



Federal Reserve Bank of Chicago

**Does the Community Reinvestment Act
Influence Lending?
An Analysis of Changes in Bank Low-Income
Mortgage Activity**

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Does the Community Reinvestment Act Influence Lending? An Analysis of Changes in Bank Low-Income Mortgage Activity

Abstract. Anecdotal evidence that the Community Reinvestment Act (CRA) influences the lending behavior of financial institutions has not been uniformly supported by empirical research. We revisit this issue by evaluating changes in low-income mortgage lending at commercial banks over the 1992 –96 period. Our empirical results fail to support a hypothesis that banks respond to public and regulatory pressure exerted as a result of a downgrade in CRA rating by increasing low-income mortgage lending. The findings are consistent with the contention that during this period regulators stressed adjustments in the *lending process* of banks (e.g., documentation of lending programs and efforts directed at targeted markets) more than *lending performance*. The findings underscore the importance of regulatory efforts made later in the decade to more closely link enforcement of the CRA to lending outcomes.

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1. INTRODUCTION

Since its inception more than twenty years ago, the Community Reinvestment Act (CRA) has played a controversial role in encouraging banks and other financial institutions to make loans to borrowers in neighborhoods with low or moderate incomes. The legislation reflects the notion that banking is fundamentally a local business and depositories should reinvest in local markets. It has been criticized, simultaneously, for both lenience in the assessment of institutional performance and rigor in the allocation of credit (see, among others, Garwood and Smith, 1993). These criticisms underscore the ongoing debate concerning the effectiveness of the CRA in redistributing financial resources to low-income neighborhoods.

Empirical research on the impact of the CRA on bank lending is mixed. Cross-sectional studies of banks which vary by CRA rating find that banks with good, or improving, CRA ratings have high, or increasing, ratios of total loans to assets (Gunther, 1999; Harrison and Seiler, 1999; Bierman, Fraser and Zardkoohi, 1994). This appears to suggest that supervisors consider overall lending in assessing CRA performance. These studies, however, do not directly address the issue of whether or not the CRA causes lending behavior to change, nor do they isolate lending targeted under the CRA from lending generally.

Other studies have examined the effect of the CRA on bank lending within low-income areas or to minorities (Schill and Wachter, 1994; Evanoff and Segal, 1996). These studies compare mortgage loan

screening by banks, which are subject to the CRA, and mortgage loan screening by mortgage companies, which are not subject to the CRA. Neither study is able to confirm that the CRA alters mortgage credit allocation within low-income or minority areas. A drawback of these studies is that mortgage companies may be influenced by potential regulation even though they are not currently subject to the CRA.

Other studies examine the CRA and bank profitability in tests of competing theories that (1) the CRA, by forcing financial institutions to make unprofitable loans, hurts profitability, or (2) the CRA, by directing lenders to potentially overlooked markets, helps profitability. Canner and Passmore (1997) find that the profitability of mortgage lending in low-income areas generally is comparable to mortgage lending in other areas, while Harrison (1999) concludes that CRA lending at banks leads to decreased bank profitability.¹

In this study, we revisit the issue of how the CRA affects bank lending. An empirical advantage, relative to prior research, is that we provide an intra-industry test of the hypothesis that banks respond to public and regulatory pressure under the CRA by increasing the quantity of mortgage loans to low-income borrowers. In this regard, our empirical approach to studying the CRA compares banks under supervisory pressure with other banks, rather than with mortgage companies, focuses on lending activities which are explicitly targeted under the CRA and does not require assumptions concerning relationships between lending and profitability.

Our methodology analyzes changes in low-income mortgage lending for 170 banks that experienced a CRA rating downgrade between 1991 and 1995. We hypothesize that these banks, relative to a control sample of several thousand banks which did not experience a ratings downgrade, would increase their quantities of low-income mortgage lending after being downgraded. Such a response would be predicated, presumably, on the potentially adverse consequences of public criticism and/or possible

regulatory denials of applications for future mergers or other organizational changes (U.S. General Accounting Office, 1995).

Our findings do not support the hypothesis that banks responded to supervisory pressure for CRA compliance during this period by significantly increasing low-income mortgage lending. This should be of interest to policymakers who, judging from ongoing revisions of the guidelines under which the CRA is implemented, struggle to achieve the Act's original lending objectives.² In particular, during the period analyzed regulators did not explicitly tie CRA ratings to lending *performance*, but rather to the lending *process* including documentation of lending programs and efforts directed at targeted markets. Although one might hope that process and output are correlated, they need not be. In addition to having implications for the ongoing CRA debate, the results are also relevant to the more general literature concerning how firms respond to regulatory enforcement mechanisms.

The paper is organized as follows. A discussion of the CRA, with an emphasis on its potential implication for lending behavior, is presented in the next section. Our sample and methodology are described in Section 3, which also includes descriptive statistical information. Section 4 discusses our empirical results and section 5 concludes.

