APPENDIX C: IMPACT OF THE COMMUNITY REINVESTMENT ACT ON LOSSES INCURRED BY NATIONAL BANKS

All the federal banking regulatory agencies have considered the impact of the Community Reinvestment Act ("CRA") on the losses incurred by depository institutions during the current crisis. Based on all available research, each has concluded that the CRA did not contribute in any material way to the mortgage crisis or the broader credit quality issues in the marketplace.[1] Attached to this Appendix are several key documents and studies related to these findings.

Studies Assessing the Impact of the CRA on the Economic and Financial Crisis

There has been much public discussion concerning whether CRA may have contributed to the current financial and economic crisis. This discussion has focused on the connection between CRA-related home mortgage lending to low- and moderate-income borrowers and what some allege to be a disproportionate representation in failing loans.

As described below, both independent and agency studies and the quantitative analysis of comprehensive home lending data sets lead to the conclusion that only a small portion of subprime loan originations (loans identified as "higher cost" under the Home Mortgage Disclosure Act ("HMDA")) are related to the CRA. In addition, these studies indicate that CRA-related loans appear to perform better than subprime loans generally.

For example, single-family CRA-related mortgages offered in conjunction with NeighborWorks organizations were found to perform on par with standard conventional mortgages.[2] Foreclosure rates within the NeighborWorks network were just 0.21 percent in the second quarter of 2008, [3] compared to 4.26 percent of subprime loans and 0.61 percent for conventional conforming mortgages.[4]

The Federal Reserve Board ("FRB") has reported extensively on these findings for all CRA loans. Using higher priced loans listed in the HMDA disclosures as a rough proxy for

---

[1] *See* Remarks by John C. Dugan Comptroller of the Currency Before the Enterprise Annual Network Conference November 19, 2008, *available at* http://www.occ.treas.gov/ftp/release/2008-136a.pdf ; Speech entitled "CRA: A Framework for the Future," Governor Elizabeth A. Duke, February 24, 2009, *available at* http://www.federalreserve.gov/newsevents/speech/duke20090224a.htm; Remarks by FDIC Chairman Sheila C. Bair Before the Consumer Federation of America, December 4, 2008, *available at* http://www.fdic.gov/news/news/speeches/archives/2008/chairman/spdec0408_2.html; Speech entitled "The Community Reinvestment Act and the Recent Mortgage Crisis," Governor Randall S. Kroszner, December 3, 2008, *available at* http://www.federalreserve.gov/newsevents/speech/kroszner20081203a.htm#f6; John M. Reich, Director of the Office of Thrift Supervision (OTS) in response to question posed at the OTS Housing Summit, Washington DC, December 8, 2009.

[2] *See* "Low-Income Mortgage Borrowers with the Benefit of Homeownership Counseling Do Substantially Better than General Market, According to New Foreclosure Analysis," NeighborWorks America, *News Release*, September 25, 2008.

[3] Latest date for which data is available.

[4] A study by the University of North Carolina's Center for Community Capital also indicates that high-cost subprime mortgage borrowers default at much higher rates than those who take out loans made for CRA purposes. *See* Lei Ding, Roberto G. Quercia, Janneke Ratcliffe, Wei Li, "Risky Borrowers or Risky Mortgages: Disaggregating Effects Using Propensity Score Models," University of North Carolina, Center for Community Capital, October 2008.

subprime loans, a FRB study of 2005 - 2006 HMDA data showed that banks subject to CRA and their affiliates originated or purchased only six percent of the reported higher-priced loans made to lower-income borrowers within their CRA assessment areas.[5] The FRB also found that less than 2 percent of the higher-priced and CRA credit-eligible mortgage originations sold by independent mortgage companies in 2006 were purchased by CRA-covered institutions. FRB loan data analysis also found that 60 percent of higher-priced loan originations went to middle- or higher-income borrowers or neighborhoods and, further, that more than 20 percent of the higher-priced loans extended to lower-income borrowers or borrowers in lower-income areas were made by independent non-bank institutions that are not covered by CRA.[6]

Federal Reserve Governor Randall S. Krozner affirmed these findings in a 2008 presentation,[7] and Governor Elizabeth Duke concurred in 2009.[8] A report issued in September 2009 by the United States Commission on Civil Rights concludes, "data reflect that the subprime loans made by banking institutions or their affiliates in their CRA assessment areas remained a marginal segment of the overall market."[9]

Additional reports by FRB economists comport with these findings that only a small percentage of higher priced loans were originated by CRA-regulated lenders to either lower-income borrowers or in neighborhoods in bank CRA assessment areas.[10] Similarly, they have concluded that banks purchased only a small percentage of higher-priced, CRA-eligible loans originated by independent mortgage companies.[11]

Finally, the performance of higher-cost loans originated by federally regulated banks and thrifts has proven markedly better than loans originated by non-bank institutions. One study found that even after controlling for a wide range of borrower, neighborhood, and loan characteristics, higher cost loans made by lenders regulated under the CRA were significantly less likely to go into foreclosure than those made by independent mortgage companies, *i.e.*, those mortgage originators that fall outside the regulatory reach of the CRA. "This provides

---

[5] *See* Neil Bhutta and Glenn B. Canner, "Did the CRA cause the mortgage market meltdown?", *Community Dividend* (Federal Reserve Bank of Minneapolis: March 2009), *available at* http://www.minneapolisfed.org/publications_papers/issue.cfm?id=293. Most subprime and Alt-A loans fall within the definition of high-cost (higher-priced). Although the definition of high-cost (higher-priced) loans under Regulation Z (which implements the Truth in Lending Act) was recently changed, for loans originated during the years covered by this study, the previous definition of high-cost applied, which covered loans where the spread between the annual percentage rate and the yield on Treasury securities of comparable maturity was 3 percentage points or more for first-lien loans and 5 percentage points or more for subordinate lien loans.

[6] *See* "The Community Reinvestment Act and the Recent Mortgage Crisis," Governor Randall S. Kroszner, *supra* at n. 1.

[7] *Id.* at p. 3 ("I can state very definitively from the research that we have done, that the Community Reinvestment Act is not one of the causes of the current crisis.").

[8] *See* "CRA: A Framework for the Future," Governor Elizabeth A. Duke, *supra* at n. 1 (An "analysis of foreclosure rates in that study found that loans originated by CRA-covered lenders were significantly less likely to be in foreclosure than those originated by independent mortgage companies. Clearly, claims that CRA caused the subprime crisis are not supported by the facts.").

[9] United States Commission on Civil Rights, "Civil Rights and the Mortgage Crisis," September 2009, p. 69.

[10] Bhutta and Canner, "Did the CRA Cause the Mortgage Market Meltdown?", *supra* n. 5, at p. 2.

[11] Robert Avery et al, "The 2007 HMDA Data," *Federal Reserve Bulletin*, December 2008.

compelling evidence that the performance of [higher cost] loans made by CRA-regulated institutions has been significantly stronger than those by [independent mortgage companies]." [12]

Another researcher states, "Our research finds that after controlling for loan vintage, origination date, borrower, credit, and loan characteristics, the estimated cumulative default rate for a comparable group of subprime borrowers was about 3.5 times higher than that experienced for borrowers in our CRA portfolio. In outperforming other types of mortgage investments, CRA portfolios may have served as a stabilizing factor for many covered institution." [13]

From such evaluations, the OCC and the other federal bank regulators have concluded that rather than causing losses to national banks, the Community Reinvestment Act has made a positive contribution to community revitalization across the country and has generally encouraged sound community development lending initiatives by regulated banking organizations.

[12] Elizabeth Laderman and Carolina Reid, "CRA Lending During the Subprime Meltdown," *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act*, a joint publication of the Federal Reserve Banks of Boston and San Francisco, February 2009, p. 122.

[13] Michael A. Stegman, testimony before the House Financial Services Committee on the subject of "Proposals to Enhance the Community Reinvestment Act," September 16, 2009, p. 2.

LISTING OF ATTACHMENTS TO APPENDIX C

Comptroller John C. Dugan, speech before the Enterprise Annual Network Conference, November 19, 2008.

Elizabeth Laderman and Carolina Reid, "CRA Lending During the Subprime Meltdown," *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act*, a joint publication of the Federal Reserve Banks of Boston and San Francisco, February 2009.

Lei Ding, Roberto G. Quercia, et al, "Risky Borrowers or Risky Mortgages: Disaggregating Effects Using Propensity Score Models," *Working Paper*, Center for Community Capital, December 2008.

Neil Bhutta and Glenn B. Canner, "Did the CRA Cause the Mortgage Market Meltdown?" *Community Dividend*, March 2009.

United States Commission on Civil Rights, "Civil Rights and the Mortgage Crisis," September 2009, pages 66-83.

Remarks by
John C. Dugan
Comptroller of the Currency
Before the
Enterprise Annual Network Conference
November 19, 2008

Thank you Mayor Rice. It's a real pleasure to have this opportunity to be here with you today at the Enterprise Annual Network Conference.

Growing up in Washington, D.C., I followed the work of Jim Rouse first-hand. He captivated us all with his festival marketplaces and his inspiring vision for America's cities. Baltimore, with its Inner Harbor and diverse neighborhoods, is one of the many places where his vision and the work of the Enterprise Foundation came alive and flourished.

Today, Enterprise brings that same spirit of innovation to projects benefiting low- and moderate-income households and green communities around the country. In the capable hands of Doris Koo and the Enterprise Board, Enterprise continues to be a respected intermediary that has raised and invested over $8 billion to support the creation of affordable homes. It is also currently investing in communities at a rate of $1 billion annually.

I would like to spend my time with you today discussing the current credit environment and the important contribution that community reinvestment makes – to individual communities and to our economy as a whole.

We continue to face an extraordinary market situation and unprecedented challenges to the flow of credit. These circumstances have put considerable pressure on borrowers and lenders alike. As so many people in this audience have witnessed, helping

low- and moderate-income individuals and families that Enterprise serves has become even more challenging with disruptions in the financial markets.

The good news is that although we have many challenges ahead, important steps have been taken to assure financial stability, and the financial system is definitely in better shape than it was six weeks ago. Our focus is now on continuing to reinforce that stability; enhancing the availability of sound credit; and moving forward with strategies to reduce the number of homes lost to foreclosure.

On this last point, I recognize that there is considerable discussion about the need for the government to provide direct funding to reduce foreclosures, and I think it's safe to assume that this debate will continue into the next Administration. In the meantime, however, I do think it's important to recognize the concerted and considerable efforts of the public, private, and nonprofit sectors to make meaningful progress. As many of you may know, the OCC has spearheaded an effort to collect reliable, validated, loan level data on the performance of individual mortgages throughout the country that are serviced by the large national banks that we supervise. The Office of Thrift Supervision has joined us in this effort, and together we have begun producing a quarterly Mortgage Metrics report that provides the best available information on more than 60 percent of all mortgages outstanding in the United States. The Mortgage Metrics report covering the second quarter of 2008 shows that new loan modifications – and I don't mean payment plans – increased by 50 percent from the previous quarter, with modifications accounting for nearly 45 percent of all workouts.[1] Our preliminary analysis of third quarter data shows that this trend is continuing, and we expect soon to have more data about the types of modifications being employed. Moreover, major lenders that we supervise have

recently announced comprehensive, proactive, and streamlined mortgage loan modification and loss mitigation programs. And a number of mortgages are being restructured and refinanced through Fannie Mae, Freddie Mac, and HUD's FHA Secure programs. While these actions and programs may not prove fully adequate to address the problem, they do constitute meaningful steps in the right direction.

Turning back to financial stability, I believe that all banks have benefited from the stabilizing effect of recent aggressive actions by the government to inject capital, to provide guarantees on bank deposit accounts and certain liabilities, and to ensure the availability of backup liquidity to our nation's banking organizations. At the same time, we recognize that banks must continue to perform their essential function of extending credit – in a safe and sound manner – to meet the needs of creditworthy borrowers.

In an interagency statement issued just last week, the federal banking agencies emphasized this – stressing both the importance of banks fulfilling their fundamental roles as credit intermediaries through prudent lending practices, and the need to work with existing borrowers to avoid preventable foreclosures. We support recent efforts by banking organizations to implement systematic loan modification protocols, and the objective of attaining modifications that borrowers are able to sustain. The OCC and the other federal banking supervisors are committed to fully supporting their regulated banking organizations as they work to implement effective and sound loan modification programs.

Indeed, all of these efforts are fully in keeping with the OCC's mission and the way that we approach our regulatory and supervisory responsibilities, including those under the Community Reinvestment Act. CRA supports banks doing what they do best

and what they should want to do well – making viable lending and investment decisions, with acceptable rates of return, consistent with their business plans, in their own communities.

Given recent public discussion, it is appropriate to ask about the role that CRA plays in the credit challenges we face on so many fronts. In my view, it plays a very positive role. Unfortunately, however, current market disruptions have clouded the accomplishments that CRA has generated, many of which we recognized last year during its 30th anniversary. There are even some who suggest that CRA is responsible for the binge of irresponsible subprime lending that ignited the credit crisis we now face.

Let me squarely respond to this suggestion: I categorically disagree. While not perfect, CRA has made a positive contribution to community revitalization across the country and has generally encouraged sound community development lending, investment, and service initiatives by regulated banking organizations.

CRA is not the culprit behind the subprime mortgage lending abuses, or the broader credit quality issues in the marketplace. Indeed, the lenders most prominently associated with subprime mortgage lending abuses and high rates of foreclosure are lenders not subject to CRA. A recent study of 2006 Home Mortgage Disclosure Act data showed that banks subject to CRA and their affiliates originated or purchased only six percent of the reported high cost loans made to lower-income borrowers within their CRA assessment areas. [2]

Over the last ten years, CRA has helped spur the doubling of lending by banking institutions to small businesses and farms, to more than $2.6 trillion. During this period, those lenders more than tripled community development lending to $371 billion.[3]

Overwhelmingly, this lending has been safe and sound. For example, single family CRA-related mortgages offered in conjunction with NeighborWorks organizations have performed on a par with standard conventional mortgages.[4] Foreclosure rates within the NeighborWorks network were just 0.21 percent in the second quarter of this year, compared to 4.26 percent of subprime loans and 0.61 percent for conventional conforming mortgages.[5] Similar conclusions were reached in a study by the University of North Carolina's Center for Community Capital, which indicates that high-cost subprime mortgage borrowers default at much higher rates than those who take out loans made for CRA purposes.[6]

Of course, not all single-family CRA mortgages performed this well, because these loans have experienced the same stresses as most other types of consumer credit. Nevertheless, a number of studies have shown that when these loans are made in conjunction with a structured homebuyer counseling program, mortgage performance is substantially improved.[7] Affordable CRA multi-family projects utilizing low-income housing tax credits have also performed well, with an average foreclosure rate through 2006 of 0.08 percent on the underlying mortgages.[8]

During the community tours I have taken over the past three years, I personally witnessed the positive impact that CRA partnerships have had in transforming communities, expanding homeownership, and promoting job creation and economic development. These partnerships between communities and financial institutions have also helped house senior citizens and people with special needs, built community facilities, and assisted small businesses serving low-income areas.

In the Anacostia community of D.C., an area of economic resurgence that I have toured on several occasions, Enterprise's Wheeler Creek project was a critical link in stabilizing a neighborhood that had been plagued by a troubled public housing project. Wheeler Creek involved development of for-sale homes in conjunction with a bank community development corporation, as well as a bank's purchase of low-income housing tax credits for rental housing.

CRA projects also act as catalysts for other investments, job creation, and housing development. Such infusion of capital into these markets leverages public subsidies, perhaps as much as 10 to 25 times, by attracting additional private capital. Many of these CRA equity investments can be made under national banks' public welfare investment authority. These bank investments have grown significantly over the years – totaling more than $25 billion over the past decade. Indeed, the OCC recently held its Managers Conference at the Grand Masonic Lodge on North Charles Street here in Baltimore, a public welfare investment funded by a national bank. To meet the demand to invest in similar types of projects, OCC successfully sought legislation last year to raise the cap on public welfare investments from 10 to 15 percent of a bank's capital and surplus. This rise will enable the amount of such investments to increase by as much as $30 billion.

Interpreting national bank public welfare investment authority, OCC recently issued an approval related to energy conservation that may be of interest to Enterprise. This approval clarifies that such authority extends to bank investments in renewable energy tax credits primarily benefiting low- and moderate-income individuals and areas, government revitalization areas, rural underserved and distressed middle-income areas, and designated disaster areas. The investing bank can claim the credits and, in some

instances, receive positive CRA consideration under the investment or community development tests.

Your Green Communities initiative, and others like it, may be able to take advantage of these tools to obtain additional resources under the public welfare investment authority, CRA, and other available incentives to build many more sustainable homes and communities across the country. The research and examples described on your Web site demonstrate that moving to a green economy can generate a significant number of jobs, stimulate economic growth, and create a healthy environment in communities that Enterprise serves.

As the credit market stabilizes, CRA-driven initiatives can also help us tackle challenges such as the preservation of homeownership opportunities and rental housing development. Opportunities also lie ahead for bank partnerships with Enterprise affiliates and other nonprofits to help mitigate the impact of foreclosures in communities across the country.

The National Community Stabilization Trust, which Enterprise and other national housing intermediaries recently formed, is an important new initiative to help coordinate the transfer of foreclosed properties from financial institutions, servicers, investors, and government-sponsored enterprises to local housing organizations funded by the Neighborhood Stabilization Program. The Trust has developed standardized transaction formats and valuation and pricing models to assist local programs in making acquisition decisions and sales efficiently.

For our part at the OCC, we have sought to clarify how banks might receive CRA consideration for the donation and discounted sales of foreclosed properties in

conjunction with these initiatives. We co-hosted a conference earlier this summer that highlighted many effective strategies employed by nonprofits and public agencies for coping with the rising number of foreclosures. We now have a Neighborhood Stabilization page on the OCC's Web site, which will serve as a resource to nonprofits and public agencies seeking to purchase foreclosed properties in your communities.

