

Commercial Real Estate Concentrations: Evidence on the Survival of Small Banks

Elisabeta Pana

Abstract

This study examines the survival of small banks with commercial real estate concentrations over the 2006-2009 period. Using data on 4646 banks, I document that commercial real estate loan concentrations increase the hazard of disappearance. The analysis of bank-specific factors reveals that bank capitalization, liquidity, and asset quality play a significant role on bank survival. I also find evidence that small banks in the Pacific Southwest and South Atlantic regions are less likely to survive as separate entities.

I. Introduction

It is often argued that the restructuring of the banking sector in the aftermath of a financial crisis eliminates excess capacity, strengthens surviving institutions, and restores the flow of capital from savers to borrowers. An important feature of the restructuring process is the regulatory intervention through capital infusions, purchases and assumption agreements, and liquidations (Santomero and Hoffman, 1998; Acharya and Yorulmazer, 2005).

During the 2007-2008 crisis, regulatory intervention provided capital for larger, politically connected banks but offered limited incentives to smaller banks to apply for government funds (Duchin and Sosyura, 2009; Li, 2010; Congressional Oversight Panel, 2010). The debate around bank capital infusions encompassed the distribution and the use of the funds, with members of the Congress arguing that federal funds should not be used for opportunistic acquisitions and Treasury officials saying that acquisitions of troubled banks would strengthen the entire sector. In his speech delivered at the Economic Club of New York, the Chairman of the Federal Reserve, Ben Bernanke acknowledged that challenges were especially high for “smaller regional and community banks that entered the crisis with high concentrations of CRE [commercial real estate] loans.”

Using logistic regression analysis and a hazard model, I investigate the main determinants of small bank survival during the recent financial crisis. The sample of small banks is the ideal setting for this analysis, as it entails no significant government capital infusions. Aimed at strengthening the entire banking sector, capital infusions through the Trouble Asset Relief Program (TARP) stimulated the lending activity of the larger bank recipients (Li, 2010), but were considered unattractive by the smaller banks (Congressional Oversight Panel, 2010). Thus, after I rule out any significant external stimulus, I focus my analysis on lending activity of small banks and the relationship between the CRE loan concentration and banks' survival during and immediately after the crisis.

Although I do not examine the effectiveness of the regulatory supervision, my analysis contributes to the understanding that regulatory agencies identified the CRE-concentration problem in the banking sector in a timely manner. After controlling for different factors related to the bank survival, I document that small CRE-concentrated banks have a higher hazard of

disappearance than the group of banks of similar size without CRE concentrations. Following Sinkey (1979) and Arena (2008), I posit that this study focuses on the near-term bank vulnerability, and not on medium-to-long-term vulnerabilities, which would require the identification and assessment of structural weaknesses affecting a bank's incentive to screen and monitor.

This paper is mainly related to two lines of literature. First, this study contributes to the literature on the impact of bank regulation and prudential supervision on lending activity (Peek and Rosengren, 1995; Berger, Kyle, and Scalise, 2001). Prior evidence suggests that the implementation of bank supervision and prudential regulation leads to a significant asset portfolio restructuring (Curry, Fissel, and Ramirez, 2006). The results support this argument and confirm that there are significant differences between the lending activities of the CRE-concentrated banks and those of the group of banks with no CRE concentration.

Second, this study contributes to the literature on financial and banking crises. Extant evidence indicates that bank crises have a negative impact on the real economy, especially on small businesses (Bernanke and Lown, 1991; Berger and Udell, 1996; Rajan and Zingales, 1998; Dell'Ariccia, Detragiache, and Rajan, 2008). The flow of credit from banks to borrowers is impeded in the event of failure, when valuable private information banks have collected about their customers is lost (Stiglitz and Weiss, 1981; Diamond, 1984; Boot, 2000; Fenn and Cole, 2008; Degryse, Masschelein, and Mitchell, 2010). This study adds to this evidence by showing that CRE-concentration had a negative impact on small bank survival during the recent crisis and implicitly on the availability of credit to the economy.

The remainder of this study is organized as follows. Next section presents an overview of the extant theoretical and empirical literature and develops the testable hypotheses. Section 3 describes the sample and presents the methodology. Section 4 presents the main results. A summary of the main findings concludes the study.

