
Munich Personal RePEc Archive

Recourse, asymmetric information, and credit risk over the business cycle

van der Plaat, Mark and Spierdijk, Laura

University of Groningen

14 December 2020

Online at https://mpra.ub.uni-muenchen.de/104718/
MPRA Paper No. 104718, posted 04 Jan 2021 15:25 UTC

Recourse, Asymmetric Information, and Credit Risk over the Business Cycle

Mark van der Plaat[1] and Laura Spierdijk[1]

[1]Faculty of Economics and Business, Department of Economics, Econometrics and Finance, University of Groningen

December 14, 2020

Abstract

Recourse is often included in loan sales and securitization in order to reduce potential problems arising from information asymmetries. Recent literature has shown, however, that recourse was ineffective in preventing such problems. In this paper we empirically study the recourse cyclicality hypothesis, which states that recourse is only effective in signaling asset quality and thereby reducing information asymmetries in a recession. Using data between 2001 and 2016 on U.S. commercial banks, we find that recourse is only effective in signaling asset quality during a recession. When the economy is booming, recourse is ineffective and cannot prevent the build-up of risky assets on- and off-balance sheet of banks. Our results are robust to several specifications.

JEL classification: G21, G32

Keywords: Recourse; Loan Sales; Securitization; Asymmetric Information; Adverse Selection; Moral Hazard; Credit Risk; Banking; Cyclicality

1. Introduction

Markets for loan sales and securitization have grown tremendously since the 1980s (Adrian and Shin, 2009; Parlour and Plantin, 2008). Securitization, a process which transforms pools of loans into marketable securities, and loan sales allow banks to transfer assets off-balance sheet before they mature. In turn, securitization and loan sales enable banks to move from a traditional originate-to-hold (OTH) model to an originate-to-distribute (OTD) model. With the OTH model, banks are delegated monitors that hold all originated loans on-balance sheet. Holding loans ensures banks have an incentive to screen and monitor, since they retain the risk of loans on their balance sheet (Diamond, 1984). Because of this, traditional banks generate private information about their borrowers through monitoring, which minimize the costs of moral hazard and adverse selection. Yet, due to market incompleteness, regulation, and other frictions, traditional banks cannot take full advantage of their expertise (Purnanandam, 2011). A solution to overcome these frictions is the OTD model, in which banks use a combination of loan sales, securitization and related techniques

to transfer, or 'distribute', originated loans to investors. As a result, the OTD model allows banks to improve risk-sharing across the economy, save on regulatory capital, obtain liquid assets, and increase their lending capacity (Duffie, 2007; Purnanandam, 2011).

The benefits of the OTD model come at the cost of a moral-hazard, and a adverse-selection (lemons) problem. First, risks are transferred off-balance sheet, which creates a moral-hazard problem that arises from diminished incentives by banks to monitor and service loans after they have been sold (Pennacchi, 1988). As a consequence, banks with the OTD model generally originate assets of lower quality. Second, banks often have superior information about the quality of loans they originate. This information asymmetry leads to a lemons problem (cf. Akerlof (1970)) in which banks only transfer their low-quality loans to the market, while keeping the high-quality loans on their balance sheets (Berndt and Gupta, 2009; Klee and Shin, 2020).

To remedy these information asymmetry problems, loan sales and securitization often include some form of recourse. Recourse forces banks to retain at least part of the risk of the transferred loans, either by implicit guarantee (implicit recourse) or by retaining a fraction of the assets on-balance sheet (explicit recourse). By forcing some form of risk retention, recourse provides an incentive to monitor loans in line with the delegated monitor of Diamond (1984). Accordingly, recourse improves lending standards of banks relative to a situation without recourse (Ahn and Breton, 2014; Gorton and Pennacchi, 1995; Parlour and Plantin, 2008; Pennacchi, 1988). In addition, recourse signals asset quality to investors. Because risks flow back to the originating bank, recourse for low-quality loans is expensive. Hence, banks have the incentive to only transfer high-quality loans, alleviating the lemons problem.

Yet, there is a large body of empirical literature documenting the ineffectiveness of recourse as a remedy for the problems of the OTD model prior to the to the Global Financial Crisis of 2007–2009 (GFC). For example, Mian and Sufi (2009) find that in general loans sold or securitized have higher delinquency and default rates. Moreover, between 2002 and 2005 sub-prime loans saw twice the growth of prime loans. Such under-performance of transferred loans is often attributed to deteriorating loan screening (Jiang et al., 2014; Keys et al., 2010; Purnanandam, 2011) and monitoring (Berndt and Gupta, 2009), declining lending standards (Dell'ariccia et al., 2012; Elul, 2016; Maddaloni and Peydró, 2011), and the sale of lemons (adverse selection) (Agarwal et al., 2012; Beltran et al., 2017; Berndt and Gupta, 2009). Not all papers, however, find that transferred loans generally under-perform their peers. Albertazzi et al. (2015) and Benmelech et al. (2012) find lower default rates for loans transferred, which is consistent with the effectiveness of recourse to signal asset quality to the market. Nonetheless, the majority of papers have findings consistent with the moral-hazard and lemons problem of the OTD model despite there being recourse. It is therefore

reasonable to believe that recourse was not effective in mitigating these problems.

An explanation why recourse did not reduce moral hazard and adverse selection, is that its efficacy depends on the business cycle. Kuncl (2019) shows that recourse is not effective in signaling asset quality to investors in a boom, but becomes effective in a bust. In a boom, loan defaults are low, which means that the costs for recourse are low. Because the costs for recourse are sufficiently below the revenue of selling low-quality loans, banks start originating these loans and sell them to the market. Because of the low loan defaults, recourse does not reveal asset quality to investors at this stage. When the economy goes bust, however, loan defaults go up, increasing the costs of recourse. Recourse now becomes too expensive for low-quality loans and therefore becomes efficient in signaling asset quality. Incidentally, recourse enables some recovery in a bust by allowing high-quality loans to be sold. When the economy recovers, recourse becomes inefficient in signaling asset quality again. We call the prediction that the efficacy of recourse depends on the business cycle the *recourse cyclicality hypothesis*.

In this paper, we empirically test the recourse cyclicality hypothesis for U.S. banks in the 2001–2016 period. The hypothesis connects recourse with asymmetric information. Since we cannot observe asymmetric information directly, we use on-balance sheet (BS) and off-balance sheet (OBS) credit risk as proxies. When recourse provides banks with the incentive to monitor, we expect overall asset quality to improve. Hence, we should observe and decrease for both BS and OBS credit risk. Simultaneously, when recourse mitigates the lemons problems, banks hold riskier assets on-balance sheet and transfer safer assets, leading to higher BS risk, but lower OBS risk. The cumulative effect of recourse through these two mechanisms is negative for OBS credit risk and ambiguous for BS credit risk, since we do not know which mechanism *ex ante* dominates. We focus on banks with an OTD model and exploit the variance of the amount of recourse between these banks to assess the impact of recourse on on-balance sheet (BS) and off-balance sheet (OBS) risk over the business cycle. To the best of our knowledge, we are the first to empirically test the recourse cyclicality hypothesis.

We contribute to the literature in several ways. First, we provide empirical evidence explaining why there was a large build-up of bad debt prior to the GFC because of loan sales, securitization and related OBS activities. Even though recourse was common in various OBS activities, it could not prevent the accumulation of bad debt. Second, we contribute to the literature focused on cyclical lending and banking. We show that risk incentives do not necessarily depend on the business cycle. The cyclicality we observe in loan sales and securitization might be because recourse is cyclical as well. As such, we also contribute to a larger body of literature focused on bank risk. Moreover, we explicitly study OBS credit risk, which has been underexposed by the current literature.

We use data from the Federal Reserve's Reports of Condition and Income (Call Reports) between

2001 and 2016. The U.S. banking industry was key in developing the OTD model, which remains popular nowadays. Moreover, the U.S. has multiple highly detailed public data sources we can use. In general we observe that OTD banks with recourse in our sample have higher BS and OBS risk exposures than their non-recourse counterparts.

Using various panel data methods, we find that recourse is generally ineffective in signaling asset quality when the economy is booming. During a boom recourse does not affect BS and OBS risk. We do, however, find that when the economy goes bust, recourse becomes efficient. During a bust, banks with recourse are forced to hold more risky assets on their balance sheets. This evidence is consistent with the recourse cyclicality hypothesis. We find no effects of recourse on OBS risk during a bust. Our results are robust to various specifications.

The remainder of the paper is setup as follows. Section 2 discusses Kuncl (2019) in more depth and formulates hypotheses. Next, section 3 and 4 present the data and method, respectively. Section 5 discusses our main results, after which section 6 offers some robustness checks. Section 7 concludes.

2. Hypothesis Development

Kuncl (2019) shows why recourse was ineffective prior to the GFC by arguing its efficacy depends on the business cycle. In this section we discuss the predictions of Kuncl in more depth and formulate various hypotheses.

2.1. Recourse over the Business Cycle

We start by discussing Kuncl's two-period model without business cycle dynamics. In the model there is a continuum of risk-neutral lenders that can originate loans (high-quality or low-quality), and sell a fraction of these loans to the market. Only lenders observe the quality of their originated loans. There are three distinct cases: no recourse, explicit recourse, and implicit recourse. In the absence of recourse, investors cannot make a distinction between low-quality and high-quality loans. As a consequence, there exists a pooling equilibrium in which both low-quality loans and high-quality loans are sold. The proceeds of securitization exceed the costs of origination for low-quality loans, and hence low-quality loans are originated and sold. With explicit recourse, the securitization of low-quality loans becomes unprofitable. The costs of origination and recourse for low-quality loans now exceed the proceeds of securitization. Low-quality loans, therefore, do not enter the market. As a result, recourse is effective in signaling asset quality, and improves the asset allocation. Implicit recourse has comparable effects to explicit recourse only if it is credible. Despite recourse, there can still be a pooling equilibrium when the dispersion of returns on low-quality and high-quality loans is

low. Such a situation exists when loan defaults are generally low, making low-quality loans more interesting and recourse for them relatively cheap.

