
	(0.0697)	(0.0700)	(0.0714)	(0.0734)	(0.387)	(0.400)	(0.426)	(0.419)
Industrial	0.107	0.108	0.125**	0.106	-1.447**	-1.483**	-1.518**	-1.605**
	(0.0667)	(0.0667)	(0.0608)	(0.0658)	(0.635)	(0.643)	(0.638)	(0.650)
Lodging	0.448***	0.453***	0.482***	0.428***	-8.174***	-8.325***	-8.387***	-8.527***
	(0.0577)	(0.0571)	(0.0471)	(0.0604)	(0.950)	(0.912)	(0.909)	(0.943)
Office	0.125**	0.126**	0.148***	0.119**	-1.402	-1.444	-1.489*	-1.670
	(0.0551)	(0.0552)	(0.0511)	(0.0535)	(0.915)	(0.916)	(0.892)	(1.043)
Retail	0.0860	0.0879	0.108*	0.0889	-3.281***	-3.310***	-3.348***	-3.227***
	(0.0631)	(0.0627)	(0.0600)	(0.0609)	(0.555)	(0.561)	(0.558)	(0.564)
N	85,668	85,668	85,668	84,956	85,668	85,668	85,668	84,956
R2	0.44	0.44	0.42	0.45	0.20	0.20	0.20	0.25
Lender Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Orig. Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
CBSA × State Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
IV	-	-	Y	-	-	-	Y	-

Table 3: Relation of Shadow Equity to Rate Spreads and LTV. *Notes:* Columns 1–4 present coefficients from regressing loan rate spreads on an indicator for whether the loan has recourse, while columns 5–8 present coefficients from regressing LTV at origination on recourse. All specifications include controls for size, term, cross-collateralization, amortization, interest rate variability, lien priority, and prepayment penalties, as well as bank, property type, origination year, and CBSA-state fixed effects. Columns 2–4 and 6–8 additionally control for LTV or loan rate spreads, and internal risk ratings. Column 3 instruments for both recourse and LTV with the average value for the recourse indicator and LTV of other loans within the same bank-state-year-property type. Column 7 instruments for recourse with the share of other loans within the same bank-state-year-property type that have recourse. Standard errors, in parentheses, are clustered at the bank level. *,**,*** indicate significance at the 10%, 5%, and 1% levels, respectively. *Source:* Authors' calculations using Y-14 H.2 Schedule.

	Obs. (#)	Modified (%)	Downgraded (%)	Distressed (%)
Full Sample				
Pre-COVID	513,127	1.48	2.84	0.37
COVID	72,580	5.41	6.05	0.94
Retail				
Pre-COVID	133,009	1.30	2.90	0.32
COVID	21,059	5.23	6.92	1.09
Industrial				
Pre-COVID	51,913	1.36	2.69	0.37
COVID	8,112	3.90	2.81	0.85
Lodging				
Pre-COVID	24,793	2.15	2.90	0.58
COVID	3,237	11.80	22.00	2.81
Office				
Pre-COVID	104,587	1.84	2.92	0.51
COVID	14,469	5.90	4.49	0.70
Multifamily				
Pre-COVID	135,162	1.39	2.90	0.29
COVID	18,550	4.82	5.48	0.65

Table 4: Summary Statistics for Loans that are Modified, Downgraded, or Distressed. *Notes:* This table presents loan-quarter shares of loans that are modified, downgraded, or distressed, separated by the pre-COVID (2012-2019) and COVID (2020) time periods and by property type.
Source: Authors' calculations using the Y-14 H.2 Schedule.