We have also hired a Community Affairs Officer, Vonda Eanes, to specialize in working with nonprofits and public agencies across the country to focus on neighborhood stabilization and serve as a resource for banks and communities developing initiatives regarding foreclosed property.

Vonda joins the OCC's Community Affairs department, headed by Barry Wides. The responsibilities of this department include sharing best practices, providing guidance on regulatory issues, and explaining to bankers how these initiatives can help their CRA performance. I encourage you to introduce yourself to Vonda, Barry, and the other OCC representatives attending this conference. They hope to learn more about how the OCC might assist your efforts.

Our nation has accomplished much since CRA's passage. Perhaps even Jim Rouse could not imagine how much the flow of CRA-related capital and credit has contributed to affordable homeownership, jobs and business development, and healthy neighborhoods. In today's challenging economy, the need for the positive results that CRA has generated are even greater, and the same is true for organizations like Enterprise.

Thank you very much.

[1] "OCC and OTS Mortgage Metrics Report: Disclosure of National Bank and Federal Thrift Mortgage Loan Data," January-June 2008. View the report at http://www.occ.gov/ftp/release/2008-105a.pdf.
[2] Glenn B. Canner, Senior Advisor, Federal Reserve Board, "2007 HMDA Data: Identifying Trends and Potential Regulatory Concerns," presentation at the Consumer Bankers Association's 2008 CRA and Fair Lending Colloquium, October 27, 2008.
[3] "Findings from Analysis of Nationwide Summary Statistics for Community Reinvestment Act Data," *FFIEC Fact Sheets*, July 1999 – July 2008.
[4] "Low-Income Mortgage Borrowers with the Benefit of Homeownership Counseling Do Substantially Better than General Market, According to New Foreclosure Analysis," NeighborWorks America, *News Release*, September 25, 2008.
[5] *Ibid*.
[6] Lei Ding, Roberto G. Quercia, Janneke Ratcliffe, Wei Li, "Risky Borrowers or Risky Mortgages: Disaggregating Effects Using Propensity Score Models," University of North Carolina, Center for Community Capital, October 2008.
[7] "Measuring the Delivery Costs of Prepurchase Homeownership Education and Counseling," NeighborWorks America, May 2005, pp. 11-15.
[8] Ernst and Young LLP, "Understanding the Dynamics IV: Housing Tax Credit Investment Performance," 2007.

CRA Lending During the Subprime Meltdown

Elizabeth Laderman and Carolina Reid[*]
Federal Reserve Bank of San Francisco

The current scale of mortgage delinquencies and foreclosures, particularly in the subprime market, has sparked a renewed debate over the Community Reinvestment Act (CRA) and the regulations governing home mortgage lending. On one side, detractors argue that the CRA helped to precipitate the current crisis by encouraging lending in low- and moderate-income neighborhoods.[1] Economist Thomas DiLorenzo, for instance, wrote that the current housing crisis is "the direct result of thirty years of government policy that has forced banks to make bad loans to uncreditworthy borrowers."[2] Robert Litan of the Brookings Institution similarly suggested that the 1990s enhancement of the CRA may have contributed to the current crisis. "If the CRA had not been so aggressively pushed," Litan said, "it is conceivable things would not be quite as bad. People have to be honest about that."[3]

On the other side, advocates of the CRA point to a number of reasons why the regulation should not be blamed for the current subprime crisis. Ellen Seidman, formerly the director of the Office of Thrift Supervision, points out that the surge in subprime lending occurred long after the enactment of the CRA, and that in 1999 regulators specifically issued guidance to banks imposing restraints on the riskiest forms of subprime lending.[4] In addition, researchers at the Federal Reserve Board of Governors have reported that the majority of subprime loans were made by independent mortgage lending companies, which are not covered by the CRA and receive less regulatory scrutiny overall.[5] In addition to being excluded from CRA obligations, independent mortgage companies are not regularly evaluated for "safety and soundness" (a key component of the regulatory oversight of banks) nor for their compliance with consumer protections such as the Truth in Lending Act and the Equal Credit Opportunity Act.[6] This has created what the late Federal Reserve Board Governor Ned Gramlich aptly termed, a "giant hole in the supervisory safety net."[7]

What has been missing in this debate has been an empirical examination of the performance of loans made by institutions regulated under the CRA, versus those made by independent mortgage banks. The ability to conduct this research has been limited by the lack of a dataset that links information on loan origination with information on loan performance. In this study, we use a unique dataset that joins lender and origination

---

* *This article is based on a longer working paper that is part of a Federal Reserve Bank of San Francisco's Working Paper Series, available at http://www.frbsf.org/publications/community/wpapers/2008/wp08-05.pdf.*

1 *Walker, David. Interview with Larry Kudlow. Lessons from Subprime. CNBC, April 4, 2008, and Steve Moore. Interview with Larry Kudlow. Kudlow & Company. CNBC, March 26, 2008.*

2 *DiLorenzo, Thomas J. "The Government-Created Subprime Mortgage Meltdown." September 2007, available at http://www.lewrockwell.com/dilorenzo/dilorenzo125.html.*

3 *Weisman, Jonathan (2008). "Economic Slump Underlines Concerns About McCain Advisers." Washington Post, April 2, 2008, A01.*

4 *Seidman, Ellen. "It's Still Not CRA," September 2008, available at http://www.newamerica.net/blog/asset-building/2008/its-still-not-cra-7222.*

5 *Avery, Robert B., Raphael W. Bostic, Paul S. Calem, and Glenn B. Canner (2007). "The 2006 HMDA Data." Federal Reserve Bulletin 94: A73–A109. See also: Kroszner, Randall S. (2008). "The Community Reinvestment Act and the Recent Mortgage Crisis." Speech given at the Confronting Concentrated Poverty Policy Forum, Board of Governors of the Federal Reserve System, Washington, DC, December 3, 2008.*

6 *The federal laws that govern home mortgage lending, including the Equal Credit Opportunity Act, the Home Mortgage Disclosure Act, and the Truth in Lending Act, apply to both depository institutions and nonbank independent mortgage companies. However, the enforcement of these laws and the regulations that implement them differ greatly between banks and nonbanks. Banks are subject to ongoing supervision and examination by their primary federal supervisor. In contrast, the Federal Trade Commission is the primary enforcer of these laws for nonbanks and only conducts targeted investigations based on consumer complaints.*

7 *Gramlich, Edward M. (2007). "Booms and Busts: The Case of Subprime Mortgages." Paper presented in Jackson Hole, Wyoming, August 31, 2007, available at http://www.urban.org/UploadedPDF/411542_Gramlich_final.pdf.*

information from the Home Mortgage Disclosure Act (HMDA) reports with data on loan performance from Lender Processing Services, Inc. Applied Analytics (LPS).[8] We thus have access to information on borrower characteristics (including race, income, and credit score), loan characteristics (including its loan-to-value ratio, whether it was a fixed or adjustable-rate mortgage, and the existence of a prepayment penalty), institutional characteristics (whether the lending institution was regulated under the CRA and the loan source), and loan performance (delinquency and foreclosure).

In this article, we use these data to examine several interrelated questions:

- What is the neighborhood income distribution of loans made by independent mortgage companies versus those made by institutions regulated under the CRA?
- After controlling for borrower credit risk, is there a difference in the foreclosure rates for loans made by independent mortgage companies versus those made by institutions regulated under the CRA?
- How do other factors, such as loan terms and loan source, influence the likelihood of foreclosure?
- How do the factors that influence foreclosure differ in low- and moderate-income neighborhoods compared with the factors in middle- and upper-income neighborhoods?

The article is organized into four sections. In the first section, we provide background information on the CRA and review the existing literature on the relationship between the CRA and mortgage lending in low- and moderate-income communities. In the second section, we describe our data and methodology. The third section presents the results of our models. We conclude with the policy implications of this study and present suggestions for further research.

The Community Reinvestment Act

In 1977, concerned about the denial of credit to lower-income communities—both minority and white—Congress enacted the Community Reinvestment Act. The CRA encourages federally insured banks and thrifts to meet the credit needs of the communities they serve, including low- and moderate-income areas, consistent with safe-and-sound banking practices. Regulators consider a bank's CRA record in determining whether to approve that institution's application for mergers with, or acquisitions of, other depository institutions. A key component of the CRA is the Lending Test (which accounts for 50 percent of a Large Bank's CRA rating), which evaluates the bank's home mortgage, small-business, small-farm, and community-development lending activity. In assigning the rating for mortgage lending, examiners consider the number and amount of loans to low- and moderate-income borrowers and areas and whether or not they demonstrate "innovative or flexible lending practices."[9]

The CRA has generated significant changes in how banks and thrifts view and serve low- and moderate-income communities and consumers. Researchers who have studied the impact of the CRA find, on balance, that the regulations have reduced information costs and fostered competition among banks serving low-income areas, thereby generating larger volumes of lending from diverse sources and adding liquidity to the market.[10] In a detailed review, William Apgar and Mark Duda of the Joint Center for Housing Studies at Harvard University

8 *Formerly known as McDash Analytics.*

9 *As part of their CRA exam, large banks are also evaluated on their investments and services. Under the Investment Test, which accounts for 25 percent of the bank's CRA grade, the agency evaluates the amount of the bank's investments, its innovation, and its responsiveness to community needs. Under the Service Test, which makes up the remaining 25 percent of the bank's evaluation, the agency analyzes "the availability and effectiveness of a bank's systems for delivering retail banking services and the extent and innovativeness of its community development services." Different rules apply for Small and Intermediate Small institutions. For more complete details on the CRA regulations, visit http://www.ffiec.gov/cra/default.htm for text of the regulations and Interagency Q&A.*

10 *Avery, Robert B., Raphael W. Bostic, Paul S. Calem, and Glenn B. Canner (1996). "Credit Risk, Credit Scoring, and the Performance of Home Mortgages." Federal Reserve Bulletin 82: 621–48. See also: Avery, Robert B., Raphael W. Bostic, Paul S. Calem, and Glenn B. Canner (1999). "Trends in Home Purchase Lending: Consolidation and the Community Reinvestment Act." Federal Reserve Bulletin 85: 81–102; Michael S. Barr (2005). "Credit Where It Counts: The Community Reinvestment Act and Its Critics." New York University Law Review 80(2): 513–652; Belsky, Eric, Michael Schill, and Anthony Yezer (2001). The Effect of the Community Reinvestment Act on Bank and Thrift Home Purchase Mortgage Lending (Cambridge, MA: Harvard University Joint Center for Housing Studies); Evanoff, Douglas D., and Lewis M. Siegal (1996). "CRA and Fair Lending Regulations: Resulting Trends in Mortgage Lending." Economic Perspectives 20(6): 19–46; and Litan, Robert E., et al. (2001). The Community Reinvestment Act After Financial Modernization: A Final Report (Washington, DC: U.S. Treasury Department).*

concluded that the CRA has had a positive impact on low- and moderate-income communities. In particular, the study notes that "CRA-regulated lenders originate a higher proportion of loans to lower-income people and communities than they would if the CRA did not exist."[11]

Since the passage of the CRA, however, the landscape of financial institutions serving low- and moderate-income communities has changed considerably. Most notably, innovations in credit scoring, coupled with the expansion of the secondary market, have led to an explosion of subprime lending, especially in the last few years. According to one source, the subprime market accounted for fully 20 percent of all mortgage originations in 2005, with a value of over $600 billion.[12] Many of these loans were not made by regulated financial institutions; indeed, more than half of subprime loans were made by independent mortgage companies, and another 30 percent were made by affiliates of banks or thrifts, which also are not subject to routine examination or supervision.[13]

Given the large role played by independent mortgage companies and brokers in originating subprime loans, there has been growing interest in extending the reach of the CRA to encompass these changes in the financial landscape. Yet to date, there has been little research that has empirically assessed individual loan performance at CRA-regulated institutions versus loan performance at independent mortgage companies, particularly within low- and moderate-income areas. Instead, most of the existing literature has focused on determining the share of subprime lending in low-income communities and among different racial groups.[14] These studies, however, cannot assess whether loans made by institutions regulated by the CRA have performed better than those made by independent mortgage companies. Answering this question has been difficult given the lack of a single dataset that captures details on loan origination as well as details on loan performance.

A few recent studies attempt to match data from different sources to shed light on pieces of this puzzle. Researchers at Case Western's Center on Urban Poverty and Community Development used a probabilistic matching technique to link mortgage records from the HMDA data with locally recorded mortgage documents and foreclosure filings.[15] They found that the risk of foreclosure for higher-priced loans, as reported in the HMDA data, was 8.16 times higher than for loans that were not higher priced. They also found that loans originated by financial institutions without a local branch had foreclosure rates of 19.08 percent compared to only 2.43 percent for loans originated by local banks.

Another recent study released by the Center for Community Capital at the University of North Carolina uses a propensity score matching technique to compare the performance of loans made through a LMI-targeted community lending program (the Community Advantage Program [CAP] developed by Self-Help, a Community Development Financial Institution) to a sample of subprime loans in the McDash database.[16] They found that for borrowers with similar income and risk profiles, the estimated default risk was much lower for borrowers with a prime loan made through the community lending program than with a subprime loan. In addition, they found that broker-origination, adjustable-rate mortgages and prepayment penalties all increased the likelihood of default.

Both of these studies provide important insights into the relationship between subprime lending and foreclosure risk, and conclude that lending to low- and moderate-income communities is viable when those

---

11 Apgar, William, and Mark Duda (2003). "The Twenty-Fifth Anniversary of the Community Reinvestment Act: Past Accomplishments and Future Regulatory Challenges." Federal Reserve Bank of New York Economic Policy Review (June): 176.

12 Inside Mortgage Finance (2007). Mortgage Market Statistical Annual (Bethesda, MD: Inside Mortgage Finance Publications).

13 Avery, Brevoort, and Canner (2007). "The 2006 HMDA Data." See also: Kroszner (2008). "The Community Reinvestment Act."

14 See, for example: Avery, Robert B., Glenn B. Canner, and Robert E. Cook (2005). "New Information Reported Under HMDA and Its Application in Fair Lending Enforcement." Federal Reserve Bulletin (Summer 2005): 344–94; Gruenstein Bocian, Debbie, Keith Ernst, and Wei Li (2008). "Race, Ethnicity, and Bubprime Home Loan Pricing." Journal of Economics and Business 60: 110–24; and Calem, Paul S. Jonathan E. Hershaff, and Susan M. Wachter (2004). "Neighborhood Patterns of Subprime Lending: Evidence from Disparate Cities." Housing Policy Debate 15(3): 603–22.

15 Coulton, Claudia, Tsui Chan, Michael Schramm, and Kristen Mikelbank (2008). "Pathways to Foreclosure: A Longitudinal Study of Mortgage Loans, Cleveland and Cuyahoga County." Center on Urban Poverty and Community Development, Case Western University, Cleveland, Ohio.

16 Ding, Lei, Roberto G. Quercia, Janneke Ratcliffe, and Wei Li (2008). "Risky Borrowers or Risky Mortgages: Disaggregating Effects Using Propensity Score Models." Center for Community Capital, University of North Carolina, Chapel Hill.

loans are made responsibly. However, both studies are limited in certain important ways. Coulton and her colleagues do not examine the regulatory oversight of the banks that made the loans, and are only able to control for a limited number of borrower and loan characteristics. Ding and his colleagues are constrained by having access only to a relatively narrow subset of loans securitized by the CAP program. Because the sample of CAP mortgages may not be representative of a national sample of mortgage borrowers, and especially since being part of the CAP demonstration may influence the lender's behavior and the quality of the loans they sell to Self-Help, the study's findings may not be applicable to lending in low- and moderate-income areas more generally.

In this study, we attempt to build on these research contributions by: (a) examining the performance of a sample of all loans (prime and subprime, and not limited to a specific demonstration program) made in California during the height of the housing boom; and (b) controlling for a wider range of variables, examining not only borrower characteristics, but assessing the influence of loan and lender variables on the probability of foreclosure as well.

Methodology

The quantitative analysis we use relies on a unique dataset that joins loan-level data submitted by financial institutions under the Home Mortgage Disclosure Act (HMDA) of 1975[17] and a proprietary data set on loan performance collected by Lender Processing Services, Inc. Applied Analytics (LPS). Using a geographic crosswalk file that provided corresponding zip codes to census tracts (weighted by the number of housing units), data were matched using a probabilistic matching method that accounted for the date of origination, the amount of the loan, the lien status, the type of loan, and the loan purpose. To check the robustness of the matching procedure, we compared the sample statistics from the matched sample with the same sample statistics from the unmatched sample and found them to be similar. The LPS database provides loan information collected from approximately 15 mortgage servicers, including nine of the top ten, and covers roughly 60 percent of the mortgage market. Because the LPS includes both prime and subprime loans, the sample of loans tends to perform better than the sample in other databases such as Loan Performance First American's subprime database. However, we believe that for this paper it is important to consider both prime and subprime loans in evaluating the performance of loans made by institutions regulated under the CRA, since presumably the original intent of the CRA was to extend "responsible" credit to low- and moderate-income communities.

For this paper, we limit our analysis to a sample of conventional, first-lien, owner-occupied loans originated in metropolitan areas in California between January 2004 and December 2006. This time period represents the height of the subprime lending boom in California. We also limit our analysis in this instance to home purchase loans, although other studies have noted that much of the demand for mortgages during this period was driven by refinance loans and this will certainly be an area for further study. This leaves us with 239,101 matched observations for our analysis.