Next, the author introduces a full infinite-horizon model to demonstrate the cyclicality of recourse. When the economy is booming, productivity and output are high, and the dispersion of returns on low-quality and high-quality loans is low. As a consequence, lending is so profitable its proceeds exceed the costs of securitization. Recourse raises the costs of securitization, but not sufficiently to discourage the origination of low-quality loans. Low-quality loans are originated and securitized, increasing lenders' off-balance-sheet exposure to these loans. When the economy goes bust, productivity and output fall, and the dispersion of loan returns increases. Many of the low-quality loans default. Accordingly, recourse becomes more expensive and becomes efficient in signaling asset quality, since its costs exceeds the proceeds of low-quality loan origination. Recourse during a bust prevents the origination and securitization of low-quality loans, but not of high-quality loans. Hence the overall number of low-quality loans in the economy reduces. When the economy is booming again, recourse becomes inefficient in signaling asset quality.

We can translate the predictions of Kuncl (2019) into a hypothesis when the economy is booming, and a hypothesis when the economy is in recession. We split the latter hypothesis for on-balance-sheet (BS) and off-balance-sheet (OBS) risk, respectively, since we have distinct expectations for both types of risk. When the economy is booming, recourse is unable to signal quality, and therefore has no impact on banks' BS and OBS risk. Hence the following hypothesis:

Hypothesis 1 (H1)**.** *When the economy is booming, recourse does not affect on-balance-sheet and off-balance-sheet risk.*

During a recession, however, recourse becomes efficient in signaling asset quality. In this state of the economy, recourse has two effects. First, from Kuncl (2019) we know that efficient recourse provides banks with the incentives to only transfer high-quality loans, and hold lower-quality loans. Accordingly recourse should signal lower risk for OBS loans, and higher risk for BS loans. Second, efficient recourse provides banks an incentive to monitor (Ahn and Breton, 2014; Gorton and Pennacchi, 1995; Parlour and Plantin, 2008; Pennacchi, 1988), which leads to an overall improvement in the quality BS and OBS loans. Taking these two effects together, we expect banks with recourse to have lower OBS risk than banks without recourse. For BS risk, however, the two effects lead to opposite results. From the outset, we do not know which effect will dominate. Consequently we formulate the following hypotheses:

Hypothesis 2 (H2)**.** *During a recession, the effect of recourse on the on-balance-sheet risk of banks is ambiguous.*

Hypothesis 3 (H3)**.** *During a recession, the effect of recourse on the off-balance-sheet risk of banks is negative.*

3. Data

We use year-end Federal Reserve's Reports of Condition and Income (Call Reports) data between 2001 and 2016. Every national bank, state member bank, and insured non-member bank in the U.S. is required to periodically file Call Reports. The Call Reports contain information about the income statement and the balance sheet of a bank, as well as a bank's off-balance sheet activities.

We add a dummy variable to proxy the U.S. business cycle based on the NBER Business Cycle Dating Committee's US Business Cycle Expansions and Contractions. The dummy is one when the year includes at least one recession month, and is zero otherwise.

The sample starts in 2001, since that is the earliest year data about securitization and loan sales are available. We restrict the sample to the years prior to 2017, since until 2016, the Call Reports require all banks to report the maximum exposure of loan sales and securitization. Since 2017, this requirement is only for banks with total assets over 1 billion USD.

In order to create a complete sample of all U.S. commercial banks, we fill the missing values in reporting form FFIEC 031 (banks with foreign and domestic offices) with reporting form FFIEC 041 (banks with domestic offices only). Next, we confine the analysis to all deposit insured, commercial banks with a physical location in a U.S. state, and that have sold loans in at least one year in the sample period. Furthermore, we only include banks with three years or more of observations and we drop all bank-years that have missing values in total assets, loans, deposits, net income. We drop all negative and zero values in total assets and loans, and we drop all observations outside the interval $[-1, 1]$ for return on assets, and outside the $[0, 1]$ interval for loan ratio, regulatory capital ratio, mortgage ratio, and OBS loan loss allowances (credit-equivalent). Lastly, we remove outliers in total loan transfers, net loan charge-offs.

3.1. Variable Description

In this subsection we discuss how we construct our dependent variables, and our variable for recourse. Table A1 presents a summary of the variables used, including control variables, and their construction.

3.1.1. Credit Risk

As our dependent variable we use multiple measures for on-balance-sheet (BS) risk and off-balance-sheet (OBS). We only consider credit risk measures, since these exactly capture loan losses, loan delinquencies, and loan defaults.

3.1.2. On-Balance-Sheet Credit Risk

We use four variables to measure BS credit risk: net loan charge-offs, loan loss allowances, and loan loss provision. The first measures realized (backward-looking) credit risk, and the last two capture anticipated (forward-looking) credit risk. All measures are common in the literature (see Casu et al. (2011), Casu et al. (2013), Cheng et al. (2011), Jiangli and Pritsker (2008), and Le et al. (2016)). We scale all variables to total loans.

We measure the amount of loan net charge-offs by the sum of total charge-offs on loans and leases, minus the sum of recoveries on loans and leases. In addition, we measure the loan loss allowances as the balance of total loan loss allowances, and the loan loss provisions as the sum of all loan loss provisions over the previous year.

Off-Balance-Sheet Credit Risk We use two measures of OBS credit risk: Allowance for credit losses on off-balance-sheet credit exposures (OBS loan loss allowances), and delinquent and defaulted securitized loans. The first measure is the OBS equivalent of loan loss allowances. We scale OBS loan loss allowances by total OBS activity. The second measure is the sum of non-performing securitized loans and net charge-offs of securitized loans. We take the sum to increase the number of non-zero values of the variable, and scale it by the outstanding principle balance of assets sold and securitized.

The Call Reports do not contain a variable for total OBS activity. We use the asset-equivalent and credit-equivalent approach from Boyd and Gertler (1994) to approximate total OBS activity (also see Calmès and Théoret (2010), Clark and Siems (2002), and Hughes and Mester (2013)). The asset-equivalent approach uses the behavior of non-interest income relative to net interest income to estimate the total OBS activity of a bank, and starts with the following accounting profits:

$$\pi = I - E - P - N + NII, \tag{1}$$

where I and E are the interest income and expense, respectively, P is are the loan loss provisions, N is the non-interest expense, and NII is the non-interest income. Then Boyd and Gertler (1994) make three assumptions. First, non-interest income is generated by (hypothetical) OBS assets, A_o.

Second, A_o are identical in all respects to actual BS assets, including the mix of liabilities and capital used to fund them. And, third, OBS and BS assets, A_b, are equally profitable. The authors then show that A_o can be estimated using Call Report data as follows:

$$A_o = A_b \left[\frac{NII}{I - E - P} \right]. \tag{2}$$

We take the absolute amount of A_o.

The asset-equivalent approach has two limitations (Clark and Siems, 2002). First, it includes losses that potentially distort the measurement of OBS exposure. Second, derivatives may be used to hedge BS and OBS risks, which means that the symmetry assumption (assumption 3) also may contribute to the distortion of A_o.

The credit-equivalent approach provides a way for measuring the credit equivalent of OBS activities. A credit equivalent is an estimate of the amount of BS asset a bank needs to hold to have the same amount of risk exposure. The Call Reports (schedule RC-R) include credit equivalent amounts for a range of OBS assets, including letters of credit, unused commitments, and derivatives. We take the sum of all credit equivalent amounts, but exclude retained recourse. Including retained recourse would lead to estimation problems.

Using the credit-equivalent approach most likely leads to an underestimation of OBS activities (Boyd and Gertler, 1994; Clark and Siems, 2002). The construction of the credit equivalent amounts only include OBS activities deemed important by the regulator. All other OBS activities are not included. Moreover, the conversion factors to convert face values or notional amounts to credit equivalent amounts are very similar for different OBS activities, suggesting some level of arbitration.

3.1.3. Recourse

We do not observe recourse directly and need to find a suitable proxy. The Call Reports contain several variables we can use to construct a proxy for recourse.

Loan sales and securitization commonly include some form of recourse. To proxy recourse for both transactions we use the maximum amount of credit exposure arising from recourse. The maximum amount of credit exposure arising from recourse captures the maximum dollar amount of recourse provided by a bank in the form of credit enhancement, retained subordinated notes, standby letters, and other enhancement. It measures the maximum *contractual* exposure remaining at the reporting date, and is not a reasonable estimate of expected losses. As such, we consider the variable to be a reasonable proxy for recourse provided.

For the maximum amount of credit exposure we observe the following asset categories: 1–4 family residential loans, home equity lines, credit card receivables, auto loans, other consumer loans,

commercial and industrial loans, and all other loans. We take the sum over all categories and sum the resulting proxies for recourse on loan sales and recourse on securitization. Next, we add the exposure to retained recourse of small business obligations under Section 208 of the Riegle Community Development and Regulatory Improvement Act.

We scale the proxy for recourse by the sum of outstanding principle balances of loan sales, securitization and small business obligations. As such, the variable measures the total recourse as a fraction of assets sold.

3.2. Summary Statistics

Approximately 48% of banks in our sample provide some form of recourse in their loan sales and securitization activities, and small business obligations. The average bank with recourse has a maximum exposure of 42.5% relative to its assets transferred.[1] Moreover, a quarter of banks with recourse has a relative maximum exposure over one, implying these banks have a maximum exposure greater than the assets transferred. The remaining banks have zero values for our recourse variable, which means they have no contractual exposures left on the reporting date. We use the variance of recourse between banks in our identification strategy, see next section.

