

## **The GSEs, CRA, and Homeownership in Targeted Underserved Neighborhoods**

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# **The GSEs, CRA, and Homeownership in Targeted Underserved Neighborhoods**

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## **Abstract**

This paper investigates the impact of CRA and GSE regulations on mortgage lending and homeownership in targeted underserved neighborhoods. While the CRA and GSE Acts seek to enhance credit availability in targeted locations, potential gains in liquidity may be partly offset for at least two reasons: (i) with less than perfectly elastic credit supply, increased lending of conforming sized loans may come at the expense of lending activity in the non-conforming sector, and (ii) GSE loan purchases may crowd out purchases by unsubsidized, private secondary market intermediaries (e.g. Gabriel and Rosenthal (2007b)). Drawing on these ideas, we use a regression discontinuity design to compare mortgage lending activity and homeownership rates in tracts just above and below the GSE and CRA underserved income cut-offs.

We find no evidence of a positive impact of GSE underserved tract status on lending activity in the conforming sector or on local homeownership rates, although underserved status does appear to have a negative impact on lending in the non-conforming sector. These patterns are suggestive of various forms of crowd out. In contrast, we do find evidence that CRA has a positive impact on lending activity in the non-conforming sector, and tentative evidence of a small positive impact on local homeownership rates. These patterns are suggestive that CRA expands the local supply of mortgage credit. Overall, the policy implications of our results are mixed. The absence of a positive GSE impact on mortgage lending activity and homeownership is striking given the extensive loan purchase goals that govern GSE activity. The evidence of CRA effects is more in keeping with the policy goals of CRA, but even here the estimated patterns are not as pronounced as policy makers may have anticipated. These are issues that clearly warrant further study.

*“More aggressive encouragement by regulatory agencies under CRA – or greater voluntary efforts by these institutions to comply with CRA – could potentially improve the overall pattern of mortgage lending in Boston.”*

*Katherine Bradbury, Karl Case, and Constance Dunham (p. 25, 1989)*

## **I. Introduction**

Efforts to expand access to mortgage credit and increase homeownership have dominated U.S. federal housing policy for much of the last twenty years. In support of those objectives, the Clinton administration in 1994 called for HUD to create programs designed to increase homeownership, especially among minorities and low-income families.<sup>1</sup> In 2002, the Bush administration called for a sharp increase in minority homeownership by 2010.<sup>2</sup> These policy goals go hand in hand with longstanding efforts to expand access to mortgage credit among disadvantaged segments of society. The 1977 Community Reinvestment Act (CRA) targets regulated financial institutions and mandates increased mortgage lending in underserved areas; the 1992 GSE Act targets the giant secondary market institutions, Fannie Mae and Freddie Mac, and mandates increased purchases of conforming loans in underserved communities. While these federal government efforts to promote increased access to mortgage credit and homeownership have been prominent, it is far less apparent what effect these initiatives have actually had on access to credit and homeownership. This paper seeks to fill part of that gap.

Our research strategy is based on the idea that the intended beneficial effects of GSE and CRA legislation on homeownership may be partly offset through at least two different mechanisms. The first of these is that with less than perfectly elastic credit supply, efforts to increase loan originations in one market segment (e.g. conforming versus non-conforming) would imply reduced lending activity in the alternate market segment. The second mechanism is that GSE loan purchase activity may be offset by crowd out of unsubsidized private entity loan purchases in the secondary market. This latter channel has

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<sup>1</sup> See [http://www.pragueinstitute.org/housing\\_us.htm](http://www.pragueinstitute.org/housing_us.htm) for the full text of the President Clinton’s 1994 letter to HUD Secretary Henry Cisneros and related commentary.

<sup>2</sup> See <http://www.whitehouse.gov/news/releases/2002/06/20020618-1.html> for the full text of the President Bush’s remarks.

recently been considered in Gabriel and Rosenthal (2007b) and is not explicitly tested here.<sup>3</sup> Instead, these two possible sources of offset motivate our research design. Using a regression discontinuity approach, we compare mortgage lending activity and homeownership rates in census tracts just above and below the GSE and CRA “underserved” income cut-offs. Our focus on census tracts close to the income cut-offs dictated by the GSE and CRA legislation helps to control for unobserved factors that may obscure the impact of these policies. A long list of census tract socio-economic attributes and county fixed effects are also included in the regression models to further control for the influence of unobserved effects.

Our priors are influenced by the institutional detail of the GSE and CRA programs, along with potential substitution between markets. With regard to GSE effects, it is important to emphasize that the GSEs are obliged to purchase a disproportionate number of conventional, conforming loans in underserved tracts. Those loan purchases must conform to GSE underwriting requirements and must not exceed loan size limitations set forth by the regulator. If the number of loans supplied to the secondary mortgage market is less than perfectly elastic, it is possible that GSE efforts to acquire greater numbers of conforming loans could encourage primary lenders to originate conforming size loans at the expense of non-conforming mortgages. This suggests that some of the increased activity in the conforming sector in response to the GSE purchase goals could be partly offset by declines in non-conforming loan activity.<sup>4</sup> This is one reason why GSE regulations may have a limited effect on targeted census tract homeownership rates. A second reason, noted above, is that some portion of the GSE purchase activity in targeted underserved tracts could be offset through the crowd out of loan purchases by unsubsidized private sector secondary market entities.

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<sup>3</sup>Note also that if GSE purchase activity is fully offset by crowd out of non-GSE private sector secondary market purchases, then GSE regulations would have no effect on loan supply in either the conforming or nonconforming market segments. Gabriel and Rosenthal (2007b) find evidence of such effects in 2004. But in 1994, 1996, 1998, 2000, and 2002, there is evidence of only partial crowd out, consistent with the idea that GSE activities affected credit supplies in those years.

<sup>4</sup> Note that increased secondary market demand for conforming sized loans causes the price of conforming loans to increase relative to that of non-conforming mortgages. Primary lenders will likely then respond by making conforming loans more affordable, and this will induce some loan applicants to substitute conforming for non-conforming sized loans.

The anticipated possible effects of CRA legislation are different. CRA mandates increased lending activity by regulated financial institutions in targeted zones, but does not impose restrictions on the size or type of loans originated. The expansion in supply of local credit resulting from CRA will tend to lower the local cost of borrowing. At the margin, this could encourage individuals who would have secured loans in the absence of the program to obtain larger loans. In this case, CRA could increase loan activity in the non-conforming segment and decrease activity in the conforming segment but have little impact on homeownership. It is also possible that the reduced cost of credit resulting from CRA could encourage some renters to secure loans and switch to homeownership. In this case, the CRA could have a positive impact on conforming loan size lending activity and should increase homeownership.