Borrower and Housing Market Characteristics

For borrower characteristics, we include information from the HMDA data on borrower race and/or ethnicity. Most of the existing research on subprime lending has shown that race has an independent effect on the likelihood of obtaining a higher-priced loan.[18] HMDA reporting requirements allow borrowers to report both an ethnicity designation (either "Hispanic or Latino" or "Not Hispanic or Latino") and up to five racial designations (including "white" and "African American" or "black"). We code and refer to borrowers who were

17 *Enacted by Congress in 1975, the Home Mortgage Disclosure Act (HMDA) requires banks, savings and loan associations, and other financial institutions to publicly report detailed data on their mortgage lending activity. A depository institution (bank, savings and loan, thrift, and credit union) must report HMDA data if it has a home office or branch in a metropolitan statistical area (MSA) and has assets above a threshold level that is adjusted upward every year by the rate of inflation. For the year 2006, the asset level for exemption was $35 million. A nondepository institution must report HMDA data if it has more than $10 million in assets and it originated 100 or more home purchase loans (including refinances of home purchase loans) during the previous calendar year. Beginning in 2004, lenders were required to report pricing information related to the annual percentage rate of "higher-priced" loans, defined as a first-lien loan with a spread equal to or greater than three percentage points over the yield on a U.S. Treasury security of comparable maturity.*

18 *Avery, Canner, and Cook (2005). "New Information Reported Under HMDA."*

identified as "Hispanic or Latino" and "white" as Latino, borrowers who were identified as "African American or black" as black, and borrowers who were identified as "Asian" as Asian. We code borrowers and refer to them as "white" if they are "Not Hispanic or Latino" and only identified as "white" in the race field.

We use two other borrower-level variables in the analyses that follow. From the HMDA data, we include the borrower income, scaled in $1,000 increments. From the LPS data, we include the FICO credit score of the borrower at origination.[19] Because FICO scores are generally grouped into "risk categories" rather than treated as a continuous variable, we distinguish between "low" (FICO < 640), "middle" (640 >= FICO < 720) and "high" (FICO >= 720) credit scores.[20] We assume that lower credit scores would lead to a higher probability of delinquency and, subsequently, foreclosure.

At the neighborhood level, we include the FFIEC income designation for each census tract, the same measure that is used in evaluating a bank's CRA performance. Low-income census tracts are those that have a median family income less than 50 percent of the area median income; moderate-income census tracts are those that have a median family income at least 50 percent and less than 80 percent of the area median income; middle-income census tracts are those that have a median family income at least 80 percent and less than 120 percent of the area median income; and upper-income are those with a median family income above 120 percent of the area median income. In addition to tract income, we also include variables from the 2000 Census that attempt to capture the local housing stock, including the percent of owner-occupied units and the median year houses in the census tract were built.[21] We also include the tract's capitalization rate, defined as a ratio of the tract's annualized median rent divided by the median house value. A larger value for this measure is consistent with lower expected price appreciation or more uncertain future house prices.[22] We would expect this variable to be positively associated with the relative likelihood of foreclosure.

In addition to neighborhood-level variables, we also include a variable on the performance of the local housing market. Economic research conducted at the Federal Reserve Bank of San Francisco and the Federal Reserve Bank of Boston has shown that house price dynamics are an important predictor of foreclosure.[23] Because current house values may be endogenously related to foreclosure rates, we include an OFHEO variable that captures house price changes in the MSA/metropolitan division in the two years prior to the loan origination.[24] We assume that loans originated during a time of significant house price appreciation will be more likely to be in foreclosure, since it is areas that saw prices rising rapidly relative to fundamentals that have seen the most dramatic realignment of prices.

Loan Characteristics

In the models that follow, we also include various loan characteristics that may affect the probability of foreclosure. From HMDA, we include whether or not the loan was a "higher-priced" loan. Researchers have shown a strong correlation between higher-priced loans and delinquency and foreclosure.[25] Since higher-priced loans are presumably originated to respond to the cost of lending to a higher risk borrower (such as those with

---

19 Although there are several credit scoring methods, most lenders use the FICO method from Fair Isaac Corporation.

20 In running the models with FICO treated as a continuous variable, foreclosure risk increased monotonically with FICO score declines, and did not significantly affect the other variables in the model.

21 In some models we tested, we also controlled for neighborhood-level variables such as the race distribution and educational level of the census tract, but these proved not to be significant in many of the model specifications, and tended to be highly correlated with the FFIEC neighborhood income categories. In addition, we were concerned about including too many 2000 census variables that may not reflect the demographic changes that occurred in neighborhoods in California between 2000 and 2006, years of rapid housing construction and price appreciation.

22 Calem, Hershaff, and Wachter (2004). "Neighborhood Patterns of Subprime Lending."

23 Doms, Mark, Frederick Furlong, and John Krainer (2007). "Subprime Mortgage Delinquency Rates." Working Paper 2007-33, Federal Reserve Bank of San Francisco. See also: Gerardi, Kristopher, Adam Hale Shapiro, and Paul S. Willen (2007). "Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures." Working Paper 07-15, Federal Reserve Bank of Boston.

24 We use OFHEO instead of Case Shiller because Case Shiller is available only for Los Angeles and San Francisco and we wanted to capture changes in house-price appreciation across a greater number of communities, particularly those in California's Central Valley.

25 Pennington-Cross, Anthony (2003). "Performance of Prime and Nonprime Mortgages." Journal of Real Estate Finance and Economics 27(3): 279–301. See also: Gerardi, Shapiro, and Willen (2007). "Subprime Outcomes;" and Immergluck, Dan (2008). "From the Subprime to the Exotic: Excessive Mortgage Market Risk and Foreclosures." Journal of the American Planning Association 74(1): 59–76.

impaired credit scores), it is not surprising that this relationship exists. However, the current crisis has also shed light on the fact that many loans originated during the height of the subprime lending boom included additional features that can also influence default risk, such as adjustable mortgage rates, prepayment penalties, and the level of documentation associated with the loan.[26] For this reason, we include a wide range of variables in the LPS data on the terms of the loan, including the loan-to-value ratio, whether or not the loan has a fixed interest rate, whether or not it included a prepayment penalty at origination, and whether or not it was a fully documented loan. We also include data on the value of the monthly payment, scaled at $500 increments. While standard guidelines for underwriting suggest that monthly costs should not exceed 30 percent of a household's income, recent field research suggests that many loans were underwritten at a much higher percent.

Lender Characteristics

To determine whether or not a loan was originated by a CRA-regulated institution, we attach data on lender characteristics from the HMDA Lender File, following the insights of Apgar, Bendimerad, and Essene (2007)[27] on how to use HMDA data to understand mortgage market channels and the role of the CRA. We focus on two variables: whether or not the lender is regulated under the CRA, and whether or not the loan was originated within the lender's CRA-defined assessment area, generally defined as a community where the bank or thrift maintains a branch location.[28]

As was described above, CRA regulations apply only to the lending activity of deposit-taking organizations and their subsidiaries (and, in some instances, their affiliates). Independent mortgage companies not only fall outside the regulatory reach of the CRA but also a broader set of federal regulations and guidance designed to protect the "safety and soundness" of the lender.[29] In contrast to CRA-regulated institutions, independent mortgage companies are subject to state licensing and monitoring requirements and do not undergo routine examination.

We further distinguish between loans made by a CRA-regulated lender outside its assessment area and those made by a CRA-regulated lender within its assessment area. Mortgages made by banks and thrifts in their assessment areas are subject to the most detailed CRA review, including on-site reviews and file checks. The assessment-area distinction also correlates with differences in the way mortgages are marketed and sold.[30] For example, loans made to borrowers living inside the assessment area are likely to come through the institution's retail channel. In contrast, loans made to borrowers living outside the organization's CRA-defined assessment area are more likely to be originated by loan correspondents or mortgage brokers. We assume that if a lending entity subject to the CRA has a branch office in a metropolitan statistical area (MSA), then that MSA is part of the entity's assessment area. Loans made in MSAs where the lending entity does not have a branch office are assumed to be originated outside the entity's assessment area.[31]

Building on recent research suggesting the importance of mortgage brokers during the subprime lending boom,[32] we also include a loan-source variable that captures the entity responsible for the loan origination, even if the loan eventually was financed by a CRA-regulated lender or independent mortgage company. We control for whether the loan was made by a retail institution, a correspondent bank, or a wholesale lender. Wholesale lenders are third-party originators, generally mortgage brokers, that market and process the mortgage application. One important methodological note is that our models that include the loan-source variable are run on a smaller sample of loans. In these models, we

26 *Crews Cutts, Amy, and Robert Van Order (2005). "On the Economics of Subprime Lending." Journal of Real Estate Finance and Economics 30(2): 167–97. See also: Immergluck (2008). "From the Subprime to the Exotic."*

27 *Apgar, William, Amal Bendimerad, and Ren Essene (2007). Mortgage Market Channels and Fair Lending: An Analysis of HMDA Data (Cambridge, MA: Harvard University, Joint Center for Housing Studies).*

28 *We exclude loans originated by credit unions from this analysis; credit unions are not examined under the CRA and comprise a relatively small proportion of the home-purchase mortgage market.*

29 *Apgar, Bendimerad, and Essene (2007). Mortgage Market Channels and Fair Lending.*

30 *Ibid.*

31 *Our methodology is consistent with that of Apgar, Bendimerad, and Essene (2007), who assume that if a lending entity subject to the CRA has a branch office in a particular county, then that county is part of the entity's assessment area.*

32 *Ernst, Keith, D. Bocia, and Wei Li (2008). Steered Wrong: Brokers, Borrowers, and Subprime Loans (Durham, NC: Center for Responsible Lending).*

exclude loans where loan source is equal to "servicing right" due to endogeneity concerns.[33] Some financial institutions specialize in servicing "scratch and dent" mortgages, which, by their nature, would be more likely to foreclose.[34] Indeed, in early models we found loans obtained through a servicing right were significantly more likely to be in foreclosure than loans originated by any other loan source.

Findings

In Table 1 (at the end of this article), we present simple descriptive statistics that show the distribution of loan originations made by CRA-regulated institutions (CRA lenders) versus independent mortgage companies (IMCs), stratified by neighborhood income level. The table demonstrates the important role that IMCs have played in low- and moderate-income communities in California during the subprime boom. While CRA lenders originated more loans in low- and moderate-income tracts than did IMCs, IMCs originated a much greater share of higher-priced loans in these communities. Indeed, more than half of the loans originated by IMCs in low-income communities were higher priced (52.4 percent), compared with 29 percent of loans made by CRA lenders; in moderate-income communities, 46.1 percent of loans originated by IMC lenders were higher priced, compared with 27.3 percent for CRA lenders. In addition, 12 percent of the loans made by IMCs in low-income census tracts and 10.3 percent of loans in moderate-income census tracts are in foreclosure, compared with 7.2 percent of loans made by CRA lenders in low-income census tracts and 5.6 percent in moderate-income census tracts.

It is also worth noting the relatively small share of loans that were originated in low- and moderate-income communities; only 16 percent of loans made by CRA lenders were located in low- and moderate-income census tracts. IMCs made a slightly greater share of their total loans (20.5 percent) in low- and moderate-income communities. The relatively limited share of lending in low- and moderate-income communities may be due in part to the high cost of housing in California, yet it also suggests that on the whole, lending in low- and moderate-income communities remained a relatively small share of the lending market for regulated financial institutions, despite the incentive of the CRA.

These descriptive statistics, however, do not control for the wide range of borrower and loan characteristics that may influence the likelihood of foreclosure. For example, might the higher rates of foreclosure among IMC-originated loans be due to different risk profiles of the borrowers themselves? In the following tables, we present a series of binomial logistic regression models that predict the likelihood of a loan being in foreclosure, controlling for various borrower and loan characteristics. In all the models, we cluster the standard errors by census tract because standard errors are likely not independent across time within tracts. We also examined the correlation among the independent variables in each of the models and found that although many of the factors we include are interrelated, the models perform well and the coefficients and standard errors do not change erratically across different model specifications. We present the findings as odds ratios to assist in interpreting the coefficients.

In Table 2, we present the full model, including all variables with the exception of loan source. Several findings stand out. First, metropolitan house-price changes do have a significant effect on the likelihood of foreclosure. Rapid house-price appreciation in the two years preceding origination significantly increases the likelihood of foreclosure (odds ratio 1.26). This is consistent with previous research that has linked foreclosures and delinquencies to local housing market conditions, particularly in California, where house prices rose quickly in relation to fundamentals and where subsequent corrections have been quite dramatic.[35] A higher percent of owner-occupied housing in a tract and more recent construction both also seem to increase the likelihood of foreclosure, but only slightly. The tract's capitalization rate is not significant.

Second, and not surprisingly, FICO scores matter. A borrower with a FICO score of less than 640 is 4.1 times

33 *"Servicing right" as the loan source means that only the servicing rights were purchased, not the whole loan. The lender was likely not involved in the credit decision or in determining the credit criteria. In some cases, the loan itself may not be salable or may be damaged ("scratch & dent"). Damaged loans are usually impaired in some way, such as missing collateral or an imperfect note/lien.*

34 *Pennington-Cross, Anthony and Giang Ho (2006). "Loan Servicer Heterogeneity and the Termination of Subprime Mortgages." Working Paper 2006-024A, Federal Reserve Bank of St. Louis.*

35 *Doms, Furlong, and Krainer (2007). "Subprime Mortgage Delinquency Rates."*

more likely to be in foreclosure than a borrower with a FICO score of more than 720; for borrowers with a FICO score between 640 and 720, the odds ratio is 2.68. We also find that race has an independent effect on foreclosure even after controlling for borrower income and credit score. In particular, African American borrowers were 1.8 times as likely as white borrowers to be in foreclosure, whereas Latino and Asian borrowers were, respectively, 1.4 and 1.3 times more likely to be in foreclosure as white borrowers.[36] The income of the neighborhood also seems to have some effect on the foreclosure rate. Loans located in low-income tracts were 1.8 times more likely to be in foreclosure than those in upper-income tracts, with the risk declining monotonically as the income of the neighborhood increases.

Yet the model shows that even with controls for borrower characteristics included, the terms of the loan matter. Consistent with previous research, we find that higher-priced loans are significantly more likely (odds ratio 3.2) to be in foreclosure than those not designated as higher priced in the HMDA data. But we also find that other loan features—such as the presence of a prepayment penalty at origination, a fixed rate interest loan, a high loan-to-value ratio, a large monthly payment in relation to income, and the loan's level of documentation—all have a significant effect on the likelihood of foreclosure, even after controlling for whether the loan was a higher-priced loan or not. A fixed interest rate significantly and strongly reduces the likelihood of foreclosure (odds ratio 0.35), as does the presence of full documentation (odds ratio 0.61). An increase of ten percentage points in the loan-to-value ratio—for example, from 80 to 90 percent loan-to-value—increases the likelihood of foreclosure by a factor of 3.0.

What is interesting, however, is that even after controlling for this wide range of borrower, neighborhood, and loan characteristics, loans made by lenders regulated under the CRA were significantly less likely to go into foreclosure than those made by IMCs (odds ratio 0.703). This provides compelling evidence that the performance of loans made by CRA-regulated institutions has been significantly stronger than those made by IMCs.

Even more striking is what we find when we present the same model with the CRA lender status broken down by loans made within the CRA lenders' assessment area and loans made outside the CRA lenders' assessment area (with the omitted category being loans originated by IMCs). Presented in the second column of the table, we find that loans made by CRA lenders in their assessment areas were half as likely to be in foreclosure as loans made by IMCs (odds ratio 0.53). For loans made by a CRA lender outside its assessment area, the odds ratio is 0.87. In other words, loans made by CRA lenders within their assessment areas, which receive the greatest regulatory scrutiny under the CRA, are significantly less likely to be in foreclosure than those made by independent mortgage companies that do not receive the same regulatory oversight.

In Table 3, we add information about the source of the loan. As discussed earlier, we omit observations where the loan source is indicated as "servicing right." [37] The model demonstrates the importance of the originating mortgage-market channel in the performance of the loan. While the findings for other variables remained similar to those in models presented above, we find significant differences in the loan performance among loans originated at the retail branch, by a correspondent lender, or by a wholesale lender/mortgage broker. In particular, loans originated by a wholesale lender were twice as likely to be in foreclosure as those originated by a retail branch. This is a significant finding, and it supports other research that has shown that there were significant differences between broker and lender pricing on home loans, primarily on mortgages originated for borrowers with weaker credit histories.[38] Interestingly, the inclusion of loan source also weakens the effect of the CRA variables. While loans made by CRA lenders within their assessment area are still less likely to go into foreclosure than those made by IMCs (an odds ratio of 0.743), the coefficient for CRA loans made outside the assessment area is no longer significant. This suggests that the origination channel is a critical factor in determining the likelihood of foreclosure, even for CRA-regulated institutions.

---

36 In some additional preliminary analysis, we interacted the race variables with income and found some variation among the coefficients. For example, while African American borrowers at all income levels were more likely to be in foreclosure, for Asian borrowers, as income went up, the risk of foreclosure decreased compared to white borrowers. The story for Latino borrowers was more mixed and warrants further research. However, these interaction terms did not meaningfully alter the other coefficients, and we do not include the interaction terms here.

37 This decreases our sample size from 239,101 to 195,698.

38 Ernst, Bocia, and Li (2008). Steered Wrong.

The Performance of CRA Lending in Low- and Moderate-Income Census Tracts

While the models above control for the income category of the neighborhood, they do not explore the relative performance of loans from CRA-regulated institutions within low- and moderate-income census tracts. In other words, on average, the loan performance of CRA lenders may be better than that of IMCs, but does this hold true within low- and moderate-income census tracts, the areas that are intended to benefit the most from the presence of the CRA? In Tables 4–7, we replicate our analysis above by looking specifically at what happens when we stratify the models by neighborhood income level. For each neighborhood classification (low, moderate, middle, and upper), we present two models: the first including borrower and loan characteristics, and the second adding the loan source. Some interesting differences emerge, both in comparison to the full model and among the models for the different neighborhood income categories.