II. Literature review and hypothesis development

Over the last three decades, the banking sector has gone through a profound technological, legislative, and financial transformation and an unprecedented consolidation process (Harford, 2005). Banking consolidation has resulted in a polarized sector with large banks specialized in transaction-based lending at one end and small banks specialized in relationship lending at the other end (Berger, Kashyap, and Scalise, 1995; Yeager, 2004).

The economic slowdown of the 1980s had a severe impact on the banking sector and challenged the survival of small banks in a deregulated environment (Gup and Walter, 1989). Two distinguishing features helped small banks endure the difficult environment and emerge as strong performers in the 1990s (Bostic and Robinson, 2004). First, small banks have a higher ability to process soft information needed in the process of originating and monitoring loans (Cole, Goldberg, and White, 2004). Second, the established presence of small banks in niche-markets allows them to extract higher profit margins than those earned by large banks (Nakamura, 1994; Banerjee, Beseley, and Guinane, 1994). However, the advantages that small banks have over larger banks have diminished over time because of changes in regulation. Bostic and Robinson (2004) show that the enforcement of the Community Reinvestment Act of 1977

altered the quality of niche-markets and increased competition in markets served by community banks. As a result, in order to maintain the same riskiness of the average borrower, community lenders originated fewer mortgages in counties where CRA agreements were in effect. In a similar vein, Calem (1994) posit that the acquisition wave triggered by the relaxation of in-state branching restrictions resulted in a reduction of the number of small banks.

The Riegle–Neal Interstate Banking and Branching Efficiency Act and the Graham–Leach–Bliley Act have removed the remaining consolidation hurdles and created the optimal conditions for a wider gap between the product and services in which large and small bank specialize. Although specialization in products and services does not increase the vulnerability of small banks to local economic shocks, it may affect their ability to survive a generalized and prolonged crisis (Yeager, 2004; Berger and Bouwman, 2009). The real estate market deterioration during the recent crisis has impaired the lending activity and reduced the ability of small banks to compete with larger banks. The mortgage-backed securities market failed to shield banks against real estate shocks and the accumulation of the risk based capital prior to the crisis proved insufficient (Lopez, 2007). With challenges quickly mounting in the banking sector, practitioners asked regulators to preserve the growth of good loans by adopting “a measured supervisory response specifically targeted at the institutions with poor risk management practices” (Igan and Pinheiro, 2009).

One group of banks with poor risk management practices has been identified immediately prior to the recent crisis through a regulatory screening process, known as the CRE-guidance. Implemented at the end of 2006, the guidance placed CRE-concentrated banks under enhanced supervisory scrutiny¹. Although no lending limits are imposed by the guidance, CRE-concentrated banks are required to put into practice higher credit and risk management standards, and thus are likely to trim down the credit supply. With a reduced lending activity, small banks become less competitive and turn into vulnerable targets to merger and acquisitions attempts. The absorption of a CRE-concentrated bank through acquisition into a larger bank with a diversified loan portfolio eliminates the enhanced supervision and allows further growth in the CRE loan portfolio of the newly created bank. Empirical evidence supporting these arguments advances the hypothesis that the enforcement of borrower limits encouraged the consolidation of small banks (Peek and Rosengen, 1995). Similarly, small banks with balance sheet concentrations were more likely to fail during the U.K. crisis of the early 1990s (Logan, 2001). Based on these arguments, I hypothesize that during the recent crisis small CRE-concentrated banks altered their lending activity and faced a lower probability of survival and a higher hazard of disappearance than banks with similar size and no CRE concentration.

Next, I analyze other variables found significant in previous studies of bank mergers and acquisitions or failure and report their predicted sign on Table 1. Following recent empirical evidence, which suggests that the addition of macroeconomic variables does not improve the bank survival analysis (Arena, 2008; Cole and Wu, 2009), I restrict the list of covariates to bank-specific and regional variables.