We test for these effects using HMDA data from 2000 in conjunction with census tract information from 1990 and 2000. From HMDA, we measure the number of conforming and non-conforming loan size applications and originations in a census tract, as well as the GSE share of mortgage loans purchased in the tract. From the census tract data, we obtain information on tract homeownership rates, as well as a host of socioeconomic tract attributes in both 1990 and 2000. Our key dependent variables are the number of applications and originations for conforming and non-conforming sized loans at the census tract level. We also examine impacts on the sum of conforming and non-conforming activity. In addition, we examine impacts on the difference in homeownership rates between 1990 and 2000. In all of these regressions, our unit of observation is the census tract.

To isolate the GSE and CRA effects we first estimate our models using the full sample of census tracts regardless of income, controlling for tract SES attributes and county fixed effects. Results from these models are compared to samples that restrict the census tracts to those within 10 percent of the GSE and CRA income cut-offs, and those within 5 percent of the cut-offs.

Our results have important implications for assessment of GSE and CRA policies. With respect to GSE effects, we find no evidence that designating a tract as underserved increases either lending activity or homeownership in the community. This is consistent with the possibility that GSE activity may be offset by various forms of crowd out, either between loan size segments of the market (i.e.

conforming versus non-conforming) or of private secondary market loan purchases as examined by Gabriel and Rosenthal (2007b). In contrast, we do find evidence of a positive impact of CRA on non-conforming mortgage lending. This result is robust to sample composition and model specification. We do not detect reliable evidence of a CRA impact on lending activity in the conforming sector. Together, these patterns are suggestive that CRA expands of the supply of mortgage credit in targeted tracts and may also draw some local renters into homeownership. Consistent with that possibility, our estimates indicate a small positive CRA effect on local homeownership rates. Nevertheless, on balance, the lack of more compelling evidence of GSE and CRA effects on mortgage lending and homeownership rates among targeted underserved tracts is striking and warrants further attention.

The plan for the remainder of the paper is as follows. The following section provides further context by briefly describing the institutional features of the CRA and GSE policies. That section also reviews previous literature on the impact of these programs. Section III describes the data and sample designs central to the research approach. Section IV presents estimates of our various models, and Section V concludes.

## **II. Background**

### *Institutional context*

As noted above, as a matter of longstanding policy, the U.S. Government has sought to aggressively increase the flow of mortgage capital to lower income, minority, and undeserved communities. Central to these efforts have been the passage of the 1977 Community Reinvestment Act (CRA) and the 1992 GSE Act. These Acts form the cornerstone of government efforts to enhance the availability of credit and the attainment of homeownership among targeted households and zones. The government regulation operates on two margins, focusing both on the origination of loans by financial institutions in the primary market (CRA of 1977) and the purchase of loans by the Government-Sponsored Enterprises in the secondary market (GSE Act of 1992). This section provides a brief overview of these policies.

The CRA directs the federal banking regulatory agencies to evaluate the extent to which federally-insured banking institutions meet the credit needs of all communities in their service areas, including lower-income areas, while maintaining safe and sound operations.<sup>5</sup> The legislation derived in part from concerns that banking institutions were engaged in “redlining,” a practice by which lenders fail to seek out lending opportunities in minority and/or lower-income neighborhoods. In the context of federal bank examinations, the CRA instructs regulators to consider the institution’s CRA performance when reviewing applications for merger, acquisition, or other structural change. Among other tests, CRA examinations of banking institutions scrutinize the geographic distribution of lending activities. These examinations compare the proportion of loans extended within the institution’s CRA “assessment area” as compared to the proportion of loans extended outside of its assessment area.<sup>6</sup> CRA examinations also take note of the distribution of neighborhood income status associated with loans issued to different locations within a financial institution’s assessment area. For this portion of the exam, lending in “low-to-moderate income” neighborhoods receives particular weight.<sup>7</sup>

An important feature of CRA that we draw upon in the empirical work to follow is the policy specific definition of a low income neighborhood. For these purposes, CRA defines low-to-moderate income neighborhoods as census tracts that have a median family income less than 80 percent of median family income in the metropolitan area in which the census tract is located (Federal Reserve System (1990)).<sup>8</sup> Regulatory agencies use this definition in CRA performance evaluations of lending activity in

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<sup>5</sup> The federal agencies that have regulatory authority under the CRA include the Board of Governors of the Federal Reserve System, the Office of the Comptroller of the Currency, the Federal Deposit Insurance Corporation, and the Office of Thrift Supervision.

<sup>6</sup> Banking institutions specify their CRA assessment area as the set of locations in which the institution operates branches and conducts much of its lending activity. Definitions of CRA assessment areas must be approved by the federal regulatory agencies and are used by examiners during CRA evaluations. See Board of Governors (2000) for further details.

<sup>7</sup> CRA also requires examiners to take note of the distribution of borrower income for loans issued to families within an institution’s assessment area.

<sup>8</sup> To assess depository institution performance, the CRA requires specific tests of lending, investment, and service activities. Also assessed are the institution’s product offerings and business strategy, its capacities and constraints, its past performance, the performance of similarly situated lenders, and information and public commentary

targeted locations. These evaluations take account of differences in lending activity inside and outside of targeted tracts within a given metropolitan area. To the extent that CRA motivates lenders to extend credit to low-income areas, CRA targeted census tracts should exhibit disproportionate lending activity and higher rates of homeownership relative to tracts just above the CRA income cut-off. This idea forms the basis for part of the empirical work to follow. Moreover, because regulators typically use data from the Home Mortgage Disclosure Act (HMDA) to conduct CRA examinations, evidence of elevated lending activity should be evident in these data.<sup>9</sup> Partly for that reason, we utilize HMDA data for the analysis later in the paper.

The secondary market for mortgages is dominated by Fannie Mae and Freddie Mac, the two giant government-sponsored enterprises (GSEs) that account for the majority of conventional, conforming home mortgage purchases. Fannie Mae and Freddie Mac are federally-chartered private corporations. Given their federal charters, market participants have come to view the debt securities of these entities as implicitly guaranteed by the full faith and credit of the U.S. Government. This implicit guarantee gives Fannie and Freddie access to the capital markets at a cost of credit substantially below that of private participants in the secondary market. In exchange for this benefit, government charters oblige Fannie and Freddie to pay particular attention to the enhancement of mortgage liquidity among lower income and minority families and neighborhoods. These goals were reaffirmed and strengthened by the 1992 Federal Housing Enterprise Financial Safety and Soundness Act, often referred to as the GSE Act of 1992. The GSE Act increased the level of support that Fannie Mae and Freddie Mac were required to provide to lower-income and minority communities. In so doing, the Act also authorized the U.S. Department of

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contained in the institution's public CRA file. When assessing lending activities, the CRA considers the geographic distribution of lending, the distribution of lending across different borrower groups, community development lending, and other innovative lending practices consistent with the larger CRA goals.

<sup>9</sup>As noted above, the CRA pertains to the lending activities in designated assessment areas of federally-insured banking institutions, including commercial banks and savings associations. It is important to note, however, that in recent years substantial growth in lending activity has occurred among institutions not covered by the CRA, and by CRA institutions outside their assessment areas.