Regarding the restriction of the sample to low-income neighborhoods, it is interesting to see that the effect of being a CRA lender loses much of its strength as well as its statistical significance. With no loan-source control, the point estimate indicates that CRA loans made outside the assessment area were only slightly less likely to be in foreclosure than loans made by IMCs (an odds ratio of 0.95). However, loans made by a CRA lender within its assessment area remain quite a bit less likely (odds ratio of 0.73) to be in foreclosure than loans made by IMCs in the same neighborhoods, and the effect remains statistically significant. In moderate-income communities, loans made by CRA lenders, both outside and within their assessment areas, are significantly less likely to be in foreclosure. In moderate-income communities, loans made by CRA-regulated institutions within their assessment areas were 1.7 times less likely (an odds ratio of 0.58) to be in foreclosure than those made by IMCs.

Yet, when we include the loan-source variable, the statistical significance of the effect of CRA lending in low- and moderate-income neighborhoods disappears. It is possible that, in these neighborhoods, the explanatory variables other than the CRA-related variables fully capture the practical application of the prudent lending requirements of the CRA and other regulations. If this were the case, then regulations, working through those factors, would be significant underlying determinants of loan performance without the coefficients on the CRA-related variables themselves showing up as statistically significant. That said, the estimation results do demonstrate the importance of the terms of the loan and the origination source in predicting foreclosure, in particular, whether or not the loan was originated by a wholesale lender. Indeed, in low-income neighborhoods, wholesale loans were 2.8 times as likely to be in foreclosure as are those originated by the retail arm of the financial institution; in moderate-income neighborhoods, wholesale loans were two times as likely to be in foreclosure. Given that these regressions control for a wide range of both borrower and loan characteristics, it suggests that more attention be paid to the origination channel in ensuring responsible lending moving forward.

In the following tables, we present the same analysis for middle- and upper-income census tracts. Here the results are more in line with the full sample. Loans made by CRA lenders within their assessment area are significantly less likely to be in foreclosure than those made by IMCs, even after controlling for the loan source. Although at first glance this may be counterintuitive—why would the CRA have an effect in middle- and upper-income areas?—we believe that this finding reflects much broader differences in market practices between regulated depository institutions and IMCs. Specifically, while the CRA may have provided regulated financial institutions with some incentive to lend in low- and moderate-income communities, the CRA is really only a small part of a much broader regulatory structure. This regulatory structure, as well as the very different business models of regulated financial institutions compared with IMCs, has significant implications for loan performance, only some aspects of which we have controlled for in our regressions.

Although not our focus here, an interesting difference that emerges across neighborhood income classifications is the role of the loan-to-value ratio as well as the variable on previous house-price appreciation. In middle- and upper-income neighborhoods, these seem to carry more weight than in low- and moderate-income neighborhoods, suggesting that in higher income areas, investment and economic decisions may be more important in predicting the likelihood that a borrower enters foreclosure. In contrast, in low- and moderate-income neighborhoods, fixed rate and monthly payment seem to have relatively more importance in predicting the likelihood of foreclosure, indicating that in these communities it may be more of an issue of short-term affordability.

While these findings are very preliminary and deserve further exploration, they do suggest that there may be important differences among communities regarding the factors that influence the sustainability of a loan.

Conclusions and Policy Implications

This article presents the first empirical examination of the loan performance of institutions regulated under the CRA relative to that of IMCs using a large sample of loans originated in California during the subprime lending boom. Importantly, by matching data on mortgage originations from the HMDA with data on loan performance from LPS, we are able to control for a wide range of factors that can influence the likelihood of foreclosure, including borrower and neighborhood characteristics, loan characteristics, lender characteristics, and the mortgage origination channel.

Before turning to our conclusions and the policy implications of our research, we would like to emphasize that these findings are preliminary, and additional research is needed to understand more fully the relationship between borrowers, lending institutions, loan characteristics, and loan performance. We see several important gaps in the literature that still need to be addressed. First, it is unclear whether or not our findings for California are applicable to other housing and mortgage markets. The size and diversity of California lend it weight as a valid case study for the performance of CRA lending more generally. However, the high cost of housing in California may influence the nature of the findings, and it would be valuable to replicate this analysis in other markets. Second, we focused our analysis on loans made in low- and moderate-income census tracts, given the CRA's original "spatial" emphasis on the link between a bank's retail deposit-gathering activities in a neighborhood and its obligation to meet local credit needs. A yet-unanswered question is the performance of CRA lending for low- and moderate- income borrowers. In addition, we focus solely on mortgage lending activities and do not examine the impact that the CRA investment or service components may have had on the current crisis.[39] Third, the continued importance of race as a variable deserves further exploration. In all of the models, African Americans were significantly more likely to be in foreclosure than whites. While some of this is likely due to differences in assets and wealth (which we cannot control for), additional research that can tease out the underlying reasons for this disparity may have important implications for fair-lending regulations. Fourth, we focus this analysis on lending for home purchases, yet an examination of refinance loans may yield different results. Finally, it may be valuable to specify this model as a two-step process, where the choice of lender is modeled separately from loan outcomes, particularly if the decision to borrow from an IMC versus a CRA-regulated institution is correlated with unobservable characteristics that affect the likelihood of foreclosure.

Despite these caveats, we believe that this research should help to quell if not fully lay to rest the arguments that the CRA caused the current subprime lending boom by requiring banks to lend irresponsibly in low- and moderate-income areas. First, the data show that overall, lending to low- and moderate-income communities comprised only a small share of total lending by CRA lenders, even during the height of subprime lending in California. Second, we find loans originated by lenders regulated under the CRA in general were significantly less likely to be in foreclosure than those originated by IMCs. This held true even after controlling for a wide variety of borrower and loan characteristics, including credit score, income, and whether or not the loan was higher priced. More important, we find that whether or not a loan was originated by a CRA lender within its assessment area is an even more important predictor of foreclosure. In general, loans made by CRA lenders within their assessment areas were half as likely to go into foreclosure as those made by IMCs (Table 2). While certainly not conclusive, this suggests that the CRA, and particularly its emphasis on loans made within a lender's assessment area, helped to ensure responsible lending, even during a period of overall declines in underwriting standards.[40]

The exception to this general finding is the significance of the CRA variables in the models that focused

39 For example, regulated financial institutions may have increased their exposure to mortgage-backed securities to satisfy their requirements for the CRA Investment Test. However, analysis conducted by the Federal Reserve Board suggests that banks purchased only a very small percentage of higher-priced loans (Kroszner 2008),1.

40 For an analysis of the quality of loans between 2001 and 2006 see Demyanyk Yuliya, and Otto van Hemert (2008). "Understanding the Subprime Mortgage Crisis." Working Paper, Federal Reserve Bank of St. Louis, February 4, 2008.

on loans made in low- and moderate-income neighborhoods. In these regressions, when loan source was not included as an explanatory variable, loans from CRA-regulated institutions within their assessment areas performed significantly better than loans from IMCs. But, when we included loan source, the significance of the CRA variables disappeared. Even so, loans from CRA-regulated institutions certainly performed no worse than loans from IMCs. Moreover, as mentioned earlier, the practical application of the prudent lending requirements of the CRA (as well as other regulations) may have been captured in the other explanatory variables in the model without the coefficients on the CRA-related variables themselves showing up as statistically significant. For example, 28 percent of loans made by CRA lenders in low-income areas within their assessment area were fixed-rate loans; in comparison, 18.2 percent of loans made by IMCs in low-income areas were fixed-rate. And only 12 percent of loans made by CRA lenders in low-income areas within their assessment areas were higher priced, compared with 29 percent in low-income areas outside their assessment areas and with 52.4 percent of loans made by IMCs in low-income areas.

Yet the finding that the origination source of the loan—retail, correspondent, or wholesale originated—is an important predictor of foreclosure, particularly in low- and moderate-income neighborhoods, should not be ignored. This builds on evidence from other research that suggests that mortgage brokers are disproportionately associated with the origination of higher-priced loans, particularly outside depository institutions' CRA assessment areas[41] and that mortgage brokers may be extracting materially higher payments from borrowers with lower credit scores and/or less knowledge of mortgage products.[42]

The study also emphasizes the importance of responsible underwriting in predicting the sustainability of a loan. Loan characteristics matter: a higher-priced loan, the presence of a prepayment penalty at origination, a high loan-to-value ratio, and a large monthly payment in relation to income all significantly increase the likelihood of foreclosure, while a fixed interest rate and full documentation both decrease the likelihood of foreclosure. For example, in low- and moderate-income communities, higher-priced loans were 2.3 and 2.1 times, respectively, more likely to be in foreclosure than those that were not higher priced, even after controlling for other variables including loan source.

In that sense, our paper supports the need to reevaluate the regulatory landscape to ensure that low- and moderate-income communities have adequate access to "responsible" credit. Many of the loans analyzed in this paper were made outside the direct purview of supervision under the CRA, either because the loan was made outside a CRA lender's assessment area or because it was made by an IMC. Proposals to "modernize" the CRA, either by expanding the scope of the CRA assessment area and/or by extending regulatory oversight to IMCs and other nonbank lenders, certainly deserve further consideration.[43] In addition, the study's findings also lend weight to efforts to rethink the regulations and incentives that influence the practice of mortgage brokers.[44]

In conclusion, we believe that one of the more interesting findings of our research is the evidence that some aspect of "local" presence seems to matter in predicting the sustainability of a loan: once a lender is removed from the community (outside their assessment area) or from the origination decision (wholesale loan), the likelihood of foreclosure increases significantly. For low- and moderate-income borrowers and communities, a return to localized lending may be even more important. Research on lending behavior has suggested that "social relationships and networks affect who gets capital and at what cost."[45] Particularly in communities that have traditionally been denied credit, and where intergenera-

41 *Kenneth P. Brevoort, and Glenn B. Canner (2006). "Higher-Priced Home Lending and the 2005 HMDA Data." Federal Reserve Bulletin (September 8): A123–A166.*

42 *Ernst, Bocia, and Li (2008). Steered Wrong.*

43 *Apgar and Duda (2003). "The Twenty-Fifth Anniversary of the Community Reinvestment Act."*

44 *Ernst, Bocia, and Li (2008). Steered Wrong.*

45 *Uzzi, Brian (1999). "Embeddedness in the Making of Financial Capital: How Social Relations and Networks Benefit Firms Seeking Financing." American Sociological Review 64(4): 481–505. See also: Holmes, Jessica, Jonathan Isham, Ryan Petersen, and Paul Sommers (2007). "Does Relationship Lending Still Matter in the Consumer Banking Sector? Evidence from the Automobile Loan Market." Social Science Quarterly 88(2): 585–97.*

tional wealth and knowledge transfers integral to the home-ownership experience may be missing, social networks and local presence may be a vital component of responsible lending (see Moulton 2008 for an excellent overview of how these localized social networks may influence mortgage outcomes, for example, by filling information gaps for both lenders and borrowers).[46] Indeed, the relatively strong performance of loans originated as part of statewide affordable lending programs,[47] Self-Help's Community Action Program,[48] and loans originated as part of Individual Development Account programs[49] all suggest that lending to low- and moderate-income communities can be sustainable. Going forward, increasing the scale of these types of targeted lending activities—all of which are encouraged under the CRA—is likely to do a better job of meeting the credit needs of all communities and promoting sustainable homeownership than flooding the market with poorly underwritten, higher-priced loans. ■

Elizabeth Laderman is a banking economist in the Economic Research Department at the Federal Reserve Bank of San Francisco. She received her PhD in Economics from the University of California at Berkeley. Her research interests include bank market structure, small business lending, and financial market issues related to low-income communities. She has written many articles on banking for the Federal Reserve and other publications.

Carolina Reid joined the Community Affairs Department in March of 2005, where she conducts community development research and policy analysis, with a special focus on asset building and housing issues. Carolina earned her PhD in 2004 from the University of Washington, Seattle. Her dissertation focused on the benefits of homeownership for low-income and minority families, using quantitative longitudinal analysis and interviews to assess the impacts of homeownership on a family's financial well-being over time. Other work experience includes policy research and program evaluation at the Environmental Health and Social Policy Center in Seattle, where she worked on issues of public housing and welfare reform, and at World Resources Institute, where she focused on issues of urban environmental health and environmental justice.

See Tables 1 – 7 on the following pages

46 Moulton, Stephanie (2008). "Marketing and Education Strategies of Originating Mortgage Lenders: Borrower Effects and Policy Implications." Paper presented at the Association for Public Policy Analysis and Management 30th Annual Research Conference, Los Angeles, November 6, 2008.

47 Ibid.

48 Ding, Quercia, Ratcliffe, and Li (2008). "Risky Borrowers or Risky Mortgages."

49 CFED (2008). "IDA Program Survey on Homeownership and Foreclosure," available at http://www.cfed.org/focus.m?parentid=31&siteid=374&id=2663.

Table 1: Distribution of Lending Activity: CRA Lenders vs. Independent Mortgage Companies

	CRA Lenders	Independent Mortgage Companies
Total Loans		
Low-Income Neighborhood	3,843	1,487
Moderate-Income Neighborhood	24,795	10,609
Middle-Income Neighborhood	67,766	24,606
Upper-Income Neighborhood	83,563	22,432
All Neighborhoods	179,967	59,134
Total High-Priced Loans		
Low-Income Neighborhood	1,116	779
Moderate-Income Neighborhood	6,765	4,892
Middle-Income Neighborhood	10,573	8,068
Upper-Income Neighborhood	5,307	4,338
All Neighborhoods	23,761	18,077
Total Foreclosures		
Low-Income Neighborhood	275	177
Moderate-Income Neighborhood	1,379	1,092
Middle-Income Neighborhood	2,517	1,945
Upper-Income Neighborhood	1,613	1,211
All Neighborhoods	5,784	4,425

Table 2: Model Predicting the Likelihood of Loan Foreclosure

	CRA		CRA with Assessment Area	
	Odds Ratio	Standard Error	Odds Ratio	Standard Error
NEIGHBORHOOD VARIABLES				
Neighborhood Income Level (omitted: Upper-Income)				
Low-Income	1.79 ***	0.149	1.73 ***	0.142
Moderate-Income	1.32 ***	0.067	1.28 ***	0.064
Middle-Income	1.21 ***	0.045	1.18 ***	0.044
Percent Owner-Occupied	1.00 ***	8.69×10^{-4}	1.00 ***	8.68×10^{-4}
Median Year Housing Built	1.01 ***	0.001	1.01 ***	0.001
Capitalization Rate	0.85	0.515	0.75	0.451
House Price Appreciation (2 years prior to origination)	1.26 ***	0.019	1.22 ***	0.019
BORROWER VARIABLES				
Borrower Race (omitted: Non-Hispanic White)				
African American	1.78 ***	0.084	1.79 ***	0.084
Latino	1.36 ***	0.044	1.36 ***	0.044
Asian	1.29 ***	0.052	1.29 ***	0.052
Borrower Income	1.00 **	7.17×10^{-5}	1.00 **	7.26×10^{-5}
Borrower FICO Score (omitted: High - Above 720)				
Low FICO - Below 640	4.09 ***	0.166	4.07 ***	0.165
Mid-level FICO - 640-720	2.68 ***	0.087	2.65 ***	0.086
LOAN VARIABLES				
Higher-Priced Loan (yes=1)	3.23 ***	0.004	3.05 ***	0.104
Fixed Interest Rate (yes=1)	0.35 ***	0.017	0.35 ***	0.017
Prepayment Penalty (yes=1)	1.30 ***	0.036	1.31 ***	0.036
Full Documentation (yes=1)	0.61 ***	0.021	0.63 ***	0.022
Monthly Payment	1.06 ***	0.110	1.05 ***	0.004
Loan-to-Value Ratio	3.00 ***	0.080	3.02 ***	0.081
LENDER VARIABLES				
CRA (omitted: Independent Mortgage Company)	0.70 ***	0.018		
CRA in Assessment Area			0.53 ***	0.017
CRA outside Assessment Area			0.87 ***	0.024
Observations	236,536			

*(**)(***) Statistically significant at 10(5)(1) level.

Table 3: Model Predicting the Likelihood of Loan Foreclosure, includes Loan Source

	CRA with Assessment Area		
	Odds Ratio		Standard Error
NEIGHBORHOOD VARIABLES			
Neighborhood Income Level (omitted: Upper-Income)			
Low-Income	2.11 ***		0.232
Moderate-Income	1.35 ***		0.096
Middle-Income	1.24 ***		0.063
Percent Owner-Occupied	1.00 ***		0.001
Median Year Housing Built	1.01 ***		0.002
Capitalization Rate	0.85		0.680
House Price Appreciation (2 years prior to origination)	1.20 ***		0.026
BORROWER VARIABLES			
Borrower Race (omitted: Non-Hispanic White)			
African American	1.77 ***		0.127
Latino	1.38 ***		0.066
Asian	1.24 ***		0.067
Borrower Income	1.00 **		8.91×10^{-5}
Borrower FICO Score (omitted: High - Above 720)			
Low FICO - Below 640	4.58 ***		0.266
Mid-level FICO - 640-720	2.73 ***		0.124
LOAN VARIABLES			
Higher-Priced Loan (yes=1)	2.47 ***		0.119
Fixed Interest Rate (yes=1)	0.39 ***		0.025
Prepayment Penalty (yes=1)	1.55 ***		0.072
Full Documentation (yes=1)	0.63 ***		0.027
Monthly Payment	1.05 ***		0.005
Loan-to-Value Ratio	2.53 ***		0.078
LENDER VARIABLES			
CRA (omitted: Independent Mortgage Company)	0.70 ***		0.018
CRA in Assessment Area	0.743***		0.043
CRA outside Assessment Area	0.995		0.057
Loan Source (omitted: retail branch)			
Correspondent Loan	1.45 ***		0.092
Wholesale Loan	2.03 ***		0.099
Observations	195,698		

*(**)(***) Statistically significant at 10(5)(1) level.

