Strategic Default and Renegotiation: Evidence from Commercial Real Estate Loans

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Abstract

We study strategic default and its role in the renegotiation of debt contracts in a setting where the borrowers hold multiple loans and the borrower cash flow is disclosed: commercial real estate loans to real estate companies. We find that the majority of defaulted loans are to borrowers that have cash flow to meet their payments on the defaulted loan and that continue to meet their payments in other loans. The pervasiveness of strategic defaults is robust to alternative characterizations. Strategic defaults make loan renegotiations more likely. Our analysis controls for unobservable time-dependent borrower-, lender-, and market-level factors.

KEYWORDS: Strategic default, renegotiation, incomplete contracts, commercial real estate loans, collateral, delinquent loans

1 Introduction

The possibility of strategic default, in which the entrepreneur chooses not to meet her obligations to the investor despite having the means to do so, plays an important role in the theory of incomplete contracts. The debt contract, together with the specified control rights and collateral, is often used to mitigate the entrepreneur's incentive for strategic default to renegotiate the original contract terms.[1] Despite the widespread use of debt, there is mixed evidence on strategic default and its role on contract renegotiation. Much of the empirical literature has focused on residential mortgages, as reviewed below, but empirical research on this topic has to overcome at least two challenges. First, the borrower's ability to meet her debt obligations, including her income, needs to be frequently observed. Second, the analysis needs to control for many time-dependent borrower- and lender-level factors that affect the default and renegotiation decisions even when such factors remain unobservable to the econometrician. Our study aims to address these issues.

Our setting of commercial mortgage loans to real estate companies has several advantages. First, each borrower tends to have several mortgages outstanding simultaneously. This allows us to study the borrower's decision to stop making payments on certain loans while meeting the obligations for other loans in the same month. In fact, the majority of borrowers that default in our sample has mortgages that remain current at the same time. Furthermore, these loans do not typically have cross-default provisions. Hence, the borrower can default on some loans without being in default in other loans. This facilitates strategic default by the borrower.

Second, these real estate companies are required to disclose their income and cash holdings. The lack of these data often impedes research on strategic default in other settings including residential mortgages. In addition, any motive to save cash for high priority future expenses by not paying debt is likely to be absent in our setting. This is because many real estate

[1] See, e.g., Aghion and Bolton (1992); Bolton and Scharfstein (1990, 1996); Hart and Moore (1994, 1998). Hart (2017) provides an overview.

companies are required to distribute much of their cash to their shareholders for favorable tax treatment.

Third, having multiple loans per borrower and lender in the sample allows us to take into account simultaneously any time-dependent factors both at the borrower and the lender level. For example, the borrower's financial health that may affect the strategic default decision or the lender's changing loan policies that may affect the renegotiation decision are captured. Similarly, the liquidation value of the collateral has been shown to be important in renegotiation as discussed below. That value depends on the likely alternative owners that can put the asset on its second best use (Benmelech et al., 2005; Coval and Stafford, 2007; Pulvino, 1998). Our setting allows us an analysis of strategic default and renegotiation while controlling non-parametrically for the time-dependent factors at the level of local market for the type of the asset that serves as collateral.

Fourth, no private value is likely to be obtained by the borrowers from the mortgaged real estate unlike the case with residential mortgages. Similarly, consumption needs that play an important role in the study of strategic default by consumers are absent in our setting.

Fifth, more than 73% of the defaults in our sample are during non-crisis years unlike the residential mortgage studies on strategic default that focus on the Great Recession. Hence, our results are not likely to depend on crisis behavior. Finally, the size of the commercial real estate market in the U.S. is very large at $32.8 trillion (Goetzmann et al., 2021).

We first show that strategic default is very prevalent in our sample. We find that 67% of borrowers that default always have both loans in default and current loans at the same time and have enough cash in that quarter to meet their debt obligations on all their current and defaulted loans. From a loan-level perspective, 75% of all loans in default are to borrowers that always have a current loan at the same time and that have cash to meet their obligations. Furthermore, these figures are based on the case when a strategically defaulted loan can be classified as strategic default until the distress resolution. In other words, if a borrower foresees a cash shortcoming, defaults strategically, and later indeed has insufficient cash

to meet its obligations, we classify that loan as non-strategic default in the above figures. Relatedly, strategic default is not a temporary phenomenon on the way to the borrower's bankruptcy either. Even 12 months after first falling into default, more than 97% of the current loans of borrowers that defaulted strategically are still current.

The prevalence of strategic defaults is unlikely due to how we identify strategic default. As discussed in the Data section, we use 36 alternative ways to identify strategic default by using different definitions of default, different number of quarters in strategic default, and various subsamples. The fraction of strategic defaults among all defaults ranges from approximately 63% to 85%.

We then study the role of strategic default on the likelihood of loan renegotiation. We indeed find that the loans are more likely to be renegotiated after a strategic default. Crucially, as mentioned above, our setting with multiple loans per borrowers and per lenders allows us to control non-parametrically for any time-specific unobservable factors at both the borrower and lender level. In other words, our result of increased likelihood of loan renegotiation following a strategic default is at the loan-level and is unlikely to be driven by borrower- or lender-specific factors at the time of renegotiation.

Much of the literature on strategic default focuses on residential mortgages around the Great Recession and reaches a mixed conclusion about the prevalence of strategic default. While Bradley et al. (2015); Ghent and Kudlyak (2011); Guiso et al. (2013); Mayer et al. (2014) find evidence of strategic default Bhutta et al. (2017); Foote et al. (2008); Ganong and Noel (2020); Gerardi et al. (2017) do not. The theoretical literature approaches strategic default as the default when the borrower has liquidity to meet her debt obligations but chooses not to do so. However, the settings studied in these papers do not allow frequent observations of the borrower's income. Hence, many of these papers focus on the role of the collateral's value, or, more specifically, the current loan-to-value (LTV), in the default decision as evidence of strategic default. A higher likelihood of default when the current LTV exceeds one is often interpreted as evidence for strategic default.

This approach has several challenges. First, the assets used as collateral in mortgages tend to be very infrequently traded and very heterogeneous across loans so estimates of current LTV tends to be very noisy. Second, Mayer et al. (2014) show that strategic behavior takes place even when current LTV is less than one. Our paper differs from these papers by using the borrower's income and cash holdings in identifying strategic defaults, as suggested in the theory. Our characterization also has the benefit of observing multiple loans to the same borrowers so we can leverage the borrower's decision to default on one loan while keeping another loan current at the same time. These differences also apply to the papers that study strategic default in other settings including Blouin and Macchiavello (2019); Ratnadiwakara (2021); Tantri (2020).

Our paper is also related to literature on renegotiation. Benmelech and Bergman (2008); Benmelech et al. (2005); Gavazza (2010) study the role of collateral liquidation value in renegotiation. Roberts (2015) and Roberts and Sufi (2009) show that renegotiation in debt contracts occurs frequently. Adelino et al. (2013); Agarwal et al. (2011); Ghent (2011); Piskorski et al. (2010) focus on the role of securitization and Denis and Wang (2014); Dou (2020) analyze the role of covenants in the renegotiation of debt contracts. Our paper complements this literature as these papers do not study the role of strategic default in loan renegotiations.

Finally, we also contribute to the literature on the defaults in the commercial real estate markets. Riddiough and Wyatt (1994a,b) provide early theoretical work of strategic interactions in default and renegotiation in a real estate setting. Empirical research on commercial mortgages, on the other hand, mainly focuses on the determinants of mortgage defaults (Ambrose and Sanders, 2003; Buschbom et al., 2018; Goldberg and Capone, Jr., 2002). Our paper differentiates from these studies by disentangling strategic defaults from non-strategic defaults using borrower-level cash flow information.

We proceed as follows. Section 2 provides information on the data sources used in our study and explains variable constructions and descriptive statistics. We also propose

alternative characterization of strategic default and document loan-level comparison of loans in default and current loans of the same borrowers in this section. In Section 3, we analyze the impact of strategic default on the renegotiation of a loan in default by a lender. We present our analysis on the drivers of strategic and non-strategic default in Section 4. Finally, Section 5 concludes.

2 Data and the Characterization of Strategic Default

2.1 Data

Unlike the housing markets where many borrowers are owners of one residential property at a time, borrowers in the commercial real estate markets are predominantly investors in multiple properties. In particular, Real Estate Investment Trusts (REITs) and Real Estate Operating Companies (REOCs) are important investors in these markets. They typically borrow to invest in multiple commercial real estate assets. Crucially, they also disclose financial information and report to Securities Exchange Commission (SEC) at the same time.[2]

To use this advantage, we obtain loan data for the U.S. REITs and REOCs from Real Capital Analytics (RCA, recently acquired by MSCI) for the period 2001 through 2019. RCA has collected commercial real estate transaction data and the corresponding mortgage information for each transaction since 2001. RCA focuses on commercial real estate transactions exceeding $2.5 million and collects data and information from various sources including SEC filings, press releases, news articles, listing services, and public records. According to RCA, the dataset covers over $20 trillion of commercial real estate transactions globally.[3] RCA collects mortgage-level information both at the loan origination and over time. Data as of loan origination include interest rate, mortgage size, the maturity date, and,

[2]See (Furfine, 2020; Ling and Archer, 2018) for a general discussion of this market.

[3]In the academic literature, RCA data have been used by Ghent and Valkanov (2016) for commercial mortgages and Demirci et al. (2020); Ghent (2021) for commercial real estate transactions, among others.

for many mortgages, amortization type, amortization period, and interest rate type. Data collected over the life of the mortgage include, importantly, loan performance and delinquency events.

Recourse, cross-default provisions, or cross-collateralization are not very common in the commercial real estate mortgage market (Benmelech et al., 2005).[4] In particular, 82% of our sample consist of CMBS loans, which are overwhelmingly non-recourse by design (Glancy et al., 2021).[5] Whether a loan has cross-default or cross-collateralization provisions is not flagged in our dataset, so we assume that they are following the common industry practice. We also observe if multiple loans are defaulted by the same borrower at the same time.

We start with a sample of loans with non-missing loan maturity, interest rate, asset value and loan amount at origination. We also focus on loans where we observe the borrower's quarterly firm-level financials. We exclude 348 loans with missing lender information, 127 mezzanine loans or loans with missing loan type, 26 delinquent loans that were resolved in less than 3 months after being delinquent (15 foreclosures, one conventional sale, two renegotiated loans, and the rest sent to a servicer specializing in collection of delinquent debt with no further information); 16 loans where we do not observe quarterly financials both at origination and in the first quarter in default; and 8 loans with missing distress end date. In the end, our final sample consists of 6,191 loans.

In our final sample, we have 193 property companies, 172 of which are REITs.[6] We obtain borrower-level financial data from S&P Global Market Intelligence (formerly SNL Financial). These financial data include quarterly income statement and balance sheet data.

[4]Grovenstein et al. (2005), who use a sample of more than 10,000 loans find that only 6% of the loans are cross-collateralized]

[5]An et al. (2011) and Chen and Deng (2013), who analyze a common dataset of CMBS loans, find that only 74 loans out of more than 13,000 are cross-collateralized.

[6]As a comparison, there are 180 equity REITs in the constituents of FTSE-NAREIT All REITs index as of January 2021. Hence, the coverage of our dataset seems extensive. However, the coverage is also not expected to include all the REITs. In particular, RCA loan dataset does not cover loans to specialty properties that invest in timberland, agriculture, cell towers, infrastructure, marina, amusement parks, ski slopes, and lodges/golf courses. RCA's coverage of loans to self-storage and manufactured housing also started only in 2017. Hence, our sample does not include the REITs and REOC that only invest in these specialty property types.