2. BACKGROUND

The CRA was passed by Congress and signed into law by the President in 1977. It directs Federal regulatory agencies to encourage banks and savings associations “to help meet the credit needs of local communities” in a manner “consistent with safe and sound operations.” The major impetus for the CRA was a concern by community groups that banks and thrifts were not responding adequately to the credit needs of local communities. Banks argued that the legislation ran counter to existing safety and soundness

regulation.

The CRA, as originally passed, did not mandate how the objective of serving community needs was to be accomplished.³ Implementation was left to regulatory agencies, which established 12 assessment factors intended to reflect the performance of a financial institution in determining community credit needs, marketing credit, participating in community development, maintaining branch offices and avoiding discriminatory credit policies. Supervisory agencies were required explicitly to assess an institution's record in meeting the credit needs of low- and moderate-income neighborhoods.

Supervisors assess CRA performance in formal examinations from which a composite rating is determined. The ratings from this process initially were confidential. Additionally, there were no explicit sanctions imposed on institutions that were found not to have adequately served the needs of their communities. Instead, regulators considered the CRA rating along with other safety and soundness factors when ruling on applications for geographic expansion through mergers and acquisitions, new branches or related operational changes.

During this early period, bankers frequently complained that the CRA was both costly to administer and vague in application. In response, regulatory agencies periodically issued policy statements delineating how the assessment criteria were scored and discussing elements of effective CRA programs. These statements emphasized the importance of CRA compliance *effort* and the documentation of that effort (Garwood and Smith, 1993). Following heightened public attention to the volume and complexity of CRA issues, Congress amended the act in 1989 to require the public release of CRA ratings. Supervisory guidelines continued to emphasize effort and documentation.

In 1995, amid increasing complaints (by bankers) about excessive reliance on paperwork and increasing complaints (from community groups) that the CRA was ineffective, the regulatory agencies

issued new guidelines which based CRA evaluation primarily on how well an institution was helping to meet the credit needs of local communities. In a conscious movement away from effort and documentation, the evaluation process introduced three specific *performance* tests--a lending test, an investment test and a service test. The lending test assesses the number, amount and distribution across income groups and geographic areas of a financial institution's mortgage loans, small business loans, small farm loans and consumer loans.

The new guidelines were put into place in July 1997 for smaller banks (less than \$250 million) and in July 1998 for large banks. The general consensus from discussions with bank supervisory personnel is that the lending test is by far the most important element of the new assessment process, and mortgages loans the most important type of loan. The other performance elements in the evaluation tend to have marginal impacts on the overall grade once the lending activity is taken into account (see Federal Reserve Bank of Chicago, 1999).

The preceding overview of the CRA underscores difficulties encountered in developing regulation that achieves appropriate policy objectives in the banking industry without adversely distorting bank behavior.⁴ Indeed, there are numerous examples of regulation having unintended, and in some cases, undesirable, effects. Specific examples include unintended responses to deposit insurance (Brewer and Mondschean, 1994), to reserve requirement provisions (Evanoff, 1990), to price and geographic barriers (Evanoff, 1988), and to credit allocation programs (Boyes, Hoffman and Low, 1986; Williamson, 1994; Thakor and Beltz, 1994).

Our study extends this line of research insofar as banks may have attempted to convince supervisors that they were adhering to the CRA guidelines by providing voluminous documentation and evidence of compliance effort. As a result, the presumed intent of the regulation, to increase lending in

low-income markets, may not have been achieved--and, moreover, may not even have been a planned objective of the regulated banks if, in a conscious effort to satisfy regulators, banks may have become more involved in process than performance. Thus, the stated objectives of CRA may not have been realized.

3. DATA AND METHODOLOGY

We investigate the response of banks to regulation imposed under the CRA. We hypothesize that banks experiencing a ratings downgrade in the early to mid 1990s attempted to reestablish an acceptable rating. In question is whether the response is in the form of increased lending, as is typically associated with the intent of CRA, or an alternative means aimed at satisfying regulators.

We focus on low-income mortgage lending because it is the category of lending most commonly associated with the CRA (our definition, in fact, directly reflects those delineated by the CRA). From a practical standpoint, reporting requirements under Home Mortgage Disclosure Act (HMDA) provide extensive information on borrower characteristics for these types of loans. This offers an opportunity to isolate a form of lending specifically targeted by the CRA.⁵

3.1 *The sample*

We obtained CRA ratings from 1990 to 1995 for commercial banks supervised by the Federal Reserve, the Federal Deposit Insurance Corporation (FDIC) or the Office of the Comptroller of the Currency (OCC). From these ratings, we identified banks that experienced a ratings downgrade in any year over this period. Downgrades include those from “outstanding” to “satisfactory” as well as those from “satisfactory” to “needs to improve” or “substantial noncompliance.”

Our sample of banks experiencing downgrades over this period is limited by the relatively infrequent incidence of changes in ratings, a failure to match entities across the HMDA data base and the Reports of Condition and Income (which is the source of our financial data) and the relative scarcity of banks with inferior ratings. For instance, in 1995, less than 5 per cent of the ratings in our sample were assigned to categories lower than “outstanding” or “satisfactory.”