Table 4: Model Predicting the Likelihood of Loan Foreclosure in Low-Income Neighborhoods

	CRA Assessment Area		CRA with Assessment Area and Loan Source	
	Odds Ratio	Standard Error	Odds Ratio	Standard Error
NEIGHBORHOOD VARIABLES				
Percent Owner-Occupied	1.01 ***	0.005	1.01	0.008
Median Year Housing Built	1.00	0.006	1.00	0.008
Capitalization Rate	0.64	0.742	0.35	0.685
House Price Appreciation (2 years prior to origination)	1.16 *	0.092	1.17	0.125
BORROWER VARIABLES				
Borrower Race (omitted: Non-Hispanic White)				
African American	1.75 **	0.393	1.96 *	0.728
Latino	0.95	0.121	1.09	0.291
Asian	1.25	0.280	1.43	0.396
Borrower Income	1.00	4.43×10^{-4}	1.00	6.97×10^{-4}
Borrower FICO Score (omitted: High - Above 720)				
Low FICO - Below 640	4.10 ***	0.783	4.00 ***	1.130
Mid-level FICO - 640-720	2.41 ***	0.434	2.48 ***	0.632
LOAN VARIABLES				
Higher-Priced Loan (yes=1)	3.12 ***	0.559	2.31 ***	0.591
Fixed Interest Rate (yes=1)	0.29 ***	0.081	0.27 ***	0.104
Prepayment Penalty (yes=1)	1.28 *	0.180	1.42	0.361
Full Documentation (yes=1)	0.71 **	0.114	0.84	0.150
Monthly Payment	1.10 ***	0.031	1.15 ***	0.037
Loan-to-Value Ratio	2.35 ***	0.220	1.81 ***	0.262
LENDER VARIABLES				
CRA (omitted: Independent Mortgage Company)				
CRA in Assessment Area	0.73 **	0.115	0.89	0.264
CRA outside Assessment Area	0.95	0.121	0.86	0.244
Loan Source (omitted: retail branch)				
Correspondent Loan			1.58	0.536
Wholesale Loan			2.79 ***	0.702
Observations	5,271		3,981	

*(**)(***) Statistically significant at 10(5)(1) level.

Table 5: Model Predicting the Likelihood of Loan Foreclosure in Moderate-Income Neighborhoods

	CRA Assessment Area		CRA with Assessment Area and Loan Source	
	Odds Ratio	Standard Error	Odds Ratio	Standard Error
NEIGHBORHOOD VARIABLES				
Percent Owner-Occupied	1.00 **	0.002	1.00 **	0.002
Median Year Housing Built	1.00	0.002	1.00	0.003
Capitalization Rate	1.21	1.160	0.58	0.806
House Price Appreciation (2 years prior to origination)	1.10 ***	0.033	1.10 **	0.048
BORROWER VARIABLES				
Borrower Race (omitted: Non-Hispanic White)				
African American	2.13 ***	0.202	1.88 ***	0.269
Latino	1.32 ***	0.089	1.17	0.117
Asian	1.27 ***	0.115	1.15	0.145
Borrower Income	1.00	$1.37x10^{-4}$	1.00	$1.14x10^{-4}$
Borrower FICO Score (omitted: High - Above 720)				
Low FICO - Below 640	3.69 ***	0.310	3.72 ***	0.475
Mid-level FICO - 640-720	2.29 ***	0.162	2.38 ***	0.242
LOAN VARIABLES				
Higher-Priced Loan (yes=1)	2.64 ***	0.181	2.07 ***	0.207
Fixed Interest Rate (yes=1)	0.30 ***	0.032	0.37 ***	0.053
Prepayment Penalty (yes=1)	1.14 ***	0.057	1.55 ***	0.148
Full Documentation (yes=1)	0.73 ***	0.505	0.73 ***	0.062
Monthly Payment	1.09 ***	0.011	1.10 ***	0.015
Loan-to-Value Ratio	2.49 ***	0.106	2.04 ***	0.125
LENDER VARIABLES				
CRA (omitted: Independent Mortgage Company)				
CRA in Assessment Area	0.58 ***	0.04	0.96	0.119
CRA outside Assessment Area	0.84 ***	0.048	1.17	0.143
Loan Source (omitted: retail branch)				
Correspondent Loan			1.62 ***	0.221
Wholesale Loan			1.96 ***	0.212
Observations	34,933		26,248	

*(**)(***) Statistically significant at 10(5)(1) level.

Table 6: Model Predicting the Likelihood of Loan Foreclosure in Middle-Income Neighborhoods

	CRA Assessment Area		CRA with Assessment Area and Loan Source	
	Odds Ratio	Standard Error	Odds Ratio	Standard Error
NEIGHBORHOOD VARIABLES				
Percent Owner-Occupied	1.01 ***	0.001	1.01 ***	0.002
Median Year Housing Built	1.01 ***	0.002	1.00	0.002
Capitalization Rate	0.69	0.636	2.27	2.920
House Price Appreciation (2 years prior to origination)	1.27 ***	0.030	1.23 ***	0.041
BORROWER VARIABLES				
Borrower Race (omitted: Non-Hispanic White)				
African American	1.53 ***	0.113	1.52 ***	0.176
Latino	1.33 ***	0.063	1.31 ***	0.091
Asian	1.17 ***	0.073	1.09	0.093
Borrower Income	1.00 ***	1.14×10^{-4}	1.00 ***	1.42×10^{-4}
Borrower FICO Score (omitted: High - Above 720)				
Low FICO - Below 640	4.22 ***	0.261	5.13 ***	0.454
Mid-level FICO - 640-720	2.68 ***	0.130	2.82 ***	0.201
LOAN VARIABLES				
Higher-Priced Loan (yes=1)	2.93 ***	0.142	2.34 ***	0.172
Fixed Interest Rate (yes=1)	0.34 ***	0.025	0.35 ***	0.035
Prepayment Penalty (yes=1)	1.30 ***	0.055	1.51 ***	0.111
Full Documentation (yes=1)	0.61 ***	0.034	0.59 ***	0.040
Monthly Payment	1.06 ***	0.008	1.06 ***	0.010
Loan-to-Value Ratio	3.10 ***	0.159	2.67 ***	0.127
LENDER VARIABLES				
CRA (omitted: Independent Mortgage Company)				
CRA in Assessment Area	0.56 ***	0.028	0.80 ***	0.072
CRA outside Assessment Area	0.92 ***	0.038	1.06	0.091
Loan Source (omitted: retail branch)				
Correspondent Loan			1.39 ***	0.129
Wholesale Loan			1.97 ***	0.147
Observations	91,400		73,603	

*(**)(***) Statistically significant at 10(5)(1) level.

Table 7: Model Predicting the Likelihood of Loan Foreclosure in Upper-Income Neighborhoods

	CRA Assessment Area		CRA with Assessment Area and Loan Source	
	Odds Ratio	Standard Error	Odds Ratio	Standard Error
NEIGHBORHOOD VARIABLES				
Percent Owner-Occupied	1.01 ***	0.002	1.00 ***	0.002
Median Year Housing Built	1.01 ***	0.002	1.01 ***	0.003
Capitalization Rate	2.79	4.720	3.93	8.280
House Price Appreciation (2 years prior to origination)	1.27 ***	0.039	1.26 ***	0.051
BORROWER VARIABLES				
Borrower Race (omitted: Non-Hispanic White)				
African American	1.67 ***	0.148	1.69 ***	0.218
Latino	1.47 ***	0.088	1.65 ***	0.141
Asian	1.38 ***	0.096	1.33 ***	0.117
Borrower Income	1.00 ***	1.09×10^{-4}	1.00 ***	1.68×10^{-4}
Borrower FICO Score (omitted: High - Above 720)				
Low FICO - Below 640	3.99 ***	0.301	4.64 ***	0.498
Mid-level FICO - 640-720	2.83 ***	0.162	2.83 ***	0.213
LOAN VARIABLES				
Higher-Priced Loan (yes=1)	3.44 ***	0.225	2.96 ***	0.248
Fixed Interest Rate (yes=1)	0.41 ***	0.032	0.45 ***	0.045
Prepayment Penalty (yes=1)	1.40 ***	0.074	1.50 ***	0.119
Full Documentation (yes=1)	0.57 ***	0.036	0.59 ***	0.048
Monthly Payment	1.04 ***	0.006	1.05 ***	0.007
Loan-to-Value Ratio	3.52 ***	0.127	2.89 ***	0.152
LENDER VARIABLES				
CRA (omitted: Independent Mortgage Company)				
CRA in Assessment Area	0.49 ***	0.028	0.64 ***	0.067
CRA outside Assessment Area	0.84 ***	0.046	0.93	0.096
Loan Source (omitted: retail branch)				
Correspondent Loan			1.37 ***	0.164
Wholesale Loan			2.12 ***	0.180
Observations	104,932		91,866	

*(**)(***) Statistically significant at 10(5)(1) level.

Risky Borrowers or Risky Mortgages:
Disaggregating Effects Using Propensity Score Models

Working Paper: November 30, 2009

By
Lei Ding
Roberto G. Quercia
Janneke Ratcliffe
Center for Community Capital

Wei Lei
Center for Responsible Lending
Durham N.C.

Prepared with financial support from

Center *for* Community Capital
Research and analysis on the transformative power of capital

UNC
COLLEGE OF
ARTS & SCIENCES

Risky Borrowers or Risky Mortgages
Disaggregating Effects Using Propensity Score Models

Lei Ding, [a] * Roberto G. Quercia, [b] Wei Li, [c] Janneke Ratcliffe [b]

Draft on November 30, 2009

[a] Department of Urban Studies and Planning, Wayne State University, Detroit, MI
[b] Center for Community Capital, University of North Carolina, Chapel Hill, NC
[c] Center for Responsible Lending, Durham, NC

* Contact author: Telephone: 313-577-0543, E-mail: lei_ding@wayne.edu

Risky Borrowers or Risky Mortgages
Disaggregating Effects Using Propensity Score Models

Abstract:

In this research, we examine the relative risk of subprime mortgages and community reinvestment loans. Using the propensity score matching method, we construct a sample of comparable borrowers with similar risk characteristics but holding the two different loan products. We find that community reinvestment loans have a lower default risk than subprime loans, very likely because they are not originated by brokers and lack risky features such as adjustable rates and prepayment penalties. Our results suggest that similar borrowers holding community reinvestment loans exhibit significantly lower default risks.

Introduction

Explanations for the current foreclosure crisis abound. There are the obvious culprits: overextended borrowers, risky mortgages, reckless originators, and investors and other secondary market participants who failed to act with due diligence (e.g. Mian and Sufi, 2008; Quercia and Ratcliffe, 2008). Moreover, there are some who blame government regulation, such as the Community Reinvestment Act (CRA), designed to increase the credit supply to traditionally underserved, but creditworthy, population (Cravatts, 2008; Krauthammer, 2008). From this perspective, the CRA and similar regulation are said to have put pressure on lenders and the government sponsored enterprises (GSEs) to extent mortgages to over-leveraged, uncreditworthy, and/or irresponsible low-income and minority borrowers.

The debate over what caused the mortgage mess and how best to fix it has important policy implications. What is missing in the debate is an empirical examination of the relative performance of similar borrowers holding either a typical CRA loan or a subprime product. Such an analysis will help inform policy by answering the question of whether high default rates represent just the higher risk profile of borrowers holding subprime loans or the risky characteristics of subprime loans. Although borrowers holding subprime loans generally are weaker across key underwriting criteria, many borrowers holding subprime products actually qualify for a prime mortgage (Hudson and Reckard, 2005; Brooks and Simon, 2007). Some products or features that are more prevalent among subprime loans, such as prepayment penalties, adjustable rates, and balloon payments, have been found to be associated with elevated default risk (e.g. Ambrose, LaCour-Little and Huszar, 2005; Pennington-Cross and Ho, 2006; Quercia, Stegman and Davis, 2007). Are the higher default rates reported in the subprime sector mainly the result of risky loan products?

We address this issue by comparing the performance of subprime loans and CRA loans in a special lending program called Community Advantage Program (CAP). To solve the problem of selection bias since performance differences may be due to differences in the borrowers who receive each product type, we rely on propensity score matching methods to construct a sample of comparable borrowers. We find that for borrowers with similar risk characteristics, the estimated default risk is about 70 percent lower with a CRA loan than with a subprime mortgage. Broker-origination channel, adjustable rates, and prepayment penalties all contribute substantially to the elevated risk of default among subprime loans. When broker origination is combined with both adjustable rates and prepayment penalties, the borrower's default risk is four to five times higher than that of a comparable borrower with a prime-term CRA mortgage. Though CAP has some program specific characteristics, the results of this study clearly suggest that mortgage default risk cannot be attributed solely to borrower credit risk; the high default risk is significantly associated with the characteristics of loan products. Thus, the results are not consistent with the concerns of those blaming the borrowers likely to benefit from CRA and similar regulations. Done responsibly, targeted lending programs stimulated by the CRA can do a much better job in providing sustainable homeownership for the low- to moderate-income (LMI) population than subprime lending. The results have important policy implications on how to respond to the current housing crisis and how to meet the credit needs of all communities, especially the LMI borrowers, in the long run.

Compared with prior work, this study is characterized by several important differences. First, while most early studies focused on the performance of mortgages within different markets, the focus here is on similar LMI borrowers with different mortgages, allowing us to compare the relative risk of different mortgage products. Second, because of data constraints, research on the performance of CRA loans is scarce. With a unique dataset, this study examines the long term viability of the homeownership opportunities that CRA-type products provide, relative to that of subprime alternatives. Third, there have been few discussions and applications of the propensity score matching method in real estate research. This study uses propensity score models to explicitly address the selection bias issue and constructs a comparison group based on observational data. This method allows us to isolate the impact of loan product features and origination channel on the performance of mortgages. Finally, while the propensity score model cannot capture all the information for estimating the propensity of taking out a subprime loan, this study makes full use of the loan interest rate information to shed some light on the impact of the unobservable heterogeneity on the mortgage performance.

Literature Review

Risk of Subprime Mortgages

Subprime mortgages were originally designed as refinancing tools to help borrowers with impaired credit consolidate debt. With the reformed lending laws, the adoption of automated underwriting, risk-based pricing, as well as the persistent growth in

house prices nationwide, the subprime lending channel soon expanded its credit to borrowers on other margins. The subprime surge was rapid and wide: between 1994 and 2006, the subprime share of all mortgage originations more than quadrupled, from 4.5 percent to 20.1 percent; and subprime loan originations increased more than seventeen fold, from $35 billion to about $600 billion. The surge was largely fueled by securitization (private Wall Street issuances) over the same period, the volume of securitized subprime mortgage loans increased over forty-four-fold, from $11 billion to more than $483 billion in 2006, accounting for more than 80 percent of all subprime lending (Inside Mortgage Finance, 2008).

Beginning in late 2006, a rapid rise in subprime mortgage delinquency and foreclosure caused a so-called meltdown of the subprime market. The Mortgage Bankers Association (MBA) reports that the serious delinquency rate for subprime loans in the second quarter of 2008 was 7.6 times higher than that for prime loans (17.9 percent versus 2.35 percent). Although subprime mortgages represented about 12 percent of the outstanding loans, they represented 48 percent of the foreclosures started during the same quarter (MBA, 2008). Delinquency and default rates for subprime loans typically are six times to more than 10 times higher than those of prime mortgages (Pennington-Cross, 2003; Gerardi, Shapiro and Willen, 2007; Immergluck, 2008).

It may be true that borrowers holding subprime loans are generally weaker across key underwriting criteria. A subprime borrower used to refer to an individual who had any of the following characteristics: 1) a FICO score below 620, 2) a delinquent debt repayment in the previous two years, 3) a bankruptcy filing in the previous five years (Gerardi et al. 2007). Recent subprime home-purchase loans became available to borrowers who may have had impaired credit history or were perceived to have elevated credit risks, such as “low-doc” or “no doc” borrowers, “low-down” or “zero-down” payment borrowers, or borrowers with high debt-to-income ratios (DTIs). All these risk characteristics are usually significantly associated with a higher default risk of the mortgages these borrowers hold.

At this point, it is important to make a distinction between borrowers and mortgage products. It can be said that there are two types of borrowers and two types of mortgage products: prime and subprime. Not all prime borrowers get prime mortgages and not all subprime borrowers get subprime mortgages. Borrowers who do not meet all the traditional underwriting guidelines can be considered subprime but these borrowers can receive prime-type mortgages as they may through CRA efforts. Similarly, borrowers with good credit can receive subprime products characterized by high debt to income and loan to value ratios, no or low documentation, teaser and adjustable rates and other such risky characteristics (the so called Alt-A market).

Some loan features and loan terms are more prevalent in the subprime sector than in other markets and are also associated with higher default risk. As summarized by Cutts and Van Order (2005) and Immergluck (2008), characteristics of subprime loans relative to prime loans include: 1) high interest rates, points, and fees, 2)

prevalence of prepayment penalties, 3) prevalence of balloon payments, 4) prevalence of adjustable-rate mortgages (ARMs), 5) popularity of broker originations. After 2004, some "innovative" mortgage products, such as interest-only, payment option, negative amortization, hybrid ARMs, and piggy-back loans became more popular in the subprime sector (Immergluck, 2008). In the literature, Calhoun and Deng (2002) and Quercia et al. (2007) find that subprime ARMs have a higher risk of foreclosure because of the interest-rate risk. At the aggregate level, the share of ARMs appears to be positively associated with market risk as measured by the probability of the property value to decline in the next two years (Immergluck, 2008). Subprime hybrid ARMs, which usually have prepayment penalties, bear particularly high risk of default at the time the interest rate is reset (Ambrose et al. 2005; Pennington-Cross and Ho, 2006).