Finally, we obtain market-level commercial real estate price indices from RCA. The RCA CPPI indices are price indices for commercial real estates by the metro area or region. We mainly use indices by metro area for each property. If the index is missing for a metro area where the collateral asset is located, we use the index for the region. We calculate the growth in the corresponding index value in each quarter after the quarter when the loan was originated to obtain the quarterly estimated value of an asset and the current LTV.

2.2 Strategic Default

We classify a default as strategic default in 36 different ways based on the exact delinquency events used, the length of quarters in default, and subsample of loans used. In this subsection, we describe our benchmark characterization. The next subsection discusses alternative characterizations. We selected this characterization as our benchmark for its conservativeness and for its similarity to the one used in the literature.

Using the loan event data, we classify a loan *in default* when a loan event contains for three consecutive months at least one of the five statements in the data: "Transferred to Special Servicer," "Delinquent/Default," "Maturity Default/Past Due," "Foreclosure Initiated," and "Foreclosure Completed." Put differently, loans are classified as in default if the borrower does not meet its debt obligations for three months or if the loan is stated to be referred to a special servicer for three consecutive months. Among the loan events concerning borrowers, if an owner is classified as "Owner/GP Bankrupt" and/or "Receivership, Admin, Special", we classify all the loans by that borrower as non-strategically defaulted loans. Finally, we define a loan as current when there is no payment in arrears that month.

With defaults thus defined, a default is classified as a strategic default in our benchmark characterization if all the following conditions are satisfied:

(a) the loan is in default as defined above; and

(b) the same borrower has at least one current loan at the same time; and,

(c) the borrower's EBITDA that quarter and cash holdings at the beginning of the quarter are greater than the sum of all its paid and unpaid interest expenses on all loans in that quarter.[7]

Several aspects of this characterization above are worth discussing. First, the second condition implies that the borrower is making a conscious decision in its choice of which loan to default. In fact, more than 97% of the current loans of strategic defaulters remain current a year later. Second, we classify all the loans to a bankrupt borrower in default as non-strategic. Of course, some of these borrowers may have strategically filed for bankruptcy so our characterization may be underestimating the pervasiveness of strategic defaults. Third, our definition follows Benmelech and Bergman (2008) but we require the borrower to have ability to meet all of its debt obligations including amortization payments, not just the interest.

Loan health is a dynamic measure that changes over time but we constructed this loan-level figure in a conservative way to avoid overestimating the prevalence of strategic defaults. For example, if a loan is in default non-strategically in one quarter, we classify that loan as non-strategic default even though it might meet our characterization of strategic default in some other quarter. That is, if a loan in default satisfies our strategic default definition but the borrower experiences reductions in its cash flow later so that the loan remains in default but no longer satisfies our strategic default definition, we classify that loan as non-strategic default in our cross sectional analysis. Despite our conservative approach, strategic defaults are very common in our sample.

[Figure 1 about here.]

Figure 1 presents the fractions of defaulted loans and their borrowers based on our main characterization. Among 297 defaulted loans as defined above, 223, or 75% of them

[7]We obtain the paid interest expense directly from a firm's income statement that quarter. Unpaid interest expense and paid and unpaid amortization (when needed) are calculated based on our loan-level data.

were strategic defaults. 25% of loans are non-strategic defaults including defaulted loans to borrowers that were flagged as bankrupt or that had all their loans in default. These defaults were often to borrowers that had some loans still current but did not have sufficient cash to meet the obligations of all their loans.

The prevalence of strategic default is also clear at the borrower level. Among the 54 borrowers that ever had a loan in default, 36 (67%) of them defaulted strategically. As a comparison, only 18 borrowers had non-strategic defaults. In other words, strategic defaults are not driven by a few borrowers in our sample but it is widespread.

[Table 1 about here.]

Table 1 presents the descriptive statistics for the full sample and three subsamples. Our final sample covers 6,191 loans in total from 2001 to 2019. 218 strategically defaulted loans correspond to 3.6% of all loans. By contrast, 74 non-strategic defaults account for 1.2% of all loans. In Panel A of Table 1, we compare loan characteristics of strategically defaulted loans to non-strategically defaulted loans and never-defaulted loans at origination. Besides the characteristics that are reported by the data provider, we calculate total monthly payments using interest rate, loan amount, and amortization period reported in the data.[8]

Sample statistics as of loan origination reported in Table 1 highlights both differences and similarities across three subsamples. For example, mean LTV at origination is more than 65% for strategically defaulted loans. While this figure is significantly larger than that for loans that were never defaulted, it is not statistically different from the LTV of non-strategically defaulted loans. Mean and median interest rate of never-defaulted loans are both statistically less than those for loans that were defaulted strategically or non-strategically. However, the interest rate of non-strategically defaulted loans is also larger than that of strategic defaults at the 1% significance level. Strategically defaulted loans also have larger maturity than never

[8]We assume that the amortization period is the same as time to maturity if the former is not explicitly stated. If we do not observe amortization type or if the loan is stated to be "partial interest-only," we assume full amortization in our benchmark characterization to be conservative.

defaulted loans. Generally, we do not observe statistical difference in the averages of loan amount, asset value, and loan payment. Finally, strategically defaulted loans have smaller fraction of fully or partially amortizing loans but larger fraction of adjustable rate loans than never-defaulted loans.

In Panel B of Table 1, we present descriptive statistics for quarterly firm financial data. Strategically defaulted borrowers have higher median assets as of loan origination than the borrowers of never-defaulted loans and borrowers that defaulted non-strategically. Their mean profitability is also higher than both peer groups. These differences are statistically significant at 5% or 10% level with borrower-level clustering.

2.3 Alternative Characterizations of Strategic Default

[Table 2 about here.]

Given the importance of characterizing strategic defaults, we check the robustness of our classification along several dimensions. Table 2 lists all 36 alternative classifications and the fraction of strategic default among all defaults under each alternative. Our main classification is in bold. The main alternative default characterization with which we repeat our regression analysis as a robustness check is in italic.

The first dimension we alter is the length of the time window between the first appearance of a delinquency event and our characterization of loans as in default. We consider windows of 1, 3, and 12 months. Our choice of 3-months is driven by the frequent banking practice of waiting for three months before allocating reserves against loan loss.

The second dimension, along which we alter our characterization is the number of quarters in default. In a loan-quarter level panel analysis, we classify a defaulted loan as strategic or non-strategic default based on whether it satisfies our strategic default characterization in that particular quarter. That analysis is sufficiently flexible to allow defaulted loans to switch between strategic and non-strategic characterization even though they don't often do so. In the loan-level cross sectional analysis, we do not have that flexibility. Hence, we

provide alternative choices for the length of time during which a defaulted loan needs to be characterized as strategic default for the loan to be considered as such in the cross sectional analysis. Our main characterization requires the defaulted loan to be classified as strategic default in *every* quarter until the distress resolution to be considered as strategic default in the cross sectional analysis. This is a stringent condition but we believe it may help avoid confusion. Alternatively, we limit the length of time to the first quarter, which seems to be more common in the literature, as well as to the first four quarters in default.

Finally, we restrict the focus to several subsamples. There are some delinquencies where the first recorded delinquency event is after the loan maturity. This is likely to be due to lags in obtaining accurate data by the data provider but it may introduce noise on the determination of the onset of delinquency. In the first subsample, we drop these loans. Separately, the only delinquency event for some loans is when they are referred to a special servicer for resolution. This also adds noise to the determination of the onset of delinquency. Our second subsample drops these loans from the full sample. Finally, our third subsample drops both sets of loans from the full sample. Our regression analysis is based on the full sample as the number of observations is small in some of these subsamples.

[Figure 2 about here.]

Panel A of Table 2 presents the fraction of strategic default under each characterization while Panel B provides sample statistics about the fraction of strategic default across all 36 characterizations. Figure 2 plots how the fraction of strategic defaults is distributed across these different classifications. The main result of all these alternative characterizations is strategic defaults are very pervasive in our sample regardless of the characterization. The fraction of strategic defaults of all defaults is never less than 63% across 36 different characterizations and can be as high as 85% with a median of 75%. In fact, these figures are even more robust than it may appear because we often make conservative choices when we need to make a choice. For example, we always consider loan amortizations as part

of debt obligations but typical coverage ratio calculations for firms focus only on interest payments, which results in lower required payment. Relatedly, when we don't have the exact amortization schedule, we assume full amortization, which leads to higher required payments by the borrower than partial amortization does. Our benchmark definition results in about 75% of defaults to be classified as strategic default and is at the median of the distribution of alternative characterizations. Naturally, when we base our characterization only on the first quarter as it seems more common in the literature, the fraction of strategic defaults is higher.

2.4 A Comparison of Strategically Defaulted Loans with the Current Loans of the Same Borrowers

Our paper leverages the fact that borrowers frequently have multiple mortgages in the commercial real estate market. Our characterization implies that strategically defaulted borrowers also have current loans in the same month of default in contrast to residential mortgages where the borrower typically has only one mortgage. This gives us the opportunity to compare strategically defaulted loans to the current loans of the same borrower.

In Table 3, we compare the two groups as of the first month in default. In Panel A, we evaluate the long-term status of the loans that are current but to the same borrower that defaulted strategically. 97% of the loans that are to the same borrower and are not in default remain current 12 months later and 89% of them would never be in default. In other words, strategic default does not seem to be a prelude to defaults in other loans.

[Table 3 about here.]

In Panel B, we compare loan characteristics of strategically defaulted loans to current loans of the same borrowers; the standard errors for the mean and the median difference tests are clustered by borrowers. Maturity of strategically-defaulted loans is shorter than those in the current loans by the same borrowers. Furthermore, about 66% of strategically-defaulted loans are in their final year as opposed to only 9% of the same borrowers' current loans.

This difference is statistically significant at the 1% level, respectively. Additionally, the mean and median interest rate of strategically defaulted borrowers is significantly larger for strategically defaulted loans at 1% level. Interestingly, average monthly payment is actually smaller for strategically defaulted loans than for loans that are current for these borrowers. This difference is statistically significant at 5% level. Remaining balance of strategically defaulted loans is also smaller and this difference is statistically significant at 10% level. Average current estimated LTV is higher for strategically-defaulted loans but this difference is not statistically significant. We will study the loan characteristics associated with strategic defaults after we study the role of strategic default in renegotiation.

3 Strategic Default and Renegotiation

3.1 Renegotiation Sample Statistics

Our RCA dataset tracks the resolution of defaulted loans. We first classify defaulted loans whether they are renegotiated or not. Using the loan events data, we label a defaulted loan as renegotiated if the loan is tagged as "Restructured/Extension," "Restructured/Modified - Long Term," "Forbearance/Modified – Short Term," "Refinanced - Short Term," and/or "Resolved by Loan Refinance."

On the other hand, RCA does not directly provide an indicator whether a healthy loan is renegotiated. We identify such loans as follows. We track the loans of a borrower from the *same* lender collateralizing the *same* property. If the later loan is originated before the maturity of an existing loan both collateralizing the same property, we label such loans as renegotiated healthy loans in the quarter of the origination of the later loan. Importantly, we only label the earlier loan as renegotiated if the lender and borrower stay the same. As we do not observe the communications between the lender and the borrower, our definition captures only the renegotiations that lead to a new loan contract in the quarter that the

new loan or resolution is observed. Renegotiations may, of course, take place longer than a quarter or the borrower may also try to renegotiate the contract other times.

Renegotiation is not the only resolution of a defaulted loan. Foreclosure of such loans is an important resolution type and we record that as a separate resolution method. There are also other resolutions of defaulted loans including "Other Resolved" group, which includes loans labeled as "Resolved By Conventional Sale," "Resolved By Debtor/Trustee Sale," "Debt-for-Equity Swap," "Auction/Trustees Sale Scheduled," "Deferred/Abandoned Property," "Resolved by Merger," and "Resolved Other." We report foreclosed loans and other resolved loans jointly.