	Modified			Downgraded			Distressed		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Recourse	-0.167***	-0.184***	-0.195***	-0.0511	-0.112*	-0.250***	-0.00505	-0.0202	-0.0452
	(0.0636)	(0.0640)	(0.0638)	(0.0643)	(0.0645)	(0.0661)	(0.0392)	(0.0389)	(0.0344)
Recourse × COVID	-2.246***	-2.424***	-2.440***	0.0581	-0.0780	-0.108	0.0611	0.0481	0.0296
	(0.368)	(0.370)	(0.369)	(0.288)	(0.288)	(0.288)	(0.172)	(0.173)	(0.126)
LTV		0.526***	0.300**		1.802***	0.0881		0.473***	-0.241**
		(0.129)	(0.129)		(0.138)	(0.143)		(0.114)	(0.100)
LTV × COVID		4.224***	3.608***		2.922***	0.219		1.593***	-0.156
		(0.565)	(0.566)		(0.541)	(0.553)		(0.428)	(0.308)
Interest Rate Spread		0.295***	0.207***		0.114***	-0.290***		0.562***	0.244***
		(0.0379)	(0.0373)		(0.0327)	(0.0345)		(0.0521)	(0.0392)
Rate Spread × COVID		-0.480***	-0.557***		-0.341***	-0.623***		0.191	-0.217**
		(0.140)	(0.139)		(0.120)	(0.126)		(0.126)	(0.0854)
Borrower Rated BBB+			-0.0684			-3.572***			0.257***
			(0.0439)			(0.0547)			(0.0279)
Borrower Rated BBB+ × COVID			-0.939***			-4.165***			0.0630
			(0.226)			(0.193)			(0.0801)
Expected Loss			0.248***			0.519***			0.997***
			(0.0205)			(0.0297)			(0.0488)
Expected Loss × COVID			0.0501			0.395***			0.744***
			(0.0508)			(0.0853)			(0.0856)
N	585,641	585,641	585,641	585,641	585,641	585,641	585,641	585,641	585,641
R2	0.06	0.06	0.07	0.03	0.03	0.05	0.02	0.03	0.19
Quarter Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lender Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Orig. Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
CBSA × State Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Property Type Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loan-level Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls and FEs × COVID	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 5: Dynamic Regressions. *Notes:* Each column presents coefficients from regressing whether the loan is modified (columns 1–3), downgraded (columns 4–6), or distressed (columns 7–9) on indicators for whether the loan has recourse, recourse interacted with when the observation comes from the COVID period (i.e., 2020), and different sets of controls (also interacted with whether the loan-quarter observations come from the COVID period). Specifications 1, 4, and 7 include the controls and fixed effects shown in the first specification of Table 3, along with year-quarter fixed effects. Specifications 2, 5, and 8 layer in LTV and the interest rate spread as controls. Specifications 3, 6, and 9 layer in risk controls: the indicator for whether the internal risk rating is equivalent to that of an investment-grade credit (rated BBB or higher) and the loan expected loss (probability of default times loss given default). Standard errors are clustered by loan. *,**,*** indicate significance at the 10%, 5%, and 1% levels, respectively.
Source: Authors' calculations using the Y-14 H.2 Schedule.

	Obs.	CB Up	To IO	Extension	TDR	Write Down
Full Sample						
Pre-COVID	7,440	26.51	17.27	54.96	2.67	1.61
COVID	3,808	49.68	17.31	36.06	0.66	1.13
Recourse						
Pre-COVID	4,392	22.61	15.76	59.38	3.51	2.12
COVID	2,335	48.09	12.89	40.69	0.64	1.28
No Recourse						
Pre-COVID	3,048	32.12	19.46	48.59	1.48	0.89
COVID	1,473	52.21	24.30	28.72	0.68	0.88

Table 6: Types of Loan Modifications. *Note:* Observations are limited to loans that were modified. The top panel provides observation counts within each category. The bottom panel is percentages of loans modified that received the specified modification. "CB Up" denotes loans for which the committed balance increases. "To IO" denotes loans switched from being amortizing to being interest only. "Extension" denotes loans for which the maturity date is extended. "TDR" denotes a troubled debt restructuring. "Write Down" denotes the committed balance falls in tandem with a positive cumulative charge-off. Types of modifications are not mutually exclusive, so percentages may add up to more than 100.
Source: Authors' calculations using the Y-14 H.2 Schedule.