Our control sample consists of commercial banks that did not experience a downgrade in any year of the sample period and downgraded banks observed in years prior to their downgrade. Adjustment for missing observations and related data inconsistencies narrowed our sample to 170 downgraded banks. Pooling across time, 1991 to 1996, yielded a final total pooled sample of 14,776 annual bank observations.⁶

3.2 *Modeling low-income mortgage lending*

Following a specification for bank lending used by Brewer et al. (2000) and Sharpe and Acharya (1992) we evaluate adjustments in bank CRA targeted lending by relating the dollar change in the volume of low-income mortgage loans to a set of variables representing supply and demand factors. By considering changes in low-income lending, as opposed to levels of low-income lending, we avoid biases produced by bank-specific propensities which banks may have in favor of, or against, these loans.

Our specification is based on the perceived determinants of changes in low-income mortgage lending. Low-income mortgage loans include the sum of mortgage loans in low-income areas and mortgage loans to low-income individuals.⁷ We standardize changes in a bank’s low-income loans by its lagged total assets to allow for the substitution of loans across all asset categories. $\Delta TLOAN_{(i,t)}$, therefore, denotes the change in CRA targeted loans: the ratio of low-income mortgage loans to assets

for bank i in year t .

To identify the effects of a CRA downgrade, we create a binary variable, $CRA_DG_{(i,t-1)}$, which equals one for observations on a downgraded bank in year $t-1$, zero otherwise. A significant response to CRA enforcement, in the year after the downgrade, would result in a positive and significant coefficient on this variable if banks increased low-income mortgage lending relative to other banks.

Because lending assessments under the CRA compare an institution's lending relative to other lenders, it is crucial that our specification allows for variation in lending potential across market areas. We include a variable, $\Delta MARKET_{(i,t)}$, representing the dollar change in the volume of low- or moderate-income mortgage loans for all financial institutions in a bank's market, normalized by lagged total mortgage lending in the market. Markets are defined to be Metropolitan Statistical Areas (MSAs).⁸ The hypothesized sign on the coefficient for this variable is positive.

Other explanatory variables include the lagged ratio of low-income mortgage loans to total assets, $TMORTG/ASSET_{(i,t-1)}$, which will be negatively correlated with the change in targeted mortgage lending to the extent that bank asset allocations revert over time toward some optimum level. The lagged ratio of equity capital to assets, $ECAP_{(i,t-1)}$, may be important if low-income mortgage lending is impacted by a bank's financial condition. A positive coefficient on this variable would reflect the notion that capitalization creates the capacity for loan growth (Brewer et al., 2000). A negative effect may be associated with the retention of cash flows, as opposed to reinvestment of cash flows in low-income lending initiatives (Harrison, 1999).

The log of lagged bank assets, $ASSET_{(i,t-1)}$, accounts for possible effects of bank size on low-income mortgage lending.⁹ A binary variable, $HOLD_{(i,t-1)}$, accounts for possible impacts of affiliation status ($HOLD = 1$ if a bank is affiliated with a holding company, 0 otherwise). The signs on the

coefficients for these variables are indeterminate.

A binary variable indicating supervisory status controls for differences that may exist among regulators in their approaches toward low-income mortgage lending. This variable, $FDIC_{(i,t-1)}$, is one if a bank is regulated by the Federal Deposit Insurance Corporation (FDIC) and zero if it is regulated by the Federal Reserve or the Office of the Comptroller of the Currency (OCC). The sign on the coefficient for this variable will be positive if banks regulated by the FDIC expand low-income mortgage lending relative to other banks. Such a finding could be attributed to a greater emphasis by the FDIC on low-income mortgage lending as argued by Thomas (1998). It also could be attributed to the existence of omitted variables from our model which render banks supervised by the FDIC more capable of expanding low-income lending.

Thus, we propose that changes in a bank's low-income mortgage lending are influenced by (1) the inherited level of low-income mortgage loans; (2) the change in low-income mortgage loans in a bank's market; and (3) lagged bank-specific variables. The basic equation is:

$$\begin{aligned} \Delta TLOAN_{(i,t)} = & a + d_1CRA_DG_{(i,t-1)} + d_2ASSET_{(i,t-1)} + d_3\Delta MARKET_{(i,t)} + d_4ECAP_{(i,t-1)} \\ & + d_5TMORTG/ASSET_{(i,t-1)} + d_6FDIC_{(i,t-1)} + d_7HOLD_{(i,t-1)} + e_{(i,t)} \end{aligned} \quad (1)$$

where d_i are coefficients associated with each parameter and $e_{(i,t)}$ is an error term.

The final econometric issue associated with equation (1) concerns sample selectivity. If CRA downgrades occur randomly, then the effect of a downgrade would be correctly impounded in the OLS coefficient on $CRA_DG_{(i,t-1)}$. However, this specification suffers from an omitted variables bias if the regulator's bank downgrade decision is not random; and few would argue this is a random decision. We

account for this potential bias by estimating the “treatment effects” model described by Greene (1993, p. 713) and Maddala (1983, p. 260).