Table 1 presents the summary statistics for banks with and without recourse for all BS and OBS risk measures. For each variable we compare the mean of the no-recourse and recourse bank, and use a simple t-test to test whether the difference is statistically significant (boldface). We observe that recourse banks have significantly higher net loan charge-offs, BS allowance ratios, and OBS loan delinquencies and defaults. The Table shows that for some variables, banks with recourse are riskier than banks without recourse. More BS risk for banks with recourse is consistent with the efficacy of recourse to be able to signal asset quality. As a result of this, recourse banks hold riskier assets on their balance sheets. Higher OBS risk for recourse banks, however, is not consistent with this signaling hypothesis. We would expect banks with recourse *vis-à-vis* banks without recourse to transfer lower-risk assets, and therefore have lower OBS credit risk. Our finding of higher OBS risk for recourse banks is most likely driven by the fact that more banks with recourse have non-zero values for OBS loan delinquencies and defaults. Hence, by definition the mean is greater.

Furthermore we observe cyclicality in all our risk variables (Figures 1 and 2). Our sample includes 4 crisis years: 2001, and 2007 through 2009 (the GFC). Especially during the GFC we notice large increases in BS net loan charge-offs, and loan loss provisions. BS allowance ratios

[1] With the term assets transferred we refer to a bank's loan sales, securitization and small business obligations transferred.

Table 1: Difference Banks With and Without Recourse

	No Recourse	Recourse	Δ
Net Charge-offs	0.0043	0.0047	**-0.0004**
Allowance Ratio	0.0151	0.0155	**-0.0005**
Provision Ratio	0.0053	0.0055	-0.0001
OBS Allowance Ratio (Asset Eq.)	0.0003	0.0003	0.0
OBS Allowance Ratio (Credit Eq.)	0.0052	0.0046	0.0006
OBS Loan Delinq. and Defaults	0.0002	0.0021	**-0.0019**

Notes. We compare the means of banks with and without recourse for all BS and OBS risk measures. Difference means $p < 0.05$ in boldface. To test the difference in means we use a t-test for unequal sample size and variance The abbreviation Eq. stands for equivalent, and Delinq. stands for Delinquencies.

display a lag, and peak after the GFC in 2010. In addition, we observe large increases for OBS allowance ratios before and especially during the GFC, peaking at 2010. For OBS loan delinquencies and defaults we see two peaks, in 2002 and 2009, respectively. These observations show there is significant cyclicality in bank lending, with loan losses increasing during crisis periods, making the data very suitable to test the recourse cyclicality hypothesis.

For the complete summary statistics see Table A2 in Appendix B.1.

4. Model Specification

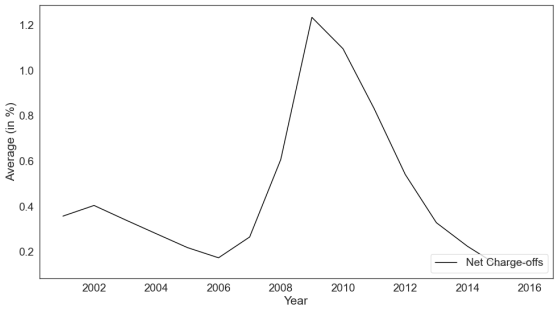
To test the cyclicality of recourse we exploit the variance of recourse between banks. We regress recourse and control variables on various measures of credit risk. As a consequence, we measure the marginal effect of recourse. We also include an interaction term between recourse and a recession dummy, which is one for years with a recession and zero otherwise. This interaction term allows us to test whether the relationship between recourse and credit risk is different in a boom than in a bust. We estimate the following benchmark model:

$$CR_{it} = \beta_1 R_{it-1} + \beta_2 \left(D_{t-1} \times R_{it-1}\right) + \gamma X_{it-1} + \alpha_i + \eta_t + \varepsilon_{it}, \tag{3}$$

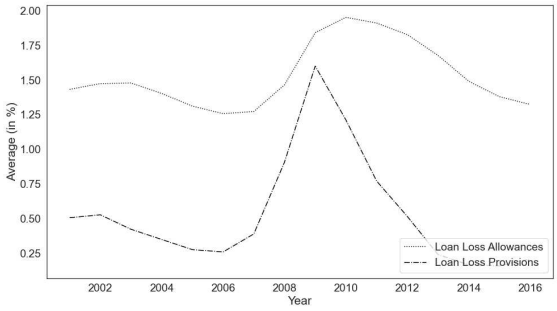
where CR_{it} is the credit risk of bank i at time t, R_{it-1} is the recourse, D_{t-1} is a recession dummy, and X_{it-1} is a vector of bank-specific controls; see Table 2 for an overview including expected signs. We take the natural logarithm for all variables, except dummy variables, and add bank fixed effects, α_i, and time fixed effects, η_t. We estimate the model with the within estimator and cluster the

Figure 1: Changes in On-Balance-Sheet Credit Risk between 2001 and 2016

(a) Realized BS Credit Risk



(b) Anticipated BS Credit Risk



Notes. We take the average of each variables for each year. The panel (a) presents the change in realized credit risk, and panel (b) the anticipated credit risk.

standard errors at the bank level.[2]

Consistent with hypothesis H1, we expect β_1 to be insignificant for BS and OBS credit risk. For BS credit risk we expect β_2 to be significant with a positive or negative sign (hypothesis 2). A positive β_2 implies recourse banks hold more risk on their balance sheet, which is consistent with a signal for asset quality, while a negative sign corresponds to lower levels of BS risk, and signals the overall improvement of asset quality. We expect β_2 to be negative and significant for OBS credit risk. Consistent with signaling asset quality, recourse banks should transfer higher-quality assets.

5. Empirical Results

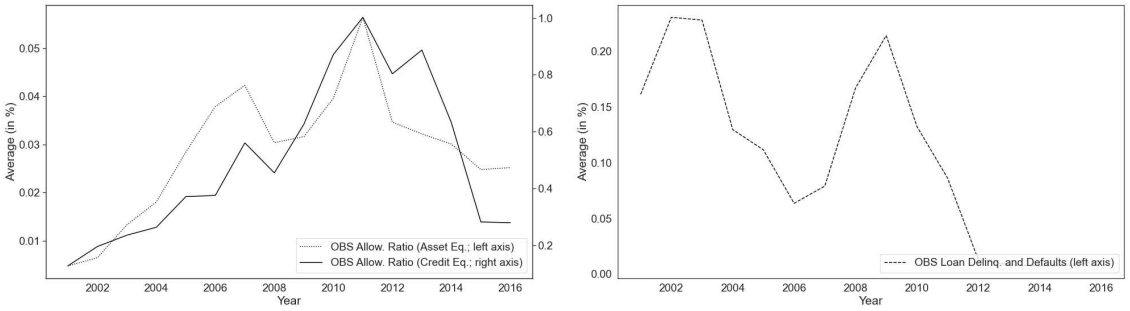
Table 3 presents the results for all four BS credit risk measures as dependent variable. In general we find that recourse does not affect BS credit risk when the economy is booming. We interpret these findings as evidence for hypothesis H1. When the economy goes bust, however, we find that the estimated coefficient for recourse is positive and significant for all three dependent variables. These findings are consistent with recourse becoming effective in signaling asset quality, providing banks the incentive to hold higher-risk loans on balance sheet, and not with recourse providing banks the incentive to monitor, leading to lower levels of BS credit risk. We interpret these results as evidence for recourse becoming effective in signaling asset quality (H2).

Most of our other control variables have the expected signs. There are a few exceptions. First,

[2]We have also estimated equation (3) with the first-difference-estimator. The estimated coefficients are similar to those of the within-estimator, but with generally lower significance levels. Because the within-estimator and first-difference-estimator give similar results, we choose the more efficient within-estimator.

Figure 2: Changes in Off-Balance-Sheet Credit Risk between 2001 and 2016

(a) OBS Allowance Ratios **(b)** OBS Loan Delinq. and Defaults



Notes. We take the average of each variables for each year. The panel (a) presents the change in OBS allowance ratios, and panel (b) the securitized loan delinquencies and defaults.

in all columns of the Table we find that the estimated coefficient for the return on assets (ROA) is negative and significant. These findings are consistent with Casu et al. (2011) and Le et al. (2016), and suggest that low-profitable banks take extra risk to improve their profits. Another explanation is that ROA could be endogenous, since net income includes a correction for loan loss provisions, and losses/gains on OBS activities. Second, the estimated coefficient for cost-to-income is negative and significant. Similarly to the ROA, cost-to-income includes a correction for loan loss provisions, and losses/gains on OBS activities. Third, the estimated coefficient for mortgage ratio has the opposite sign in columns (1) and (2). These findings are in line with Avery et al. (1996), who argue that banks are very conservative mortgage lenders since U.S. citizens often default their mortgages than on other types of debt. Last, the estimated coefficient for size in columns (1), and (3) is positive and significant, suggesting that large banks are riskier. These findings are consistent with the predictions on Berger, Miller, et al. (2005). Large banks often heavily rely on hard information and less on soft information, reducing their risk mitigation.

Table 4 contains the results for our three OBS risk measures. Overall, recourse does not impact the amount of OBS credit risk. We find no significant results for Recourse and Recourse × Recession, suggesting that recourse is ineffective in signaling asset quality of OBS assets regardless of the state of the economy. Consequently, we reject hypothesis H3. The estimated coefficients of the control variables are similar to those in Table 3.

6. Robustness Checks

In this section we present the results of several sets of robustness checks.