Housing and Urban Development to establish “affordable housing goals” for the federally-chartered secondary market institutions.<sup>10</sup>

Like the CRA, the GSE Act targets underserved communities and individuals for extra support. In the case of the GSE Act, this is accomplished by requiring that the share of conventional, conforming loans purchased by Fannie Mae and Freddie Mac attain a set of minimum thresholds or “goals” specified by HUD. These goals include loans to lower-income borrowers (the “low-moderate income” goal), loans to borrowers residing in lower-income communities, loans to borrowers in “high minority” neighborhoods (jointly, the “geographically targeted” or “underserved areas” goal); and loans to very low income borrowers and low-income borrowers living in low-income areas (the “special affordable” goal).<sup>11</sup> The goals are potentially overlapping in the sense that a single loan can potentially count towards GSE credit for multiple goal categories.

Table 1 describes HUD goals for GSE purchase activity since 1994. Observe that the goals have changed over time and in general have become more stringent. The most recent set of goals, specified in November 2004, have governed purchase activity since 2005. With these most recent guidelines, the low- and moderate-income goal was set at 54 percent of total GSE purchases, the geographically targeted goal at 38.5 percent, and the special affordable goal at 24 percent.

An important feature of these goals that we draw upon in the empirical work to follow is the policy specific definition of an “underserved” neighborhood. For these purposes, the GSE Act defines underserved neighborhoods as census tracts that meet one of the following conditions: (i) the tract’s average income is below 90 percent of its MSA median income, or (ii) the tract’s average income is

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<sup>10</sup>While the housing GSEs (Fannie Mae and Freddie Mac) were established to provide liquidity to mortgage markets and to mitigate severe cyclical fluctuations in housing, those entities are intended as well to support the provision of affordable housing and the attainment of homeownership in lower-income and minority communities.

<sup>11</sup>The GSE Act defines lower-income borrowers (for purposes of the low-moderate income goal) as those having incomes less than the metropolitan area median income. Under the geographically targeted goal, lower-income neighborhoods are defined as those having a median income less than 90 percent of the area median income and high minority neighborhoods are defined as those having a minority population that is at least 30 percent of the total population and a median income of less than 120 percent of the area median. For the special affordable goal, very low income borrowers are those with incomes of less than 60 percent of the area median income. The special affordable goal also includes borrowers living in low-income areas with incomes less than 80 percent of the area median income.

below 120 percent of its MSA median income *and* the tract's population is more than 30 percent African American and Hispanic. If either of these conditions is met, the GSE Act deems a given census tract as underserved, and Fannie and Freddie receive credit towards their geographic purchase goals for purchases in such communities. It should also be noted that for years prior to 2003, 1990 MSA and tract attributes (e.g. income and racial composition) are used to determine underserved status based on 1990 census tract geographic boundaries. Beginning with 2003, those benchmarks were shifted to year-2000 values and census tract geography.

To confirm that the mandated GSE goals are associated with increased GSE loan purchases in underserved communities, Table 2 presents results from an illustrative regression. Using census tract HMDA data from 2000 we form the ratio of GSE purchases to all secondary market purchases for all conforming and nonconforming loans in the conventional home purchase segment of the mortgage market. This measure is then regressed on the census tract GSE underserved status and MSA fixed effects. Observe that the coefficient on the tract's underserved status is 0.091. This indicates that the GSE share of secondary market purchases is 9.1 percent higher in underserved tracts than in tracts not subject to GSE purchase requirements. This confirms what has been documented elsewhere in the literature: the GSEs respond to their mandated purchase goals by increasing their level of activity in underserved communities.<sup>12</sup>

In combination with the CRA, the GSE loan purchase goals represent a remarkable degree of government intervention in the allocation of mortgage credit. Ours, of course, is not the first study to consider the impact of these important programs. We review briefly some of the existing literature below. While much has been learned from various studies to date, we believe that fundamental gaps remain in our understanding of how these programs have affected access to credit and homeownership.

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<sup>12</sup>See also Gabriel and Rosenthal (2007b) for further discussion of the extent to which the GSEs adhere to their purchase goals.

## 2.2 Previous studies of CRA and GSE policy effects

While a number of studies have sought to document financial institution response to CRA or GSE regulatory goals, a comparative few have tested for the direct effects of the legislation on neighborhood lending and homeownership outcomes (e.g. Bradbury, Case, and Dunham (1989)).<sup>13</sup> Of those studies that have focused on financial institution responses, Avery, Bostic, and Canner (2003) find a limited increase in the percentage of institutions engaged in community lending activities as a result of the CRA. Other researchers, including Schwartz (1998) and Bostic and Robinson (2003), indicate increased levels of CRA-qualified lending among financial institutions that are bound by CRA agreements, which typically include pledges to extend loans in targeted communities. Apgar and Duda (2003) compare CRA-eligible lending to minorities among CRA-regulated and non-CRA lenders; results of that study suggest elevated loan origination shares among CRA-regulated lenders.<sup>14</sup> In that same study, Apgar and Duda (2003) suggest that the impact of CRA on mortgage loan originations may have attenuated over the course of the 1990s.<sup>15</sup>

Other recent studies have similarly sought to evaluate the GSEs' response to the loan purchase goals associated with the 1992 legislation. Bunce and Scheessele (1996), Bunce (2002), and others provide evidence that in the years following enactment of the 1992 GSE Act, the GSEs increased the

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<sup>13</sup>See, for example, Bunce and Scheessele (1996), Manchester (1998), Manchester, Neal, and Bunce (1998), Schwartz (1998), Bunce (2002), Apgar and Duda (2003), Avery, Bostic, and Canner (2003), Bostic and Robinson (2003), and Gabriel and Rosenthal (2007b).

<sup>14</sup>For whites, the difference was minimal, but for blacks, assessment area lenders had CRA-eligible shares that were 17 percentage points (38 percent) higher than shares for lenders outside assessment areas and 20 percentage points (48 percent) higher than shares for non-CRA lenders. For Hispanics, the CRA eligible share for assessment-area lenders were 13 percentage points (28 percent) higher than that for outside-assessment area lenders and 16 percentage points (39 percent) higher than that for non-CRA lenders.

<sup>15</sup>According to Apgar and Duda (2003), the number of home purchase loans made by CRA regulated institutions in their assessment areas as a share of all home purchase loans declined from 36.1 to 29.5 percent over the 1993-2000 period. The decline in the CRA share of loan originations could owe to a variety of factors associated with evolution in the mortgage industry, notably including the rise of secondary market and mortgage banking operations and the related reduction in share of loan originations funded by retail deposits. By 1997, mortgage companies accounted for 56 percent of one-to-four family mortgage loan originations, with commercial banks and thrifts accounting for only 25 and 18 percent of loan originations, respectively. Apgar, William C. and Duda, Mark, "The Twenty-Fifth Anniversary of the Community Reinvestment Act: Past Accomplishments and Future Regulatory Challenges", *FRBNY Economic Policy Review*, June 2003.

proportion of loan purchases from targeted populations. Between 1992 and 1995, for example, Fannie Mae doubled the share of loan purchases from lower-income borrowers while Freddie Mac increased its share by roughly 50 percent. Manchester (1998) documents that in 1995, Fannie Mae and Freddie Mac both surpassed the affordable loan purchase housing goals established by HUD. Manchester, Neal, and Bunce (1998) reach similar conclusions.<sup>16</sup> More recently, Gabriel and Rosenthal (2007b) demonstrate that upon controlling for the size of the local market for conforming loans, the GSEs are much more active in underserved communities targeted by the 1992 GSE Act. Collectively, these studies provide evidence that the GSEs have largely met the loan purchase targets imposed by the regulatory authorities.