Two alternative hypotheses on the relationship between capital adequacy and survival

¹ “Concentrations in Commercial Real Estate lending, Sound Risk management Practices,” December, 2006, was issued by the Office of the Comptroller of the Currency, The Board of Governors of the Federal Reserve System, and the Federal Deposit Insurance Corporations.

probability have emerged in the literature (Demirguc-Kunt, 1989; Thomson, 1992; Cole and Gunther, 1998; Wheelock and Wilson, 2000; Logan, 2001; Hannan and Pilloff, 2007). A positive relationship between bank capitalization and the likelihood of being a target might be expected, if a bank has excess capital or has limited growth opportunities. In this case, banks are attractive targets for growth-oriented acquirers or for better-diversified acquirers (Hernando, Nieto, and Wall, 2009). In extreme situations, when the level of capitalization falls below a critical level, the supervisor might foster an acquisition by a well-capitalized bank. Alternatively, if high capitalization is a reflection of managerial efficiency, then better-capitalized banks are less attractive to potential buyers. Recent evidence by Berger and Bouwman (2009) shows that the capital helps small banks survive banking and market crises and that the manner in which a bank exits when it does not survive a crisis depends on the pre-crisis capital level. Finally, Hannan and Pilloff (2007) argue that taking over a poor-capitalized target enables acquirers to maximize the post-merger gains.

Another factor playing an important role on bank survival is liquidity. Several empirical studies find that higher levels of bank liquidity are associated with a higher probability of survival (Wheelock and Wilson, 2000; Fenn and Cole, 2008). Supporting evidence is also provided by a recent report issued by the Committee of European Banking Supervisors (CEBS), which stresses the importance of creating liquidity buffers to ensure bank survival². Based on these arguments, I expect a negative relationship between bank liquidity and the hazard of disappearance or the probability of exit.

The inverse relationship between poor asset quality and survival has been extensively documented in the banking literature (Demirguc-Kunt, 1989; Whalen, 1991; Thomson, 1992; Cole and Gunther, 1995; Cole and Gunther, 1998). Oshinsky and Olin (2005) argue that among the factors that determine whether troubled banks recover, merge, survive as a problem bank, or eventually fail, the asset-quality variables are “statistically significant more often than other variables”. In this study, I use the delinquency rate of commercial loans and the delinquency rate of residential loans as proxies of poor asset quality. A negative relationship is expected between poor asset quality and bank survival.

Bank size is considered one of the main factors affecting the probability of bank failure and the probability of being acquired. On one hand, acquirers may find small banks a more attractive acquisition because they can be easily integrated into acquirer’s operations and, the acquisition process of a small target is less likely to be challenged by the competition authorities. DeYoung, Hunter and Udell (2004) and Gilbert (2007) show that asset size is important for the survival of small banks and argue that banks with assets less than \$100 million need to be especially well run to survive the competition with larger banks. On the other hand, one might expect a negative relationship between size and the survival probability because the acquisition of a larger target provides the acquirer with economies of scale and market power sooner than through a series of small acquisitions (Hernando, Nieto, and Wall, 2008).

I also control for management’s preference for risk by including the ratio of jumbo CDs to total assets, a variable commonly used in bank performance and survival studies (Fenn and

² Committee of European Banking Supervisors, “Interim Report on Liquidity Buffers and Survival Periods”, March 2009

Cole, 1998, Maechler and McDill, 2006; Schaeck, 2008). For instance, Maechler and McDill (2006) show that riskier institutions fail to increase the volume of insured deposits to compensate the outflow of uninsured deposits – such as jumbo CDs. Schaeck (2008) concludes that banks that rely heavily on uninsured deposits are likely to fail faster due to their inability to substitute the uninsured deposits cash outflows with other types of funds.

Finally, I control for regional differences by including a dummy variable that takes the value of 1 for banks in the Pacific Southwest and the South Atlantic regions and 0 otherwise. As shown by Peek and Rosengen (1995) and Fenn and Cole (2008), controlling for regional differences is necessary because differences in the structure of the banking industry across different regions affect bank consolidation and failure patterns. Specifically, Fenn and Cole (2008) show that Southwestern banks accounted for at least one fourth of all U.S. bank failures in each year from 1987-92.

III. Sample and methodology

The sample of small banks is obtained from the Reports of Conditions and Income (Call Reports) database. The analysis is restricted to the sample of banks with total assets up to one billion dollars because it represents the group of banks with no significant capital injection during the TARP program³. I define commercial real estate (CRE) loans as loans secured by real estate for (i) construction, land development, and other land loans; (ii) multifamily residential properties; and (iii) non-farm, nonresidential properties. CRE loans are loans where cash flow from the real estate is the primary source of repayment.