[Table 4 about here.]

In Table 4, we present the transition matrix of strategically defaulted loans, non-strategically defaulted loans, and healthy loans by resolution type.[9] Panel A presents the statistics for our main definition of strategic default. The transition matrix indicates higher likelihood of renegotiation for all defaulted loans. More than 25% of strategically and more than 35% of non-strategically defaulted loans are renegotiated as opposed to only 4% healthy loans. The differences between defaulted loans and healthy loans are statistically significant at the 1% level. However, the difference in renegotiation rates between strategically and non-strategically defaulted loans is not statistically significant. In other words, sample statistics suggest that strategically defaulted and non-strategically defaulted loans are more likely to be renegotiated than healthy loans. In Panel B, we present the statistics for our main alternative definition of strategic default, where we consider a loan in default if it remains delinquent for 12 consecutive months instead of three. While the fraction of renegotiated loans remains similar for strategic defaults, the fraction declines for non-strategic defaults. The likelihood of renegotiation is still statistically higher for both types of defaults than for healthy loans. In addition, the strategic defaults are more likely to be renegotiated than

[9]Healthy loans may, of course, transition to refinancing, pay off, or continue as a current loan by the end of our sample period; we omit those cases in this table.

non-strategic defaults at a statistically significance level of 10%. We will provide robustness checks using this definition later.

3.2 Regression Analysis

We start with a loan-level cross sectional regression analysis where the dependent variable is a binary indicator that takes one if the loan is renegotiated. More specifically, we have the following model:

$$Prob(Renegotiated_i = 1) = f(\beta_0 + \beta_1 * StrategicDefault_i + \beta_2 * NonStrategicDefault_i + \gamma * \mathbf{x_i} + FixedEffects) \quad (1)$$

The main explanatory variables of interest are the two default indicator variables, $StrategicDefault_i$ and $NonStrategicDefault_i$, which take the value of one if the loan is defaulted strategically and non-strategically, respectively. We adopt a very stringent definition for the former such that it takes one only if the defaulted loan can be classified as strategic default in every quarter it is in default. The latter are all other defaults including the loans to borrowers flagged as bankrupt. The loans that remain healthy serve as the (omitted) baseline. $\mathbf{x_i}$ contains many loan- and borrower-level variables as of loan origination. Several sets of fixed effects are also included. We, of course, obtain the logit or probit model with a logistic or normal distribution for $f()$. Instead, we will use linear $f()$ because the resulting Linear Probability Model allows the inclusion of a larger set of fixed effects; the results of a probit model with a limited set of fixed effects are presented in the Robustness subsection. Main results are presented in Table 5 with the standard errors robust to clustering at the borrower level.

[Table 5 about here.]

The first regression includes, as control variables, loan-level variables such as LTV at origination, interest-only indicator, loan maturity, interest rate, and loan size as of origination among others as well as borrower size, profitability, and leverage at the time of loan origination. The regression also include time(year-quarter)×metro area interaction fixed effects to control for time-specific local characteristics at the time of loan of origination including macroeconomic factors. *StrategicDefault* indicator has a positive coefficient, which is statistically significant at 1% level. The coefficient estimates suggest that loans that are defaulted strategically are about 27-30 percentage points more likely to be renegotiated than the loans that are never defaulted. *NonStrategicDefault* indicator does not have a statistically significant coefficient but the difference in the coefficients of *StrategicDefault* and *NonStrategicDefault* is not statistically significant.

Each of the other regressions presented in the table builds upon the previous one by adding additional control variables or using more granular set of fixed effects. The second regression controls for the characteristics of the asset that serves as collateral.[10] The third regression adds borrower fixed effects while the fourth one adds lender fixed effects. The coefficient of *StrategicDefault* is statistically significant at 1% level in all the regressions. While the coefficient of *NonStrategicDefault* is never significant, it is not statistically significantly different from that of *StrategicDefault* either. The results are also economically large as the coefficient changes between 0.27 and 0.30, which implies 27-30 percentage point higher probability of renegotiation relative to the healthy loans, which have about 5% unconditional probability of renegotiation.

The coefficients of other explanatory variables may also be of independent interest. Loans with higher LTV at origination and loans with higher interest rate at origination are less likely to be renegotiated but larger loans are more likely. Securitized loans are also less likely to be renegotiated along the lines found by (Adelino et al., 2013; Agarwal et al., 2011; Ghent,

[10]Asset characteristics provided by RCA include the natural logarithm of the total sqft of the collateral asset, the natural logarithm of the age of the asset, the natural logarithm of the number of stories, the number of buildings in the collateral, and an indicator variable that becomes one if the asset is located in a central business district.

2011; Piskorski et al., 2010). The loans of borrowers with high profitability as of origination are also more likely to be renegotiated. On the other hand, adjustable rate mortgages have higher likelihood to be renegotiated but we do not find any statistically significant effect for the past lender indicator or interest-only loans.

The drawback of the cross sectional analysis just presented is that it cannot capture time-dependent factors. For example, we can only control for loan characteristics at origination; controlling for loan characteristics at the time of default or renegotiation is not possible with healthy loans in the sample as not all loans are defaulted or renegotiated. We adopt the following richer model using the loan-quarter level panel data to capture the role of time-varying factors:

$$Prob(Renegotiated_{it} = 1) = f(\beta_0 + \beta_1 * StrategicDefault_{it} + \beta_2 * NonStrategicDefault_{it} + \gamma * \mathbf{x_{it}} + FixedEffects) \quad (2)$$

$Renegotiated_{it}$ is an indicator variable that becomes one in the quarter the loan is renegotiated. It is zero in the preceding quarters. The two default indicator variables, $StrategicDefault_{it}$ and $NonStrategicDefault_{it}$ are indicators that become one if the default is classified as strategic and non-strategic that quarter, respectively. Both indicators are zero before the default. Notice that this construction is flexible enough to capture the cases where a default is classified as strategic in one quarter and non-strategic in another quarter as the borrower's financial health changes although this flexibility is not needed for the majority of defaults. Healthy loans, for which both of these indicators are always zero serve as the baseline. We again use Linear Probability Model to include a large set of fixed effects. The results of the analysis with non-linear $f()$ are qualitatively similar and discussed in the Robustness subsection below.

We start following a loan at its origination (or in 2001Q1, the start of our sample period, whichever is later). The loan remains in the analysis every quarter until we reach the end of our sample or one of the following exit events occurs: a) loan maturity; b) renegotiation, c) refinancing; d) foreclosure, e) bankruptcy of the borrower, f) sale of the collateral. Notice that this structure allows borrowers to have defaulted loans and current loans at the same time, which in turn allows us to control for time-varying unobservable borrower- and lender-level characteristics as discussed below.

[Table 6 about here.]

We report the results of this regression analysis in Table 6. Regressions now control for variables that change over time such as (estimated) current LTV and an indicator for whether the loan is in its last year.[11] More importantly, the regressions include borrower×time(year-quarter) interaction fixed effects that controls non-parametrically for observable and unobservable time-varying factors at the borrower level including the borrower's financial health. The first regression also includes time×metropolitan area interaction fixed effects to control for time varying local market conditions in addition to asset type and lender fixed effects. We find that *StrategicDefault* indicator has a positive coefficient that is statistically significant at the 1% level. *NonStrategicDefault*, on the other hand, has an insignificant impact on the likelihood of renegotiation but the difference between the coefficients of *StrategicDefault* and *NonStrategicDefault* is insignificant.

Each of the other regressions builds upon the previous regression. The second regression adds asset characteristics. The third regression includes metropolitan area×asset type×time interaction fixed effects. This set of fixed effects can control for the time varying local market conditions at the asset type level. In particular, the lender's willingness to renegotiate a loan may depend on the availability of alternative investors specializing in that asset type at that

[11] Unfortunately, current LTV is very noisily estimated. The denominator, the current value of the asset, is estimated using the original asset value adjusted by the change in the metropolitan index for that asset type. The numerator, the loan value, is imprecisely calculated for 56% loans, for which we lack the precise amortization schedule.

locality (Benmelech and Bergman, 2008). We do not have homogenous or frequently traded assets, which would allow us to incorporate fully the role of collateral value into the analysis. However, this set of fixed effects will help capture some of that effect. Finally, the fourth regression has lender×time interaction fixed effects instead of lender fixed effects. The former set of fixed effects can control for time varying renegotiation policies of the lender including those due to lender financial health.

In all the regressions, *StrategicDefault* indicator has a positive coefficient that is statistically significant at the 1% level. This indicates that renegotiation of a strategically defaulted loan is more likely than that of a healthy loan. The difference with respect to healthy loans is also economically significant. The probability of renegotiation after a strategic default is between 2.4 and 2.7 percentage points higher in a quarter than that for the healthy loans. To give perspective, the unconditional probability of renegotiation for all loans in a given quarter is only 0.26%.

3.3 Robustness Tests

We start our robustness tests by adopting a different definition for strategic default. We change the length of delinquency from three months to 12 months for a loan to be considered in default. This change in the definition results in an increase in the fraction of strategic defaults from more than 75% to 80%. We first repeat the cross sectional analysis and present the results in Table OA-1 in the Online Appendix. The results are qualitatively similar. We then repeat the panel analysis and report the results in in Table OA-2 in the Online Appendix. We again obtain qualitatively similar results. Strategic default statistically significantly increases the likelihood of renegotiation relative to healthy loans.

We next repeat by using the probit model the cross sectional analysis that was based on Linear Probability Model and presented in Table 5. The former addresses the fact that a probability is estimated but it is a non-linear model so we cannot include as many fixed effects as with the latter. We present the results in Table OA-3 in Online Appendix. We

can use only year-quarter, asset type, and metropolitan area fixed effects. We find loan renegotiations to be more likely after both strategic and non-strategic defaults relative to loans that are never defaulted; this effect is statistically significant at the 1% level.

We also repeat by using probit model the panel analysis that was based on Linear Probability Model and presented in Table 6. We present the results in Table OA-4 in Online Appendix. We are again limited in how many sets of fixed effects that can be included in the analysis and we use only year-quarter, borrower, asset type, and metropolitan area fixed effects. We again find loan renegotiations to be more likely after both strategic and non-strategic defaults relative to loans that are never defaulted, and this effect is again statistically significant at the 1% level.

These tests confirm that strategic default makes loan renegotiation more likely relative to healthy loans and this result is robust to using an alternative identification of strategic default or different econometric models.

4 Characteristics Associated with Strategic and Non-Strategic Default

4.1 Regression Analysis

We have documented that strategically defaulted loans are more likely to be renegotiated than healthy loans. In this section, we now study the borrowers' decision to default strategically as well as non-strategically. Similar to our renegotiation analysis, we first do cross sectional analysis at the loan level and present the results at Table 7. The dependent variable of the first regression is *Default*, which takes the value of one if the loan is defaulted strategically or non-strategically. This regression serves as benchmark. Explanatory variables include many loan- and borrower-level variables as of origination and asset characteristics. We again use Linear Probability Model, which allows a greater set of fixed effects. To focus on loan characteristics, the analysis incorporates borrower, lender, and asset type fixed effects to

control for unobservable time-independent factors at the borrower, lender, and asset type level, respectively. Time×metropolitican area fixed effects control for local market conditions at the time of loan origination including macroeconomic factors. Standard errors robust to clustering at the borrower level are reported.

[Table 7 about here.]

We find that loans with higher LTV at origination are defaulted more often while the loans with longer maturity or greater size are defaulted less often. Larger borrowers and borrowers with lower leverage default more frequently. Finally, the borrower's past borrowing relationship with the lender is associated with lower likelihood of default at the 5% level of statistical significance. We do not find any statistically significant association for loan interest rate at origination, amortization type, or borrower profitability.