In comparison to the many studies that have examined financial institution response to the CRA and GSE Acts, few studies have sought to identify the impact of those Acts on local mortgage and housing market outcomes, including homeownership. An exception is Avery, Calem and Canner (2003). That study analyzes the effects of CRA on changes in tract-level vacancy rates, crime rates, owner-occupied units, and homeownership rates over the decade of the 1990s. To identify CRA effects, the paper compares neighborhood outcome measures among census tracts just below and above the relative income threshold used to distinguish CRA-eligible tracts.<sup>17</sup> As suggested by the authors, results of the analysis are mixed and difficult to interpret. This could be consistent with the lack of a clear cut relationship between changes in the neighborhood measures and the CRA.<sup>18</sup> But this result could also reflect challenges in specifying a model that adequately strips away confounding factors that tend to obscure the potential impact of CRA.

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<sup>16</sup>See also Listokin and Wylie (2000), Myers (2002), Case, Gillen, and Wachter (2002), and Freeman and Galster (2004) for related discussion.

<sup>17</sup>In the Avery, Calem, and Canner (2003) analysis, regression equations are estimated for changes over the 1990s in neighborhood outcomes among a sample of tracts within the range of 10 percentage points above the 80 percent of MSA median income threshold for CRA eligibility. The authors then apply the models to predict changes in outcomes in census tracts with relative median incomes between 70-80 percent and calculate residuals and determine their statistical significance. They then test for any relationship between regression residuals and various measures of CRA-related activity.

<sup>18</sup>Results were not robust to a reversal of procedure whereby the CRA-eligible cohort was used to predict outcomes for the not CRA-eligible cohort.

In an analogous fashion, Bostic and Gabriel (2006) assess the effects of the GSE loan purchase goals on changes in homeownership among California communities that are the focus on the 1992 GSE Act. The study adopts a methodology similar to Avery, Calem and Canner (2003), but focuses on outcomes among a sample of tracts within 10 percentage points of the 90 percent of MSA median income threshold established by the GSE legislation.<sup>19</sup> Results of the study provide little evidence that GSE loan purchase goals elevate homeownership in targeted tracts despite other evidence that suggests that a more active secondary mortgage market does expand the supply of mortgage credit (e.g. Gabriel and Rosenthal (2007a)).<sup>20</sup>

Ambrose and Thibodeau (2004) consider the degree to which the frequency of underserved tracts within an MSA affects the number of mortgage originations in the metropolitan area (including purchase and refinance loans that do and do not conform to GSE underwriting requirements). They conclude that for the years between 1995 and 1999, only in 1998 did GSE activity increase originations. An and Bostic (forthcoming, mimeo) restrict their attention to census tracts in 1996 and 2000 just below and just above 90 percent of an MSA's median income, the cutoff used to define underserved tracts for purposes of the GSE purchase targets. The authors conclude that GSE purchases reduce subprime and FHA originations in underserved tracts close to the target cutoff.

The studies above have added considerably to our understanding of the impacts of CRA and GSE regulations on access to mortgage credit and homeownership. Nevertheless, taken as a whole, prior

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<sup>19</sup>Additional tests evaluated the interactive effects of GSE geographic targeting of tracts with those tracts ranked highly as regards proportion of borrowers qualifying for the low-moderate income and special affordable GSE housing goals. Also, the analysis sought to assess the robustness of estimation results across local housing markets.

<sup>20</sup>Among other analyses, An, Bostic, Deng and Gabriel (2007) expand upon tests undertaken by Bostic and Gabriel (2006). Using a two-stage approach, the authors first estimate models of GSE purchase intensity (defined as proportion of mortgage loans in the tract purchased by the GSEs) controlling for the GSE housing goals; predicted values of GSE purchase intensity are then used as regressors in analyses of changes in tract housing market conditions. Results of that analysis show that GSE purchase intensity increased significantly in tracts targeted under the geographically targeted goal, suggesting that the GSEs responded affirmatively to incentives established through the affordable housing goals. Further, increases in GSE purchase intensity are associated with declines in neighborhood vacancy rates and increases in median house values.

studies do not provide a unified, integrated assessment of the effects of CRA and GSE regulatory goals on access to mortgage credit and homeownership. This study attempts to make progress in that direction.

### **III. Data and sample design**

#### *3.1 Data*

The data used for the analysis were the year-2000 files of the Home Mortgage and Disclosure Act (HMDA) and census tract information from the 1990 and 2000 decennial Census. All of the data were coded to year-2000 census tract boundaries to ensure geographic comparability over time. The HMDA data derive from individual loan records as initially reported by regulated financial institutions. These data were cleaned and aggregated to the census tract level, after which they were merged with the decennial census tract information.

As described in the Introduction, our primary empirical approach is to use a regression discontinuity design that compares borrowing activity and homeownership rates in census tracts just above and below the CRA and GSE income cut-offs. Identification in this model is based on the idea that the CRA and GSE regulation results in policy-induced discrete changes in mortgage supply and related activity as one crosses the income threshold used to define an underserved census tract. In contrast, demand for mortgage debt and lender perceptions of borrower credit worthiness likely vary in a smooth, continuous fashion with income and other socioeconomic factors. Accordingly, in order to isolate the impact of designating a census tract as underserved, it is essential to include additional controls in the model that allow for socioeconomic factors that may drive local supply and demand for mortgage credit for reasons unrelated to the CRA and GSE policies.<sup>21</sup> With this in mind, our models are specified as follows.

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<sup>21</sup> In addition, recall from Table 1 and the discussion above that GSE loan purchase requirements include goals that target loans issued to borrowers of low income status as well as loans originated in targeted underserved tracts. Partly for that reason, the GSEs seek out opportunities to purchase loans in all tracts that include low-income families, not just those that meet the definition of underserved. Accordingly, in order to isolate the effect of tract underserved status, it is necessary to control for the presence of low-income households regardless of whether a tract

Except where noted, all of the regression models include a large number of year-1990 and year-2000 census tract socioeconomic attributes. Most importantly, from each of these years, controls include tract average income, average income squared, average income cubed, and average income to the fourth power. Also included in the models are the 1990 and 2000 tract unemployment rate, poverty rate, and percent households that are single female headed with children; percent population Hispanic and percent African American; average age of population and percent population male; percent adult population with no high school, with some high school, with a high school degree, or with some college; average age of homes, percent of homes single family, and population density. Finally, all of the models also include controls for the 1990 homeownership rate and fixed effects for roughly 850 counties.