The sample of small banks with CRE concentration is identified by applying the two-step screening process outlined by the CRE guidance. The first criterion identifies banks with aggregate CRE loans for construction, land development, and other land representing 100% or more of bank total capital. The second criterion identifies banks where aggregate CRE loans represent 300% or more of total capital and the CRE portfolios have increased 50% or more during the prior three-year period. I obtain a sample of 2323 small banks that violated at least one of the CRE lending concentrations criteria at the end of 2006. Each bank identified by the CRE Guidance criteria is next matched with a bank of similar size from the remaining population of banks. During the sample period, 564 banks were acquired or failed. The sample of 4082 surviving banks at the end of 2009 contains 1942 banks classified as CRE-concentrated and 2140 banks as non-CRE-concentrated.

Following Fenn and Cole (2008), I model bank exit using a logistic regression. I assume that $Exit^*_{it}$ is an unobservable index of the probability that bank i exits through failure or merger and acquisitions in year t and is a function of bank specific characteristics x_{it} .

$$Exit^*_{it} = b_t x_{it} + \mu_{it} \quad (1)$$

where x_{it} is a vector of commercial real estate loan concentrations and control variables, b_t is a vector of parameter estimates for the independent variables and μ_{it} is a random disturbance term. The likelihood function for this model is:

³ In a 2010 letter to Congressional leaders, Secretary of Treasury Timothy Geithner mentioned that future commitments of government funds will “provide capital to small and community banks, which are important sources for credit for small businesses.” However, these capital injections fall outside our study period.

$$L = \prod_{Exit_{it}=0} [\Phi(-b_t x_{it})] \prod_{Exit_{it}=1} [1 - \Phi(-b_t x_{it})]$$

where:

$$\Phi(-b_t x_{it}) = 1/[1 - \exp(-b_t x_{it})] \text{ and } 1 - \Phi(-b_t x_{it}) = \exp(-b_t x_{it})/[1 + \exp(-b_t x_{it})]$$

Shumway (2001) and Cole and Wu (2009) argue that hazard models are superior to static models in predicting bank bankruptcy or failure. Static models fail to correct for the length of period for which a bank is at risk of bankruptcy or failure and as a result, parameter estimates are biased and inconsistent. Thus, the second part of the analysis presents a model of the determinants of bank disappearance similar to the one used by Wheelock and Wilson (2000).

The model for the hazard of disappearance is based on the Cox (1972) proportional hazard model with time-varying covariates, where all disappearances (takeovers and failures) are treated as identical events. The hazard function of the probability that the i^{th} community bank disappears through event k between time t and time $t+1$, is as follows:

$$\lambda_{k,i}(t|x_{k,i}(t), b_k) = \bar{\lambda}_k(t) \exp(x_{k,i}(t)'b_k) \quad (2)$$

where $x_{k,i}(t)$ represents a vector of covariates of the i^{th} bank at time t , $\bar{\lambda}_k(t)$ denotes the baseline hazard, and b_k is a vector of coefficients to be estimated. Time is measured in calendar time elapsed since the first observation, on December 2006. If S_t is the set of banks in existence at the end of 2006 and $D_{k,t}$ is the set of banks $d_{k,t}$ that disappear through event k between t and $t+1$, then $\exp(x_{k,i}(t)'b_k)/\sum_{n \in S_t} \exp(x_{k,n}(t)'b_k)$ represents the contribution to the partial likelihood function of bank i which disappears through event k between t and $t+1$. The log-partial likelihood function is:

$$\ln(L(b_k)) = \sum_{t=1}^T \left\{ \sum_{i \in D_{k,t}} x_{k,i}(t)'b_k - d_{k,t} \cdot \ln \left[\sum_{n \in S_t} \exp(x_{k,n}(t)'b_k) \right] \right\}$$

IV. Empirical results

Table 1 presents the definition for each dependent and independent variables. Table 2 presents the descriptive statistics for the independent variables for the group of CRE-concentrated banks and the group of banks without CRE-concentrated loan portfolio at the end of each year, from 2006 to 2009. I report that for each year during the sample period CRE-concentrated banks operate at a significantly lower equity ratio than the group of banks without CRE concentration. However, both liquidity measures—the 1-year GAP and the 1-year GAP best estimate—indicate a more cautious approach in liquidity management undertaken by CRE-concentrated banks. Although at the beginning of the sample period the delinquency rates for the two bank groups were similar, the delinquency growth rates for the CRE-concentrated banks outpaced the growth of the delinquency rates for non-CRE-concentrated banks, reaching a level of 7.8% for commercial real estate loans and 5.8% for residential estate at the end of 2009. I also note that commercial real estate concentrated banks relied more on non-insured deposits.