It turns out that these associations depend on whether the loans are defaulted strategically or not. The dependent variable of the second and third regressions is *StrategicDefault* and *NonStrategicDefault*, which take the value of one if the loan is defaulted strategically and non-strategically, respectively. We actually run these two regressions together using Seemingly Unrelated Regressions framework so that we can do inference across the regressions.[12] Column (4) presents the p-value of t-tests comparing the coefficients of two regressions.

We find that longer maturity loans are defaulted less frequently only for strategic defaults but not otherwise and this difference is statistically significant at the 5% level. Loans with higher LTV at origination are more likely to be defaulted strategically but not otherwise; and the difference is significant at 5% level. Loans of greater size and loans to borrowers with lower profitability are also defaulted less frequently but only in the case of strategic default. These differences are statistically significant at the 1% and 10% level, respectively. Finally, the borrower's past borrowing relationship with the lender is statistically significantly

[12]Stata's sureg command could not estimate this model with so many fixed effects so we had to implement it manually. We created a sample identifier for each regression sample, combined the samples together with the identifier, and ran the regression by interacting all the variables including fixed effects with the sample identifier.

associated with lower frequency of strategic default but not with nonstrategic default but the difference is not statistically significant.

We now move to the panel data analysis at the loan-quarter level using a framework similar to the one in the previous section. We present the results in Table 8. The dependent variable in the first regression is $Default_{it}$, which is an indicator variable that becomes one in the loan is in default that quarter; it is zero in the preceding quarters. We again use the Linear Probability Model. We start following a loan at its origination or in 2001Q1, the start of our sample period, whichever is later. The loan remains in the analysis until we reach the end of our sample or one of the following exit events occurs: a) maturity, b) strategic default, c) non-strategic default, d) refinancing, e) asset sale.

[Table 8 about here.]

The explanatory variables now include time-varying ones like an indicator for loans in their last year and estimated current LTV in addition to loan characteristics as of origination and asset characteristics. Crucially, the regression includes borrower×time interaction fixed effects to control for the borrower's changing financial health as well as any other observable and unobservable borrower-level time varying factors. Time×metro area×asset type interaction fixed effects control for changing local conditions for that asset type as well as for macroeconomic factors. Time×lender fixed effects capture the role of changing lender characteristics. Standard errors robust to clustering at the borrower level are reported.

Panel analysis in Regression 1 provides new insights. Loans that are in their last year are more likely to be defaulted; this effect is statistically significant at the 1% level. Longer maturity at origination, on the other hand, is associated with lower likelihood of default; this effect is also significant at the 1% level. A higher estimated current LTV is associated with higher rates of default at the 10% statistical significance.

A comparison of the factors associated with strategic and non-strategic defaults is also instructive and is provided in columns (2)-(4). The dependent variables are now

$StrategicDefault_{it}$ and $NonStrategicDefault_{it}$, which are indicator variables that become one in the quarter the loan is strategically and non-strategically defaulted, respectively. They are zero in the preceding quarters. We again estimate these regressions using the Seemingly Unrelated Regression approach. Column (4) presents the t-tests for the comparison of coefficients.

We find that loans in their last year are more likely to be defaulted regardless of the type of default but the association is almost three times as strong for strategic defaults. This difference is statistically significant at the 5% level. Economically a coefficient estimate of 0.008 for the loan term less than a year in column (2) implies an increase of 80 strategic defaults over 10,000 loan-quarters. By comparison, unconditional incidence rate of strategic defaults is about 18 per 10,000 loan-quarters.

Original loan maturity also has a statistically significant – and negative – association only for the strategic default. That difference is also statistically significant at the 1% level. Higher current LTV is associated with only strategic defaults in a statistically significant way but not with non-strategic defaults albeit this difference is not statistically significant. Finally, interest-only loans are positively associated with strategic defaults at 5% level and negatively but insignificantly associated with non-strategic defaults, and the difference is significant at the 5% level.

We again perform a robustness tests by adopting a different definition for strategic default. It is the same definition we considered in the robustness subsection of the previous section; that is, we increase the length of delinquency to 12 months before we consider the loan in default. We first repeat the cross sectional analysis and present the results in Table OA-5 in the Online Appendix. The results are mostly qualitatively similar except for the past lending relationship, which now associated with defaults only in general but not with specific types.

We then repeat the panel analysis and report the results in Table OA-6 in the Online Appendix. We again obtain qualitatively mostly similar results. One notable difference is that the coefficient of the indicator for loan in the last year is positive and statistically

significant only for strategic default but not for non-strategic default. The difference remains statistically significant at the 1% level.

Our findings suggest that borrowers who default on their loans strategically have different motives from when they do so non-strategically. It seems that loan-level factors are associated with strategic defaults but not with non-strategic defaults when the analysis controls for time-varying borrower, lender, and market characteristics.

5 Discussion and Concluding Remarks

We study an important component of incomplete contracts and the theory debt, namely, strategic default. We focus on commercial real estate loans, which provide a setting where a typical borrower has many mortgages outstanding, a typical loan is non-recourse and has no cross-default provisions, and the borrower's cash flow and cash holdings are often disclosed for regulatory reasons. We find that strategic default is widespread in this setting. The borrowers of most loans in default have the means to meet their debt obligations. They even continue to meet their obligations on other mortgages while selectively defaulting on some of their loans.

The theory of debt based on incomplete contracts suggests that borrowers may strategically default on their loans to renegotiate them. We indeed find that renegotiation is more likely after a strategic default than for healthy loans. Our results are robust to controlling for many loan-, borrower-, lender-, and locality-level factors including those that are time varying.

An interesting question is why lenders do not structure the loans in a way that would mitigate strategic default. After all, the lender seems to be providing an 'option' to the borrower to default without much adverse effect to the rest of the borrower's business. This may have to do with the alternative use of the assets used as collateral. In our sample, the types of collateral include shopping malls and condominiums. The value of such assets is unlikely to depend much to the asset owner. When the collateral under new owner is worth

about the same as the defaulting owner, the banks may be willing to provide (sell) this default option to the borrower. In fact, some securities may have been designed to give the borrower the option to default strategically. For example, equipment trust certificates used in financing aircrafts, railway cars, containers are secured debentures that give the borrower the right to default and forego the use of the asset without much negative impact on the rest of its business (Benmelech and Bergman, 2011). However, loans secured with non-standard assets may be different. For example, a factory designed and built to the needs and specifications of the owner may be worth much less to an alternative owner. It is an interesting research question whether such loans are more likely to have cross-default or recourse provisions.

The large prevalence of strategic defaults in commercial loans invites questions about their frequency in residential mortgages. While we would be very cautious to extrapolate our results to other settings, our results also have implications for residential loans among others. For example, empirical findings that attribute little importance to strategic default in residential mortgages may need to be justified by further analyses of the channels that mitigate such behavior in residential mortgages. In particular, non-recourse mortgages on second or investment homes, are likely to share common elements with the setting studied here, and hence, may experience strategic default more frequently.

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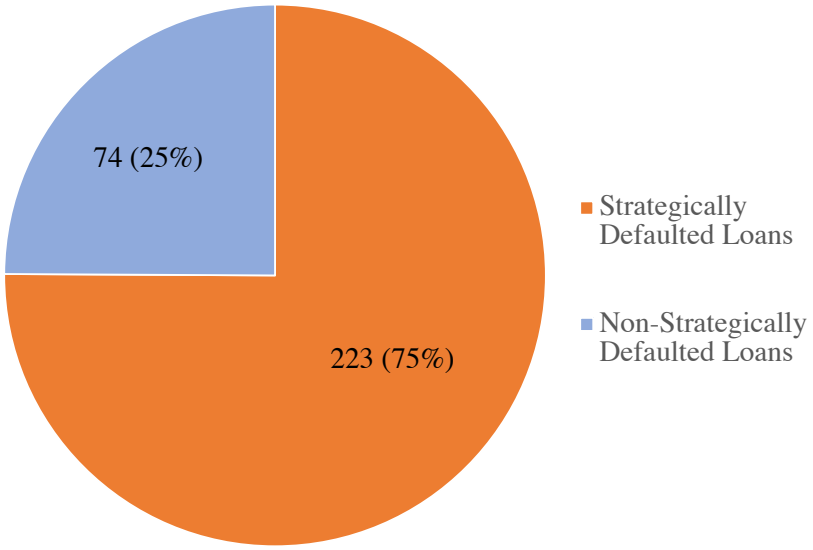
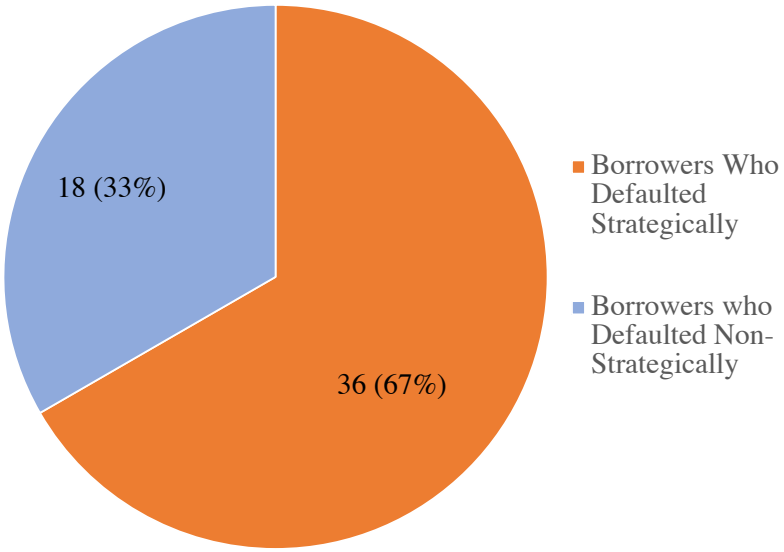


(a) Defaulted Loans



(b) Borrowers Who Defaulted

Figure 1. Prevalence of Strategic Default

The figure shows the breakdown of loan in default and their borrowers. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. We require a defaulted loan to be a strategic default in *every* quarter until its resolution to be included as Strategic Default in this figure.

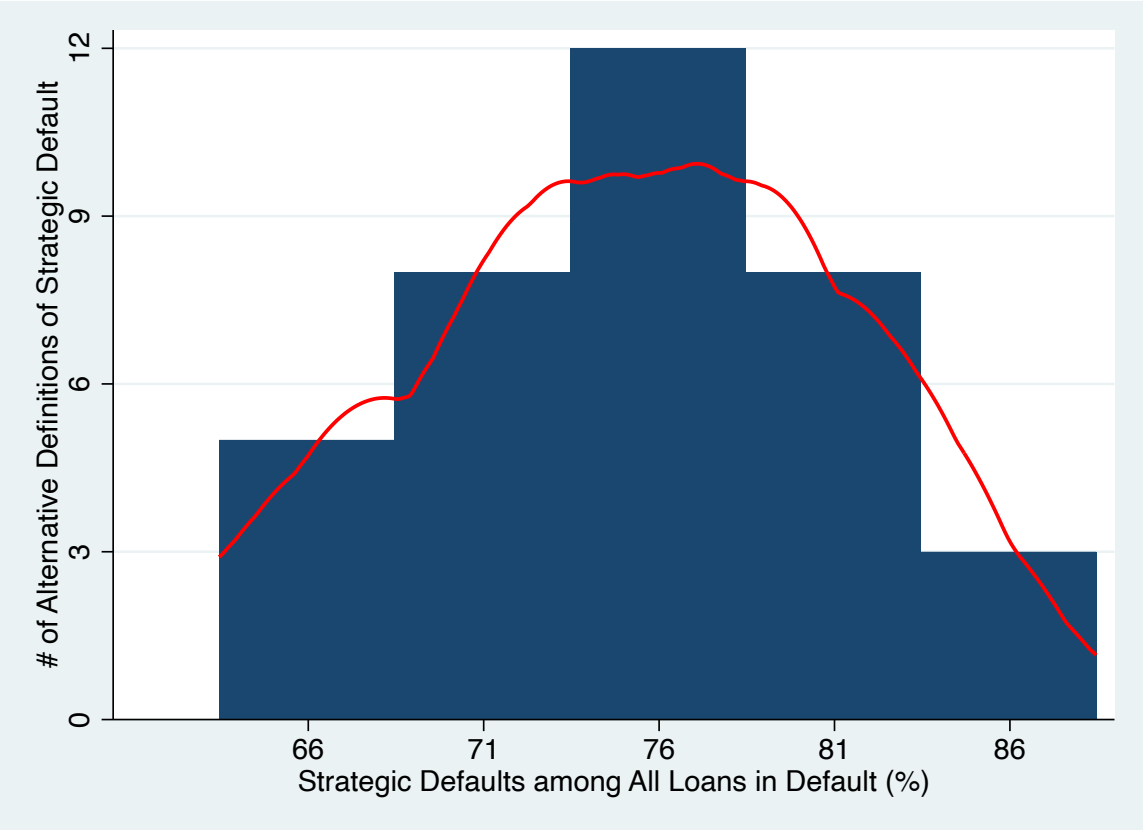


Figure 2. The Distribution of Strategic Defaults under 36 Alternative Characterizations

The figure presents the distribution of strategic defaults among all loans in default under 36 alternative definitions of strategic default.