3.3 *The treatment effects model*

To isolate the effect of the CRA downgrade, equation (1) can be rewritten as:

$$\Delta\text{TLOAN}_{(i,t)} = d_1 (\text{CRA_DG}) + \beta' X + e \quad (2)$$

where X is a vector of the explanatory variables other than the regulatory downgrade, and β a vector of the corresponding coefficients. Since the downgrade decision is not random, but rather the result of a conscious decision by regulators, the value of CRA_DG may reflect selection bias causing parameter estimates to be inconsistent. To correct for this potential, we first model the downgrade decision explicitly. Assume that regulators consider a bank’s characteristics when deciding whether to downgrade it for CRA compliance and there exists an unobservable factor, CRA_DG^* , that drives the downgrade decision. We model CRA_DG^* as a function of a vector of variables, W . The bank is downgraded if $\text{CRA_DG}^* > 0$, thus:

$$\text{CRA_DG} = \begin{cases} 1 & \text{if } \text{CRA_DG}^* > 0, \\ 0 & \text{otherwise} \end{cases} \quad (3)$$

and

$$\text{CRA_DG}^* = \gamma W + \mu \quad (4)$$

where e and μ have bivariate normal distribution with means zero and the covariance matrix:

$$\begin{bmatrix} 1 & \rho\sigma \\ \rho\sigma & \sigma^2 \end{bmatrix} \quad (5)$$

Given the downgrade specification, one can show that ¹⁰

$$E [e | \text{CRA_DG} = 1] = \rho\sigma \varphi(\gamma W) / \Phi(\gamma W) \quad \text{and} \quad (6)$$

$$E [e | \text{CRA_DG} = 0] = - \rho\sigma \varphi(\gamma W) / (1-\Phi)(\gamma W) \quad (7)$$

where $\varphi(\cdot)$ and $\Phi(\cdot)$ are the probability density function and the cumulative distribution function, respectively, of the standard normal distribution. Equations (6) and (7) can be combined to generate the expression:

$$E [e | \text{CRA_DG}] = \rho\sigma \frac{\varphi(\gamma W) \{\text{CRA_DG} - \Phi(\gamma W)\}}{\Phi(\gamma W) \{1 - \Phi(\gamma W)\}} = \lambda(\text{CRA_DG}, W; \gamma) \quad (8)$$

To estimate the parameters in (1) or (2) consistently, we first estimate the probit model given by (4), and calculate $\lambda(\text{CRA_DG}, W; \gamma)$ for each observation using the estimate for γ .¹¹ This calculated value is the observation's "Inverse Mills Ratio." If $\hat{\lambda} = \lambda(\text{CRA_DG}, W; \hat{\gamma})$ represents this estimate then consistent parameter estimates for the targeted lending model can be obtained by estimating:

$$\Delta\text{TLOAN}_{(i,t)} = d_1(\text{CRA_DG}) + \beta' X + \beta_\lambda \hat{\lambda} + \varepsilon \quad (9)$$

via OLS. The new disturbance term ε is given by $\{e - E[e | \text{CRA_DG}]\}$ and is uncorrelated with CRA_DG . The OLS estimate of β_λ gives a consistent estimate of $\rho\sigma$. This is the approach taken.

If the correction, λ , is not accounted for in equation (9), the specification will over- or under-state the role of the CRA downgrade depending on the sign of β_λ . For example, it may be that banks that are prone to downgrades are relatively poor managers of their loan portfolios. Thus, for these banks, targeted loan growth will be relatively low whether or not a CRA downgrade is imposed. This would correspond to a negative sign for $\hat{\beta}_\lambda$. Our priors are that this could be a plausible result. The somewhat less plausible

scenario would be if downgraded banks were more prone to have greater targeted loan growth regardless of the presence or absence of a downgrade. Then excluding β_λ from equation (9) would tend to overstate the impact of the downgrade and would correspond to $\beta_\lambda > 0$.

3.4 *The probit model*

Our probit estimation explains the likelihood of a bank experiencing a CRA ratings downgrade in year $t-1$ on the basis of lagged (year $t-2$) bank-specific information. We will use this information for estimating targeted lending growth in the year following the downgrade (year t). In modeling the likelihood of a downgrade, we include the ratio of total loans to assets, $LOAN/ASSET_{(i,t-2)}$, to account for the possibility that supervisors consider a bank's overall lending activity in their decisions on downgrades. Bierman et al. (1994) and Gunther (1999) both found evidence that banks with high CRA ratings tended to have high ratios of total loans to assets. Harrison (1999) similarly concluded that banks with active loan departments were more likely to receive high CRA ratings. Our hypothesized sign on the coefficient for this variable, therefore, is negative--i.e., banks with high loan to asset ratios are less likely to be downgraded.

$MARKET_{(i,t-2)}$, which denotes the ratio of low-income mortgage loans to total mortgage loans for the market in which a bank operates, is included to account for the possibility that banks in markets with significant low-income mortgage lending may be more likely to be downgraded than other banks. This may be related to the imposition of a higher standard under the CRA for banks in markets with greater potential for low-income mortgage lending.