Two remaining control variables complete the specification of our models and are central to our empirical work. A tract was coded as GSE underserved if it met one of the following conditions: (i) the tract's average income was below 90 percent of its MSA median income in 1990, or (ii) the tract's average income was below 120 percent of its MSA median income in 1990 and the tract's 1990 population was more than 30 percent African American and Hispanic. If either of these conditions was met, GSE underserved tract status was set equal to 1. If neither condition was met the variable was set equal to 0. This coding is consistent with the definition of underserved tracts as laid out in the federal regulation.

A tract is also coded as meeting CRA definitions of low-income and thereby eligible for CRA credit if the tract's 1990 average income was less than 80 percent of MSA median income. In this case, the CRA variable was coded as 1 and 0 otherwise. This definition is also consistent with federal guidelines governing the identification of CRA eligible tracts.

Comparing these two definitions for GSE underserved tract status and CRA tract status, it is apparent that there are three groups of census tracts in the population. The first group includes tracts that are neither underserved nor subject to CRA regulations. These tracts have average income above 90

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is designated underserved. The extensive set of tract socioeconomic indicators described below address this need while also controlling for more fundamental socioeconomic drivers of the demand and supply for mortgage credit.

percent of area median income (AMI) except for high minority tracts with average income above 120 percent of AMI. The second set of census tracts are those between the CRA and GSE underserved income cutoffs. This includes tracts with average income between 80 and 90 percent of AMI (except for the high minority tracts whose average income may extend up to 120 percent of AMI). These tracts are subject to GSE purchase requirements but are not subject to CRA origination goals. The third set of census tracts are those with average 1990 income below 80 percent of AMI. These tracts are subject to both GSE purchase requirements and CRA.

Mortgage activity is measured using HMDA data. As will be apparent, much of our analysis focuses on two key dependent variables, the number of loan applications and the number of loan originations. These variables are measured separately for loans below the GSE conforming loan size limit for a given metropolitan area – referred to as “conforming” loans – and for loans in excess of the conforming loan size limits – referred to as “non-conforming” loans. We also estimate models that add together activity from the conforming and non-conforming sectors.

For all of the samples used in the analysis, mortgage variables are drawn only from HMDA records pertaining to conventional, home purchase loans. HMDA loan records for which the type or purpose of the loan could not be determined were dropped from the samples. In addition, throughout the analysis to follow we include only census tracts in metropolitan statistical areas (MSAs) as defined by in the 2000 census.

### *3.2 Sample Design*

Before proceeding to the empirical results it is useful to highlight additional features of the samples used to estimate the models and the specifications of the models themselves. As will become apparent, all of the regressions were estimated twice, first including the GSE underserved census tract dummy variable as a control, and a second time replacing that variable with the CRA census tract indicator. In each case, regressions were run for seven different dependent variables: the number of applications for conforming sized conventional home purchase loans, the number of originations for

conforming sized conventional home purchase loans, their analogues for non-conforming sized loans, the sum of these variables between the conforming and non-conforming sectors, and the difference in homeownership rates between 2000 and 1990.

Each of these regressions was estimated separately over three different samples in order to apply successively tighter filters as part of the regression discontinuity approach. The first sample includes all census tracts in identified MSAs regardless of tract income. The second sample includes only tracts for which average income is within ten percent of the income cut-off associated with the policy in question. The third sample includes only tracts for which average income is within five percent of the income-cutoff for the policy in question.

In defining these samples it is worth reiterating that the GSE definition of an underserved tract is one whose average income is below 90 percent of AMI or below 120 percent of AMI with a minority population share in excess of 30 percent. The CRA definition of underserved, in contrast, is 80 percent of AMI. This implies that the “all-tract” sample effectively mixes three different types of tracts relative to the GSE and CRA goals: tracts with income above both the GSE and CRA income limits, tracts with income between the two income limits and for which only GSE goals apply, and tracts with income below the CRA limit and for which both the CRA and GSE goals apply. This mixing of tract types potentially obscures the influence of CRA and GSE policy effects. For the CRA analysis, for example, the CRA dummy variable effectively compares tracts subject to both CRA and GSE goals to a blend of two types of tracts, those that are subject to GSE goals and those that are not.

In contrast, the 5- and 10-percent window samples provide a sharper comparison. When focusing on GSE effects, the 5- and 10-percent window samples exclude any tracts subject to CRA targeting. For this sample, the GSE underserved dummy variable highlights effects in GSE targeted tracts relative to those not targeted by the GSE Act. Analogously, when focusing on CRA effects, the 5- and 10-percent window samples exclude all tracts not subject to GSE goals. In these instances, the CRA dummy variable highlights activity in CRA targeted tracts relative to those not directly subject to CRA, bearing in mind that all of the sample tracts are subject to GSE purchase priorities.

Given these features of the different samples, it seems likely that the 10- and 5-percent window samples are likely to provide a more accurate assessment of GSE and CRA policy effects. In part this because these samples provide a sharper delineation of tract type as just described. In addition, narrowing the sample by income type is likely to further control for unobserved effects not captured directly by the SES variables and fixed effects included in the models. Of course, against those benefits must be weighed a significant disadvantage of the more refined samples: as the sample focus is narrowed, the number of tracts in the sample is correspondingly reduced and this makes it more difficult to obtain precise estimates, all else equal. Tables 3 and 4 indicate the sample sizes associated with each of the different regressions. For the all census tract models sample size is just over 50,000. With a 10 percent window restriction sample size is reduced to roughly 8,000 to 10,000 tracts depending on the policy in question. With a 5 percent window restriction sample size is further reduced to roughly 4,000 to 5,000 depending on the policy in question. Although the restricted samples are clearly much smaller, they still contain thousands of census tracts. For that reason, on balance, we believe that these restricted samples yield more reliable results.

## **IV. Results**

### *4.1 Socioeconomic controls*

As noted earlier, a very long list of tract socioeconomic characteristics are included in the regressions to ensure that we adequately control for the influence of underlying drivers of demand and supply for mortgage credit apart from the influence of the GSE and CRA policy goals. In total, 37 socioeconomic variables are included in the models in addition to fixed effects for roughly 850 counties. This very large number of control variables requires that we be parsimonious in presentation. Partly for that reason, and also because of the reduced form nature of the socioeconomic controls, we do not discuss the coefficients on those variables. Instead, it is sufficient to note that many of the socioeconomic controls from both 1990 and 2000 are significant predictors of mortgage activity and changes in homeownership rates, as would be anticipated. As an illustrative example, we report the complete

regression results for the origination regressions that examine CRA effects in all three samples described above. Those estimates are provided in the appendix. The complete results from the other regressions are not reported to conserve space. This leaves us free to focus here on the coefficients on GSE underserved tract status and CRA tract status, the coefficients of primary interest.