Table 2: Control Variables and Their Expected Signs

Variable	Exp. Sign	Explanation	Source
Balance Sheet and Income Statement Variables			
Capital Ratio	+	Surplus capital allows banks to increase risk taking	Acosta Smith et al. (2018) and Dautović (2019)
Loan Ratio	+	Larger loan portfolio means a greater exposure to credit risk	Stiroh (2006)
ROA	+	Higher profitability loosens the bank borrowing constraints	Martynova et al. (2019)
Deposit Ratio	+	Deposit funding spurs more aggressive lending	Khan et al. (2017)
Cost-to-Income	+	Bad management hypothesis: bad management means riskier bank	Berger and DeYoung (1997)
Size	-	A greater size implies a better diversification	Krasa and Villamil (1992)
BHC	+	Possibly leads to more risk taking	
Loan Portfolio Variables			
Com. Loan Ratio	-	Commercial loans are often short-term and closely linked to company turnover	Jiménez and Saurina (2004)
Mortgage Ratio	+	Captures the risk of mortgage lending	Stiroh (2006)
Cons. Loan Ratio	+	Captures the risk of consumer lending	Stiroh (2006)
Loan HHI	+	Captures loan concentration	Stiroh (2006)

6.1. Alternative Business Cycle Measures

In the first set of robustness check we use alternative variables to measure the business cycle, since our main results can be sensitive to which business cycle proxy we choose. First we follow Bedayo et al. (2020) and Rey (2015) and use the Chicago Board Options Exchange's Volatility Index (VIX) which we obtain from Yahoo finance. The VIX measures the expectation of volatility of the market, and is based on S&P 500 index options. A high VIX corresponds to volatile markets, consequently to a bust in the business cycle. Second, we use a proxy for producer confidence, PC, which we obtain from the Business Tendency Surveys for Manufacturing via FRED Economic Data from the Federal Reserve Bank of St. Louis. We center the variable. Last, following Behr et al. (2017) we use GDP growth of the U.S., which we obtain from the World Bank. We consider a year with negative GDP growth a recession.

Tables A3 through A5 contain the estimation results of the robustness checks for VIX, PC,

and GDP growth respectively. In general our main results are robust to various business cycle measures. When we use the VIX to measure the business cycle, we find that recourse leads to lower BS credit risk in a boom, but to higher BS credit risk in a bust (see columns (1), (3)–(4) in Table A3). Moreover, we also find that recourse leads to higher BS credit risk in a boom and even higher BS credit risk in a bust when we use GDP (see column (1) in Table A5). These findings do not invalidate the cyclicality of recourse. They do, however, show that our recourse variable could be sensitive to business cycle measure used. For the PC-measure, we only find significant estimated coefficients for Recourse × Recession for BS credit risk.

Similar to our main results, we cannot find any effect of recourse on OBS credit risk. Moreover, the control variables in all specifications are relatively robust to our main results.

6.2. Alternative Recourse Measures

Next, we consider two different measures for recourse. First, we use a dummy variable which equals one when $Recourse > 0$, and 0 otherwise. With this dummy we capture the difference between banks with and without recourse. Second, we split our recourse variable into three distinct categories: loan sales, securitization, and small business obligations. Doing so allows us to study whether one type of transaction dominates our results.

Table A6 presents the estimation results of the model with a dummy recourse variable. Similar to our main results, we find no effects of recourse on BS and OBS credit risk when the economy is booming. For Recourse × Recession we find significant and positive coefficents in columns (1) and (6). The coefficient for Recourse × Recession in column (6) is particularly interesting, since it implies that recourse leads to more OBS risk taking. Because many banks with recourse use securitization, and OBS loan delinquencies and defaults measures risk arising from securitization, the recourse dummy picks up some dimension of securitization.

In Table A7 we split the recourse variable into three distinct categories. We find that when the economy is booming, recourse does not affect BS and OBS credit risk. When the economy is in recession, however, we find positive and significant coefficients for recourse on loan sales in columns (1) through (3), and recourse on securitization in columns (1). We find no effects of recourse on SBOs on credit risk in a recession. We interpret these results as evidence that our main results are mainly driven by loan sales.

6.3. The Dodd-Frank Act

Our sample also includes the introduction of the Dodd-Frank Wall Street Reform and Consumer Protection Act (the Dodd-Frank Act). In this subsection we correct for potential intertemporal changes in recourse due to the Act.

The U.S. responded to the GFC and its aftermath with the Dodd-Frank Act. First introduced to the House in December 2 2009 and eventually signed into law on July 21 2010, the Act includes numerous regulations on the financial sector. The final Act contains over 2,300 pages of text, and introduces almost 400 new rules, reports and studies on various aspects of the financial system. Among others, the Act requires banks to have some 'skin in the game' and forces them to retain at least 5% of all the risk from the assets they securitize on-balance sheet. In essence, the Act prescribes a minimum level of recourse for all securitizing banks, with the aim of reducing moral hazard in securitization. Banks do not need to have skin in the game if the assets they securitize meet specific underwriting standards.

This risk retention rule is most likely unable to mitigate any information asymmetry problems of securitization. We know from Kuncl (2019) that recourse is ineffective in signaling asset quality when the economy is booming. Increasing the level of recourse increases the costs of securitization, but most likely not enough to prevent low-quality loans to enter the market. As a result, the risk retention rule cannot avoid a build-up of bad assets similar to what we have seen prior to the GFC.

To test the effectiveness of the risk retention rule, we add a second interaction term where we interact Recourse with a Dodd-Frank-Act (DFA) dummy. We follow Bordo and Duca (2018) and construct a dummy for the Dodd-Frank act which equals one after 2010, a half when $t = 2010$, and zero otherwise. The value of a half at $t = 2010$ captures expectations of the Dodd-Frank Act in 2010.

Table A8 display the estimation results of the model including Recourse $\times$ DFA. In general our main results hardly change with the addition of interaction term. Recourse is insignificant in all columns, and Recourse $\times$ Recession is significant and positive for all BS credit risk variables (columns (1)–(3)). Furthermore, we find the estimated coefficients for Recourse $\times$ DFA to be insignificant in all columns. The Act was enacted after the GFC in a period of economic growth. Most likely, recourse was ineffective in signal asset quality during this period. As a result, we interpret these results as evidence that the Dodd-Frank Act is not effective in mitigating the moral-hazard and adverse selection problems of the OTD model. Since our sample does not include any post-2010 recession, and since our recession dummy and Dodd-Frank dummy do not overlap, we cannot say anything about the effects of the Act during a bust.

6.4. Non-performing Loans

As a last robustness check, we consider the popular variable on-balance-sheet non-performing loans (NPLs). The variable captures the sum of all on-balance sheet loans past due 90 days or more and still accruing, and non-accrual on-balance sheet loans. We divide the NPLs by the total assets. In contrast to our other BS variables for credit risk, NPLs capture the total loan amount of risky loans and not only the risk.

Table A9 contains the estimates for our model with NPLs as dependent variable. We find that recourse does not affect non-performing loans regardless of whether the economy is booming or in recession (column (1)). These insignificant findings are most likely due to the fact that NPLs is a too crude of a measure for our analysis. NPLs includes too little information on defaults.

In columns (2) through (10) we split the dependent variable non-performing loans into several categories so that we can study whether recourse impact specific categories of NPLs. First we split the variable into loans past due 90 days or more and still accruing, and non-accrual loans (columns (2) and (3)). Then we look at restructured loans included in the non-performing loans, restructured loans not included in the non-performing loans, and non-restructured loans included in the non-performing loans (columns (4)–(6)). Last we focus on non-performing loans in the categories secured by real estate, commercial and industrial loans, household expenditure loans, and other loans (columns (7)–(10)). We find no significant results for Recourse or Recourse $\times$ Recession in any of the columns, and interpret this as evidence that NPLs is too crude of a measure for our analysis.

7. Conclusions

In this paper we have focused on the cyclical relationship between recourse and on- and off-balance-sheet credit risk. Using data on U.S. commercial banks between 2001 and 2016 we have found that, in general, recourse is unable to signal the quality of assets transferred when the economy is booming. As a result, recourse does not affect credit risk during a boom. When the economy goes bust, however, recourse becomes effective in signaling asset quality, and forces banks to retain riskier loans on their balance sheets. Our results are robust to various specifications.

We not only provide empirical evidence for Kuncl (2019), our results are also consistent with the build-up of risk prior to the Global Financial Crisis. During this period the U.S. economy was booming. As a consequence, recourse could not signal asset quality to investors, which led to the build-up of bad loans and the eventual crash in 2007. The Dodd-Frank Act of 2010 was enacted to, among others, prevent such build-ups. The included risk retention rule for securitization was designed to force higher levels of risk retention to mitigate the moral-hazard and adverse selection

problems of the OTD model. Our results show that a simple risk retention rule might not be effective in curbing excessive risk taking by banks due to securitization.

Furthermore, our estimated effects of recourse are probably underestimated. The proxy we use for recourse, maximum credit exposure arising from recourse and other credit enhancements, measures the amount of remaining maximum exposure at the time of reporting, not the amount of recourse provided at the time of loan sale or securitization. Its is possible that banks provide some recourse or credit enhancement between the time a loan is sold or securitized and the reporting date. Hence, our results are probably underestimated. Moreover, the proxy includes some level of measurement error, leading to attenuation bias. We do not correct for measurement error, so our results are most likely biased downward.

References

Acosta Smith, J., Grill, M., & Lang, J. H. (2018). The leverage ratio, risk-taking and bank stability. *Bank of England Working Paper*, (No. 766).

Adrian, T., & Shin. (2009). Money, Liquidity, and Monetary Policy. *American Economic Review*, *99*(2), 600–605.

Agarwal, S., Chang, Y., & Yavas, A. (2012). Adverse selection in mortgage securitization. *Journal of Financial Economics*, *105*(3), 640–660.