Table 1. Sample Statistics

The table presents descriptive statistics of loan and borrower characteristics. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Variables are described in Table A-1. Borrower-clustered standard errors for the means are reported in parentheses. Borrower-clustered bootstrapped standard errors are used to report significance for medians. The significance of mean and median difference tests for strategically and non-strategically loans relative to never defaulted loans are indicated as follows: * p<0.1; ** p<0.05; *** p<0.01. The significance of mean and median difference tests between strategically defaulted loans and non-strategically defaulted loans are indicated as follows: a p<0.1; b p<0.05; c p<0.01.

	Panel A - Loan Characteristics							
	Strategically Defaulted Loans		Non-Strategically Defaulted Loans		Never Defaulted Loans		All Loans	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Loan Amount at Origination ($ million)	21.64	10.72	27.58	13.15	28.67	9.70	28.40	9.75
	(7.96)		(7.90)		(5.45)		(5.29)	
Asset Value at Origination ($ million)	40.03	15.85	62.22	20.30	90.19	18.00	88.05	17.99
	(15.34)		(24.76)		(27.94)		(26.79)	
LTV at Origination (%)	65.77**	74.19**	57.10	63.09	54.37	62.00	54.81	62.38
	(4.66)		(4.50)		(2.47)		(2.42)	
Monthly Payment ($ million)	0.13	0.06	0.23	0.11	0.20	0.06	0.20	0.06
	(0.04)		(0.07)		(0.04)		(0.04)	
Interest Rate at Origination (%)	5.92[a,***]	5.79[a,***]	6.44***	6.35***	5.16	5.33	5.20	5.40
	(0.05)		(0.14)		(0.08)		(0.08)	
Maturity at Origination (months)	93.63**	120.00	83.69*	61.00	110.21	120.00	109.29	120.00
	(6.18)		(13.88)		(2.61)		(2.66)	
# of Loans	223		74		5,894		6,191	

Table 1. Sample Statistics (Continued)

	Panel A - Loan Characteristics (Continued)			
	Strategically Defaulted Loans	Non-Strategically Defaulted Loans	Never Defaulted Loans	All Loans
Fraction of Loans				
Interest-Only	38.12%	18.92%	21.24%	21.82%
Fully or Partially Amortizing	11.66%**	22.97%	23.02%	22.61%
Adjustable Rate	21.97%*	14.86%	8.62%	9.17%
Fixed Rate Loans	77.58%*	85.14%	90.87%	90.32%
# of Loans	223	74	5,894	6,191

	Panel B - Firm Financials							
	Strategically Defaulted Loans		Non-Strategically Defaulted Loans		Never Defaulted Loans		All Loans	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Total Assets ($ billion)	6.27	5.17[b,**]	3.40	0.75	5.35	2.24	5.36	2.29
	(1.42)		(1.47)		(1.68)		(1.64)	
Profitability (%)	0.98[c,**]	0.82	0.47	0.51	0.41	0.26	0.43	0.29
	(0.22)		(0.19)		(0.15)		(0.15)	
Debt-to-Assets (%)	53.50	51.22	56.87	55.26	56.40	55.38	56.30	55.26
	(3.05)		(2.00)		(1.75)		(1.72)	
# of Loans	223		74		5,894		6,191	

Table 2. Alternative Characterizations of Strategic Default

The table presents the fraction of strategic defaults among all defaults under alternative assumptions and characterizations. A loan is considered *in default* if it remains delinquent for the number consecutive months given under *Min. Delinquency Length*. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. We alter our characterizations by *Min. Delinquency Length* and *The Number of Quarters in Default*. We identify two subsamples with potential issues in data recording: a) Delinquencies with recorded start date after the loan's maturity date; b) loans that are not recorded explicitly as delinquent but are nevertheless referred to a servicer specializing in distressed debt collection. Dropping or keeping these subsamples result in four different samples. Different combinations of these approaches lead to 36 alternative characterizations of strategic defaults. Our main characterization is in bold. The default characterization we use in robustness checks of the regression analysis is in italic. Panel B provides sample statistics for the fraction of strategic defaults among all defaults across those 36 alternative characterizations.

Panel A - Alternative Definitions

Min. Delinquency Length	Quarters in Default	# of Defaults	Fraction of Strategic Defaults
Full Sample			
3 Months	**All Quarters Until Resolution**	**297**	**75.08%**
3 Months	1st Quarter	297	84.51%
3 Months	All Quarters in the 1st Year	297	78.45%
12 Months	*All Quarters Until Resolution*	*242*	*80.17%*
12 Months	1st Quarter	242	84.30%
12 Months	All Quarters in the 1st Year	242	82.64%
1 Month	All Quarters Until Resolution	300	75.00%
1 Month	1st Quarter	300	85.00%
1 Month	All Quarters in the 1st Year	300	78.33%
Dropping Delinquencies Starting after the Loan Maturity			
3 Months	All Quarters Until Resolution	244	71.72%
3 Months	1st Quarter	244	81.56%
3 Months	All Quarters in the 1st Year	244	75.00%
12 Months	All Quarters Until Resolution	189	77.25%
12 Months	1st Quarter	189	81.48%
12 Months	All Quarters in the 1st Year	189	79.89%
1 Month	All Quarters Until Resolution	247	71.66%
1 Month	1st Quarter	247	82.19%
1 Month	All Quarters in the 1st Year	247	74.90%

Table 2. Alternative Characterizations of Strategic Default (Continued)

Min. Delinqency Length	Quarters in Default	# of Defaults	Fraction of Strategic Defaults
Dropping Delinquencies Being Referred to a Special Servicer without a Delinquency Tag			
3 Months	All Quarters Until Resolution	80	70.00%
3 Months	1st Quarter	80	80.00%
3 Months	All Quarters in the 1st Year	80	75.00%
12 Months	All Quarters Until Resolution	68	70.59%
12 Months	1st Quarter	68	76.47%
12 Months	All Quarters in the 1st Year	68	72.06%
1 Month	All Quarters Until Resolution	79	69.62%
1 Month	1st Quarter	79	79.75%
1 Month	All Quarters in the 1st Year	79	74.68%
Dropping Both Subsamples			
3 Months	All Quarters Until Resolution	64	64.06%
3 Months	1st Quarter	64	75.00%
3 Months	All Quarters in the 1st Year	64	68.75%
12 Months	All Quarters Until Resolution	52	63.46%
12 Months	1st Quarter	52	69.23%
12 Months	All Quarters in the 1st Year	52	63.46%
1 Month	All Quarters Until Resolution	63	63.49%
1 Month	1st Quarter	63	74.60%
1 Month	All Quarters in the 1st Year	63	68.25%

Panel B - Distribution of Fraction of Strategic Defaults under Alternative Assumptions

	Fraction of Strategic Defaults
# of Strategic Default Characterizations	36
Distribution	
Mean	74.93%
Min	63.46%
25th Percentile	70.44%
Median	75.00%
75th Percentile	79.92%
Max	85.00%
Main Specification	75.08%

Table 3. Strategically Defaulted Loans vs. Current Loans of the Same Borrowers
The table presents loan-level comparison of strategically defaulted loans and current loans of the same borrowers at the time of default. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. We group the defaulted loans under Strategic Default in this table if such loans can be characterized as strategic default in all the quarters until the distress resolution, which is typically foreclosure or loan renegotiation. Variables are described in Table A-1. Borrower-clustered standard errors for the means are reported in parentheses. Borrower-clustered bootstrapped standard errors are used to report significance for medians. The significance of mean and median difference tests between strategic default loans and current loans of the same borrower are indicated as follows: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table 3. Strategically Defaulted Loans vs. Current Loans of the Same Borrowers (Continued)

	Panel A - Loan Status Over Time
Current Loans of Borrowers Who Strategically Defaulted	
Still Current after 12 Months	97.65%
Never in Default	89.29%

	Panel B - Loan Characteristics at the Time of Default					
	Strategically Defaulted Loans		Current Loans		All Loans	
	Mean	Median	Mean	Median	Mean	Median
Maturity at Origination	93.63***	120	118.22	120	117.12	120
	(6.25)		(2.79)		(2.63)	
Loan in the Last Year (1=Yes)	0.66***	-	0.09	-	0.12	-
	(0.12)		(0.02)		(0.02)	
(Estimated) Current LTV (%)	61.25	54.69	56.48	58.43	56.69	58.36
	(4.56)		(5.11)		(4.89)	
Interest Rate at Origination (%)	5.92***	5.79***	5.45	5.51	5.47	5.51
	(0.05)		(0.13)		(0.13)	
Remaining Balance ($ million)	19.79*	8.91	44.95	18.68	43.83	18.05
	(7.55)		(13.05)		(13.07)	
Monthly Payment ($ million)	0.12**	0.04	0.34	0.12	0.33	0.12
	(0.04)		(0.09)		(0.09)	
Amortization and Rate Types						
Interest-Only	0.38	-	0.21	-	0.21	-
	(0.10)		(0.05)		(0.05)	
Fully or Partially Amortizing	0.12*	-	0.21	-	0.21	-
	(0.04)		(0.03)		(0.03)	
Adjustable Rate	0.22***	-	0.03	-	0.04	-
	(0.07)		(0.02)		(0.01)	
Fixed Rate	0.78***	-	0.97	-	0.96	-
	(0.07)		(0.01)		(0.01)	
# of Loans	223		4,762		4,985	

Table 4. Renegotiation Frequencies

The table presents the fraction of renegotiated loans based on their default status. In Panel A, a loan is considered *in default* if it remains delinquent for three consecutive months; this is our main definition. In Panel B, a loan is considered *in default* if it remains delinquent for 12 consecutive months, our alternative definition. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of the same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Variables are described in Table A-1.The significance of Pearson's Chi-Squared tests relative to non-delinquent loans are indicated as follows: * p<0.1; ** p<0.05; *** p<0.01. The significance of Pearson's Chi-Squared tests between strategic default loans and non-strategic default loans are indicated as follows: a p<0.1; b p<0.05; c p<0.01.