#### *4.2 GSE and CRA effects*

Tables 3 and 4 summarize the core results of the paper and are presented in a manner intended to facilitate comparisons across model and sample designs. Table 3 presents the coefficients on GSE underserved tract status from the various regressions, while Table 4 presents the analogous set of coefficients on CRA tract status. It is important to note that each coefficient in these tables is taken from a separate regression as described above. In addition, robust standard errors were used in calculating the t-ratios reported in parentheses.

Consider first the impact of GSE underserved tract status as described by the results summarized in Table 3. When using the complete sample of census tracts from all MSAs, the impact of GSE underserved status on the sum of conforming and non-conforming loan activity is statistically insignificant, both for applications and originations. In addition, GSE underserved status has no discernible effect on applications for conforming mortgages but there is evidence of a positive and marginally significant impact on originations. In the non-conforming sector GSE underserved tract status has a modest positive effect on both applications and originations. Moreover, the larger positive impact on the conforming sector relative to the non-conforming sector is appealing given the GSE mandate to focus on conforming sized loans. This interpretation breaks down, however, when considering homeownership. Note that underserved tract status is negatively associated with the change in homeownership during the decade of the 1990s: the coefficient is -0.005 with a t-ratio of 1.79. It is difficult to explain how the GSE goals could generate such an outcome. For this reason, we view the full sample results with caution and cannot rule out the possibility that unobserved local factors correlated with GSE tract status may be contaminating our estimates.

Consider next the 10- and 5-percent window sample estimates in Table 3. As noted above, these samples are much smaller, but hopefully still large enough to yield reliable results. They are also cleaner in their composition. Bearing this in mind, the dominant pattern evident in the table is that all of the estimates are insignificant. For both the 10- and 5-percent window samples, the estimated GSE effect on non-conforming loan activity is negative – measured both by applications and originations. For the 10 percent sample the estimates are marginally significant; for the 5-percent sample the coefficients are considerably smaller and indistinguishable from zero. In the conforming sector, the estimated effects on applications and originations are negative in the 10 percent sample but very imprecisely estimated as indicated by the low t-ratios. In the 5-percent sample estimates for the conforming sector become positive but remain indistinguishable from zero. For the pooled sample of both conforming and non-conforming loans, all coefficients in the 5% and 10% samples are statistically insignificant except for a negative and significant coefficient on applications. Finally, for both the 10- and 5-percent window samples, the estimated effect on the change in homeownership in the 1990s is very small, positive, and statistically insignificant.

Two possible explanations would seem to account for the limited evidence of a GSE effect in the three samples. The first is that all of our models suffer from unobserved effects that bias our estimates. Although we cannot rule out this possibility, we note again the very long list of control measures and county fixed effects taken into account, along with the sharp focus provided by the 10- and 5-percent window samples. The window sample design along with the model controls should do quite a lot to address fundamental socioeconomic drivers of mortgage demand and supply, as well as the influence of the “Low-Moderate” and “Special Affordable” GSE goals as discussed earlier. A different explanation is that the GSE goals have limited effect on mortgage lending activity and homeownership. As considered in Gabriel and Rosenthal (2007b), evidence suggests that in some years an important fraction of GSE loan purchases are offset because of crowd out of unsubsidized private sector purchase activity. Such crowd out effects would mitigate effects of GSE tract status on originations and homeownership.

Table 4 presents corresponding results for the impact of a census tract's CRA status. For the full sample, CRA has a generally positive and significant impact on lending activity in both the conforming and non-conforming segments of the market. That same result is apparent in the pooled sample of conforming plus non-conforming loans. This is possible to the extent that CRA encourages existing homeowners to obtain larger loans, and also encourages some renters to become homeowners (and likely obtain smaller, conforming sized loans). Note, however, that the estimated impact of CRA on homeownership in the 1990s is negative and significant – the coefficient is -0.01 with a t-ratio of 2.43. It is difficult to provide an economic rationale for this result since CRA almost certainly works to expand mortgage supply and, if anything should increase homeownership. Instead, once again, despite the extensive set of SES controls and county fixed effects, we cannot rule out the possibility that unobserved factors may contaminate our estimates of CRA policy effects in the full sample models.

Focusing on the 10- and 5-percent window sample models yields more encouraging results. Note first that for both samples, CRA effects on conforming loan activity are generally negative and/or not significant. This is plausible given the nature of the CRA goals. In addition, observe that the estimated effect of CRA tract status is remarkably similar for both samples: in both cases the estimated impact on applications is slightly more than one-half loan per tract while the estimated effects on originations is just below one-half loan per tract. Moreover, these estimates are significant or nearly so. These estimates are also close to those obtained for the full sample (All Tract) model. It is also apparent that for the 10-percent window sample CRA tract status has a positive and significant impact on homeownership: the coefficient is 0.013 with a t-ratio of 2.24. For the 5-percent sample the corresponding coefficient is smaller by a factor of four and is insignificant.<sup>22</sup>

Summarizing the CRA effects, we find robust evidence of a positive and significant impact of CRA on non-conforming loan activity: this pattern is evident in each of the three samples. In the

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<sup>22</sup>Observe also that for the pooled sample of conforming plus non-conforming loans, all estimated CRA tract coefficients in the 5% and 10% samples are insignificant. Given the robust and significant impact of CRA tract status on non-conforming loan activity, this result highlights the importance of not treating all loan size segments of the market as alike.

restricted samples we tend to see either negative or zero impact on the conforming sector, but in all cases the estimates are insignificant. In the 10-percent window sample CRA has a positive and significant impact on homeownership, but that effect is smaller and insignificant in the 5-percent window sample.

Overall, we interpret these results as follows. From a conceptual standpoint, CRA should have an unambiguous positive impact on the local supply of mortgage credit and homeownership. The robust evidence of a positive CRA effect on non-conforming loan activity is consistent with that prior. The same is true for the significant impact on homeownership in the 10-percent sample although the estimate loses significance in the smaller 5-percent sample. Moreover, it is possible that CRA could elevate lending in the non-conforming sector without having a positive impact on the conforming segment of the market by encouraging some borrowers to substitute larger, non-conforming loans for smaller, conforming sized loans. On balance, therefore, the patterns in Table 4 are suggestive that CRA has indeed contributed to an expansion in the supply of mortgage credit in targeted census tracts.

#### *4.3 Alternative specifications*

A number of alternative model specifications were also used to assess the impact of GSE and CRA underserved status on local mortgage activity and homeownership. We briefly note these models here and highlight any differences from the estimates reported in Tables 3 and 4. In most instances, those differences were small and in no case did the overall qualitative nature of the results change. For that reason, we do not table out the estimates from these alternative models.

Our first alternative was to experiment with a less nonlinear set of controls for tract income. We did this out of concern that there may be a high degree of collinearity in our key regressors and that this could make identification more difficult. Accordingly, all of the regressions in Tables 3 and 4 were re-estimated omitting average income cubed and average income to the fourth power from both 1990 and 2000. This change had essentially no impact on the 10- and 5-percent window samples for both the GSE and CRA effects. The full sample models were affected in that the coefficients on conforming and non-

conforming loan activity increased in magnitude and took on a different pattern of signs. However, we do not view those results as being reliable in comparison to the restricted samples.