Ahn, J.-H., & Breton, R. (2014). Securitization, competition and monitoring. *Journal of Banking & Finance*, *40*(1), 195–210.

Akerlof, G. A. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, *84*(3), 488–500.

Albertazzi, U., Eramo, G., Gambacorta, L., & Salleo, C. (2015). Asymmetric information in securitization: An empirical assessment. *Journal of Monetary Economics*, *71*, 33–49.

Avery, R. B., Bostic, R. W., Calem, P. S., & Canner, G. B. (1996). Credit risk, credit scoring, and the performance of home mortgages. *Fed. Res. Bull.*, *82*, 621.

Bedayo, M., Jiménez, G., Peydró, J.-L., & Vegas, R. (2020). *Screening and Loan Origination Time: Lending Standards, Loan Defaults and Bank Failures* (tech. rep.). Kiel, Hamburg, ZBW - Leibniz Information Centre for Economics.

Behr, P., Foos, D., & Norden, L. (2017). Cyclicality of SME lending and government involvement in banks. *Journal of Banking & Finance*, *77*, 64–77.

Beltran, D. O., Cordell, L., & Thomas, C. P. (2017). Asymmetric information and the death of ABS CDOs. *Journal of Banking and Finance*, *76*, 1–14.

Benmelech, E., Dlugosz, J., & Ivashina, V. (2012). Securitization without adverse selection: The case of CLOs. *Journal of Financial Economics*, *106*(1), 91–113.

Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking and Finance*, *21*(6), 849–870.

Berger, A. N., Miller, N. H., Petersen, M. A., Rajan, R. G., & Stein, J. C. (2005). Does function follow organizational form? Evidence from the lending practices of large and small banks. *Journal of Financial Economics*, *76*(2), 237–269.

Berndt, A., & Gupta, A. (2009). Moral hazard and adverse selection in the originate-to-distribute model of bank credit. *Journal of Monetary Economics*, *56*(5), 725–743.

Bordo, M. D., & Duca, J. V. (2018). *The impact of the Dodd-Frank Act on small business*, NBER.

Boyd, J. H., & Gertler, M. (1994). Are banks dead? Or are the reports greatly exaggerated? *Federal Reserve Bank of Minneapolis Quarterly Review*, *18*(3), 2–23.

Calmès, C., & Théoret, R. (2010). The impact of off-balance-sheet activities on banks returns: An application of the ARCH-M to Canadian data. *Journal of Banking & Finance*, *34*(7), 1719–1728.

Casu, B., Clare, A., Sarkisyan, A., & Thomas, S. (2011). Does securitization reduce credit risk taking? Empirical evidence from US bank holding companies. *European Journal of Finance*, *17*(9-10), 769–788.

Casu, B., Clare, A., Sarkisyan, A., & Thomas, S. (2013). Securitization and bank performance. *Journal of Money, Credit and Banking*, *45*(8), 1617–1658.

Cheng, M., Dhaliwal, D. S., & Neamtiu, M. (2011). Asset securitization, securitization recourse, and information uncertainty. *The Accounting Review*, *86*(2), 541–568.

Clark, J. A., & Siems, T. (2002). X-Efficiency in Banking: Looking beyond the Balance Sheet. *Journal of Money, Credit, and Banking*, *34*(4), 987–1013.

Dautović, E. (2019). *Has regulatory capital made banks safer? Skin in the game vs moral hazard*. Frankfurt am Main, European Systemic Risk Board.

Dell'ariccia, G., Igan, D., & Laeven, L. (2012). Credit booms and lending standards: evidence from the subprime mortgage market. *Journal of Money, Credit and Banking*, *44*(2-3), 367–384.

Diamond, D. W. (1984). Financial Intermediation and Delegated Monitoring. *The Review of Economic Studies*, *51*(3), 393.

Duffie, D. (2007). Innovations in Credit Risk Transfer: Implications for Financial Stability. *SSRN Electronic Journal*, (255), 1–47.

Elul, R. (2016). Securitization and mortgage default. *Journal of Financial Services Research*, *49*(2-3), 281–309.

Gorton, G. B., & Pennacchi, G. G. (1995). Banks and loan sales Marketing nonmarketable assets. *Journal of Monetary Economics*, *35*(3), 389–411.

Hughes, J. P., & Mester, L. J. (2013). Who said large banks don't experience scale economies? Evidence from a risk-return-driven cost function. *Journal of Financial Intermediation*, *22*(4), 559–585.

Jiang, W., Nelson, A. A., & Vytlacil, E. (2014). Liar's loan? Effects of origination channel and information falsification on mortgage delinquency. *Review of Economics and Statistics*, *96*(1), 1–18.

Jiangli, W., & Pritsker, M. G. (2008). The Impacts of Securitization on US Bank Holding Companies. *SSRN Electronic Journal*.

Jiménez, G., & Saurina, J. (2004). Collateral, type of lender and relationship banking as determinants of credit risk. *Journal of Banking & Finance*, *28*(9), 2191–2212.

Keys, B. J., Mukherjee, T., Seru, A., & Vig, V. (2010). Did securitization lead to lax screening? Evidence from subprime loans. *The Quarterly Journal of Economics*, *125*(1), 307–362.

Khan, M. S., Scheule, H., & Wu, E. (2017). Funding liquidity and bank risk taking. *Journal of Banking & Finance*, *82*, 203–216.

Klee, E., & Shin. (2020). *Post-crisis signals in securitization: Evidence from auto ABS*. Washington D.C., Federal Reserve Board.

Krasa, S., & Villamil, A. P. (1992). A Theory of Optimal Bank Size. *Oxford Economic Papers*, *44*(4), 725–749.

Kuncl, M. (2019). Securitization under asymmetric information over the business cycle. *European Economic Review*, *111*, 237–256.

Le, H. T. T., Narayanan, R. P., & Van Vo, L. (2016). Has the effect of asset securitization on bank risk taking behavior changed? *Journal of Financial Services Research*, *49*(1), 39–64.

Maddaloni, A., & Peydró, J.-L. (2011). Bank risk-taking, securitization, supervision, and low interest rates: Evidence from the Euro-area and the U.S. lending standards. *Review of Financial Studies*, *24*(6), 2121–2165.

Martynova, N., Ratnovski, L., & Vlahu, R. (2019). Bank profitability, leverage constraints, and risk-taking. *Journal of Financial Intermediation*, (December 2018), 100821.

Mian, A., & Sufi, A. (2009). The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis. *Quarterly Journal of Economics*, *124*(4), 1449–1496.

Parlour, C. A., & Plantin, G. (2008). Loan Sales and Relationship Banking. *The Journal of Finance*, *63*(3), 1291–1314.

Pennacchi, G. G. (1988). Loan Sales and the Cost of Bank Capital. *The Journal of Finance*, *43*(2), 375–396.

Purnanandam, A. (2011). Originate-to-distribute model and the subprime mortgage crisis. *Review of Financial Studies*, *24*(6), 1881–1915.

Rey, H. (2015). *Dilemma not trilemma: the global financial cycle and monetary policy independence.*

Stiroh, K. J. (2006). New evidence on the determinants of bank risk. *Journal of Financial Services Research*, *30*(3), 237–263.

A. Appendix

B. Variable Construction

See Table A1

Table 3: Estimation Results Benchmark Model: On-Balance-Sheet Risk

	(1)	(2)	(3)
Recourse	-0.0002	-0.0001	-0.0006
	(0.4856)	(0.7255)	(0.1165)
Recourse × Recession	0.0021	0.0012	0.0026
	(0.0047)	(0.0106)	(0.0039)
Capital Ratio	-0.007	-0.0043	0.0016
	(0.4743)	(0.6987)	(0.8453)
Loan Ratio	0.0074	-0.0044	0.0128
	(0.0558)	(0.2001)	(0.0004)
ROA	-0.3183	-0.2448	-0.2166
	(0.0000)	(0.0000)	(0.0000)
Deposit Ratio	0.0012	-0.0004	-0.0103
	(0.8589)	(0.9598)	(0.2079)
Com. Loan Ratio	-0.0024	-0.0156	0.0046
	(0.6414)	(0.0039)	(0.3472)
Mortgage Ratio	-0.0339	-0.0437	-0.0212
	(0.0404)	(0.0230)	(0.0621)
Cons. Loan Ratio	0.0285	0.0152	0.0188
	(0.0143)	(0.2580)	(0.0304)
Loan HHI	0.0314	0.0344	0.0203
	(0.0305)	(0.0434)	(0.0427)
Cost-to-Income	-0.0102	-0.0074	-0.006
	(0.0002)	(0.0068)	(0.0414)
Size	0.0027	0.0007	0.0032
	(0.0000)	(0.2796)	(0.0000)
BHC	-0	0.0004	-0.0006
	(0.9978)	(0.5754)	(0.3061)
Observations	20494	20494	20494
Adj. R^2	0.133	0.127	0.068

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.

Table 4: Estimation Results Benchmark Model: Off-Balance-Sheet Risk

	(1)	(2)	(3)
Recourse	-0	0.0003	0.0004
	(0.6674)	(0.8227)	(0.2523)
Recourse × Recession	-0	-0.0016	0.0001
	(0.9559)	(0.3001)	(0.7847)
Capital Ratio	0.0026	0.0059	-0.0187
	(0.0008)	(0.5809)	(0.1321)
Loan Ratio	0.0007	-0.0055	-0.0075
	(0.0533)	(0.2957)	(0.0609)
ROA	-0.0132	-0.1068	0.0521
	(0.0160)	(0.0097)	(0.1007)
Deposit Ratio	0.0006	0.0163	-0.0014
	(0.2926)	(0.1052)	(0.8469)
Com. Loan Ratio	-0.0003	0.0065	0.0009
	(0.3945)	(0.4965)	(0.8598)
Mortgage Ratio	-0.0004	0.0008	-0.0078
	(0.3096)	(0.9360)	(0.6773)
Cons. Loan Ratio	0.0003	-0.0037	0.0169
	(0.5770)	(0.8015)	(0.2026)
Loan HHI	0.0005	0.0101	0.0128
	(0.2664)	(0.1942)	(0.4434)
Cost-to-Income	-0.0007	-0.0046	0.0057
	(0.0393)	(0.1529)	(0.0211)
Size	0.0001	0.0008	0.0012
	(0.1588)	(0.3851)	(0.1369)
BHC	-0.0003	-0.003	-0.0007
	(0.0031)	(0.3380)	(0.4379)
Observations	20494	20494	20494
Adj. R^2	0.005	0.001	0.013

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.