The logistic regression results in Table III show that banks identified as CRE-concentrated at the end of 2006 are more likely to exit through mergers, acquisitions, or failures, than non-CRE-concentrated banks. The coefficient of the 2006 CRE dummy variable is positive and significant in all specifications. The results provide support to the arguments that bank loan

portfolio concentrations result in bank exit through failure or acquisition (Peek and Rosengen, 1995; Fenn and Cole, 2008). The negative and significant coefficients of the *1-year GAP*, *1-Year GAP best estimate*, and the *Jumbo CDs* variables are consistent with the interpretation that lower liquidity and the ability to attract non-insured deposits facilitate bank survival during the first year of crisis. Although the sign of the coefficients remains unchanged, the lack of significance for the year 2009 indicates that the role played by liquidity and non-insured funds on bank survival diminishes over time. However, I find that asset quality plays an increasing role on small bank survival. Although the coefficients of the delinquency rate variables are not significant for the year 2006, I document that a higher commercial real estate delinquency rate increases the likelihood of a bank exiting through mergers, acquisitions, or failure in 2009. Finally, consistent with previous empirical evidence, I show that smaller banks were less likely to survive as separate entities during the crisis (DeYoung, Hunter, and Udell, 2004; Gilbert, 2007). This result is generally attributed to the ability of larger banks to garner benefits from the diversification of risk. However, in the year immediately following the crisis, size is unrelated to the probability of surviving as a separate entity.

Table IV reports the results of the hazard model estimation for the time-to-exit through mergers, acquisitions, or failure. I report the results for four equations, corresponding to two measures of CRE-concentrations and two measures of liquidity. In order to account for CRE-concentration, I include a dummy variable that identifies the group of banks with CRE-concentration at the end of 2006 and the group of banks matched by size. In a different specification, I include a time-varying covariate (CRE-concentration) which classifies each bank as CRE-concentrated or non-CRE-concentrated at the end of each quarter during the sample period. The two liquidity measures are the 1-year GAP and the 1-year GAP best estimate.

The results support the evidence that significant loan portfolio concentrations lead to bank exit through mergers, acquisitions, or failure (Peek and Rosengen, 1995; Logan, 2001). The coefficients of the two CRE-concentrations variables are positive and significant in all four equations. The results also indicate that banks with a higher equity ratio have a higher hazard of disappearance. The coefficients of the *Equity ratio* lend support to the argument advanced by Thomson (1992), that the positive relationship between bank capitalization and the hazard of disappearance is explained by the fact that “stronger banks are more aggressive in recognizing and reserving against emerging problems in their loan portfolios than are weaker banks.” The negative coefficients of the two variables for liquidity indicate that banks with a more aggressive liquidity management are more likely to survive as separate entities. Consistent with the asset quality hypothesis, I find that banks with higher commercial and residential delinquency rates are more likely to exit through mergers, acquisitions, or failure. I also document a signaling effect consistent with the assertion by Schaeck (2008) that a bank’s ability to attract and retain uninsured funds indicates that it is able to hide emerging problems in its asset portfolio. Thus, the regulator perceives it as less risky and sees no reason to intervene and take remedial action. The negative coefficient on *Size* is consistent with the interpretation that larger banks are less vulnerable than smaller banks. Finally, similar to the crisis of late 1980s and early 1990s, banks from the Pacific Southwest and the South Atlantic regions were less likely to survive as separate entities.

V. Concluding remarks

The empirical evidence on the impact of commercial real estate lending concentration on bank survival provides support for the need to control one of the most important challenges in the post-crisis period.