The ratio of low-income mortgage lending to total loans, $TMORTG/ASSET_{(i,t-2)}$ for bank i in year t , is included to account for the possibility that loans within specific areas targeted by the CRA legislation

play a role in whether or not a bank is downgraded. We hypothesize a negative relationship between this variable and likelihood of downgrade. We note, however, that previous research linking overall lending with CRA compliance has failed to link CRA compliance and lending which directly served the local community (Bierman et al., 1994).

Since the affiliation status, and size, of banks may influence incentives to avoid downgrades, we include $HOLD_{(i,t-2)}$ and $ASSET_{(i,t-2)}$, as previously defined. Previous research has found that larger banks, or affiliated banks, are more likely to receive higher CRA ratings (Bierman et al., 1994; Gunther, 1999; Harrison, 1999; Hylton, 1999). The hypothesized signs on the coefficients for these variables are therefore negative. However, this effect may be dampened to the extent that supervisors are more critical of the lending behavior of larger banks.

The ratio of net income to total assets, $ROA_{(i,t-2)}$, is included to account for the role of profitability on CRA downgrades. The sign on the coefficient for this variable is indeterminate. Bierman et al. (1994) find that banks with poor profitability have higher CRA ratings, which suggests that these banks have adopted suboptimal portfolios in order to conform to the CRA.¹² Gunther (1999), however, finds that profitability is negatively related to CRA rating. He states that financial losses may require a redirection of resources away from CRA objectives.

The ratio of equity capital to total assets, $ECAP_{(i,t-2)}$, also accounts for financial condition. Harrison (1999) and Gunther (1999) find that higher levels of bank capital increase the chance of a low CRA rating. Harrison argues that highly-capitalized banks retain cash flows rather than reinvesting the funds into community development initiatives. The hypothesized sign on the coefficient for this variable, therefore, is positive--as capital increases, so will the likelihood of a downgrade.

The final variable, $FDIC_{(i,t-2)}$, is an indicator for supervision by the FDIC (as opposed to the Federal Reserve or the OCC). This variable is intended to reflect different practices of bank supervisors in determining which banks to downgrade [see U.S. General Accounting Office (1995) and Thomas (1998)]. A positive relationship between downgrades and regulation by the FDIC could be attributed to a greater emphasis by the FDIC in identifying CRA inadequacies. It also could be attributed to the existence of omitted variables from our model which render banks regulated by the FDIC less capable of maintaining CRA compliance.

Our probit model is therefore:

$$\begin{aligned}
 PR(CRA_DG)_{(i,t-1)} = & a + d_1HOLD_{(i,t-2)} + d_2(LOAN/ASSET)_{(i,t-2)} + d_3ASSET_{(i,t-2)} \\
 & + d_4MARKET_{(i,t-2)} + d_5ROA_{(i,t-2)} + d_6ECAP_{(i,t-2)} \\
 & + d_7TMORTG/ASSET_{(i,t-2)} + d_8FDIC_{(i,t-2)} + u_{(i,t)}
 \end{aligned} \tag{10}$$

3.5 *Descriptive statistics*

Table 1 presents descriptive information on the independent variables used in our analysis. The sample consists of 14,776 bank observations. We divide the variables into two groups, those that are used in the probit model and those which are used in the treatment effects model. Differences exist in both the variables included in each model and in the lag structures when a variable is used in both models.

The annual change in low-income mortgage lending for bank markets, expressed as a percentage of lagged market mortgage loans, $\Delta MARKET_{(i,t)}$, is .0331 indicating that low-income mortgage lending increased over our sample period. The data also indicate that a majority of banks in

our sample are supervised by the FDIC and are affiliated with a bank holding company.

Table 2 presents a comparison of variable means for downgraded and non-downgraded banks. These univariate measures indicate that downgraded banks are more likely to be regulated by the FDIC and are relatively better capitalized institutions. Additionally, downgraded banks exhibit declines in growth for low-income mortgage lending in the year following the downgrade. While the decline is not statistically different from zero, the difference in targeted lending between downgraded and non-downgraded banks *is* significant, with non-downgraded banks showing slight increases. This is inconsistent with the notion that banks aggressively respond to downgrades by increasing lending relative to other banks in categories targeted by the CRA. However, the difference in means is only significant at the 10 percent level, and no additional influences are being controlled for.

4. EMPIRICAL RESULTS

In table 3, we present results of our probit model explaining the likelihood of a bank experiencing a ratings downgrade in year $t-1$. In table 4, we present results of our treatment effects model of changes in targeted lending in year t . Two subsamples are considered. The first is the overall sample and compares downgraded banks to banks that were not downgraded.¹³ The second sample compares downgraded banks to banks that were not downgraded, as before, but excludes all banks that were not in “merger-mode” over the sample period. A merger-mode bank is one that experienced a merger at any time during our sample period. This subsample focuses on banks that were more likely to be sensitive to pressure under the CRA because of outstanding regulatory applications. In this regard, Sarkar and Johnson (1996) found banks subject to CRA protests--which usually arise when an institution applies for a merger, acquisition or branch relocation--experienced

negative average excess returns. Litan et al. (2000) stressed the potential aggressiveness of merger active banks in CRA targeted lending.