Table A1: Variable Description, Source, and Construction

Variable	Description	Source	Construction
Dependent Variables			
Net Charge-offs	On- and off-balance-sheet charge-offs on loans and leases to total loans	Call Reports	(RIAD SUM(B747, B748, B749, B750, B751, B752, B753, 4635)) / (RCFD or RCON 2122 + 2123)
NPL	The sum of loans past due 90 days or more and still accruing to total loans	Call Reports	RCON or RCFD SUM(1407, 1403) / (RCFD or RCON 2122 + 2123)
Loan Loss Allowances	Loan loss allowances to total loans	Call Reports	RIAD3123 / (RCFD or RCON 2122 + 2123)
Loan Loss Provisions	Loan loss provisions to total loans	Call Reports	RIAD4230 / (RCFD or RCON 2122 + 2123)
OBS Allowances (Asset Eq.)	OBS allowances for credit losses to OBS activities	Call Reports	(RCON or RCFD B557) / Asset equivalent OBS activities
OBS Allowances (Credit Eq.)	OBS allowances for credit losses to OBS activities	Call Reports	(RCON or RCFD B557) / Credit equivalent OBS activities
OBS Loan Delinquencies and Defaults	OBS non-performing loans and loan charge-offs for securitization to total securitization	Call Reports	(RCON or RCFD SUM(B740, B741, B742, B743, B744, B745, B746) + RIAD SUM(B747, B748, B749, B750, B751, B752, B753) - RIAD SUM(B754, B755, B756, B757, B758, B759, B760)) / (RCON or RCFD SUM(B705, B706, B707, B708, B709, B710, B711))
Recourse Variables			
Recourse	Maximum credit exposure arising from recourse to total transferred assets	Call Reports	(RCFD or RCON SUM(B712, B713, B714, B715, B716, B717, B718, B719, B720, B721, B722, B723, B724, B725, C393, C394, C395, C396, C397,C398, C399, C400, C401, C402, C403, C404, C405, C406, B797, B798, B799, B800, B801, B802, B803,A250)) / (RCFD or RCON SUM(B705, B706, B707, B708, B709, B710, B711, B790, B791, B792, B793, B794, B795, B796, A249))
Control Variables			

Table A1 *(*continued)

Variable	Description	Source	Construction
Capital Ratio	Tier 1 and tier 2 capital to risk-weighted assets	Call Reports	RCON or RCFD 7205
Loan Ratio	Loans to total assets	Call Reports	(RCFD or RCON 2122) / (RCFD or RCON 2170)
ROA	Net income to total assets	Call Reports	RIAD4340 / (RCFD or RCON 2170)
Deposit Ratio	Deposits to total assets	Call Reports	(RCFD or RCON 2200) / (RCFD or RCON 2170)
Com. Loan Ratio	Commercial loans to total assets	Call Reports	RCON1766 / (RCFD or RCON 2170)
Mortgage Ratio	Mortgages to total assets	Call Reports	RIAD SUM(1415, F158, F159) + (RCFD or RCON SUM(1420, 1460, 1797, 5367, 5368, 1480, F160, F161)) / (RCFD or RCON 2122)
Cons. Loan Ratio	Consumer loans to total assets	Call Reports	(RCFD or RCON SUM(B538, B539, 2011, K137, K207)) / (RCFD or RCON 2122)
Loan HHI	Loan Hirsch-Herfindahl Index	Call Reports	SUM(commercial loasn/TA$\hat{2}$ + mortgages/TA$\hat{2}$ + consumer loans/TA$\hat{2}$ + (RCFD or RCON 1590 / RCFD or RCON 2122)$\hat{2}$) - 1 / (4 - 1)
Cost-to-Income	Non-interest expense to total income	Call Reports	RIAD4093 / (RIAD4074 + RIAD4079)
Size	ln total assets	Call Reports	RCON or RCFD ln(2170)
BHC	Dummy variable which is one when part of a BHC and is zero otherwise	Call Reports	1(RSSD9364 > 0.0)

Table A2: Summary Statistics

	Mean	SD
Dependent Variables		
Net Charge-offs	0.0045	0.0108
Allowance Ratio	0.0153	0.0097
Provision Ratio	0.0054	0.0118
OBS Allowance Ratio (Asset Eq.)	0.0003	0.0019
OBS Allowance Ratio (Credit Eq.)	0.0049	0.0355
OBS Loan Delinq. and Defaults	0.0011	0.0123
Recourse Variables		
Max. Credit Exp.	0.2022	0.3823
Control Variables		
Capital Ratio	0.1495	0.0556
Loan Ratio	0.6627	0.1373
ROA	0.0087	0.0122
Deposit Ratio	0.8163	0.0857
Commercial Loan Ratio	0.1528	0.0945
Mortgage Ratio	0.6824	0.1704
Consumer Loan Ratio	0.0706	0.1028
Loan HHI	0.5589	0.1612
Cost-to-Income	0.71	0.936
Size	12.5834	1.568
BHC	0.9144	0.2798
Business Cycle Variables		
VIX	20.3597	6.3778
Prod. Confidence	-0.0019	0.0099
ΔGDP	1.881	1.4996
N	22109	
Banks	1612	
Years	16	

Notes. Summary statistics of the full sample. The abbreviation exp. stands for exposure.

Table A3: Robustness Check Alternative Business Cycle Measures: VIX

	(1)	(2)	(3)	(4)	(5)	(6)
Recourse	-0.0071	-0.0047	-0.0064	0.0001	0.0043	0.0013
	(0.0094)	(0.0213)	(0.0324)	(0.9071)	(0.5694)	(0.3910)
Recourse × VIX	0.0025	0.0016	0.0022	-0	-0.0015	-0.0003
	(0.0092)	(0.0184)	(0.0371)	(0.8769)	(0.5503)	(0.5711)
Capital Ratio	-0.0072	-0.0044	0.0016	0.0026	0.0065	-0.0187
	(0.4619)	(0.6862)	(0.8477)	(0.0007)	(0.5385)	(0.1307)
Loan Ratio	0.0074	-0.0044	0.0128	0.0007	-0.0054	-0.0075
	(0.0573)	(0.1961)	(0.0004)	(0.0507)	(0.3002)	(0.0608)
ROA	-0.3183	-0.2447	-0.2167	-0.0132	-0.1066	0.052
	(0.0000)	(0.0000)	(0.0000)	(0.0160)	(0.0100)	(0.1013)
Deposit Ratio	0.0012	-0.0004	-0.0103	0.0006	0.0166	-0.0014
	(0.8651)	(0.9534)	(0.2061)	(0.2804)	(0.0994)	(0.8435)
Com. Loan Ratio	-0.0024	-0.0156	0.0046	-0.0003	0.0065	0.0009
	(0.6443)	(0.0039)	(0.3449)	(0.4112)	(0.4950)	(0.8529)
Mortgage Ratio	-0.0338	-0.0437	-0.0212	-0.0004	0.0007	-0.0077
	(0.0407)	(0.0231)	(0.0622)	(0.3248)	(0.9430)	(0.6811)
Cons. Loan Ratio	0.0285	0.0152	0.0189	0.0003	-0.0035	0.017
	(0.0143)	(0.2591)	(0.0299)	(0.5398)	(0.8129)	(0.2008)
Loan HHI	0.0314	0.0344	0.0203	0.0005	0.0102	0.0128
	(0.0306)	(0.0435)	(0.0422)	(0.2680)	(0.1916)	(0.4435)
Cost-to-Income	-0.0103	-0.0074	-0.006	-0.0007	-0.0047	0.0057
	(0.0002)	(0.0068)	(0.0404)	(0.0373)	(0.1509)	(0.0217)
Size	0.0028	0.0008	0.0032	0.0001	0.0007	0.0012
	(0.0000)	(0.2602)	(0.0000)	(0.1798)	(0.4451)	(0.1328)
BHC	-0.0004	0	-0.0007	-0.0003	-0.002	-0.001
	(0.5455)	(0.9551)	(0.3052)	(0.0033)	(0.4631)	(0.3724)
Observations	20494	20494	20494	20494	20494	20494
Adj. R^2	0.133	0.127	0.067	0.005	0.001	0.013

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.