As to the feature of prepayment penalties and balloons, Quercia et al. (2007) find that refinanced loans with prepayment penalties are 20 percent more likely than loans without to experience a foreclosure while loans with balloon payments are about 50 percent more likely to experience a foreclosure than those without. Prepayment penalties also tend to reduce prepayments and increase the likelihood of delinquency and default among subprime loans (Danis and Pennington-Cross, 2005).

Recently, mortgage brokers have played a greater role in the subprime sector. In 2003 brokers originated about 48 percent of all subprime loans; in 2006 the share was estimated between 63 percent and 80 percent (Ernst et al. 2008), higher than the share of about 30 percent of broker-originated loans among all mortgages in recent years (Inside Mortgage Finance, 2008). Empirical evidence on the behavior of broker-originated mortgages is scarce. LaCour-Little and Chun (1999) find that for the four types of mortgages analyzed, loans originated by a third party (including broker and correspondence) were more likely to prepay than loans originated by a lender. Alexander, Grimshaw, McQueen and Slade (2002) find that third-party originated loans do not necessarily prepay faster but they default with greater frequency than similar retail loans, based on a sample of subprime loans originated from 1996 to 1998. They suggest that third-party originated mortgages have higher default risk than similar retail loans because brokers are rewarded for originating a loan but not held accountable for the loan's subsequent performance.

Thus, the higher default rates reported in subprime lending may be because of risky borrowers, risky loan products, or a combination of both.

CRA Lending

The Community Reinvestment Act (CRA) of 1977 was created in response to charges that financial institutions were engaging in redlining and discrimination. The Act mandates that federally insured depository institutions help meet the credit needs of communities in which they operate in a manner consistent with safe and sound operation (Bernanke, 2007). Regulators assess each bank's CRA record when evaluating these institutions' applications for mergers, acquisitions, and branch

openings. The performance of large institutions is measured under three categories of bank activities: lending, services, and investment, with the lending test carrying the most weight (at least 50 percent).[1] For the lending test, it examines the amount and proportion of lending activities made within an institution's assessment area.[2] Usually, loans are regarded as "CRA-related" if they are made by CRA-regulated institutions within their assessment areas to low-income borrowers (those with less than 80% area median income (AMI), regardless of neighborhood income) or in a low- income neighborhood (with less than 80% AMI, regardless of borrower income) (Avery, Bostic and Canner, 2000).

The CRA lending test also examines the use of *innovative or flexible* lending practices to address the credit needs of LMI households and community. In response, many banks have developed "CRA Special Lending Programs" or have introduced mortgage products characterized by more flexible underwriting standards. Survey results suggest that most financial institutions offer these special programs, and that most of the programs relate to home mortgage lending, which typically feature some combination of special outreach, counseling and education, and underwriting flexibility (especially in terms of reduced cash to close, alternative credit verification and higher debt-to-income thresholds) (Avery et al. 2000). A review article by Apgar and Duda (2003) suggests the CRA has had a positive impact on underserved population by originating a higher proportion of loans to low-income borrowers and communities than they would have without CRA. At the same time, one study suggests that there is no evidence that CRA-affected lenders cut interest rates to CRA-eligible borrowers or that there is a regulation-driven subsidy for CRA loans (Canner, Laderman, Lehnert and Passmore, 2002).

CRA-type mortgages are different from subprime loans in that CRA products usually have prime-term characteristics. In general, they are believed to carry a higher risk because they are originated by liberalizing one or two underwriting criteria. Moreover, CRA products are originated by federally insured depository institutions covered by CRA while two out of three subprime lenders are independent mortgage companies not covered by CRA (Bernanke, 2007). A few studies investigating the delinquency behaviors among CRA borrowers suggest the delinquency rate of CRA mortgages is comparable to that of FHA loans after excluding loans with low loan-to-value ratios (LTV) (e.g., Quercia, Stegman, Davis and Stein, 2002). Because of data constraints, little is known about the long term viability of the homeownership opportunities that these products provide.

Why Different Markets Coexist

To increase the flow of funds into low-income population and neighborhoods, the CRA encourages lenders to meet credit needs within their service or catchment area, taking into account safety and soundness considerations. Liberalizing one or two traditional mortgage underwriting standards allows lenders to make loans to those who would otherwise not qualify for a prime mortgage (for instance, not requiring

mortgage insurance when the downpayment is less than 20 percent makes loans more affordable for some borrowers).

In this sense, both CRA and subprime products may target many of the same borrowers. In fact, recent studies suggest there is a significant overlap between borrowers holding subprime mortgages and those holding prime loans, FHA loans, and other loan products, particularly among LMI borrowers with marginal credit quality. Freddie Mac, for example, finds that about 20 percent of subprime borrowers could have qualified for a prime rate mortgage (Hudson and Reckard, 2005). A Wall Street Journal report suggests 61 percent of subprime mortgages went to borrowers with credit that would have qualified them for conventional loans by 2006 (Brooks and Simon, 2007). Bocian, Ernst and Li (2007) suggest that a significant portion of subprime borrowers (estimates range from 10 percent to almost 40 percent) could have qualified for low-priced prime loans.

Why would many people who could qualify for low-cost prime-type loans take out subprime products? First of all, many borrowers, especially those with impaired credit history, are usually financially unsophisticated and may feel they have limited options. Courchane, Surette and Zorn (2004) indicate that subprime borrowers "are less knowledgeable about the mortgage process, are less likely to search for the best rates, and are less likely to be offered a choice among alternative mortgage terms and instruments" (p.365). Especially, for some nontraditional mortgages, including interest-only mortgages, negative amortization mortgages, and mortgages with teaser rates, they were apparently not well understood by many borrowers. When borrowers do not know the best price and are less likely to search for the best rates, it is likely that they cannot make the right decision when they shop for mortgage products. In fact, Courchane et al. (2004) find that search behavior as well as adverse life events, age, and Hispanic ethnicity contribute to explaining the choice of a subprime mortgage.

Second, *predatory lending* or abusive lending practices are concentrated in the subprime sector which may explain why some borrowers end up with certain loans. Unscrupulous lenders, or brokers as their agents, may take advantage of uninformed borrowers by charging fees and rates not reflected of the risk, by not informing borrowers of lower cost loan alternatives, and by offering products and services without full disclosure of terms and options. Renuart (2004) highlights the role of loan steering and abusive push-marketing of subprime lending practices, in which lenders steer borrowers to subprime products instead of low-cost prime alternatives. A major reason for this is that there are higher incentives from originating subprime mortgages than from low-cost alternatives. Compared to traditional prime mortgages, subprime mortgages generated much higher profit for originators before the bust – 3.6 percent versus 0.93 percent for Countrywide alone in 2004 (Morganson, 2008). For brokers, in addition to the standard origination fees, they are compensated by a yield-spread premium (YSM), which is an extra payment that brokers receive from lenders for delivering a mortgage with a higher interest rate than that for which the borrower may qualify (Ernst et al. 2008). Thus, brokers are usually more concerned about

mortgage volume and features that generate fees and points from borrowers and commissions and premiums from lenders, instead of the loan's subsequent performance. Because the subprime market is characterized by complicated pricing tiers and product types that are not easy to understand, the steering problem is likely to be more pronounced in the subprime sector than in other markets in which products are generally standardized. Furthermore, the originators usually do not have to be held accountable for the loan's long term performance as most of subprime loans originated in recent years were securitized (80 percent in 2006). For brokers, broker fees and the yield spread premiums are paid upon settlement of the loan, at which point the broker would have no further stake in the performance of that loan. Of course, banks and investors, as well as brokers and banks, are involved in repeated relationships, reputation concerns may somewhat prevent the moral hazard of lenders. But the not well-designed compensation mechanism and the lack of responsibility for the long-term sustainability of mortgages provide the incentive for many lenders and brokers to originate subprime loans than other less profitable products to maximize their own profit.

In the literature, similar behaviors have been examined with the information asymmetry theory, moral hazard theory, and agency cost theory. For an originator to provide an efficient level of such services as marketing and underwriting mortgage products, it must be given the proper incentives to do so. But Alexander et al. (2002) suggest that third-party originators have the incentive to game with lenders and investors either passively or actively in the credit underwriting process: intentionally lacking rigor in the screening process, exaggerating measures of credit worthiness or property value, or targeting and putting borrowers with marginal quality to high-cost subprime with risky loan terms instead of lower cost alternatives.[3] Mian and Sufi (2008) blame the moral hazard on behalf of originators selling risky mortgages is the primary cause of the loose underwriting and the subsequent mortgage foreclosure crisis. Keys, Mukherjee, Seru and Vig (2008) also suggest that securitization leads to lax screening by adversely affecting the screening incentives of lenders.

In short, borrowers generally sort to prime/CRA, subprime or other mortgage markets based on their risk profile. However, the lack of financial sophistication of some borrowers, the poor alignment of incentives, and moral hazard considerations are some of the many reasons borrowers—especially marginally qualified borrowers—may receive less desirable mortgage products than they can be qualified for.

Data

Data for this study come from one LMI-targeted lending program, the Community Advantage Program (CAP), developed by Self-Help in partnership with a group of lenders, Fannie Mae, and the Ford Foundation. Participating lenders establish their own guidelines. The most common variants from typical conventional, prime standards are: reduced cash required to close (through lower down payment and/or lower cash reserve requirements);[4] alternative measures or lower standards of credit quality;[5] and flexibility in assessing repayment ability (through higher debt ratios and/or flexible requirements for employment history).[6] These guidelines variants could be combined or used to offset each other.[7] Nearly 90 percent of the programs feature exceptions in at least two of these areas, and more than half feature exceptions in all three. The majority of programs combine neighborhood and borrower targeting.

Under the LMI-targeted CAP lending program, participating lenders are able to sell these nonconforming mortgages to Self-Help, which then securitizes and sells them to Fannie Mae or other investors. Participating lenders originate and service the loans under contract with Self-Help. It should be emphasized that, while many of the borrowers are somewhat credit impaired, the program cannot be characterized as subprime. The vast majority of CAP loans are retail originated (in contrast to broker originated) and feature terms associated with the prime market: thirty-year fixed-rate loans amortizing with prime-level interest rates, no prepayment penalties, no balloons, with escrows for taxes and insurance, documented income, and standard prime-level fees. As a LMI-targeting program, CAP has some program-specific characteristics such as income and geographic limitations.[8]

The data of subprime loans come from a proprietary database from Lender Processing Services, Inc. (LPS, formerly McDash Analytics), which provides loan information collected from approximately 15 mortgage servicers. LPS' coverage in the subprime market by volume increased from 14 percent in 2004 to over 30 percent in 2006, based on our estimation using data from Inside Mortgage Finance. There is no universally accepted definition of *subprime mortgage*; the three most commonly used definitions are 1) those categorized as such by the secondary market, 2) those originated by a subprime lender as identified by HUD's annual list, and 3) those that meet HUD's definition of a "high-cost" mortgage (Gerardi et al. 2007). For the purposes of this paper we primarily follow the first definition, since we can identify those B&C loans in LPS but could not identify lenders' information and mortgages' APR. We further consider high-cost ARMs as subprime in this analysis. Less than 20% of loans in our LPS study sample are included solely because they are considered high-cost, defined as having a margin greater than 300 basis points (Poole, 2007). In addition, we appended to our data selected census and aggregated HMDA variables at a zip code level, including the Herfindahl-Hirschman Index ("HHI") calculated from HMDA, racial and educational distribution from census data, and area average FICO scores calculated from the LPS data.

We started from a sample of 9,221 CAP loans originated from 2003 to 2006. All are first-lien, owner-occupied, fixed-rate conforming home purchase loans with full or alternative documentation. National in scope, these loans were originated in 41 states, with about two-thirds concentrated in Ohio, North Carolina, Illinois, Georgia and Oklahoma. To make sure subprime loans are roughly comparable to CAP loans, as Exhibit 1 shows, we limited our analysis to subprime mortgages also characterized as first-lien, single-family, purchase-money, and conforming loans with full or alternative documentation that originated during the same period. We further excluded loans with missing values for some key underwriting variables (FICO score, LTV, DTI, and documentation status) and loans without complete payment history. Finally, because we want to compare CAP and subprime loans in the same market, we excluded those subprime loans in areas without CAP lending activities. This gave us a sample of 42,065 subprime loans. Table 2 summarizes some important characteristics of both CAP loans and subprime loans in this analysis. Significance tests show that almost all variables across the two groups differ significantly before matching, indicating that the covariate distributions are different between CAP and subprime loans in the original sample.

Though drawn from similar markets, the CAP borrowers (including all active loans originated as early as 1990s) are not experiencing the same mortgage woes as subprime borrowers. As Exhibit 2 shows, 3.21 percent of our sample of community lending borrowers were 90-days' delinquent or in foreclosure process in the second quarter of 2008. This was slightly higher than the 2.35 percent delinquency rate on prime loans but well below the 17.8 percent on subprime loans nationwide. Especially, over 27 percent of subprime ARMs were in foreclosure or serious delinquency, which was almost nine times that of community lending loans.

In summary, the CAP and subprime samples have identical characteristics for the following important underwriting variables: lien status, amortization period, loan purpose, occupancy status, and documentation type. They were originated during the same time period and roughly in the same geographic areas. But the two samples differ in other underwriting factors, including DTI, LTV, and FICO score, and in loan amount and some loan features that are more common only for subprime loans. In the next section, we use the propensity score matching (PSM) method to develop a new sample by matching CAP loans with comparable subprime loans.

Methodology

The PSM method has been widely used to reduce selection biases in recent program evaluation studies. PSM was first developed by Rosenbaum and Rubin (1983) as an effort to more rigorously estimate causal effects from observational data. Basically, PSM accounts for observable heterogeneity by pairing participants with nonparticipants on the basis of the conditional probability of participation, given the observable characteristics. The PSM approach has gained increasing popularity among researchers from a variety of disciplines, including biomedical research, epidemiology, education, sociology, psychology, and social welfare (see review in

Guo, et al., 2006). There is some evidence that nonparametric PSM methods can produce impact estimates that are closer to the experimental benchmark than the parametric approach (Essama-Nssah, 2006).

There are three basic steps involved in implementing PSM. First, a set of covariates is used to estimate the propensity scores using *probit* or *logit*, and the predicted values are retrieved. Then each participant is paired with a comparable nonparticipant based on propensity scores. In the last step, regression models or other methods can be applied to the matched group to compare the outcomes of participants and nonparticipants. Here we describe these steps in our analysis in more details.

In this case, because receiving a subprime is a choice/assignment process rather than randomly assigned we used the PSM method to adjust this selection bias. In the first step, we employed logistic regression models to predict the propensity ($e(x_i)$) for borrower i (i= 1,…,N) of receiving subprime loans (S_i= 1) using a set of conditioning variables (x_i).

$$\mathrm{e}(x_i)=pr(S_i=1|X_i=x_i) \tag{1}$$

In the second step, we used the nearest-neighbor with caliper method to match CAP borrowers with borrowers holding subprime loans based on the estimated propensity scores from the first step. The method of nearest-neighbor with caliper is a combination of two approaches: traditional nearest-neighbor matching and caliper matching. [9] This method begins with a randomly sort of the participants and nonparticipants, then selecting the first participant and finding the nonparticipant subject with the closest propensity score within a predetermined common-support region called caliper (δ). The approach imposes a tolerance level on the distance between the propensity score of participant i and that of nonparticipant j. Formally, assuming $c(p_i)$ as the set of the neighbors of i in the comparison group, the corresponding neighborhood can be stated as follows.

$$c(p_i) = \{j : \delta > \|p_i - p_j\|\} \tag{2}$$

If there is no member of the comparison group within the caliper for the treated unit i, then the participant is left unmatched and dropped from the analysis. Thus, caliper is a way of imposing a common support restriction. Naturally, there is uncertainty about the choice of a tolerance level since a wider caliper can increase the matching rate but it also increase the likelihood of producing inexact matching. A more restrictive caliper increases the accuracy but may significantly reduce the size of the matched sample.

In the third step, we employed a multinomial regression model (MNL) to further control factors that may influence the performance of the new sample after loan origination, many of which are time-varying. In each month the loan can be in only one state or outcome (active, default, or prepaid). Since the sum of the probabilities of each outcome must equal to one, the increase in the probability of one outcome

necessitates a decrease in the probability of at least one competing outcome. Thus the multinomial logit model is a competing risk model.

We can think of mortgage borrowers as having three options each month:

- DEFAULT: This study treats the incidence of the first 90-day delinquency as a proxy of default.
- PREPAID: If a loan was prepaid before it is seriously delinquent, it is considered a prepayment.
- ACTIVE: Active and not default (not seriously delinquent in some models)

The probability of observing a particular loan outcome is given by:

$$\Pr(y_{it} = j) = \frac{e^{\beta_j Z_{it} + \gamma_j S_i}}{1 + \sum_{k=1}^{2} e^{\beta_k Z_{it} + \gamma_k S_i}} \quad for\ j = 1,2$$

$$\Pr(y_{it} = j) = \frac{1}{1 + \sum_{k=1}^{2} e^{\beta_k Z_{it} + \gamma_k S_i}} \quad for\ j = 0 \qquad (3)$$

$$\ln L = \sum_{t=1}^{T} \sum_{i=1}^{N} \sum_{j=0}^{2} d_{ijt} \ln(\Pr(y_{it} = j))$$

where *j=0,1,2* represents the three possible outcomes of a loan and the omitted category (*j=0*) remains active and not seriously delinquent (ACTIVE). d_{ijt} is an indicator variable taking on the value 1 if outcome *j* occurs to loan *i* at time *t*, and zero otherwise. *Z* contains a set of explanatory variables and β is the coefficient. To identify the difference between the performance of CAP loans and subprime loans, *S* contains a subprime dummy variable or indicators of subprime loan characteristics. Specifically, we considered the impact one origination channel and two loan characteristics: the prepayment penalty, the adjustable rate, and the broker origination channel. We constructed six mutually exclusive dummy variables for the combinations of these three characteristics,[10] such as *sub_bro&arm&ppp* for "broker-originated subprime loans with adjustable rates and prepayment penalties" and *sub_arm* for "retail-originated subprime loans with adjustable interest rates and no prepayment penalties." None of the CAP loans have these features, and they are set as the reference group in both models.