	CB Up			To IO			Extension		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Recourse	0.227	0.0799	0.0965	0.387	0.308	0.453	-0.297	-0.291	0.138
	(1.292)	(1.296)	(1.291)	(0.975)	(0.979)	(0.980)	(1.305)	(1.303)	(1.277)
Recourse × COVID	-7.050***	-7.396***	-7.016***	7.846***	7.949***	7.824***	-1.014	-0.720	-0.992
	(2.202)	(2.190)	(2.188)	(1.700)	(1.703)	(1.701)	(2.101)	(2.101)	(2.085)
LTV		11.37***	11.39***		-3.094	-1.884		-12.08***	-8.825***
		(2.931)	(2.950)		(2.046)	(2.054)		(2.866)	(2.853)
LTV × COVID		6.136	8.724*		-0.726	-0.111		0.784	-2.330
		(5.108)	(5.223)		(3.534)	(3.600)		(4.838)	(4.980)
Interest Rate Spread		0.622	0.720		-1.534***	-1.147**		-2.389***	-1.105*
		(0.673)	(0.687)		(0.469)	(0.489)		(0.665)	(0.653)
Rate Spread × COVID		-3.993***	-3.414***		1.180	0.970		4.314***	3.225***
		(1.129)	(1.110)		(0.775)	(0.785)		(1.098)	(1.054)
Borrower Rated BBB+			-3.437***			3.579***			0.381
			(1.190)			(0.922)			(1.208)
Borrower Rated BBB+ × COVID			1.649			-0.0315			-3.025
			(2.059)			(1.530)			(1.985)
Expected Loss			-0.294***			-0.0963			-1.033***
			(0.0872)			(0.0633)			(0.102)
Expected Loss × COVID			-0.588***			0.105			0.653***
			(0.157)			(0.115)			(0.196)
N	11,248	11,248	11,248	11,248	11,248	11,248	11,248	11,248	11,248
R2	0.50	0.51	0.51	0.55	0.55	0.56	0.51	0.51	0.52
Quarter Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lender Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Orig. Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
CBSA × State Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Property Type Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loan-level Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls and FEs × COVID	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 7: Dynamic Regressions for Types of Loan Modifications. *Notes:* Each column presents coefficients from regressing the type of loan modification on LTV, indicators for whether the loan has recourse, recourse interacted with when the observation comes from the COVID period (i.e., 2020), and controls and fixed effects (also interacted with whether the loan-quarter observations come from the COVID period). Specifications 1, 4, and 7 include the controls and fixed effects shown in the first specification of Table 3, along with year-quarter fixed effects. Specifications 2, 5, and 8 layer in LTV and the interest rate spread as controls. Specifications 3, 6, and 9 layer in risk controls: the indicator for whether the internal risk rating is equivalent to that of an investment-grade credit (rated BBB or higher) and the loan expected loss (probability of default times loss given default). "CB Up" denotes loans for which the committed balance increases. "To IO" denotes loans switched from being amortizing to being interest only. "Extension" denotes loans for which the maturity date is extended. Standard errors are clustered by loan. *,**,*** indicate significance at the 10%, 5%, and 1% levels, respectively.
Source: Authors' calculations using the Y-14 H.2 Schedule.