Table A4: Robustness Check Alternative Business Cycle Measures: Producer Confidence

	(1)	(2)	(3)	(4)	(5)	(6)
Recourse	0.0002	0.0001	-0.0001	-0	-0	0.0004
	(0.6005)	(0.8077)	(0.8735)	(0.6867)	(0.9976)	(0.2587)
Recourse × PC	-0.0733	-0.0516	-0.0873	0.001	0.0486	-0.0091
	(0.0094)	(0.0029)	(0.0068)	(0.8754)	(0.4005)	(0.6257)
Capital Ratio	-0.0072	-0.0045	0.0016	0.0026	0.0065	-0.0187
	(0.4593)	(0.6842)	(0.8523)	(0.0007)	(0.5363)	(0.1308)
Loan Ratio	0.0074	-0.0044	0.0128	0.0007	-0.0054	-0.0075
	(0.0565)	(0.1971)	(0.0004)	(0.0521)	(0.3001)	(0.0602)
ROA	-0.3185	-0.2449	-0.2168	-0.0132	-0.1064	0.0522
	(0.0000)	(0.0000)	(0.0000)	(0.0163)	(0.0101)	(0.1001)
Deposit Ratio	0.0011	-0.0005	-0.0104	0.0006	0.0167	-0.0014
	(0.8758)	(0.9470)	(0.2030)	(0.2780)	(0.0986)	(0.8454)
Com. Loan Ratio	-0.0024	-0.0156	0.0046	-0.0003	0.0065	0.0009
	(0.6436)	(0.0039)	(0.3462)	(0.4110)	(0.4946)	(0.8542)
Mortgage Ratio	-0.0338	-0.0437	-0.0212	-0.0004	0.0007	-0.0077
	(0.0406)	(0.0230)	(0.0620)	(0.3252)	(0.9424)	(0.6811)
Cons. Loan Ratio	0.0286	0.0152	0.0189	0.0003	-0.0035	0.017
	(0.0142)	(0.2584)	(0.0297)	(0.5415)	(0.8120)	(0.2010)
Loan HHI	0.0314	0.0344	0.0203	0.0005	0.0101	0.0127
	(0.0304)	(0.0434)	(0.0423)	(0.2666)	(0.1913)	(0.4444)
Cost-to-Income	-0.0103	-0.0074	-0.006	-0.0007	-0.0047	0.0057
	(0.0002)	(0.0068)	(0.0404)	(0.0374)	(0.1513)	(0.0214)
Size	0.0027	0.0007	0.0032	0.0001	0.0007	0.0012
	(0.0000)	(0.2632)	(0.0000)	(0.1804)	(0.4415)	(0.1323)
BHC	-0.0004	0	-0.0007	-0.0003	-0.002	-0.001
	(0.5455)	(0.9547)	(0.3047)	(0.0033)	(0.4630)	(0.3720)
Observations	20494	20494	20494	20494	20494	20494
Adj. R^2	0.133	0.127	0.067	0.005	0.001	0.013

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.

Table A5: Robustness Check Alternative Business Cycle Measures: GDP Growth

	(1)	(2)	(3)	(4)	(5)	(6)
Recourse	0.0013	0.0009	0.001	0.0001	-0.0007	0.0003
	(0.0300)	(0.0706)	(0.1344)	(0.7692)	(0.6282)	(0.4158)
Recourse × ΔGDP	-0.0005	-0.0004	-0.0005	-0	0.0003	0
	(0.0114)	(0.0098)	(0.0384)	(0.4993)	(0.3861)	(0.6859)
Capital Ratio	-0.0074	-0.0045	0.0015	0.0026	0.0066	-0.0187
	(0.4524)	(0.6795)	(0.8607)	(0.0006)	(0.5321)	(0.1311)
Loan Ratio	0.0074	-0.0044	0.0128	0.0007	-0.0054	-0.0075
	(0.0567)	(0.1975)	(0.0004)	(0.0526)	(0.2988)	(0.0606)
ROA	-0.3182	-0.2447	-0.2167	-0.0131	-0.1066	0.0521
	(0.0000)	(0.0000)	(0.0000)	(0.0162)	(0.0101)	(0.1011)
Deposit Ratio	0.0011	-0.0005	-0.0104	0.0006	0.0167	-0.0014
	(0.8766)	(0.9463)	(0.2022)	(0.2763)	(0.0984)	(0.8449)
Com. Loan Ratio	-0.0023	-0.0156	0.0047	-0.0003	0.0065	0.0009
	(0.6519)	(0.0040)	(0.3393)	(0.4139)	(0.4972)	(0.8537)
Mortgage Ratio	-0.0337	-0.0436	-0.0211	-0.0004	0.0007	-0.0078
	(0.0414)	(0.0233)	(0.0634)	(0.3341)	(0.9479)	(0.6808)
Cons. Loan Ratio	0.0285	0.0152	0.0189	0.0003	-0.0035	0.017
	(0.0143)	(0.2586)	(0.0298)	(0.5445)	(0.8121)	(0.2010)
Loan HHI	0.0313	0.0343	0.0203	0.0005	0.0102	0.0128
	(0.0310)	(0.0438)	(0.0429)	(0.2807)	(0.1907)	(0.4436)
Cost-to-Income	-0.0102	-0.0074	-0.006	-0.0007	-0.0047	0.0057
	(0.0002)	(0.0069)	(0.0407)	(0.0375)	(0.1506)	(0.0216)
Size	0.0028	0.0008	0.0032	0.0001	0.0007	0.0012
	(0.0000)	(0.2624)	(0.0000)	(0.1779)	(0.4423)	(0.1324)
BHC	-0.0003	0	-0.0006	-0.0003	-0.002	-0.001
	(0.5549)	(0.9480)	(0.3107)	(0.0034)	(0.4619)	(0.3719)
Observations	20494	20494	20494	20494	20494	20494
Adj. R^2	0.133	0.127	0.067	0.005	0.001	0.013

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.

Table A6: Robustness Check Alternative Recourse Measures: Recourse Dummy

	(1)	(2)	(3)	(4)	(5)	(6)
Recourse	-0.0001	0.0002	-0.0001	-0	0	0.0008
	(0.7476)	(0.4332)	(0.7826)	(0.7681)	(0.9914)	(0.0533)
Recourse × Recession	0.001	0.0005	0.0006	0	-0.0013	0.001
	(0.0201)	(0.0878)	(0.2213)	(0.8352)	(0.1771)	(0.0017)
Capital Ratio	-0.007	-0.0042	0.0017	0.0026	0.0061	-0.0179
	(0.4692)	(0.7004)	(0.8374)	(0.0007)	(0.5613)	(0.1408)
Loan Ratio	0.0075	-0.0043	0.0128	0.0007	-0.0055	-0.0074
	(0.0550)	(0.2052)	(0.0003)	(0.0525)	(0.2941)	(0.0625)
ROA	-0.3189	-0.2455	-0.2173	-0.0132	-0.106	0.051
	(0.0000)	(0.0000)	(0.0000)	(0.0167)	(0.0101)	(0.1071)
Deposit Ratio	0.0011	-0.0005	-0.0104	0.0006	0.0167	-0.0012
	(0.8774)	(0.9493)	(0.2016)	(0.2802)	(0.0990)	(0.8605)
Com. Loan Ratio	-0.0024	-0.0157	0.0046	-0.0003	0.0066	0.0007
	(0.6354)	(0.0039)	(0.3479)	(0.4123)	(0.4848)	(0.8979)
Mortgage Ratio	-0.0339	-0.0437	-0.0213	-0.0004	0.0008	-0.0078
	(0.0399)	(0.0228)	(0.0611)	(0.3251)	(0.9330)	(0.6767)
Cons. Loan Ratio	0.0286	0.0152	0.0189	0.0003	-0.0035	0.017
	(0.0140)	(0.2576)	(0.0295)	(0.5451)	(0.8119)	(0.1994)
Loan HHI	0.0316	0.0344	0.0204	0.0005	0.0101	0.0126
	(0.0293)	(0.0427)	(0.0407)	(0.2764)	(0.1941)	(0.4468)
Cost-to-Income	-0.0103	-0.0074	-0.0061	-0.0007	-0.0046	0.0056
	(0.0002)	(0.0064)	(0.0394)	(0.0377)	(0.1521)	(0.0217)
Size	0.0027	0.0007	0.0032	0.0001	0.0007	0.0011
	(0.0000)	(0.2712)	(0.0000)	(0.1844)	(0.4255)	(0.1473)
BHC	-0.0004	0	-0.0007	-0.0003	-0.002	-0.001
	(0.5424)	(0.9428)	(0.3053)	(0.0033)	(0.4610)	(0.3801)
Observations	20494	20494	20494	20494	20494	20494
Adj. R^2	0.133	0.127	0.067	0.005	0.001	0.016

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.