	Panel A - 3 Months of Delinquency Length		
	# of Loans	Foreclosed/Other Resolved	Renegotiated
Strategic Default (A)	223	74.89%	25.11%
Non-Strategic Default (B)	74	64.86%	35.14%
Never in Default (C)	5,894	-	4.19%
All Loans	6,191	3.47%	5.31%
		Chi-squared	Prob.
Test of Independent Distribution between A and B		2.79	0.101
Test of Independent Distribution between A and C		199.76	<0.001
Test of Independent Distribution between B and C		160.32	<0.001
	Panel B - 12 Months of Delinquency Length		
	# of Loans	Foreclosed/Other Resolved	Renegotiated
Strategic Default (A)	194	77.32%	22.68%
Non-Strategic Default (B)	48	89.58%	10.42%
Never in Default (C)	5,894	-	4.19%
All Loans	6,136	3.15%	4.82%
		Chi-squared	Prob.
Test of Independent Distribution between A and B		3.58	0.071
Test of Independent Distribution between A and C		141.08	<0.001
Test of Independent Distribution between B and C		4.54	0.051

Table 5. Strategic Default and Renegotiation: Cross Sectional Analysis

The table presents cross sectional loan-level regression results based on the linear probability model. The dependent variable is a binary indicator that takes one if the loan is restructured. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Control variables are described in Table A-1 and are as of loan origination. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table 5. Strategic Default and Renegotiation: Cross Sectional Analysis (Continued)

VARIABLES	(1)	(2)	(3)	(4)
	Coefficient × 10^2			
Strategic Default (A)	26.950***	27.080***	28.712***	29.754***
	(7.452)	(7.490)	(7.999)	(8.602)
Non-Strategic Default (B)	22.742	18.188	12.329	13.069
	(14.266)	(11.435)	(10.171)	(10.201)
ln(Maturity at Origination)	-3.314*	-3.664*	-2.460	-2.075
	(1.941)	(1.992)	(2.028)	(2.178)
LTV at Origination	-6.461**	-8.959***	-10.477***	-9.970***
	(2.718)	(2.953)	(2.869)	(2.436)
Interest-Only	0.256	0.025	0.807	0.406
	(1.117)	(1.114)	(1.355)	(1.313)
Missing Amortization Type	0.405	0.349	0.335	0.403
	(0.779)	(0.757)	(0.669)	(0.707)
ln(Interest Rate at Origination)	-6.762*	-5.917	-9.318**	-11.412***
	(3.937)	(3.899)	(3.792)	(3.847)
Adjustable Rate	4.827*	5.048*	6.118*	7.058*
	(2.682)	(2.710)	(3.450)	(3.921)
Missing Rate Type	3.739	3.471	3.796	0.562
	(3.233)	(3.526)	(3.663)	(3.353)
ln(Loan Amount at Origination)	0.568*	1.119***	1.730***	1.528***
	(0.327)	(0.375)	(0.462)	(0.333)
Securitized Loan	-3.392**	-3.375**	-3.764**	-2.515*
	(1.431)	(1.369)	(1.567)	(1.350)
Past Lender	1.877	1.522	1.368	-0.077
	(1.326)	(1.322)	(1.341)	(1.408)
ln(Total Assets)	-0.412	-0.381	-0.249	-0.074
	(0.468)	(0.496)	(1.586)	(1.541)
Profitability (%)	2.453**	2.436***	3.137***	3.058***
	(0.945)	(0.925)	(0.740)	(0.717)
Debt-to-Assets	9.492**	7.946*	12.402*	15.309**
	(4.136)	(4.283)	(6.783)	(6.765)
Constant	27.543***	29.472***	26.084	25.468
	(10.248)	(10.997)	(17.459)	(18.254)
t-Value(A-B)	0.257	0.626	1.318	1.380
Prob(A-B)	0.797	0.532	0.190	0.170
YearQ×Metro FE	Yes	Yes	Yes	Yes
Asset-Type FE	Yes	Yes	Yes	Yes
Asset Characteristics	-	Yes	Yes	Yes
Borrower FE	-	-	Yes	Yes
Lender FE	-	-	-	Yes
# of Loans	4,214	4,067	4,030	3,978
Adj. R-squared	0.547	0.561	0.599	0.625

Table 6. Strategic Default and Renegotiation: Panel Analysis

The table presents panel regression results based on the linear probability model. The dependent variable is a time-dependent binary indicator that takes one if the loan is restructured in that quarter; it remains zero until the restructuring. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. *StrategicDefault* and *NonStrategicDefault* are time-dependent binary indicators that become one during the quarter the loan is in strategic default and non-strategic default, respectively. Control variables are described in Table A-1. Observations are by loan-quarters and a loan leaves the sample once the loan is renegotiated or another exit event such as foreclosure or payoff takes place as described in the text. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table 6. Strategic Default and Renegotiation: Panel Analysis (Continued)

VARIABLES	(1)	(2)	(3)	(4)
	Coefficient × 10^2			
Strategic Default (A)	2.383***	2.604***	2.352***	2.732***
	(0.908)	(0.951)	(0.805)	(0.809)
Non-Strategic Default (B)	2.181	1.948	1.453	1.652
	(2.049)	(1.835)	(1.616)	(1.854)
Loan in the Last Year	0.021	0.014	0.107	0.260
	(0.329)	(0.333)	(0.315)	(0.209)
ln(Maturity at Origination)	-0.441	-0.480	-0.386	-0.160
	(0.343)	(0.351)	(0.346)	(0.132)
Current LTV	-0.221**	-0.324***	-0.193	-0.186**
	(0.092)	(0.109)	(0.118)	(0.089)
Interest-Only	0.061	0.021	0.035	0.020
	(0.054)	(0.063)	(0.076)	(0.073)
Missing Amortization Type	0.113	0.098	0.136	0.046
	(0.111)	(0.104)	(0.123)	(0.057)
ln(Interest Rate at Origination)	-0.459*	-0.414*	-0.403*	-0.279**
	(0.262)	(0.239)	(0.228)	(0.134)
Adjustable Rate	0.747	0.827	0.734	0.586*
	(0.616)	(0.632)	(0.641)	(0.308)
Missing Rate Type	0.483	0.521	0.505	0.359
	(0.311)	(0.331)	(0.343)	(0.312)
ln(Remaining Balance)	0.049	0.052	0.052	0.021
	(0.042)	(0.039)	(0.044)	(0.025)
Securitized Loan	-0.200*	-0.186*	-0.218*	-0.150**
	(0.110)	(0.104)	(0.125)	(0.068)
Past Lender	-0.006	0.004	0.006	-0.016
	(0.078)	(0.077)	(0.084)	(0.077)
Constant	3.112*	3.288*	2.706	1.536**
	(1.829)	(1.793)	(1.767)	(0.670)
t-Value(A-B)	0.087	0.306	0.480	0.522
Prob(A-B)	0.930	0.760	0.632	0.603
Asset Characteristics	-	Yes	Yes	Yes
YearQ×Borrower FE	Yes	Yes	Yes	Yes
YearQ×Metro FE	Yes	Yes	-	-
Asset-Type FE	Yes	Yes	-	-
YearQ×Metro×Asset-Type FE	-	-	Yes	Yes
Lender FE	Yes	Yes	Yes	-
YearQ×Lender FE	-	-	-	Yes
# of Loan-Quarters	117,654	114,362	105,253	103,214
Adj. R-squared	0.544	0.545	0.584	0.649

Table 7. Characteristics Associated with Strategic and Non-Strategic Defaults: Cross Sectional Analysis

The table presents loan-level regression results based on the linear probability model. The dependent variables are *Default*, *StrategicDefault*, and *NonStrategicDefault*, which are binary indicators for any default, strategic default only, and non-strategic default only, respectively. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Control variables are described in Table A-1. Borrower-level variables are as of loan origination. The regression results in columns 2 and 3 are from a single joint estimation in the framework of Seemingly Unrelated Regressions implemented by concatenating strategic default and non-strategic default samples and interacting each variable in the regression including fixed effects by the sample indicator. The joint estimation of regressions (2) and (3) allows tests of the equality of coefficients; p-values of these tests are reported in column 4. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * p<0.1; ** p<0.05; *** p<0.01.

Table 7. Characteristics Associated with Strategic and Non-Strategic Defaults: Cross Sectional Analysis (Continued)

VARIABLES	All Defaults (1)	Strategic Default (2)	Non-Strategic Default (3)	Equality of Coefficients (2)-(3)
	Coefficient			*P-Value*
ln(Maturity at Origination)	-0.082***	-0.079***	-0.003	0.016
	(0.027)	(0.026)	(0.014)	
LTV at Origination	0.094**	0.096**	-0.002	0.016
	(0.041)	(0.039)	(0.012)	
Interest-Only	0.006	0.006	-0.001	0.765
	(0.018)	(0.019)	(0.008)	
Missing Amortization Type	-0.002	-0.009	0.007**	0.174
	(0.010)	(0.011)	(0.004)	
ln(Interest Rate at Origination)	0.032	-0.002	0.034	0.593
	(0.066)	(0.061)	(0.026)	
Adjustable Rate	0.020	0.030	-0.010	0.410
	(0.040)	(0.041)	(0.017)	
Missing Rate Type	0.030*	0.030*	-0.000	0.127
	(0.018)	(0.016)	(0.010)	
ln(Loan Amount at Origination)	-0.014**	-0.019***	0.005	0.005
	(0.006)	(0.006)	(0.004)	
Securitized Loan	0.007	0.006	0.001	0.685
	(0.010)	(0.009)	(0.005)	
Past Lender	-0.043**	-0.035**	-0.008	0.217
	(0.017)	(0.017)	(0.010)	
ln(Total Assets)	0.059***	0.035**	0.024	0.633
	(0.021)	(0.015)	(0.016)	
Profitability	-0.172	-0.650*	0.477	0.058
	(0.498)	(0.360)	(0.410)	
Debt-to-Assets	-0.349***	-0.240**	-0.108*	0.259
	(0.105)	(0.092)	(0.062)	
Constant	0.113	0.065		-
	(0.222)	(0.114)		
Asset Characteristics	Yes	Yes	Yes	Yes
YearQ×Metro FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes
Asset Type FE	Yes	Yes	Yes	Yes
# of Loans	3,978	3,978	3,978	-
Adj. R-squared	0.600	0.569		-

Table 8. Characteristics Associated with Strategic and Non-Strategic Defaults: Panel Analysis

The table presents panel regression results based on the linear probability model. The dependent variables are $Default_{it}$, $StrategicDefault_{it}$, and $NonStrategicDefault_{it}$, which are time-dependent binary indicators that take the value of one in the quarter the loan is in default, strategic default, and non-strategic default, respectively. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Control variables are described in Table A-1. The regression results in columns 2 and 3 are from a single joint estimation in the framework of Seemingly Unrelated Regressions implemented by concatenating strategic default and non-strategic default samples and interacting each variable in the regressions including fixed effects by the sample indicator. The joint estimation of regressions (2) and (3) allows tests of the equality of coefficients; p-values of these tests are reported in column 4. Observations are by loan-quarters and a loan leaves the sample once it is paid off or defaulted. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * p<0.1; ** p<0.05; *** p<0.01.