This study documents that larger banks with better liquidity management and a higher ability to attract uninsured funds are more likely to survive as separate entities. Consistent with previous empirical evidence, I find that poor asset quality increases the hazard of disappearance. I also show that at the beginning of the recent financial crisis CRE-concentrated banks had lower delinquency rates than the group of banks of similar size without CRE-concentrations. However, higher growth rates during the crisis led to unprecedented levels of commercial and residential delinquencies at the end of year 2009. Using a time-varying covariate for the CRE-concentration, I find strong evidence that banks with concentrated asset portfolios are less likely to survive as separate entities. The main findings provide support to recent regulatory initiatives to revisit the credit and risk management standards for the group of banks with CRE-concentrations.

Table I: Definition of variables

Variable	Predicted sign	Definition
Logit dependent Variable		The dependent variable takes the value of 1 for banks that exit and 0 otherwise
Hazard model dependent variable		The dependent variable is measured as the number of quarters the bank survives as an independent entity after December 2006.
2006 CRE dummy	+/-	A dummy variable that takes the value of 1 for CRE-concentrated banks at the end of 2006 and 0 otherwise.
CRE-concentration	+/-	A time covariate created as a set of dummy variables that identify CRE concentrated banks at the end of each quarter, from December 2006 to December 2009.
Equity ratio	+/-	The equity ratio is defined as equity as a percentage of total assets.
1-year GAP	-	The 1-year GAP variable is the difference between rate sensitive assets and rate sensitive liabilities. <i>Rate sensitive assets</i> = (federal funds sold) + (securities purchased under agreements to resell) + (trading assets) + (fixed and floating debt securities maturing or repricing within 12 months) + (fixed and floating loans maturing or repricing within 12 months); <i>Rate sensitive liabilities</i> = (federal funds purchased) + (securities sold under agreements to repurchase) + (bank's liability on acceptances executed and outstanding) + (trading liabilities) + (other borrowed money) + (demand notes issued to the U.S. Treasury) + (time and savings deposits) - (large long-term time deposits)
1-year GAP best estimate	-	The 1-year GAP best estimate is the 1-year GAP plus small longer-term deposits as a percentage of total assets.
Delinquency rates	+	Loans secured by real estate that are past due thirty days or more and still accruing interest, as well as those in nonaccrual status, expressed as a percentage of year-end loans (calculated separately for residential and commercial real estate)
Jumbo CDs	-	The Jumbo CDs variable is defined as Certificate of Deposits greater than \$100,000 as a percentage of total assets
Region dummy	+	A dummy variable that takes the value of 1 for banks in the Pacific Southwest and the South Atlantic regions and 0 otherwise.
Size dummy	+/-	A dummy variable that takes the value of 1 for banks with total assets above \$100,000,000 and 0 otherwise

Table II: Descriptive statistics

The variables are created using one-year lagged, end of the year data. Columns (1) present the mean and median (in the brackets) for all the variables calculated for non-CRE-concentrated banks. Columns (2) present the data for CRE-concentrated banks.

	2006		2007		2008		2009	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Equity ratio	0.1128 [0.1010]	0.0958 [0.0895]	0.1124 [0.1029]	0.0995 [0.0913]	0.1096 [0.1007]	0.0934 [0.0886]	0.1074 [0.1001]	0.0887 [0.0879]
1-year GAP	-0.3358 [-0.3510]	-0.2592 [0.2627]	-0.3456 [-0.3597]	-0.2934 [-0.2990]	-0.4065 [-0.4230]	-0.3716 [-0.3843]	-0.4323 [-0.4497]	-0.4206 [-0.4327]
1-year GAP best estimate	-0.2804 [-0.2888]	-0.2143 [-0.2190]	-0.2942 [-0.3065]	-0.2490 [-0.2582]	-0.3506 [-0.3662]	-0.3131 [-0.3243]	-0.3780 [-0.3965]	-0.3573 [-0.3658]
Delinquency rate commercial	0.0221 [0.0075]	0.0162 [0.082]	0.0282 [0.0128]	0.0296 [0.0181]	0.0408 [0.0223]	0.0579 [0.0370]	0.0462 [0.0269]	0.0782 [0.0542]
Delinquency rate residential	0.0251 [0.0151]	0.0197 [0.0115]	0.0306 [0.0217]	0.0282 [0.0173]	0.0346 [0.0225]	0.0404 [0.0257]	0.0382 [0.0268]	0.0581 [0.0392]
Jumbo CD	0.1596 [0.1484]	0.1934 [0.1798]	0.1632 [0.1534]	0.1822 [0.1700]	0.1650 [0.1509]	0.1821 [0.1698]	0.1713 [0.1555]	0.1943 [0.1841]
Nr. Observations	2323	2323	2051	2365	2036	2210	2140	1942