Table A7: Robustness Check Alternative Recourse Measures: Recourse Split

	(1)	(2)	(3)	(4)	(5)	(6)
Recourse (Loan Sales)	-0.0002	-0.0003	-0.0004	0	0.0005	0.0001
	(0.5078)	(0.4263)	(0.2626)	(0.6326)	(0.7330)	(0.8545)
Recourse (Loan Sales) × Recession	0.002	0.0015	0.0031	-0	-0.0011	0.0007
	(0.0070)	(0.0016)	(0.0006)	(0.7723)	(0.5052)	(0.2870)
Recourse (Sec.)	-0.0014	0.0026	-0.0049	0	0.0095	0.0094
	(0.7431)	(0.5535)	(0.2157)	(0.9462)	(0.4753)	(0.2566)
Recourse (Sec.) × Recession	0.0146	0.0034	0.0056	0	-0.0071	0.0299
	(0.0404)	(0.4291)	(0.2865)	(0.9407)	(0.5155)	(0.0578)
Recourse (SBO)	-0.0048	-0.0015	-0.0058	-0.0017	-0.0033	-0.0013
	(0.0708)	(0.4492)	(0.0780)	(0.0558)	(0.3980)	(0.2841)
Recourse (SBO) × Recession	0.0066	0.0003	0.0024	0.0001	0.0148	0.0001
	(0.1231)	(0.8984)	(0.6781)	(0.9543)	(0.2220)	(0.9513)
Capital Ratio	-0.0072	-0.0044	0.0016	0.0026	0.0066	-0.0185
	(0.4639)	(0.6906)	(0.8456)	(0.0007)	(0.5336)	(0.1320)
Loan Ratio	0.0075	-0.0044	0.0127	0.0007	-0.0054	-0.0073
	(0.0516)	(0.1971)	(0.0004)	(0.0527)	(0.3066)	(0.0568)
ROA	-0.3172	-0.2446	-0.2161	-0.0132	-0.106	0.0539
	(0.0000)	(0.0000)	(0.0000)	(0.0159)	(0.0102)	(0.0855)
Deposit Ratio	0.001	-0.0004	-0.0103	0.0005	0.0168	-0.0018
	(0.8889)	(0.9541)	(0.2049)	(0.3032)	(0.0953)	(0.7955)
Com. Loan Ratio	-0.0026	-0.0158	0.0047	-0.0002	0.0063	-0.0002
	(0.6129)	(0.0038)	(0.3346)	(0.4577)	(0.5043)	(0.9720)
Mortgage Ratio	-0.0337	-0.0436	-0.0212	-0.0004	0.0009	-0.0073
	(0.0405)	(0.0227)	(0.0627)	(0.3794)	(0.9250)	(0.6930)
Cons. Loan Ratio	0.0285	0.0151	0.0191	0.0003	-0.0037	0.0161
	(0.0136)	(0.2587)	(0.0278)	(0.5065)	(0.8007)	(0.2130)
Loan HHI	0.0312	0.0342	0.0205	0.0005	0.0096	0.0114
	(0.0295)	(0.0425)	(0.0397)	(0.2876)	(0.2202)	(0.4834)
Cost-to-Income	-0.0102	-0.0074	-0.006	-0.0007	-0.0047	0.0058
	(0.0003)	(0.0071)	(0.0417)	(0.0381)	(0.1519)	(0.0194)
Size	0.0027	0.0007	0.0032	0.0001	0.0007	0.0011
	(0.0000)	(0.2706)	(0.0000)	(0.1929)	(0.4620)	(0.1476)
BHC	-0.0004	0	-0.0007	-0.0003	-0.002	-0.0011
	(0.4959)	(0.9696)	(0.2941)	(0.0030)	(0.4648)	(0.3267)
Observations	20494	20494	20494	20494	20494	20494
Adj. R^2	0.135	0.128	0.069	0.005	0.001	0.03

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.

Table A8: Robustness Check: The Dodd-Frank Act

	(1)	(2)	(3)	(4)	(5)	(6)
Recourse	-0.0004	-0.0005	-0.0007	-0.0001	-0.0014	0.0005
	(0.4140)	(0.2386)	(0.1224)	(0.3283)	(0.4464)	(0.1420)
Recourse × Recession	0.0022	0.0016	0.0027	0.0001	0	0
	(0.0060)	(0.0032)	(0.0033)	(0.6806)	(0.9884)	(0.9643)
Recourse × DFA	0.0003	0.0008	0.0003	0.0001	0.0035	-0.0003
	(0.6505)	(0.2093)	(0.6319)	(0.3217)	(0.1766)	(0.4733)
Capital Ratio	-0.0072	-0.0046	0.0016	0.0026	0.0058	-0.0186
	(0.4637)	(0.6787)	(0.8461)	(0.0007)	(0.5809)	(0.1324)
Loan Ratio	0.0074	-0.0044	0.0128	0.0007	-0.0054	-0.0075
	(0.0567)	(0.1983)	(0.0004)	(0.0521)	(0.3026)	(0.0604)
ROA	-0.3183	-0.2447	-0.2165	-0.0132	-0.1061	0.0521
	(0.0000)	(0.0000)	(0.0000)	(0.0164)	(0.0101)	(0.1008)
Deposit Ratio	0.0012	-0.0005	-0.0103	0.0006	0.0163	-0.0014
	(0.8675)	(0.9445)	(0.2077)	(0.2861)	(0.1046)	(0.8488)
Com. Loan Ratio	-0.0023	-0.0156	0.0046	-0.0003	0.0067	0.0009
	(0.6466)	(0.0041)	(0.3431)	(0.4262)	(0.4788)	(0.8564)
Mortgage Ratio	-0.0338	-0.0436	-0.0212	-0.0004	0.0011	-0.0078
	(0.0409)	(0.0233)	(0.0627)	(0.3447)	(0.9151)	(0.6802)
Cons. Loan Ratio	0.0285	0.0152	0.0189	0.0003	-0.0034	0.017
	(0.0143)	(0.2580)	(0.0300)	(0.5346)	(0.8183)	(0.2013)
Loan HHI	0.0314	0.0343	0.0203	0.0005	0.0098	0.0128
	(0.0307)	(0.0438)	(0.0429)	(0.2836)	(0.2059)	(0.4438)
Cost-to-Income	-0.0102	-0.0074	-0.006	-0.0007	-0.0047	0.0057
	(0.0002)	(0.0067)	(0.0407)	(0.0375)	(0.1489)	(0.0214)
Size	0.0027	0.0007	0.0032	0.0001	0.0007	0.0012
	(0.0000)	(0.2646)	(0.0000)	(0.1810)	(0.4397)	(0.1325)
BHC	-0.0004	0	-0.0007	-0.0003	-0.0019	-0.001
	(0.5470)	(0.9465)	(0.3058)	(0.0034)	(0.4702)	(0.3708)
Observations	20494	20494	20494	20494	20494	20494
Adj. R^2	0.133	0.127	0.068	0.005	0.001	0.013

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.

Table A9: Robustness Check: Non-performing Loans

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Recourse	-0.0013	0.0002	-0.0015	-0.0001	-0.0005	-0.0013	-0.0012	-0.0001	-0	-0
	(0.2376)	(0.7327)	(0.1282)	(0.8771)	(0.4301)	(0.1829)	(0.2553)	(0.7168)	(0.6894)	(0.9488)
Recourse × Recession	0.0007	-0.0005	0.0012	-0.0006	0.0004	0.0013	0.001	0	-0.0002	-0.0001
	(0.6267)	(0.2576)	(0.4049)	(0.1984)	(0.5575)	(0.3771)	(0.4876)	(0.9057)	(0.1306)	(0.2781)
Capital Ratio	-0.0175	0.0053	-0.0228	-0.0089	-0.0129	-0.009	-0.013	-0.0044	-0.0003	-0
	(0.1050)	(0.2301)	(0.0239)	(0.0521)	(0.0822)	(0.3202)	(0.1685)	(0.0464)	(0.9123)	(0.9827)
Loan Ratio	0.0066	0.0055	0.0013	-0.0037	-0.0075	0.0102	0.0007	0.0027	0.0029	0.0003
	(0.2874)	(0.0688)	(0.8055)	(0.0493)	(0.0102)	(0.0654)	(0.8964)	(0.0178)	(0.0678)	(0.7092)
ROA	-0.5271	-0.0201	-0.5085	-0.1372	-0.1168	-0.3982	-0.4589	-0.0527	-0.0092	-0.0112
	(0.0000)	(0.0165)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0212)	(0.0047)
Deposit Ratio	0.0021	-0.0034	0.0053	0.0049	0.0042	-0.0026	0.0001	0.0002	0.0004	0.0016
	(0.8469)	(0.6620)	(0.4813)	(0.0843)	(0.3480)	(0.8011)	(0.9893)	(0.9113)	(0.8383)	(0.1605)
Com. Loan Ratio	-0.0239	-0.0051	-0.019	-0.0039	-0.0094	-0.0202	-0.0179	0.0086	-0.0015	-0.0128
	(0.0174)	(0.1592)	(0.0318)	(0.1086)	(0.0043)	(0.0312)	(0.0307)	(0.0055)	(0.0483)	(0.0026)
Mortgage Ratio	-0.0562	-0.0141	-0.0424	-0.0054	-0.0055	-0.0511	-0.0184	-0.009	-0.0067	-0.0222
	(0.0000)	(0.0009)	(0.0001)	(0.0325)	(0.2332)	(0.0000)	(0.0325)	(0.0237)	(0.0298)	(0.0042)
Cons. Loan Ratio	-0.0009	0.0127	-0.0136	0.0008	0.004	-0.0017	-0.0001	-0.0034	0.0174	-0.0143
	(0.9363)	(0.0200)	(0.1267)	(0.7313)	(0.3103)	(0.8698)	(0.9896)	(0.3130)	(0.0004)	(0.0027)
Loan HHI	0.0506	0.0121	0.0388	0.0086	0.0116	0.0424	0.0354	0.0033	0.0056	0.0068
	(0.0000)	(0.0008)	(0.0000)	(0.0001)	(0.0007)	(0.0000)	(0.0000)	(0.3729)	(0.0752)	(0.0479)
Cost-to-Income	-0.0165	-0.0029	-0.0137	-0.0015	0.0019	-0.0152	-0.0132	-0.0021	-0.0006	-0.0008
	(0.0002)	(0.0027)	(0.0010)	(0.3315)	(0.4383)	(0.0000)	(0.0011)	(0.0063)	(0.1196)	(0.0159)
Size	0.005	0.0013	0.0037	0.0001	-0.0009	0.0049	0.0047	-0.0001	0.0003	0.0001
	(0.0000)	(0.0143)	(0.0000)	(0.8275)	(0.1459)	(0.0000)	(0.0000)	(0.8182)	(0.0365)	(0.3811)
BHC	0.0003	-0.0008	0.0011	0.0011	0.0018	-0.0008	0.001	-0.0001	-0.0002	-0.0003
	(0.8726)	(0.1665)	(0.5484)	(0.1244)	(0.0695)	(0.6330)	(0.5701)	(0.7389)	(0.1436)	(0.3934)
Observations	20494	20494	20494	20494	20494	20494	20494	20494	20494	20494
Adj. R^2	0.081	0.019	0.082	0.044	0.027	0.063	0.076	0.027	0.102	0.05

Notes. P-value in parentheses. The model is estimated with clustered standard errors on the bank-level.