Table 8. Characteristics Associated with Strategic and Non-Strategic Defaults: Panel Analysis (Continued)

VARIABLES	All Defaults (1)	Strategic Default (2)	Non-Strategic Default (3)	Equality of Coefficients (2)-(3)
	Coefficient × 10^2			*P-Value*
Current LTV	0.349*	0.304**	0.045	0.187
	(0.185)	(0.148)	(0.119)	
Loan in the Last Year	1.038***	0.760***	0.278**	0.025
	(0.224)	(0.177)	(0.128)	
ln(Maturity at Origination)	-0.515***	-0.486***	-0.028	0.002
	(0.128)	(0.112)	(0.082)	
ln(Interest Rate at Origination)	0.215	0.195	0.020	0.299
	(0.170)	(0.154)	(0.069)	
ln(Remaining Balance)	-0.013	-0.002	-0.011	0.827
	(0.043)	(0.032)	(0.025)	
Interest-Only	0.158	0.213**	-0.055	0.018
	(0.106)	(0.102)	(0.038)	
Missing Amortization Type	0.025	0.045	-0.020	0.294
	(0.066)	(0.052)	(0.037)	
Adjustable Rate	0.548	0.387	0.161	0.557
	(0.394)	(0.347)	(0.177)	
Missing Rate Type	0.422	0.462	-0.040	0.083
	(0.334)	(0.304)	(0.070)	
Securitized Loan	0.033	-0.010	0.042	0.434
	(0.073)	(0.056)	(0.042)	
Past Lender	-0.072	-0.058	-0.014	0.549
	(0.084)	(0.069)	(0.039)	
Constant	1.991***	1.826***		-
	(0.533)	(0.454)		
Asset Characteristics	Yes	Yes	Yes	Yes
YearQ×Metro×Asset Type FE	Yes	Yes	Yes	Yes
YearQ×Borrower FE	Yes	Yes	Yes	Yes
YearQ×Lender FE	Yes	Yes	Yes	Yes
# of Loan-Quarters	101,460	101,460	101,460	-
Adj. R-squared	0.398	0.394		-

Appendix

Table A-1. Variable Descriptions

Variables	Description
Current Loan	A loan is defined as current if there is no payment in arrears that month.
Loan In Default	A loan is classified as in default if the borrower does not meet its debt obligations for three consecutive months or if the loan is stated to be referred to a special servicer for three consecutive months. In some of the Robustness checks, default is also defined for delinquency in one month or 12 consecutive months.
Strategic Default	A loan is defined as strategic default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default.
Loan Amount	The amount borrowed at origination in $ millions
Monthly Payment	Monthly payment of a loan in $ millions calculated based on the interest rate and amortization period information provided by RCA using the annuity formula if a loan is a fixed-rate loan. For adjustable-rate loans, we first calculate the margin at origination by subtracting the rate of equivalent-maturity U.S. Treasury term structure from the interest rate data provided by RCA. Then, we adjust the rate every month by adding the rate of equivalent-maturity U.S. Treasury yield curve to the margin we calculate. This way, we obtain an adjustable rate every month. Then, monthly payment is calculated based on this adjustable rate using the annuity formula.
Interest Rate	The interest rate of the loan as provided by RCA in percentage points.
Maturity at Origination	The number of months to maturity for a loan at origination.
Interest-Only Loans	Loans with no amortization

Table A-1. Variable Descriptions (Continued)

Variables	Description
Fully or Partially Amortizing Loans	Loans with interest-only payments for a certain period or loans that have a balloon payment at maturity. and then that become fully amortizing, or loans that are fully amortizing through out their life
Loan to Value at Origination	The ratio of loan amount to the value of the collateral at origination. If the loan is originated at the purchase of the asset, the value of the asset is the purchase price. If the loan is originated for refinance, the value of the asset is the estimated value at refinancing provided by RCA.
Current Loan to Value	The ratio of loan amount to the value of the collateral at any month. The loan amount is the remaining balance in a given month. The value of the collateral is calculated using the return of an index from the month of origination to that month. Commercial real estate indices specific to the collateral type and the Metropolitan Area are use as provided by RCA.
Securitized Loans	Loans that are flagged as securitized by RCA.
Past Lender	A binary indicator that becomes one if a lender has a previous loan with a borrower at any point in time after 2001, the start of our sample.
Total Assets	Total Assets in $ billions as reported in the balance sheet of the borrower
Debt-to-Assets	The ratio of Total Debt to Total Assets as reported in the balance sheet of the borrower
Profitability	The ratio of Net Income to Total Assets as reported by the borrower
Collateral Asset Size	Total square footage of the collateral asset
Asset Age	The age of the collateral asset
# of Stories	The number of stories in the collateral asset
# of Buildings	The number of buildings in the collateral asset
CBD	An indicator that becomes one if a collateral asset is located in a Central Business District.

Online Appendix

Table OA-1. Strategic Default and Renegotiation Using an Alternative Definition for Strategic Default: Cross Sectional Analysis

The table presents cross sectional loan-level regression results based on the linear probability model. The dependent variable is a binary indicator that takes one if the loan is renegotiated. A loan is considered *in default* if it remains delinquent for 12 consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Control variables are described in Table A-1 and are as of loan origination. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table OA-1. Strategic Default and Renegotiation Using an Alternative Definition for Strategic Default: Cross Sectional Analysis (Continued)

VARIABLES	(1)	(2)	(3)	(4)
	Coefficient × 10^2			
Strategic Default (A)	25.052***	25.127***	28.103***	27.817***
	(7.254)	(7.223)	(8.351)	(9.239)
Non-Strategic Default (B)	5.425	4.726	6.280*	4.905
	(4.100)	(3.912)	(3.331)	(3.294)
ln(Maturity at Origination)	-1.802	-2.029	-1.418	-0.599
	(1.642)	(1.648)	(1.859)	(1.836)
LTV at Origination	-5.709**	-8.018***	-9.681***	-9.010***
	(2.363)	(2.593)	(2.799)	(2.195)
Interest-Only	0.402	0.304	0.515	0.580
	(1.122)	(1.137)	(1.465)	(1.405)
Missing Amortization Type	-0.224	-0.174	-0.233	0.072
	(0.708)	(0.721)	(0.687)	(0.646)
ln(Interest Rate at Origination)	-7.696**	-6.716*	-10.475***	-13.217***
	(3.771)	(3.800)	(3.721)	(3.637)
Adjustable Rate	7.096***	7.434***	8.078**	9.233**
	(2.557)	(2.658)	(3.686)	(4.047)
Missing Rate Type	4.714	4.398	4.830	0.890
	(3.497)	(3.855)	(3.898)	(3.839)
ln(Loan Amount at Origination)	0.512	1.061***	1.569***	1.376***
	(0.325)	(0.361)	(0.463)	(0.325)
Securitized Loan	-3.846***	-3.729***	-3.978**	-2.646**
	(1.388)	(1.357)	(1.548)	(1.287)
Past Lender	2.133	2.130*	1.869	0.501
	(1.291)	(1.282)	(1.402)	(1.309)
ln(Total Assets)	-0.361	-0.313	-0.689	-0.883
	(0.432)	(0.468)	(1.539)	(1.614)
Profitability (%)	2.448**	2.385**	2.854***	2.595***
	(1.046)	(1.017)	(0.834)	(0.776)
Debt-to-Assets	9.388**	8.502**	13.137**	15.404**
	(4.124)	(4.207)	(6.496)	(6.462)
Constant	21.615**	21.397**	25.354	26.662
	(9.662)	(9.992)	(17.680)	(19.644)
t-Value(A-B)	2.276	2.376	2.617	2.940
Prob(A-B)	0.024	0.019	0.010	0.004
YearQ×Metro FE	Yes	Yes	Yes	Yes
Asset-Type FE	Yes	Yes	Yes	Yes
Asset Characteristics	-	Yes	Yes	Yes
Borrower FE	-	-	Yes	Yes
Lender FE	-	-	-	Yes
# of Loans	4,174	4,030	3,993	3,943
Adj. R-squared	0.567	0.577	0.609	0.640

Table OA-2. Strategic Default and Renegotiation Using an Alternative Definition for Strategic Default: Panel Analysis

The table presents panel regression results based on the linear probability model. The dependent variable is a time-dependent binary indicator that takes one if the loan is restructured in that quarter; it remains zero until the restructuring. A loan is considered *in default* if it remains delinquent for 12 consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. *StrategicDefault* and *NonStrategicDefault* are time-dependent binary indicators that become one during the time the loan is in strategic default and non-strategic default, respectively. Control variables are described in Table A-1. Observations are by loan-quarters and a loan leaves the sample once the loan is renegotiated or another exit event such as foreclosure or payoff takes place as described in the text. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table OA-2. Strategic Default and Renegotiation Using an Alternative Definition for Strategic Default: Panel Analysis (Continued)

VARIABLES	(1)	(2)	(3)	(4)
	Coefficient × 10^2			
Strategic Default (A)	2.824**	3.167**	2.854**	3.378***
	(1.399)	(1.501)	(1.276)	(1.288)
Non-Strategic Default (B)	0.058	0.076	0.001	-0.008
	(0.133)	(0.153)	(0.145)	(0.162)
Loan in the Last Year	-0.019	-0.026	0.066	0.255
	(0.334)	(0.339)	(0.319)	(0.214)
ln(Maturity at Origination)	-0.424	-0.455	-0.379	-0.142
	(0.343)	(0.350)	(0.341)	(0.127)
Current LTV	-0.189**	-0.297**	-0.197*	-0.161*
	(0.091)	(0.116)	(0.117)	(0.087)
Interest-Only	0.083*	0.045	0.054	0.055
	(0.047)	(0.057)	(0.061)	(0.064)
Missing Amortization Type	0.104	0.091	0.119	0.033
	(0.110)	(0.104)	(0.119)	(0.049)
ln(Interest Rate at Origination)	-0.471*	-0.424*	-0.397*	-0.269*
	(0.270)	(0.246)	(0.232)	(0.141)
Adjustable Rate	0.897	0.988	0.897	0.731**
	(0.637)	(0.655)	(0.673)	(0.320)
Missing Rate Type	0.505	0.542	0.542	0.419
	(0.322)	(0.344)	(0.362)	(0.335)
ln(Remaining Balance)	0.038	0.045	0.053	0.020
	(0.045)	(0.041)	(0.048)	(0.027)
Securitized Loan	-0.206**	-0.194**	-0.218*	-0.159**
	(0.103)	(0.097)	(0.120)	(0.067)
Past Lender	-0.024	-0.012	-0.005	-0.027
	(0.076)	(0.075)	(0.082)	(0.075)
Constant	3.072*	3.187*	2.674	1.431**
	(1.808)	(1.766)	(1.719)	(0.633)
t-Value(A-B)	2.095	2.190	2.393	2.801
Prob(A-B)	0.038	0.030	0.018	0.006
Asset Characteristics	-	Yes	Yes	Yes
YearQ×Borrower FE	Yes	Yes	Yes	Yes
YearQ×Metro FE	Yes	Yes	-	-
Asset-Type FE	Yes	Yes	-	-
YearQ×Metro×Asset-Type FE	-	-	Yes	Yes
Lender FE	Yes	Yes	Yes	-
YearQ×Lender FE	-	-	-	Yes
# of Loan-Quarters	115,784	112,590	103,544	101,545
Adj. R-squared	0.568	0.568	0.607	0.680

Table OA-3. Strategic Default and Renegotiation:
Cross Sectional Analysis Using Probit Model

The table presents cross sectional loan-level regression results based on the probit model. The dependent variable is a binary indicator that takes one if the loan is renegotiated. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Control variables are described in Table A-1 and are as of loan origination. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table OA-3. Strategic Default and Renegotiation:
Cross Sectional Analysis Using Probit Model (Continued)