We also considered the possibility that the long list of socioeconomic controls could contribute to excessive collinearity that would obscure identification, especially in the smaller 10- and 5-percent window samples. To address that concern, we re-ran the regressions in Tables 3 and 4 two additional times. In the first instance, we omitted all of the 1990 socioeconomic control measures except for the tract income terms. In the second instance, we omitted all socioeconomic controls from both 1990 and 2000 except for the tract income terms. In both cases, restricting the set of control variables tended to cause the estimated impact of GSE and CRA tract status to have a negative and significant impact on lending activity, and also a negative and significant impact on homeownership. Given that mortgage activity and homeownership are less prevalent in lower income communities, these results are suggestive that insufficient controls were included in the above models to address underlying fundamental determinants of mortgage demand and supply, and homeownership.

Based on these alternative models, we believe that the most reliable specifications are those reported in Tables 3 and 4, and which include the full set of tract income and socioeconomic controls from both 1990 and 2000. Those controls work to eliminate more traditional drivers of mortgage demand and supply, and homeownership, and allow the influence of the GSE and CRA targeting to be more fully apparent.

## **V. Conclusion**

Together, the CRA and GSE Acts form the centerpiece of U.S. government efforts to expand access to mortgage credit and homeownership in targeted, underserved neighborhoods. We examine these issues empirically by applying a regression discontinuity design to HMDA data from 2000 along with further control measures based on 1990 and 2000 census tract attributes. Based on a variety of models and specifications, we find no evidence of a positive effect of GSE underserved tract status on mortgage lending activity or homeownership. This could be consistent with GSE crowd out of

unsubsidized private sector secondary market activity (e.g. Gabriel and Rosenthal (2007b)), or possibly of increased lending of conforming sized loans at the expense of non-conforming loan activity. In contrast, we do find robust evidence that CRA increases mortgage lending activity in the non-conforming segment of the mortgage market. Additional evidence also indicates a small, positive impact of CRA on local homeownership rates. These patterns are consistent with conceptual arguments that CRA should serve to expand the local supply of mortgage credit in targeted areas.

Overall, the policy implications from our results are mixed. The absence of a compelling positive GSE impact on mortgage lending activity and homeownership is striking given the extensive purchase goals that govern GSE purchase activity. The evidence of positive CRA effects is more in keeping with the policy goals of CRA, but even here the estimated patterns are not as pronounced as policy makers may have anticipated. These are issues that clearly warrant further study.

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**Table 1**  
**HUD-Specified Affordable Housing Loan Purchase Goals<sup>a</sup>**

	Low- and Moderate- Income	Underserved Neighborhoods	Special Affordable
1994-1995	30	30*	- <sup>b</sup>
1996	40	21	12
1997-2000	42	24	14
2001-2004	50	31	20
2005-2008	52-56	37-39	22-27

<sup>a</sup>All figures are percentages of the total number of units associated with the mortgages purchased by each GSE. During 1994 and 1995, underserved neighborhoods were defined differently from the current definition. The percentage thresholds for 1996-2000 were published on December 1, 1995, those for 2001-2003 were published on October 31, 2000, and those for 2005-2008 were published on November 2, 2004. According to HUD, the increase in the underserved neighborhoods goal from 31% in 2001-2004 to 37% in 2005-2008 largely reflects adjustments in the 2000 census data, whereby the 2001-2004 goal of 31% would have been equivalent to 36% under the current definition. HUD used the 1990 census data to create housing goals prior to 2005, and used the 2000 census data to create goals for 2005-2008.

<sup>b</sup>The special Affordable goal in 1994-1995 was specified in dollar amounts rather than as a percentage of loans purchased.

Source: U.S. Department of Housing and Urban Development (2000, 2004).

**Table 2**  
**Impact of GSE Underserved Status on GSE Purchase Share<sup>a</sup>**  
**(Absolute value of t-ratios in Parentheses)**

GSE Underserved Tract	0.09128 (57.34)
Constant	0.49213 (541.58)
Observations	50,104
MSA Fixed Effects	330
R-sq within	0.0620
R-sq between	0.1181
R-sq overall	0.0417

<sup>a</sup>GSE purchase share equals GSE purchases of conforming and nonconforming loans divided by all purchases of conforming and nonconforming loans.

**Table 3**  
**Impact of GSE Underserved Census Tract Status**  
(Absolute value of t-ratios based on robust standard errors in parentheses)<sup>a</sup>

	Dependent Variables		
	Applications for Conventional Home Purchase Loans	Originations for Conventional Home Purchase Loans	Change in Homeownership Rate Year 2000 – Year 1990
<b><u>All Census Tracts</u></b>			
Conforming Mortgages (Observations: 50,402 tracts in 853 counties)	-2.216 (2.01)	-0.1105 (0.15)	
Non-Conforming Mortgages (Observations: 50,374 tracts in 853 counties)	0.6476 (2.21)	0.4663 (2.34)	
Conforming + Non-Conforming Mortgages (Observations: 50,370 tracts in 853 counties)	-1.527 (1.24)	0.3699 (0.44)	
All Households (Observations: 50,341 tracts in 853 counties)			-0.0002 (0.23)
<b><u>Tracts Within 10% of Underserved Border</u></b>			
Conforming Mortgages (Observations: 10,052 tracts in 741 counties)	-4.826 (1.91)	-2.606 (1.51)	
Non-Conforming Mortgages (Observations: 10,048 tracts in 741 counties)	-1.286 (1.73)	-0.8894 (1.88)	
Conforming + Non-Conforming Mortgages (Observations: 10,048 tracts in 741 counties)	-6.144 (2.15)	-3.517 (1.81)	
All Households (Observations: 10,079 tracts in 741 counties)			-0.0009 (0.46)
<b><u>Tracts Within 5% of Underserved Border</u></b>			
Conforming Mortgages (Observations: 5,057 tracts in 652 counties)	-2.429 (0.77)	-1.831 (0.85)	
Non-Conforming Mortgages (Observations: 5,055 tracts in 652 counties)	-1.906 (1.82)	-1.394 (2.09)	
Conforming + Non-Conforming Mortgages (Observations: 5,055 tracts in 652 counties)	-4.368 (1.21)	-3.256 (1.32)	
All Households (Observations: 5,076 tracts in 652 counties)			0.0015 (0.62)

<sup>a</sup>All models include the following census tract control variables from both 1990 and 2000: average income, average income squared, average income cubed, and average income to the fourth power; unemployment rate, poverty rate, and percent households that are single female headed with children; percent population Hispanic and percent African American; average age of population and percent population male; percent adult population with no high school, with some high school, with a high school degree, or with some college; average age of homes, percent of homes single family, and population density. All of the models also include the 1990 homeownership rate and county fixed effects. Estimates from these control measures are not reported to conserve space.