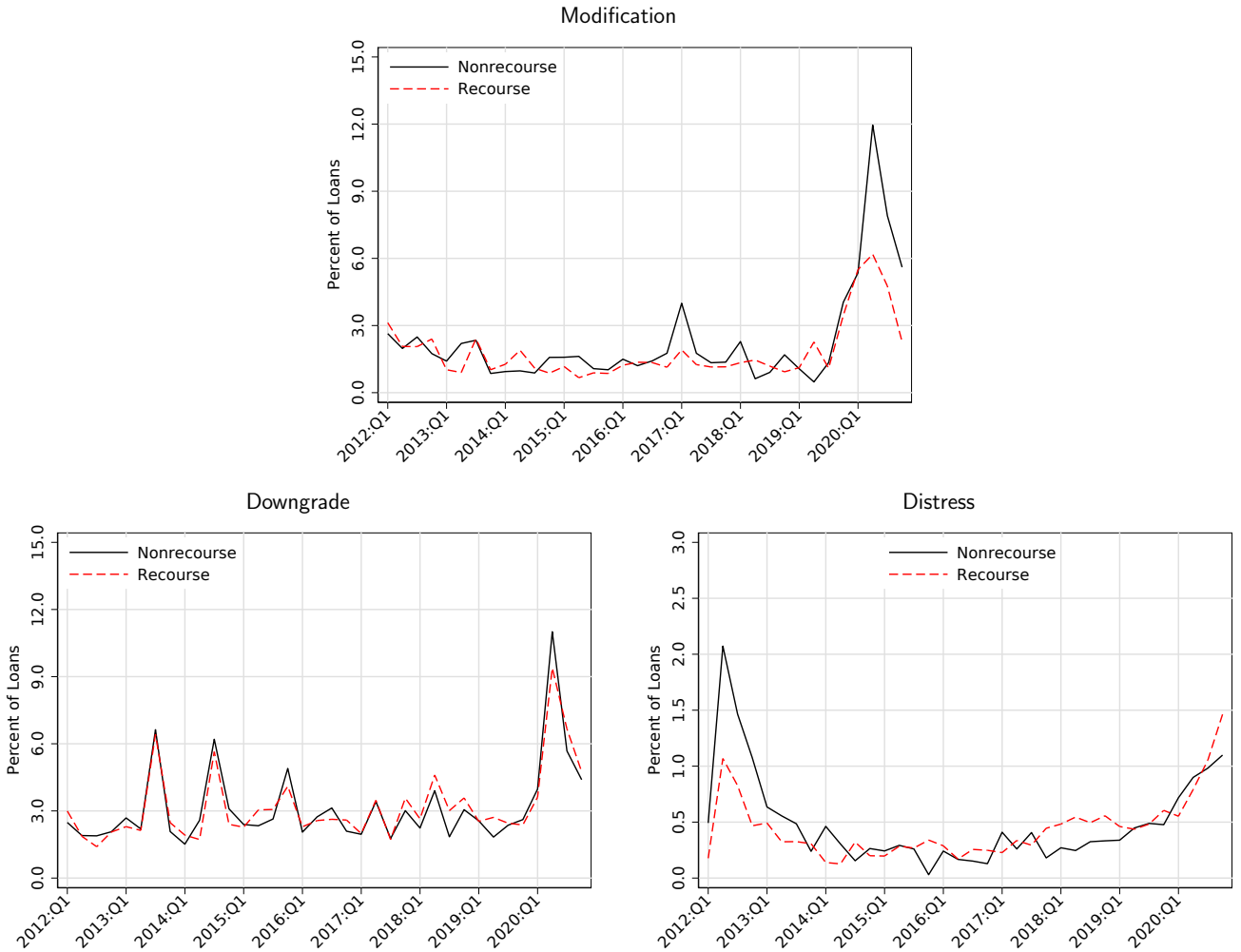

Figure 1: Average Predicted Effects. *Notes:* We show predicted values of regressing whether the loan is modified (top), downgraded (bottom left), or distressed (bottom right) on whether the loan is recourse or cross-collateralized with controls and the fixed effects from specifications 2, 5, and 8 in Table 5, run on a quarter-by-quarter basis.
Source: Authors' calculations using the Y-14 H.2 Schedule.

A. SUPPLEMENTAL TABLES

This section includes supplemental tables referenced in the text.

	Loans (#)	Share of #	Share of $	Orig. Value (Mil.$)	Orig. Amount (Mil.$)	Term (Years)	LTV (%)	Rate Spread (bps)	Prepay Penalty (%)	IO (%)	Floating Rate (%)	1st Lien (%)
Transitional												
Overall	57,035	100	100	23	12	7	64	271	28	62	73	96
Recourse	39,283	69	66	21	11	7	65	278	27	64	79	96
No Recourse	17,752	31	34	27	13	8	63	255	30	58	60	96

Table A.1: Summary Statistics for Loans Secured by Transitional Properties. *Notes:* This table presents summary statistics for loans secured by transitional properties—also disaggregated by recourse—used in our analysis of loans at origination. All averages are unweighted.
Source: Authors' calculations using Y-14 CRE Schedule.

	Loans (#)	Share of #	Share of $	Orig. Value (Mil.$)	Orig. Amount (Mil.$)	Maturity (Years)	LTV (%)	Rate Spread (bps)	Prepay Penalty (%)	IO (%)	Floating Rate (%)	1st Lien (%)
Full Sample												
Overall	58,024	100	100	18	9	17	55	197	78	14	32	99
Full Recourse	36,629	55	27	9	4	16	55	205	73	8	36	98
Partial Recourse	15,335	23	16	12	6	23	52	182	87	7	27	100
No Recourse	15,017	22	57	50	23	10	57	207	63	40	37	97
Retail												
Overall	8,095	100	100	19	7	8	56	215	62	17	48	98
Full Recourse	7,002	67	38	8	4	7	56	218	58	10	50	98
Partial Recourse	1,412	14	16	16	9	8	56	210	62	18	57	98
No Recourse	2,017	19	46	58	18	8	56	219	64	39	46	98
Industrial												
Overall	3,767	100	100	17	9	8	56	220	63	17	49	98
Full Recourse	3,239	67	35	8	4	8	56	223	60	11	50	96
Partial Recourse	749	16	14	19	8	9	53	220	73	13	46	99
No Recourse	830	17	51	46	25	7	57	214	56	43	56	97
Lodging												
Overall	1,158	100	100	49	23	7	56	247	49	29	63	97
Full Recourse	896	58	25	18	9	7	53	238	41	17	65	94
Partial Recourse	153	10	12	41	25	6	58	256	42	27	87	97
No Recourse	503	32	63	91	40	7	55	263	59	46	59	99
Office												
Overall	6,412	100	100	44	20	7	58	217	62	28	55	98
Full Recourse	4,852	59	20	13	7	7	59	221	60	14	50	97
Partial Recourse	972	12	9	27	15	8	56	212	61	22	60	98
No Recourse	2,346	29	71	110	47	6	58	214	60	58	64	98
Multifamily												
Overall	35,125	100	100	12	6	24	53	183	89	9	19	99
Full Recourse	17,905	48	26	7	3	24	54	187	89	4	21	100
Partial Recourse	11,721	31	22	9	5	28	51	172	96	3	18	100
No Recourse	7,730	21	52	29	16	13	58	195	65	32	22	96