VARIABLES	(1)	(2)	(3)	(4)
Strategic Default (A)	2.299***	2.300***	2.474***	3.501***
	(0.369)	(0.361)	(0.377)	(0.535)
Non-Strategic Default (B)	2.275***	2.146***	2.457***	3.058***
	(0.527)	(0.535)	(0.529)	(0.578)
ln(Maturity at Origination)	-0.419*	-0.466**	-0.254	-0.142
	(0.225)	(0.221)	(0.199)	(0.216)
LTV at Origination	-1.141***	-1.286***	-1.334***	-2.260***
	(0.365)	(0.393)	(0.340)	(0.459)
Interest-Only	0.133	0.062	0.183	0.517
	(0.258)	(0.248)	(0.244)	(0.331)
Missing Amortization Type	0.092	0.136	0.142	0.371
	(0.302)	(0.307)	(0.297)	(0.277)
ln(Interest Rate at Origination)	-0.494	-0.471	-0.565	-0.374
	(0.498)	(0.495)	(0.610)	(0.611)
Adjustable Rate	0.686***	0.759***	0.680***	1.217***
	(0.212)	(0.196)	(0.183)	(0.256)
Missing Rate Type	1.247**	1.376***	1.936***	2.697***
	(0.574)	(0.521)	(0.525)	(0.606)
ln(Loan Amount at Origination)	0.091	0.123	0.128*	0.272***
	(0.067)	(0.076)	(0.070)	(0.076)
Securitized Loan	-0.761***	-0.823***	-0.972***	-1.142***
	(0.229)	(0.215)	(0.249)	(0.298)
Past Lender	0.535***	0.545***	0.567**	0.459**
	(0.187)	(0.186)	(0.236)	(0.228)
ln(Total Assets)	-0.100	-0.115	0.007	-0.115
	(0.071)	(0.072)	(0.087)	(0.105)
Profitability (%)	0.141***	0.156***	0.127***	0.178***
	(0.042)	(0.037)	(0.036)	(0.049)
Debt-to-Assets	1.845**	1.546*	0.795	0.327
	(0.852)	(0.845)	(0.750)	(0.750)
z-Value(A-B)	0.044	0.287	0.034	0.734
Prob(A-B)	0.965	0.774	0.973	0.463
Constant	Yes	Yes	Yes	Yes
YearQ FE	Yes	Yes	Yes	Yes
Asset Characteristics	-	Yes	Yes	Yes
Asset-Type FE	-	-	Yes	Yes
Metro FE	-	-	-	Yes
# of Loans	5,277	5,130	5,130	5,130

Table OA-4. Strategic Default and Renegotiation: Panel Analysis Using Probit Model
The table presents panel regression results based on the probit model. The dependent variable is a time-dependent binary indicator that takes one if the loan is restructured in that quarter; it remains zero until the restructuring. A loan is considered *in default* if it remains delinquent for three consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. *StrategicDefault* and *NonStrategicDefault* are time-dependent binary indicators that become one during the time the loan is in strategic default and non-strategic default, respectively. Control variables are described in Table A-1. Observations are by loan-quarters and a loan leaves the sample once the loan is renegotiated or another exit event such as foreclosure or payoff takes place as described in the text. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table OA-4. Strategic Default and Renegotiation: Panel Analysis Using Probit Model (Continued)

VARIABLES	(1)	(2)	(3)	(4)
Strategic Default (A)	1.864***	1.938***	1.944***	2.305***
	(0.448)	(0.445)	(0.442)	(0.428)
Non-Strategic Default (B)	2.059***	2.104***	2.127***	2.550***
	(0.435)	(0.462)	(0.462)	(0.507)
Loan in the Last Year	0.640**	0.618**	0.626**	0.723**
	(0.298)	(0.282)	(0.283)	(0.285)
ln(Maturity at Origination)	0.013	-0.086	-0.109	-0.244
	(0.272)	(0.254)	(0.260)	(0.259)
Current LTV	-0.915***	-1.067***	-1.058***	-1.305***
	(0.260)	(0.304)	(0.291)	(0.317)
Interest-Only	0.259	0.118	0.097	0.101
	(0.257)	(0.233)	(0.217)	(0.255)
Missing Amortization Type	0.248	0.244	0.249	0.203
	(0.279)	(0.272)	(0.273)	(0.234)
ln(Interest Rate at Origination)	-0.359	-0.340*	-0.322*	-0.344**
	(0.232)	(0.192)	(0.183)	(0.150)
Adjustable Rate	0.616	0.645*	0.605	0.596*
	(0.379)	(0.376)	(0.383)	(0.360)
Missing Rate Type	1.431***	1.520***	1.479***	1.566**
	(0.555)	(0.497)	(0.517)	(0.649)
ln(Remaining Balance)	0.096	0.102	0.097	0.169**
	(0.068)	(0.079)	(0.082)	(0.085)
Securitized Loan	-0.539***	-0.547***	-0.514***	-0.490***
	(0.145)	(0.135)	(0.143)	(0.160)
Past Lender	0.488*	0.532*	0.538*	0.543*
	(0.276)	(0.278)	(0.289)	(0.319)
ln(Total Assets)	-0.276	-0.266	-0.279	-0.316
	(0.228)	(0.240)	(0.230)	(0.232)
Profitability (%)	0.215***	0.223***	0.222***	0.236***
	(0.057)	(0.059)	(0.059)	(0.065)
Debt-to-Assets	-0.150	-0.222	-0.247	-0.445
	(0.767)	(0.791)	(0.774)	(0.731)
z-Value(A-B)	-0.455	-0.395	-0.462	-0.696
Prob(A-B)	0.649	0.693	0.644	0.486
Constant	Yes	Yes	Yes	Yes
YearQ FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes
Asset Characteristics	-	Yes	Yes	Yes
Asset-Type FE	-	-	Yes	Yes
Metro FE	-	-	-	Yes
# of Loan-Quarters	119,556	116,350	116,350	116,350

Table OA-5. Characteristics Associated with Strategic and Non-Strategic Defaults Using an Alternative Definition of Strategic Default: Cross Sectional Analysis

The table presents loan-level regression results based on the linear probability model. The dependent variables are *Default*, *StrategicDefault*, and *NonStrategicDefault*, which are binary indicators for any default, strategic default only, and non-strategic default only, respectively. A loan is considered *in default* if it remains delinquent for 12 consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Control variables are described in Table A-1. Borrower-level variables are as of loan origination. The regression results in columns 2 and 3 are from a single joint estimation in the framework of Seemingly Unrelated Regressions implemented by concatenating strategic default and non-strategic default samples and interacting each variable in the regression including fixed effects by the sample indicator. The joint estimation of regressions (2) and (3) allows tests of the equality of coefficients; p-values of these tests are reported in column 4. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table OA-5. Characteristics Associated with Strategic and Non-Strategic Defaults Using an Alternative Definition of Strategic Default: Cross Sectional Analysis (Continued)

VARIABLES	All Defaults (1)	Strategic Default (2)	Non-Strategic Default (3)	Equality of Coefficients (2)-(3)
	Coefficient			*P-Value*
ln(Maturity at Origination)	-0.067**	-0.067**	-0.000	0.034
	(0.028)	(0.027)	(0.012)	
LTV at Origination	0.087**	0.094**	-0.007	0.014
	(0.041)	(0.038)	(0.013)	
Interest-Only	0.008	0.012	-0.004	0.515
	(0.017)	(0.018)	(0.009)	
Missing Amortization Type	-0.001	-0.007	0.006	0.323
	(0.009)	(0.010)	(0.004)	
ln(Interest Rate at Origination)	0.005	-0.031	0.036	0.282
	(0.063)	(0.057)	(0.024)	
Adjustable Rate	0.038	0.045	-0.007	0.292
	(0.039)	(0.041)	(0.017)	
Missing Rate Type	0.015	0.015	-0.000	0.499
	(0.018)	(0.017)	(0.012)	
ln(Loan Amount at Origination)	-0.014**	-0.019***	0.005	0.007
	(0.006)	(0.007)	(0.003)	
Securitized Loan	0.004	0.007	-0.003	0.327
	(0.010)	(0.009)	(0.005)	
Past Lender	-0.030*	-0.019	-0.011	0.688
	(0.017)	(0.016)	(0.008)	
ln(Total Assets)	0.048***	0.039***	0.010	0.155
	(0.018)	(0.014)	(0.012)	
Profitability	-0.142	-0.469	0.326	0.119
	(0.515)	(0.387)	(0.334)	
Debt-to-Assets	-0.314***	-0.259***	-0.055	0.051
	(0.091)	(0.089)	(0.040)	
Constant	0.135	0.090		-
	(0.196)	(0.103)		
Asset Characteristics	Yes	Yes	Yes	Yes
YearQ×Metro FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes
Asset Type FE	Yes	Yes	Yes	Yes
# of Loans	3,943	3,943	3,943	-
Adj. R-squared	0.607	0.569		-

Table OA-6. Characteristics Associated with Strategic and Non-Strategic Defaults Using an Alternative Definition of Strategic Default: Panel Analysis

The table presents panel regression results based on the linear probability model. The dependent variables are $Default_{it}$, $StrategicDefault_{it}$, and $NonStrategicDefault_{it}$, which are time-dependent binary indicators that take the value of one during the time the loan is in any default, strategic default, and non-strategic default, respectively. A loan is considered *in default* if it remains delinquent for 12 consecutive months. Strategic default is a default if the borrower also has at least one current loan in the same month AND the borrower's EBITDA that quarter and Cash Holdings at the beginning of same quarter are greater than the sum of all its paid and unpaid interest expenses and mortgage amortization on all loans in that quarter. *StrategicDefault* is an indicator that becomes one if the defaulted loan can be classified as strategic default in every quarter it is in default. Non-Strategic Defaults are all other defaults including the loans to borrowers flagged as bankrupt. Control variables are described in Table A-1. The regression results in columns 2 and 3 are from a single joint estimation in the framework of Seemingly Unrelated Regressions implemented by concatenating strategic default and non-strategic default samples and interacting each variable in the regressions including fixed effects by the sample indicator. The joint estimation of regressions (2) and (3) allows tests of the equality of coefficients; p-values of these tests are reported in column 4. Observations are by loan-quarters and a loan leaves the sample once it is paid off or defaulted. Borrower-clustered robust standard errors are reported in parentheses. Significance is indicated as follows: * p<0.1; ** p<0.05; *** p<0.01.

Table OA-6. Characteristics Associated with Strategic and Non-Strategic Defaults Using an Alternative Definition of Strategic Default: Panel Analysis (Continued)

VARIABLES	All Defaults (1)	Strategic Default (2)	Non-Strategic Default (3)	Equality of Coefficients (2)-(3)
	Coefficient × 10^2			*P-Value*
Loan in the Last Year	0.939***	0.804***	0.135	0.001
	(0.220)	(0.187)	(0.095)	
ln(Maturity at Origination)	-0.418***	-0.374***	-0.044	0.005
	(0.122)	(0.101)	(0.064)	
Current LTV	0.236	0.320**	-0.084	0.013
	(0.148)	(0.137)	(0.071)	
Interest-Only	0.136	0.188*	-0.052	0.028
	(0.099)	(0.095)	(0.041)	
Missing Amortization Type	0.009	0.054	-0.045	0.092
	(0.066)	(0.049)	(0.038)	
ln(Interest Rate at Origination)	0.186	0.144	0.042	0.501
	(0.161)	(0.141)	(0.068)	
Adjustable Rate	0.437	0.339	0.098	0.513
	(0.386)	(0.340)	(0.163)	
Missing Rate Type	0.003	-0.026	0.029	0.728
	(0.163)	(0.159)	(0.026)	
ln(Remaining Balance)	-0.032	-0.009	-0.023	0.698
	(0.045)	(0.032)	(0.026)	
Securitized Loan	0.015	-0.014	0.029	0.498
	(0.073)	(0.060)	(0.034)	
Past Lender	-0.105	-0.090	-0.015	0.344
	(0.078)	(0.065)	(0.043)	
Constant	1.727***	1.425***		-
	(0.524)	(0.399)		
Asset Characteristics	Yes	Yes	Yes	Yes
YearQ×Metro×Asset Type FE	Yes	Yes	Yes	Yes
YearQ×Borrower FE	Yes	Yes	Yes	Yes
YearQ×Lender FE	Yes	Yes	Yes	Yes
# of Loan-Quarters	100,440	100,440	100,440	-
Adj. R-squared	0.421	0.418		-