In the context of observational studies, the PSM methods seek to mimic conditions similar to an experiment so that the assessment of the impact of the program can be based on a comparison of outcomes for a group of participants (i.e. those with $S_i = 1$) with those drawn from a comparison group of non-participants ($S_i = 0$). We need to check whether our observational data meet the two primary assumptions underlying the PSM methods: the *conditional independence* assumption and the *overlap* assumption.

Conditional Independence Assumption: [11]

To yield consistent estimates of program impact, matching methods rely on a fundamental assumption known as "*conditional independence*," which can be formally stated as:

$$(y_0, y_1) \perp w|x \tag{4}$$

This expression states that potential outcomes are orthogonal to treatment status, given the observable covariates. In other words, conditional on observable characteristics, participation is independent of potential outcomes and unobservable heterogeneity is assumed to play no role in participation (Dehejia and Wahba, 2002). Assuming that there are no unobservable differences between the two groups after conditioning on x_i, any systematic differences in outcomes between participants and nonparticipants are due to participation. So the plausibility of an evaluation method depends largely on the correctness of the propensity score model underlying program design and implementation.

Our first strategy is to use a well specified logit regression to estimate the probability of taking out a subprime mortgage for each cohort, grounded on a sound understanding of the subprime market. We determined the conditional variables that are associated with the use of subprime loans based on a review of subprime lending and mortgage choice literature, as discussed in the next section. Second, it is possible that lenders have access to more information about the borrower and local market than the information in our dataset and the unobservable lender information would influence the estimation results. Our strategy is to rerun the multinomial regression model by including the unobservable borrower heterogeneity as an independent variable, which is proxied by interest rate variables if the mortgage note rate can be assumed to an effective predictor of the level of credit risk.

Overlap assumption:

For matching to be feasible, there must be individuals in the comparison group with the same or similar propensity as the participant of interest. This requires an overlap in the distribution of observables between the treated and the comparison groups.

The overlap assumption is usually stated as:

$$0 < pr(w = 1|x) < 1 \tag{5}$$

This implies the possible existence of a nonparticipant analogue for each participant. When this condition is not met, then it would be impossible to find matches for a fraction of program participants.

In this case, as we discussed in the literature review, it is highly likely that there is significant overlap between the CRA-type CAP loans and the subprime sample since both of them focus on households with marginal credit quality and have identical loan characteristics such as lien status, loan purpose, occupancy status, and documentation type. As shown in Exhibit 3, the distribution of credit scores for the CAP and subprime borrowers, subprime borrowers tend to have lower FICO scores than CAP borrowers, but there is a significant overlap in these distributions. This overlap allows us to conduct a meaningful analysis of the performance of different loan products.

Empirical Analysis

Propensity Score Matching

Recent empirical studies suggest that borrowers take out subprime mortgages based on their credit score, income, payment history, level of down payment, debt ratios, and loan size limits; there is mixed evidence on the effect of demographics (Courchane et al. 2004; Cutts and Van Order, 2005; Chomsisengphet and Pennington-Cross, 2006; LaCour-Little, 2007). Based on the literature review, we included the key underwriting factors of FICO score and DTI in our analysis. These variables are assumed to directly affect credit risk and therefore affect mortgage choice/assignment, since higher credit risk is hypothesized to be associated with a greater probability of taking out a subprime mortgage. For example, lower FICO scores are assumed to be associated with higher credit risk, so we expect subprime loans to capture the majority of the borrowers with lower FICO scores. LTV, another important underwriting variable, is also generally considered to raise endogeniety concerns (LaCour-Little, 2007). In this case, higher LTV is one distinct characteristic of most CAP loans, with over 82 percent of CAP loans having an LTV equal to or higher than 97 percent. By contrast, most subprime loans have an LTV of less than 90 percent. Courchane et al. (2004) also suggest that high LTV may be associated with higher risk but is not necessarily associated with getting a subprime mortgage. Because our focus is the impact of borrower and neighborhood characteristics on borrowers' choice/assignment of mortgages, we decided not to include LTV variables in the model.[12]

In addition to the underwriting variables, we included loan amount as an explanatory variable since fixed costs are usually a large component of loan originations. We further included several factors measuring local market dynamics and credit risk. We constructed a zip-code-level credit risk measure: the mean FICO score for mortgages originated in the preceding year from the LPS data. Our hypothesis is that subprime lenders tend to market in neighborhoods or areas with a larger share of potential borrowers who have impaired credit history. The zip-code educational distribution was included as a proxy of residents' financial knowledge and literacy. Because some literature suggests that subprime lending is more likely to be concentrated in minority neighborhoods (Calem et al. 2004), we included the share of minority in the zip code in the models. Furthermore, we constructed a zip-code-level HHI using HMDA data to measure the extent of competition in the market in which borrowers' properties are

located.[13] The HHI measure also partially represents the volume of transactions in the area, since more transactions in a hot market could, though not necessarily would, attract more lenders to the market. In addition, we included quarterly calendar dummy variables to account for fluctuations in the yield curve that could affect market dynamics.

Exhibit 5 presents the results from logistic regression models for different vintages. Across different years, credit risk measures are highly predictive: borrower FICO score, coded into buckets with above 720 as the holdout category, is highly predictive of the use of subprime loans; coefficients are relatively large and decrease monotonically as credit score categories increase. In other words, as expected, the higher the FICO score, the lower the probability of taking out a subprime mortgage. Compared to those with very high DTI (>42 percent), borrowers with lower DTIs are generally less likely to receive subprime loans; exceptions are the buckets with low DTI (<28 percent) for the 2005 and 2006 samples. While it seems CAP borrowers had very high DTIs in 2006, the results generally suggest that borrowers with very high DTIs are more likely to receive subprime loans. In all the models, loan amount is positive for the use of subprime loans, consistent with the hypothesis that subprime borrowing involves higher costs, with costs being driven by large fixed components.

Further, zip-code-level average credit score is statistically significant and negatively related to the probability of taking out a subprime mortgage, suggesting that borrowers in areas with a higher share of low-score population are more likely to receive subprime loans. Zip-code-level education performs about as expected, with higher educational attainment roughly associated with a reduced probability of receiving a subprime mortgage. Borrowers in areas with a higher share of minorities are more likely to use subprime mortgages. Finally, higher HHIs are associated with a lower probability of taking out a subprime mortgage—suggesting that, at least in the period from 2003-2006, subprime loans were more likely to be in the markets with more intensive competition and/or more transactions.

In this analysis, we defined the logit rather than the predicted probability as the propensity score, because the logit is approximately normally distributed. For the one-to-one nearest neighbor with caliper match, we selected the subprime loan with the closest propensity score within a caliper for the first CAP loan after the subprime and randomly ordered CAP loans. We then removed both cases from further consideration and continued to select the subprime loan to match the next CAP loan. For the one-to-many match, we matched subprime loans with CAP loans with the closest propensity score within a caliper after all the loans were randomly sorted. Instead of removing the matched cases after matching, as in the one-to-one match, we kept the matched CAP loans in the sample and continued to find the matching CAP loans for the next subprime loan. This allows us to match as many subprime loans as possible for each CAP loan. We tried two different calipers, 0.1 and 0.25 times of standard error as suggested by Rosenbaum and Rubin (1985). In other words, we tried two matching algorithms, allowing us to match one CAP loan with one or multiple subprime loans, and two caliper sizes, allowing us to test the sensitivity of the

findings to varying sizes. For the one-to-many matched sample, to ensure that our analysis is representative of the matched set, we apply a system of weights, where the weight is the inverse of the number of subprime loans that matched to one single CAP loan.

Exhibit 6 describes the four matching schemes and numbers of loans for the resamples: Match 1 and Match 2 are based on the one-to-one match; Match 3 and Match 4 are based on the one-to-many match. Match 1 and Match 3 use nearest neighbor matching within a more restrictive caliper of 0.1, while other matching schemes employ a wider caliper (0.25 times of the standard deviation of the propensity scores). The results show that the more restrictive caliper does not dramatically reduce the sample size; we lost about 791 cases (12 percent) from Match 2 to Match 1 and only one CAP loan from Match 4 to Match 3. Because the qualitative results do not change and a restrictive caliper can lower the likelihood of producing inexact matching, we focused on the schemes using the more restrictive caliper size of 0.1 (Matches 1 and 3) in our analysis of loan performance. For the one-to-one match (Match 1), we ended up with a sample of 5,558 CAP loans and 5,558 matching subprime loans. For the one-to-many match, the sample was 35,971 subprime loans matched to 3,943 CAP loans (Match 3).

We checked covariate distributions after matching. Both Match 1 and Match 3 remove all significant differences, except LTV variables, between groups. For the matched groups, as Exhibit 7 shows, borrowers are remarkably similar across all groups except for LTV ratios, and we got a reduced but more balanced sample of CAP and subprime borrowers. Compared to CAP loans, which are usually fixed-rate retail loans with no prepayment penalty, subprime loans have distinctive features and terms. A vast majority (86 percent) of subprime loans are adjustable rate mortgages; most (70 percent) were obtained through brokers; and many (41 percent) have prepayment penalties.

Performance of the Matched Sample

We turn now to the comparison of CAP loans and subprime loans with similar characteristics. For the matched sample, we observed the payment history during the period from loan origination to March 2008. During this period, CAP loans had a lower serious delinquency rate: only 9.0 percent had ever experienced 90-day delinquencies before March 2008, compared to 19.8 percent of comparable subprime loans (Exhibit 8). Subprime loans also had a higher prepayment rate, 38 percent compared to about 18 percent for the matched CAP loans.

In addition to the subprime variables, we considered in the MNL model important underwriting variables, including borrower DTI ratio, credit history, loan age, and loan amount, as well as the put option. According to the option-based theory, home equity plays a central role in determining the probability of foreclosure (Quercia and Stegman 1992). The value of the put option is proxied by the ratio of negative equity (unpaid mortgage balance minus estimated house price based on the house price

index of the Office of Federal Housing Enterprise Oversight) to the original house price. We recognize that the inclusion of the put option may overestimate the risk of subprime loans since, as suggested in Zelman, McGill, Speer and Ratner (2007), some subprime loans may have second mortgages that were not captured here. We tried the same models without the put option variable; although the estimated default rate for the subprime loans is smaller, the qualitative results are fairly consistent with those in Exhibit 9 and Exhibit 10.

Falling interest rates may lead to faster prepayments and drive down delinquency rates as borrowers refinance their way out of potential problems. Rising interest rates can cause payment shocks at the reset date for adjustable-rate mortgages and reduce the ability of borrowers to afford a fixed-rate refinance. To capture the change in interest rate environment, we used the difference between the prevailing interest rates, which is proxied by the average interest rate of 30-year fixed-rate mortgages from the Freddie Mac Primary Mortgage Market Survey (PMMS), and the temporal average of the prevailing interest rates during the study period (Q1 2003 to Q1 2008).

Consistent with prior work, we further separated the matched sample into two cohorts based on years of origination. Subprime loans that originated in 2003 and 2004 were underwritten during a time of historically low interest rates and a strong economy, leading to a relatively good performance with very low default rates (Cutts and Merrill, 2008). Many borrowers were able to refinance their mortgages or sell their houses because of lax underwriting and high house price appreciation before 2007, which extinguished the default option. Instead, subprime loans that originated in 2005 and 2006, especially subprime ARMs, have not performed as well. These two cohorts capture some unobservable heterogeneity characterizing mortgages that originated in a booming housing market and those that originated in a softening housing market.

The results from the MNL regressions based on different matching samples are listed in Exhibit 9 (one-to-one match) and Exhibit 10 (one-to-many match). Model 1 considers the subprime dummy variable only, while Model 2 helps us explain the difference in performance between CAP and subprime loans. The results-based samples using varying algorithms are quite consistent; estimated coefficients for the explanatory variables are of the same sign and similar size, so Exhibit 10 only lists results for the subprime variables. Except for a few insignificant coefficients for the prepayment outcome, the subprime variables are significant and have expected signs. It is not easy to interpret the results based on the coefficients from the MNL regressions directly. We estimated the cumulative default and prepayment rates in the first 24 months after origination for borrowers with impaired credit score (FICO score 580-620) and with mean value of other regressors, except loan age and loan characteristics, based on the MNL regression results. The estimation results discussed below are listed in Exhibit 11, where we consider a 90-day delinquency as termination of a loan, although it may still be active after the delinquency.

Summary of Primary Findings

First of all, there is consistent evidence that subprime loans have a higher default risk and a higher prepayment probability than CAP loans. The estimated cumulative default rate for a 2004 subprime loan is 16.3 percent, about four times that of CAP loans (4.1 percent). For a 2006 subprime loan, the cumulative default rate is over 47.0 percent, about 3.5 times that of comparable CAP loans (13.3 percent). In other words, CAP loans are over 70 percent *less* likely to default than a comparable subprime loan across different vintages. We also notice that the default rate of the 2005-2006 cohort is significantly higher than that of the 2003-2004 cohort for loans with same loan features. Very likely this is because of changes in the underwriting standard and in economic conditions, as well as other unobservable heterogeneity.

We also found that subprime loans with adjustable rates have a significantly higher default rate than comparable CAP loans. And when the adjustable rate term is combined with the prepayment-penalty feature, the default risk of subprime loans becomes even higher. For a 2004 *sub_arm* loan (retail-originated subprime ARM without prepayment penalty), the estimated cumulative default rate would be 6.5 percent, slightly higher than that of CAP loans (4.1 percent). But if the adjustable rate subprime mortgage has a prepayment penalty, the estimated default rate increases to 13.5 percent for a 2004 *sub_arm&ppp* loan (retail-originated subprime ARM with prepayment penalty), over 100 percent higher than that of *sub_arm*. The same pattern also holds for the 2006 originations.

Finally, we found that the broker-origination channel is significantly associated with an increased level of default. For example, the estimated cumulative default rate for a 2004 *sub_bro&arm* loan (broker-originated adjustable-rate subprime loan without prepayment penalty) is 17.3 percent, significantly higher than the 6.5 percent of the *sub_arm* loans. For a 2006 *sub_bro&arm* loan, the estimated cumulative default rate is as high as 51 percent, much higher than the 16.8 percent of the *sub_arm* loans. The same pattern can also identified for adjustable-rate subprime loans with prepayment penalties. When a broker-originated subprime ARM has the term of prepayment penalty, the default risk for 2004 originations is 5.1 times as high as that of CAP loans (21.8 percent vs. 4.1 percent) and for 2006 originations 4.0 times as high (53.8 percent vs. 13.3 percent).

The results suggest that, all other characteristics being equal, borrowers are three to five times more likely to default if they obtained their mortgages through brokers. When this feature is combined with the adjustable rate and/or prepayment penalty, the default risk is even higher. One possible explanation is that, as suggested in Ernst et al. (2008) and Woodward (2008), loans originated through brokers have significantly higher closing costs and prices, which increases borrowers' costs and can lead to elevated default risk. It is also possible that borrowers obtaining loans through brokers are more likely to receive products with features that may increase the default risk. Finally, it is very likely that the broker-origination channel has a looser underwriting standard that has not been fully captured by the model, which allows unqualified borrowers to receive unsustainable risky products. All these contentions

are consistent with the results, and additional research is needed to examine this issue in more detail.

As to the outcome of prepayment, we observed two obvious trends. The first is that subprime loans, especially subprime ARMs, have a significantly higher prepayment rate than CAP loans (Exhibit 11). Second, for recent originations (2005-2006), subprime loans with prepayment penalties are less likely to prepay than loans with similar terms but without prepayment penalties. But for early originations (2003-2004), the pattern is reversed: subprime loans with prepayment penalties have a higher prepayment rate, probably because they are more likely to be prepaid after the prepayment penalty period has expired. Although we were not able to determine the prepayment penalty clauses for all subprime loans because of missing values, for those loans with complete information prepayment penalties were most frequently levied within the first two to three years of loan origination. As of March 2008, then, most prepayment penalties for 2003-2004 originations have expired. But prepayment may also be part of the problem if the borrower prepaid the loans by refinancing into another subprime product.

The Impact of Unobservable Heterogeneity

To check how unobservable borrower risk characteristics impact the results, we treated unobservable heterogeneity as an omitted variable, and solved this problem by including a proxy of the omitted variable as a regressor in the outcome equation along with the subprime dummy and other controls. Our first proxy of borrower unobservable heterogeneity is the risk premium (*rate_sp*), which is the mortgage interest rate minus the national average rate of 30-year fixed-rate mortgages from the PMMS. Of course, the risk premium variable may be an endogenous variable here, because if priced properly mortgage interest rates are determined by an assessment of a borrower's risk profile and some mortgage characteristics. To address the endogeneity issue, we used the residue of the risk premium (*rate_resid*) as a proxy of the unobservable lender/borrower risk characteristics based on an OLS model using observable information to predict mortgage risk premium.[14]

The qualitative results generally do not change when the proxies of unobservable heterogeneity are considered (Model 3 and Model 4 in Exhibit 12). The inclusion of the risk premium variables seems help explain the borrowers' prepayment behavior but not the default behavior. The coefficients of the subprime variables for the default option vary only slightly and have the same significance in different models. The noticeable difference is that for prepayment option once the risk premium variables are controlled, the coefficients of the subprime variables become much smaller for the 2005-2006 cohort but the signs and significance are the same. The coefficients of the risk premium variables (*rate_sp* and *rate_resid*) are generally insignificant for the default option (with only one exception of the 2003-2004 cohort which is slightly significant). As to the prepayment option, risk premium variables have a positive impact on the probability of prepayment for the 2005-2006 cohort but have a negative

impact, though with a magnitude close to zero, for the 2003-2004 cohort, possibly because of changes in some uncaptured market condition information.