For the treatment effects model we also redefine our DOWNGRADE variable to equal one for banks that were downgraded, and subsequently recovered to at least a satisfactory rating by 1995, zero otherwise. This is useful in isolating a group of banks that were successful in reversing observed declines in CRA compliance and evaluating whether the recovery was associated with changes in lending behavior. Thus, we evaluate our entire sample, a subsample of banks which have more to gain from aggressively responding to a CRA downgrade, and a subgroup which *did* recover from the downgrade.

4.1 *The probit model*

Results for the probit models relating the likelihood of a bank experiencing a CRA downgrade to bank-specific factors are statistically significant. The signs on the coefficients for individual variables are generally consistent across the three samples.

The coefficient on $HOLD_{(i,t-2)}$ is negative in both specifications. This suggests that affiliated banks are less likely to experience a downgrade than independent banks and is consistent with the conclusions of earlier research (Bierman et al., 1994; Harrison, 1999).

The coefficient on ratio of total loans to assets, $LOAN/ASSET_{(i,t-2)}$, is negative and significant, as hypothesized, which indicates that banks with high ratios of loans-to-assets are less likely to be downgraded. The coefficient on $TMORTG/ASSETS_{(i,t-2)}$, however, is insignificant. These twin results are consistent with the conclusion of Bierman et al. (1994) that CRA ratings are influenced by overall lending, but not by lending with categories typically associated with the CRA.

The coefficient on $MARKET_{(i,t-2)}$ is positive and significant in two of the specifications. This

indicates that lagged ratios of low-income mortgage loans to total mortgage loans, by all financial institutions in a particular market, positively affect the likelihood of a bank being downgraded. It suggests that regulators apply higher standards to banks in markets with active low-income mortgage lending.

Capitalization and profitability are not statistically related to the odds of a bank experiencing a downgrade. The log of the asset size of a bank, surprisingly, is positively associated with downgrades. Supervision by the FDIC is found to increase the odds of a bank being downgraded.

4.2 *The treatment effects model*

All three versions of the treatment effects models are statistically significant. They explain a substantial minority of the variation in the dependent variable, defined to be the percentage change in the ratio of low-income mortgage loans to total assets.

Among the independent variables, the change in a market's low-income loans, $\Delta\text{MARKET}_{(i,t)}$, is positively associated with low-income loan growth for banks in all three samples, and is statistically significant in one of the three samples. This result, as anticipated, indicates that banks find it easier to expand targeted lending within markets characterized by greater growth potential.

The lagged level of targeted loans for a bank, $\text{TMORTG}/\text{ASSET}_{(i,t-1)}$, is negatively and significantly associated with low-income lending growth, as hypothesized, in all three samples. This indicates that banks revert over time to optimum levels through a partial adjustment process. The coefficient on $\text{ASSETS}_{(i,t-1)}$ indicates that smaller banks expand targeted lending at faster rates than larger banks. Banks supervised by the FDIC have slower growth rates in targeted lending (this despite the fact that they were found to be more apt to be downgraded in the probit model). This may suggest that FDIC-supervised banks are less capable of expanding low-income lending because of omitted

variables from our model, which are associated with supervisory status.

The crucial relationship in our analysis is that between changes in low-income lending and the binary variable indicating bank observations in the year after the CRA downgrade. The sign on the coefficient for this variable is positive, but is always insignificant.¹⁴ This is inconsistent with the contention that banks significantly increase low-income lending in the year after being downgraded relative to banks that were not downgraded. The fact that this relationship is observed among merger-mode banks, which would likely be more sensitive to CRA enforcement than other banks, is particularly striking. Low-income lending outcomes apparently were not a factor in the lending decisions of these banks following a downgrade.

The finding that downgraded banks that recovered within the time period analyzed were indistinguishable from other banks in low-income mortgage lending suggests that they recovered due to changes that were unrelated to this category of targeted lending. Our empirical approach assumes that banks feel the regulatory scrutiny from CRA enforcement when they are downgraded, and respond in the next time period to avoid public criticism and avoid having bank regulators deny future merger applications. To the extent that downgrades are considered signs of increased regulatory scrutiny, our results are inconsistent with greater low-income lending growth following periods of heightened CRA enforcement.¹⁵

The negative coefficient on the inverse Mills ratio is consistent with our priors that CRA downgraded banks may have had slower targeted loan growth irrespective of any regulatory action. However the coefficient is not significant suggesting that the samples are not significantly distorted by sample selection bias.¹⁶ The findings were robust to alternative specifications.

Our results must be qualified by two factors. First, it is possible that bank-specific factors are

less closely correlated with low-income mortgage lending, which is relatively small in relation to a bank's overall assets, than they have been shown to be in prior lending studies using larger loan categories (Brewer et al., 2000). This may impair the ability of our model to identify an effect of the CRA on lending. Second, it is possible that banks are expanding low-income lending in areas other than mortgages, which our methodology is incapable of discerning. Given our approach to the problem, however, we find no evidence that banks responded to CRA downgrades by increasing targeted lending.