Table A.2: Full and Partial Recourse Summary Statistics. *Notes:* This table presents summary statistics for loans originated in 2015 or later for the full sample of stabilized properties and those secured by the five largest stabilized property types. All averages are unweighted.
Source: Authors' calculations using Y-14 CRE Schedule.

	Modification		Downgrade		Distressed	
	Non-recourse	Recourse	Non-recourse	Recourse	Non-recourse	Recourse
2012						
Q1	2.64	3.12	2.48	3.00	0.49	0.18
Q2	1.98	2.06	1.90	1.86	2.07	1.07
Q3	2.49	2.06	1.89	1.40	1.47	0.83
Q4	1.75	2.40	2.07	2.06	1.08	0.47
2013						
Q1	1.41	1.02	2.69	2.30	0.64	0.49
Q2	2.20	0.90	2.20	2.13	0.56	0.32
Q3	2.34	2.41	6.63	6.42	0.49	0.33
Q4	0.86	1.03	2.08	2.47	0.24	0.31
2014						
Q1	0.94	1.27	1.52	1.92	0.46	0.14
Q2	0.98	1.89	2.58	1.72	0.30	0.13
Q3	0.88	1.09	6.20	5.64	0.15	0.32
Q4	1.58	0.87	3.09	2.40	0.26	0.20
2015						
Q1	1.58	1.17	2.39	2.27	0.24	0.20
Q2	1.62	0.67	2.34	3.05	0.29	0.28
Q3	1.07	0.89	2.64	3.07	0.26	0.27
Q4	1.02	0.86	4.90	4.10	0.03	0.34
2016						
Q1	1.50	1.23	2.05	2.29	0.24	0.29
Q2	1.21	1.36	2.74	2.57	0.17	0.17
Q3	1.42	1.35	3.13	2.63	0.15	0.26
Q4	1.76	1.14	2.09	2.59	0.13	0.25
2017						
Q1	4.00	1.91	1.96	1.99	0.41	0.23
Q2	1.76	1.25	3.42	3.48	0.26	0.34
Q3	1.34	1.15	1.77	1.72	0.41	0.29
Q4	1.37	1.16	3.01	3.57	0.18	0.45
2018						
Q1	2.29	1.34	2.24	2.65	0.27	0.48
Q2	0.62	1.46	3.90	4.60	0.25	0.54
Q3	0.91	1.19	1.84	3.02	0.32	0.49
Q4	1.69	0.93	3.06	3.58	0.33	0.56
2019						
Q1	1.07	1.12	2.56	2.53	0.34	0.46
Q2	0.48	2.26	1.83	2.71	0.45	0.44
Q3	1.34	1.09	2.36	2.45	0.49	0.48
Q4	4.04	3.45	2.61	2.37	0.48	0.60
2020						
Q1	5.36	5.50	3.98	3.61	0.72	0.55
Q2	11.96	6.18	11.01	9.39	0.90	0.79
Q3	7.90	4.76	5.68	6.66	0.98	1.05
Q4	5.61	2.27	4.40	4.75	1.10	1.46

Table A.3: VALUES FOR FIGURE 1. *Note:* In this table, we show the values for the lines plotted in Figure 1.
Source: Authors' calculations using Y-14 data.