**Table 4**  
**Impact of CRA Census Tract Status**  
**(Absolute value of t-ratios based on robust standard errors in parentheses)<sup>a</sup>**

	Dependent Variables		
	Applications for Conventional Home Purchase Loans	Originations for Conventional Home Purchase Loans	Change in Homeownership Rate Year 2000 – Year 1990
<b><u>All Census Tracts</u></b>			
Conforming Mortgages (Observations: 50,402 tracts in 853 counties)	0.1387 (0.14)	1.386 (2.27)	
Non-Conforming Mortgages (Observations: 50,374 tracts in 853 counties)	1.243 (5.11)	0.8896 (5.39)	
Conforming + Non-Conforming Mortgages (Observations: 50,370 tracts in 853 counties)	1.392 (1.25)	2.289 (3.38)	
All Households (Observations: 50,341 tracts in 853 counties)			-0.0038 (3.56)
<b><u>Tracts Within 10% of CRA Border</u></b>			
Conforming Mortgages (Observations: 8,322 tracts in 794 counties)	-1.397 (0.81)	-0.4674 (0.48)	
Non-Conforming Mortgages (Observations: 8,320 tracts in 794 counties)	0.7344 (1.99)	0.4742 (2.03)	
Conforming + Non-Conforming Mortgages (Observations: 8,320 tracts in 794 counties)	-0.6534 (0.35)	0.0201 (0.02)	
All Households (Observations: 8,283 tracts in 794 counties)			0.0035 (2.11)
<b><u>Tracts Within 5% of CRA Border</u></b>			
Conforming Mortgages (Observations: 4,191 tracts in 699 counties)	-0.1460 (0.06)	0.6270 (0.48)	
Non-Conforming Mortgages (Observations: 4,190 tracts in 699 counties)	0.7251 (1.49)	0.4851 (1.57)	
Conforming + Non-Conforming Mortgages (Observations: 4,190 tracts in 699 counties)	0.5539 (0.22)	1.097 (0.76)	
All Households (Observations: 4,175 tracts in 699 counties)			0.0024 (1.08)

<sup>a</sup>All models include the following census tract control variables from both 1990 and 2000: average income, average income squared, average income cubed, and average income to the fourth power; unemployment rate, poverty rate, and percent households that are single female headed with children; percent population Hispanic and percent African American; average age of population and percent population male; percent adult population with no high school, with some high school, with a high school degree, or with some college; average age of homes, percent of homes single family, and population density. All of the models also include the 1990 homeownership rate and county fixed effects. Estimates from these control measures are not reported to conserve space.

**Appendix: Table A-1**  
**Impact of CRA Census Tract Status on Non-Conforming Originations**  
**(t-ratios calculated using robust standard errors)**

	All Census Tracts		Tracts Within 10% of CRA Border		Tracts Within 5% of CRA Border	
	Coeff	t-ratio	Coeff	t-ratio	Coeff	t-ratio
CRA Tract Status	0.8896	5.39	0.4742	2.03	0.4851	1.57
Average income in 2000	-2.576E-01	-6.67	-1.539E+00	-4.78	-2.314E+00	-3.47
Average income <sup>2</sup> in 2000	4.515E-03	11.85	2.759E-02	4.14	4.155E-02	2.91
Average income <sup>3</sup> in 2000	-1.340E-05	-11.96	-1.774E-04	-3.16	-2.768E-04	-2.22
Average income <sup>4</sup> in 2000	9.840E-09	11.53	3.770E-07	2.37	6.110E-07	1.66
Unemployment rate in 2000	-7.5533	-5.82	-4.3364	-2.58	-6.2319	-2.38
Poverty rate in 2000	0.8298	0.65	-3.7112	-2.16	-2.9218	-1.06
% Female w/ child in 2000	5.3818	7.27	0.4670	0.48	-0.5528	-0.32
% Hispanic in 2000	-11.5865	-10.60	-0.9866	-0.61	1.0510	0.42
% Black in 2000	-1.0282	-1.40	-1.8204	-1.13	-0.1322	-0.09
Average age in 2000	-0.2699	-8.03	-0.0295	-0.73	0.0087	0.18
% male in 2000	11.7811	5.12	1.9501	0.64	-3.3498	-0.79
% No HS in 2000	-20.2002	-9.96	-13.8766	-4.24	-9.2066	-1.92
% Some HS in 2000	-10.2525	-5.60	-10.9373	-3.58	-9.4013	-1.96
% HS in 2000	-16.0942	-9.52	-11.5952	-4.29	-10.3909	-2.30
% Some college in 2000	-26.7849	-11.70	-12.3333	-3.47	-7.5702	-1.33
Avg. age of homes in 2000	-0.2858	-11.67	-0.0622	-2.01	-0.0805	-1.68
% Single family homes in 2000	0.8714	1.00	0.4369	0.34	2.6488	1.24
Population density in 2000	-2.060E-05	-0.69	2.020E-05	0.54	1.079E-04	2.01
Average income in 1990	-2.252E-01	-3.77	8.902E-01	1.00	-1.513E-03	0.00
Average income <sup>2</sup> in 1990	4.209E-03	5.81	-2.873E-02	-1.31	-1.517E-02	-0.41
Average income <sup>3</sup> in 1990	-1.850E-05	-6.04	3.775E-04	1.68	3.201E-04	0.88
Average income <sup>4</sup> in 1990	2.340E-08	5.71	-1.580E-06	-2.00	-1.580E-06	-1.26
Unemployment rate in 1990	-0.9778	-0.54	3.0268	0.74	5.7464	0.85
Poverty rate in 1990	2.1567	1.67	-0.9077	-0.46	-1.9190	-0.59
% Female w/ child in 1990	5.0537	6.43	2.3014	2.06	1.7025	0.95
% Hispanic in 1990	4.7139	4.11	2.5756	1.30	-0.6060	-0.19
% Black in 1990	-2.8630	-3.81	0.1039	0.06	-1.6568	-1.01
Average age in 1990	0.2167	6.88	0.0074	0.17	-0.0169	-0.27
% male in 1990	-2.7723	-1.01	-2.3336	-0.65	-1.1713	-0.21
% No HS in 1990	16.8378	7.80	5.8442	1.90	2.1472	0.42
% Some HS in 1990	19.1781	9.59	3.9533	1.26	0.8470	0.16
% HS in 1990	16.7020	9.14	4.7290	1.62	1.1557	0.25
% Some college in 1990	23.1562	8.64	4.4021	1.25	6.6141	1.23
Avg. age of homes in 1990	0.1532	6.34	0.0433	1.51	0.0517	1.16
% Single family homes in 1990	-1.4074	-1.40	-0.7564	-0.52	-2.6371	-1.03
Population density in 1990	0.0001	2.00	0.0000	0.25	-0.0001	-1.52
1990 Homeownership rate	3.3189	4.45	2.2600	2.03	3.3991	1.70
Observations		50,374		8,320		4,190
County Fixed Effects		853		794		699
R-sq (overall)		0.3794		0.2677		0.2673