5. SUMMARY AND CONCLUSIONS

We compare the lending behavior of banks experiencing a CRA downgrade to the lending behavior of several thousand banks that do not experience a downgrade. We hypothesize that banks would respond to regulatory and public pressure exerted as a result of the downgrade by increasing the volume of mortgage loans made in CRA targeted markets: in low-income areas or to low-income individuals. Our results are inconsistent with the hypothesis that downgraded banks, in an attempt to reestablish an "acceptable" CRA rating, significantly increase their low-income mortgage lending. This result is robust to various specifications.

We note that our conclusions are based on a sample period during which regulators did not take an aggressive approach in tying CRA ratings to lending *performance* but rather to the lending *process* (including documentation of lending programs and efforts directed at targeted markets).¹⁷ This suggests that recent regulatory adjustments that more closely link CRA enforcement and lending outcomes are warranted. Future research over time periods subsequent to our sample period, when the lending test was imposed, is needed to determine the effectiveness of these revisions.

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Table 1 - Descriptive Statistics, Overall Sample

Panel A -- Independent variables used in the probit model

VARIABLE	MEAN	STD. DEV.	MINIMUM	MAXIMUM
HOLD _(t-2)	0.7529	0.4313	0.0000	1.0000
LOAN/ASSET _(t-2)	0.5669	0.1377	0.0041	0.7957
ASSETS _(t-2)	11.522	1.314	8.601	19.164
MARKET _(t-2)	0.1113	0.1046	0.0007	0.6712
ROA _(t-2)	0.0096	0.0092	-0.1427	0.5569
ECAP _(t-2)	0.0866	0.0265	-0.0118	0.5403
TMORTG/ASSET _(t-2)	0.0030	0.0206	0.0000	0.6599
FDIC _(t-2)	0.6244	0.4842	0.0000	1.0000

Panel B - Independent variables used in the treatment effects model

ASSET _(t-1)	11.611	1.32	8.545	19.209
ECAP _(t-1)	0.0876	0.0262	-0.0118	0.5403
FDIC _(t-1)	0.6244	0.4842	0.0000	1.0000
HOLD _(t-1)	0.7529	0.4313	0.0000	1.0000
Δ MARKET _(t-1)	0.0331	0.0952	-0.7760	0.9999
TMORTG/ASSET _(t-1)	0.0030	0.0185	0.0000	0.6222

Note: Year (t-1) denotes the year in which a bank is downgraded.

Table 2 - Comparison of Means, Downgraded Banks Versus Other Banks

	Downgraded Banks	Other Banks
VARIABLE	MEAN	MEAN
$\Delta\text{TLOAN}_{(t)}$	-.0013	.0003*
$\text{ASSETS}_{(t-1)}$	11.636	11.610
$\text{ECAP}_{(t-1)}$	.092	.087*
$\text{FDIC}_{(t-1)}$	.941	.621***
$\text{HOLD}_{(t-1)}$	.712	.753
$\Delta\text{MARKET}_{(t-1)}$	.032	.033
$\text{TMORTG/ASSET}_{(i, t-1)}$	.005	.003

Notes: . Year (t-1) denotes the year in which a bank is downgraded. . *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level in the difference in means for the two groups.

Table 3 - Probit Model Estimates of the Likelihood of a Bank Being Downgraded

Dependent variable: PR (CRA_DG)_(t-1)

	All Banks	Merger-Active Banks
Intercept	3.206*** (-8.77)	3.143*** (-4.06)
HOLD _(i, t-2)	-0.057 (-0.79)	0.007 (0.04)
LOAN/ASSET _(i, t-2)	0.952*** (-4.47)	1.339*** (-2.94)
ASSETS _(i, t-2)	0.057** (2.15)	0.063 (1.22)
MARKET _(l, t-2)	1.096*** (4.48)	0.097 (0.15)
ROA _(i, t-2)	0.568 (0.17)	-0.348 (-0.04)
ECAP _(i, t-2)	-0.183 (-0.15)	-0.244 (-0.08)
TMORTG/ASSET _(i, t-2)	1.027 (0.87)	2.504 (1.16)
FDIC _(i, t-2)	0.876*** (8.09)	1.102*** (4.73)
Log Likelihood	-856	-217.13
Number of Bank Observations	14,776	3,668
Downgraded Bank Observations	170	45

Notes: The dependent variable is a binary variable equal to 1 (0) if a bank was (not) downgraded for CRA performance during a particular year. t statistics are in parentheses. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 4 - Treatment Effects Model Estimates