Table III: Logistic regressions

Logistic regression estimates of the probability of exit through mergers, acquisitions, or failure of small commercial banks during the 2006-2009 period; χ^2 appears in parentheses. The dependent variable takes the value of 1 for banks that exit and 0 otherwise. For each year, the probability of bank exit is estimated using Call Report data for December 31 of the preceding year. Call report data were obtained from the Federal Reserve Board's archival files. * Indicates significance at the 5.0% level. ** Indicates significance at the 1.0% level. ***Indicates significance at the 0.1% level.

	2007		2008		2009	
	(1)	(2)	(1)	(2)	(1)	(2)
2006 CRE dummy	1.076*** (12.188)	1.050*** (11.665)	0.679** (4.374)	0.708** (4.777)	0.959** (6.032)	0.940** (5.847)
Equity ratio	-2.454 (0.215)	-2.470 (0.221)	1.360 (0.094)	1.888 (0.187)	2.605 (0.253)	2.100 (0.172)
1-year GAP	-3.591*** (16.426)		-1.837* (3.550)		-0.465 (0.149)	
1-year GAP best estimate		-3.568*** (0.221)		-2.357** (5.886)		-0.156 (0.019)
Delinquency rate commercial	-9.888 (2.213)	-9.432 (2.040)	1.074 (0.114)	1.252 (0.158)	5.368*** (10.655)	5.389*** (10.812)
Delinquency rate residential	-4.171 (0.427)	-3.511 (0.312)	-0.152 (0.001)	0.008 (0.001)	1.162 (0.188)	1.208 (0.269)
Jumbo CD	-5.492*** (7.156)	-5.520*** (7.405)	-0.912 (0.283)	-0.903 (0.281)	-0.985 (0.239)	-1.041 (0.269)
Region dummy	-0.916 (2.299)	-0.905 (2.243)	0.853*** (7.090)	0.863*** (7.240)	-0.140 (0.105)	-0.142 (0.107)
Size dummy	-1.249*** (17.718)	-1.275*** (18.315)	-0.827*** (6.715)	-0.858*** (7.223)	-0.005 (0.001)	0.001 (0.000)
Accuracy ratio	73.3	72.8	62.2	59.1	64.6	64.9
Likelihood Ratio (χ^2)	57.66	57.07	17.39	19.84	22.35	22.21
Number of surviving banks		4570		4343		4184

Table IV: Survival analysis

Hazard model estimates for banks exit through mergers, acquisitions, or failure of small commercial banks during the 2006-2009 period; standard errors appear in parentheses. The dependent variable is the number of quarters between the end of 2006 and the bank exit through mergers, acquisitions, or failure. * Indicates significance at the 5.0% level. ** Indicates significance at the 1.0% level. *** Indicates significance at the 0.1% level.

	(1)	(2)	(3)	(4)
2006 CRE dummy	0.864*** (0.090)		0.852*** (0.098)	
CRE-concentration		0.874*** (0.100)		0.860*** (0.100)
Equity ratio	3.575*** (1.139)	3.612*** (1.127)	3.239*** (1.125)	3.251*** (1.111)
1-year GAP	-1.252*** (0.295)	-1.282*** (0.297)		
1-year GAP best estimate			-1.159*** (0.287)	-1.184*** (0.288)
Delinquency rate commercial	5.308*** (0.426)	5.423*** (0.420)	5.324*** (0.422)	5.449*** (0.417)
Delinquency rate residential	2.388*** (0.492)	2.337*** (0.494)	2.485*** (0.491)	2.427*** (0.493)
Jumbo CD	-1.756*** (0.535)	-1.800*** (0.537)	-1.874*** (0.532)	-1.916*** (0.534)
Region dummy	0.403*** (0.102)	0.384*** (0.102)	0.405*** (0.102)	0.386*** (0.102)
Size dummy	-0.366*** (0.098)	-0.367*** (0.098)	-0.368*** (0.098)	-0.367*** (0.098)
Likelihood Ratio (χ^2)	288.93	300.52	299.27	285.26