Dependent Variable: $\Delta TLOAN_{(i, t)}$

	All Banks	Merger Active Banks	Recovered Banks
Intercept	0.003*** (3.20)	0.002 (1.42)	0.002*** (3.15)
CRA_DG _(i, t-1)	0.003 (0.57)	0.001 (0.02)	0.015 (0.18)
ASSETS _(i, t-1)	-0.001** (-2.40)	-0.001 (-0.22)	-0.001*** (-2.34)
ECAP _(i, t-1)	-0.002 (-0.53)	-0.003 (-0.63)	-0.002 (-0.52)
FDIC _(i, t-1)	-0.001** (-2.29)	-0.001 (-0.53)	-0.001*** (-2.32)
HOLD _(i, t-1)	-0.001 (-0.05)	-0.001** (-2.01)	-0.001 (-0.11)
$\Delta MARKET_{(i, t)}$	0.003*** (4.22)	0.004*** (3.85)	0.003*** (4.24)
TMORTG/ASSET _(i, t-1)	-0.075*** (-18.59)	-0.053*** (-6.40)	-0.075*** (-18.59)
MILLS	-0.002 (-0.83)	-0.001 (-0.27)	-0.006 (-1.61)
Number of Observations	14,776	3,668	14,776
Adjusted R ²	.0240	.0153	.0239

Notes: For the first two columns, downgrade (CRA_DG) is as defined in Table 3. For the last column, it is defined as a bank that is downgraded *and* recovers during our sample period. t-statistics (from a consistent covariance matrix corrected for heteroskedasticity) are shown in parentheses. ***Indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

¹ Johnson and Sarkar (1996) examine the effect of passage of the CRA on the stock market valuations of banks and savings and loan associations. They conclude that the expected costs of the CRA exceed the expected benefits among small institutions only.

² For example, the Financial Services Modernization Act of 1999 (Gramm-Leach-Bliley Act) specifically directs the U.S. Treasury “to study the extent to which adequate services are being provided as intended by the CRA.” Concerning the Act’s lending objectives, in describing the original intent of the act its principal sponsor said it was to “have banks be more sensitive...to their responsibilities to provide for local community needs;” see Community Credit Needs (1977).

³ The potential conflict between CRA performance and bank safety is probably one reason the regulators did not originally require explicit CRA performance criteria. Gunther (1999) provides evidence consistent with “a supervisory process in pursuit of conflicting goals, particularly at smaller-sized banks.”

⁴ For a discussion of the appropriate role of government intervention in housing markets see Calomiris, Kahn and Longhofer (1994), and Van Order (1994).

⁵ We recognize that low-income mortgage lending does not capture the entirety of potential changes in bank behavior resulting from CRA enforcement, such as low-income lending in non-mortgage areas, partnerships with community groups, “layered” lending or additional small business lending. Mortgage activity, however, is the lending typically associated with the CRA and there have been increased interests recently expressed in evaluating the relationship between CRA and mortgage lending [e.g., Litan et al. (2000) and Hylton (1999)].

⁶ We excluded a small number of observations (less than two per cent) identified as outliers on the basis of our independent variable, which measures changes in low-income mortgage lending (see section 3.2). We repeated the analysis with the unrestricted sample. The results were qualitatively the same as those reported in the paper.

⁷ “Low-income areas” are census tracts where the median income is less than 80% of the MSA median income (technically, this includes what is considered low- and moderate-income areas under the CRA).

⁸ For banks operating in multiple markets this was calculated as a weighted average of its activity across markets. Market mortgage lending includes lending by non-bank institutions (this is appropriate because the variable is included to capture the overall market lending activity).

⁹ Assets are measured in thousands.

¹⁰ See Greene (1993) or Maddala (1983).

¹¹ See Greene or Barnow, Cain, and Goldberger (1981). The general approach is attributable to Heckman (1979).

¹² It is also possible that this variable reflects managerial talent--if so, bad managers may be less profitable and less able to satisfy CRA requirements.

¹³ The latter category includes observations on downgraded banks in years prior to the downgrade.

¹⁴ Various tests of robustness were preformed. We altered our lag structure on the time allowed for bank response after the regulatory downgrades. One specification focused on changes in mortgage lending during the year of the downgrade as well as the following year, and another specification focused on changes in mortgage lending during the two years after the year of downgrade. Our conclusions were unaffected by these modifications.

¹⁵ We differentiated with respect to the type of downgrade to see if this affected the results insofar as banks may be less concerned about maintaining an “outstanding” rating than they are with insuring that they do not fall below the “satisfactory” rating. To test for this we employed more detailed measures of downgrades. Again, we found no impact on lending following the downgrade.

¹⁶ Results in column 3 of Table 4 were generated with the same Mills ratio as used in the first column—i.e., based on the probit using all downgraded banks. While this is the appropriate means to account for potential sample selection bias, for completeness we reestimated the model defining DOWNGRADE as a bank that was downgraded and also recovered (i.e., the model in column 3) *and* using a Mills ratio based on a probit using this definition for the binary variable. The results were nearly identical. We also estimated the targeted-lending relationship [equation (1)] with OLS to insure we were not introducing distortions with the treatment effects model without gaining any of the potential benefits. Again, the basic findings were unchanged.

¹⁷ Hylton (1999) questions whether recent changes will have much of an impact on bank lending behavior.