In summary, we demonstrate that the results we obtained earlier are robust enough even after controlling for proxies of the unobservable heterogeneity among borrowers. As a result, we are more confident about the conclusions about the relative risk of different loan products.

Empirical Results of Other Controls

Because the results for most of the variables are generally consistent across different models, discussion of other control variables is based primarily on Model 1, as summarized in Exhibit 9. For other controlled variables, the results suggest:

Other risk variables

- Put option: Borrowers with less or negative equity in their homes (larger value of *put*) are more likely to default and less likely to prepay. The results confirm the common wisdom that the level of equity in a home is a strong predictor for prepayment and default.
- Credit history: As expected, there is consistent evidence that borrowers with lower credit scores are more likely to experience serious delinquency.
- Debt-to-income ratio: Higher debt-to-income ratios are associated with a higher default risk for the 2003-2004 cohort, but the coefficients are insignificant for the 2005-2006 sample.

Loan characteristics

- Size of unpaid balance: Larger loan size is generally associated with lower default risk. Larger loan size is also associated with higher prepayment probability for the 2003-2004 cohort.

Area and neighborhood controls

- Area credit risk: Average credit score in the zip code is significantly and negatively associated with default risk. There is also some evidence that zip code average credit score is positively associated with prepayment probability (for the 2005-2006 vintage).
- Interest rate dynamics: For different cohorts, the impact of interest rate environment is different. For the 2003-2004 cohort, the increase in average interest rate decreases the prepayment probability but for the recent cohort, the increase in average interest rate increases the default risk and has no significant impact on the prepayment probability.
- County unemployment rate: Average county unemployment rate is generally insignificant in explaining the default and prepayment behaviors across different models.

Time dummies

- Dummies of 2003 and 2005 originations: The 2005 originations are significantly less likely to default, compared to the 2006 cohort.

Conclusions

As the current economic crisis worsens, the debate continues as to what cause the initial foreclosure crisis in the mortgage markets. In this study, we examine the relative default risk of two of the suspects: subprime mortgages and community reinvestment loans. Using propensity matching methods, we constructed a sample of comparable borrowers with similar risk characteristics but holding the two different loan products. We found that, for comparable borrowers, the estimated default risk is much lower with a CRA loan than with a subprime mortgage. More narrowly, we found that the broker-origination channel, an adjustable rate, and a prepayment penalty, all contribute substantially to the elevated risk of default among subprime loans. In the worst scenario, when broker origination is combined with the features of adjustable rate and prepayment penalty, the default risk of a borrower is four to five times as high as that of a comparable borrower holding a CRA-type product. Though CAP has some program-specific features, the results clearly suggest that the relative higher default risk of subprime loans may not be solely attributed to borrower credit risk, instead it is significantly associated with the characteristics of the products and the origination channel in the subprime market. Thus, the results suggest that when done right and responsibly, lending to LMI borrowers is viable proposition. Borrowers and responsible CRA lending should not be blamed for the current housing crisis.

Our results are consistent with recent regulatory action.[15] Key features of subprime loans—underwriting that ignores ability to pay, the inclusion of prepayment penalties, escalating interest rates and hidden fees--make it difficult for families to stay current on their mortgage payments. Federal Reserve rules issued in 2006 and recent amendments to the Truth in Lending Act (Regulation Z) have banned negative amortization for high-priced loans and most prepayment penalties. They have also banned underwriting loans without regard to a borrower's ability to pay. Unfortunately, broker origination also significantly increases default risk. However, there is no Federal law and only a few states have sufficiently regulated the incentive structure of the broker origination channel, especially the yield spread premium which many have argued may lead brokers to originate loans that may not be in the best interest of the borrower.[16]

In the current economic situation, many borrowers holding subprime mortgages with risky loan features are having difficulty making their current payments and many have already been seriously delinquent or in default. One proposed solution has been to modify troubled owner-occupied subprime loans with FHA-insured loans or more sustainable fixed-rate products at a significant discount (Inside B&C Lending, 2008). This research demonstrates that if subprime-like borrowers receive loans with prime rather than subprime terms and conditions, their default rate would be much lower.

Because the mortgage industry was originally criticized for failing to serve lower-income and minority households and more recently for flooding the market with unsustainable mortgages with risky features, our findings are important for policymakers. This research suggests that loans with prime terms and conditions offered through special CRA lending programs provide LMI and minority households, even those with somewhat imperfect credit histories, more sustainable homeownership options than subprime loans.

While our results are interesting for understanding the performance difference between subprime and CRA loans, we would like to emphasize that CAP has some program specific characteristics. Though national in scope, CAP is geographically concentrated in certain markets. In addition, this analysis focuses solely on home purchase lending activities and borrowers with full or alternative documentation only. As such, it is unclear whether or not our findings for the CAP program are applicable to national population of CRA loans and the entire subprime market. However, CAP borrowers are matched with subprime borrowers with similar risk profiles, focusing in this way on the less risky portion of the subprime market. We have also excluded from the analysis investor loans and low- or no-doc subprime mortgages, all of which are generally associated with a higher credit risk. Further, if borrowers are indeed steered to low- and no-doc loans in the subprime market even when they could have documented their income, as has been asserted by some observers, this would suggest that the increased risk of having one's mortgage originate in the subprime market is even greater than captured in this paper. As such, this research provides more convincing evidence of the relative risk of the CRA-type loans and the impact of loan features and origination channels on loan performance.

Endnotes:

[1] For more complete details of CRA regulations, see http://www.ffiec.gov/cra/default.html.

[2] The CRA assessment area for a retail-oriented banking institution must include "the areas in which the institution operates branches and deposit-taking automated teller machines and any surrounding areas in which it originated or purchased a substantial portion of its loans" (Avery et al. 2000, p. 712).

[3] As Alexander et al. (2002) suggest that some practices of possible gaming of brokers with lenders include at least reporting the highest FICO score from the three bureaus, pulling a FICO score after challenging a derogatory, and shopping for cooperative appraisers.

[4] Examples of guidelines that reduced cash required to close include: Lesser of $500 or 1percent from borrower's own funds; Maximum LTV of 98percent and maximum combined LTV (including soft seconds) of 103percent; No reserves required.

[5] Examples of guideline flexibility with respect to credit history include: Demonstrate 6-month satisfactory payment history with four sources of credit, either traditional or non-traditional; FICO scores thresholds below 620 accepted in certain programs.

[6] Examples of underwriting flexibility in assessing the ability to repay include: Maximum total ratio of debt payments to income ratio of 43 percent, or up to 45 percent if new housing payment is not more than 25 percent higher than prior housing payment.

[7] Examples of offsetting or combined guideline flexibilities include: Maximum total ratio of debt payments to income varies from 38percent to 48percent with borrowers with higher credit scores allowed higher ratios; Higher downpayments or reserve requirements for borrowers with FICO below 620.

[8] To qualify for the CAP program, borrowers must meet one of three criteria: (1) have income under 80 percent of the area median income (AMI) for the metropolitan area; (2) be a minority with income below 115 percent of AMI; (3) or purchase a home in a high-minority (>30%) or low-income (<80% AMI) census tract and have an income below 115 percent AMI.

[9] Other common matching algorithms include: nearest-neighbor matching, kernel matching, local linear matching, Mahalanobis metric matching, Mahalanobis metric matching including the propensity score, and difference in differences methods (see review in Guo et al. 2006 and Essama-Nssah, 2006).

[10] Unfortunately, there are too few loans in the matched sample for retail-originated fixed-rate mortgages (less than 20 for the one-to-one match for each category), which does not allow us to conduct meaningful analysis, and so they were dropped from further analysis.

[11] This assumption is also known as the *exogeneity*, or *unconfoundedness*, or *ignorable treatment assignment*, or *conditional homogeneity*, *or selection on observables* assumption *(*Essama-Nssah, 2006).

[12] To empirically test the impact on results of including/excluding LTV variables, we tried logistic regression models with LTV variables. As expected, LTV ratio is highly significant in predicting the use of subprime loans, with lower LTVs consistently and monotonically related to the use of subprime loans. The match rate is lower than those reported in Exhibit 6, but the qualitative results on the performance of mortgages do not change.

[13] The HHI is constructed as the sum of squared market shares of firms in a zip code. Based on HMDA data, we got the market share of firms in a census tract and then matched to corresponding zip codes. When a census tract overlaps multiple zip codes, we assume the share of loans for the particular firm is the same as the share of house units of the tract in this zip code. As such, the index ranges from 10,000 in the case of 100% market concentration to near zero in the case of many firms with equally small market shares.

[14] We assume mortgage risk premium is determined by a set of borrower, neighborhood characteristics in the propensity score estimation and loan characteristics that may influence pricing including LTV, adjustable rates, and prepayment penalties. We ran OLS regressions for different cohorts and the R squares of the four regressions range from 0.4 for the 2004 cohort to 0.61 for the 2003 cohort. The regression results are available upon request.

[15] Home Ownership and Equity Protection Act bans balloon payments, negative amortization, most prepayment penalties for high-rate/high-fee loans. The Revision of Regulation Z of Truth in Lending Act in July 2008 further bans any prepayment penalties if the payment can change in the initial four years and for high-priced loans prepayment penalties cannot last for more than two years.

[16] Effective on October 1, the House Bill 2188 in North Carolina bans rate or yield spread premiums.

Reference:

Alexander, W.P., S.D. Grimshaw, G.R. McQueen and B.A. Slade. Some Loans Are More Equal than Others: Third-Party Originations and Defaults in the Subprime Mortgage Industry. *Real Estate Economics*, 2002, 30(4): 667-697.

Ambrose, B.W., M. LaCour-Little and Z.R. Huszar. A Note on Hybrid Mortgages. *Real Estate Economics*, 2005, 33(4): 765-782.

Apgar, W.C. and M. Duda. The Twenty-Fifth Anniversary of the Community Reinvestment Act: Past Accomplishments and Future Regulatory Challenges. *FRBNY Economic Policy Review*, 2003, June: 169-191.

Avery, R.B., R.W. Bostic and G.B. Canner. CRA Special Lending Programs, *Federal Reserve Bulletin*, 2000, 86: 711-731.

Bernanke, B.S. The Community Reinvestment Act: Its Evolution and New Challenges. Speech, The Community Affairs Research Conference, Washington, D.C. March 30, 2007, http://www.federalreserve.gov/newsevents/speech/Bernanke20070330a.htm.

Brooks, R. and R. Simon. Subprime Debacle Traps Even Very Credit-Worthy As Housing Boomed, Industry Pushed Loans To a Broader Market, *Wall Street Journal*, 2007, Dec. 3, A1.

Bocian, D., K. Ernst and W. Li. Unfair lending: The effect of race and ethnicity on the price of subprime mortgages. Federal Reserve System Community Affairs Research Conference, Washington, DC, 2007.

Calem, P.S., K. Gillen and S.M. Wachter. The Neighborhood Distribution of Subprime Mortgage Lending. *Journal of Real Estate Finance and Economics*, 2004, 29 (4): 393-410.

Calhoun, C.A. and Y. Deng. A Dynamic Analysis of Fixed- and Adjustable-Rate Mortgage Terminations. *Journal of Real Estate Finance and Economics*, 2002, 24(1/2): 9-33.

Chomsisengphet, S. and A. Penning-Cross. The Evolution of the Subprime Mortgage Market. *Federal Reserve Bank of St. Louis Review*, 2006, January/February: 31-56.

Cravatts, R.L. Unintended fallout of loan crisis, *The Boston Globe*, 2008, July 26.

Courchane, M.J. The Pricing of Home Mortgage Loans to Minority Borrowers, How Much of the APR Differential Can We Explain? *Journal of Real Estate Research*, 2007. 29(4): 399-440.

Courchane, M.J., B.J. Surette and P.M. Zorn. Subprime Borrowers, Mortgage Transitions and Outcomes. *Journal of Real Estate Finance and Economics*, 2004, 29(4): 365-392.

Cutts, A.C. and Merrill, W.A. Interventions in Mortgage Default: Policies and Practices to Prevent Home Loss and Lower Costs. in Retsinas, N.P. and E.S. Belsky, eds. *Borrowing to Live: Consumer and Mortgage Credit Revisited*, 2008, pp. 203-254, Brookings Institution Press. Washington, DC

Cutts, A.C. and R. Van Order. 2005. On the Economics of Subprime Lending, *Journal of Real Estate Finance and Economics*, 2005, 30(2): 167–196.

Danis, M.A. and A. Pennington-Cross. The Delinquency of Subprime Mortgages. Federal Reserve Bank of St. Louis, Research Division Working Paper, 2005-022A, 2005.

Dehejia, R.H. and W. Sadek. Propensity Score-Matching Methods for Nonexperimental Causal Studies. *The Review of Economics and Statistics*, 2002, 84(1): 151-161.

Ernst, K., D. Bocian and W. Li. Steered Wrong, Brokers, Borrowers, and Subprime Loans. Center for Responsible Lending, 2008, http://www.responsiblelending.org/research/steered-wrong-brokers-borrowers-and-subprime-l-oans.html.

Essama-Nssah, B. Propensity Score Matching and Policy Impact Analysis: A Demonstration in EViews**,** *World Bank Policy Research Working Paper*, No. 3877, 2006.

Gerardi, K., A.H. Shapiro and P. Willen. 2007. Subprime Outcomes, Risky Mortgages, Homeownership Experiences, and Foreclosures. *Federal Reserve Bank of Boston Working Papers* 07-15, 2007.

Glenn B.C., E.Laderman, A. Lehnert and W. Passmore. Does the Community Reinvestment Act (CRA) cause banks to provide a subsidy to some mortgage borrowers? *Finance and Economics Discussion Series* 2002-19, 2002.

Guo, S., R.P. Barth and C. Gibbons. Propensity Score Matching Strategies for Evaluating Substance Abuse Services for Child Welfare Clients. *Children and Youth Services Review*, 2006, 28(4): 357-383.

Hudson, M. and E.S. Reckard. More Homeowners with Good Credit Getting Stuck with Higher-Rate Loans. *Los Angeles Times*, 2005, October 24.

Immergluck, D. From the Subprime to the Exotic, Excessive Mortgage Market Risk and Foreclosures. *Journal of the American Planning Association*, 2008, 74 (1): 59-76.

Inside B&C Lending. FDIC's Mod Plan a Possible Model for Subprime Servicing, *Inside B&C Lending*, 2008, August 29: 4-5.

Inside Mortgage Finance. *The 2008 Mortgage Market Statistical Annual*. Inside Mortgage Finance Publications: Bethesda, MD, 2008.

Keys, B.J., T.K. Mukherjee, A. Seru and V. Vig. Did Securitization Lead to Lax Screening? Evidence from Subprime Loans (April 2008). EFA 2008 Athens Meetings Paper. 2008. Available at SSRN: http://ssrn.com/abstract=1093137.

Krauthammer, C. Catharsis, Then Common Sense, *Washington Post*, 2008, September 26, A23.

LaCour-Little, M. and Chun, G.H. Third Party Originators and Mortgage Prepayment Risk: An Agency Problem *Journal of Real Estate Research*, 1999, 17(1/2): 55-70.

LaCour-Little, M. The Home Mortgage Preferences of Low-and-Moderate Income Households. *Real Estate Economics*, 2007. 35(3): 265-290.

Mian, A. and A. Sufi. The Consequences of Mortgage Credit Expansion: Evidence from the 2007 Mortgage Default Crisis, 2008. Available at SSRN: http://ssrn.com/abstract=1072304.

Morganson, G. *Inside the Countrywide Spending Spree, New York Times*, August 26, 2008.

Mortgage Bankers Association (MBA). National Delinquency Survey, Second Quarter 2008, 2008.

Pennington-Cross, A. Credit History and the Performance of Prime and Nonprime Mortgages. *Journal of Real Estate Finance and Economics*, 2003, 27(3): 279–301.

Pennington-Cross, A. and G. Ho. The Termination of Subprime Hybrid and Fixed-Rate Mortgages. *Federal Reserve Bank of St. Louis, Research Division Working Paper* 2006-042A, July 2006.

Poole, W. Reputation and the Non-Prime Mortgage Market. Speech at St. Louis Association of Real Estate Professionals, Saint Louis, MO, July 20, 2007.

Quercia, R.G. and M.A. Stegman. Residential mortgage default: A review of the literature. *Journal of Housing Research*, 1992, 3(2): 341-376.

Quercia, R.G., M.A. Stegman, W.R. Davis and E Stein. The performance of community reinvestment loans: Implications for secondary market purchases. In *Low-income homeownership: Examining the unexamined goal*, edited by N. P. Retsinas and E. S. Belsky. Washington, DC: The Brookings Institution, 2002.

Quercia, R.G., M.A. Stegman and W.R. Davis. The Impact of Predatory Loan Terms on Subprime Foreclosures, The Special Case of Prepayment Penalties and Balloon Payments. *Housing Policy Debate*, 2007, 18(2): 311-346.

Quercia, R.G. and J. Ratcliffe. The Preventable Foreclosure Crisis. *Housing Policy Debate*, 2008, 19(4): 775-783.

Renuart, E. An Overview of the Predatory Mortgage Lending Process. *Housing Policy Debate*, 2004, 15 (3): 467-502.

Rosenbaum, P.R. and D.B. Rubin. The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, 1983, 70: 41-55.

Rosenbaum, P.R. and D.B. Rubin. Constructing a Control Group Using Multivatiae Matched Sampling Methods that Incorporate the Propensity Score. *American Statistician*, 1985, 39: 33-38.

Woodward, S.E. A Study of Closing Costs for FHA Mortgages, U.S. Department of Housing and Urban Development, May 2008.

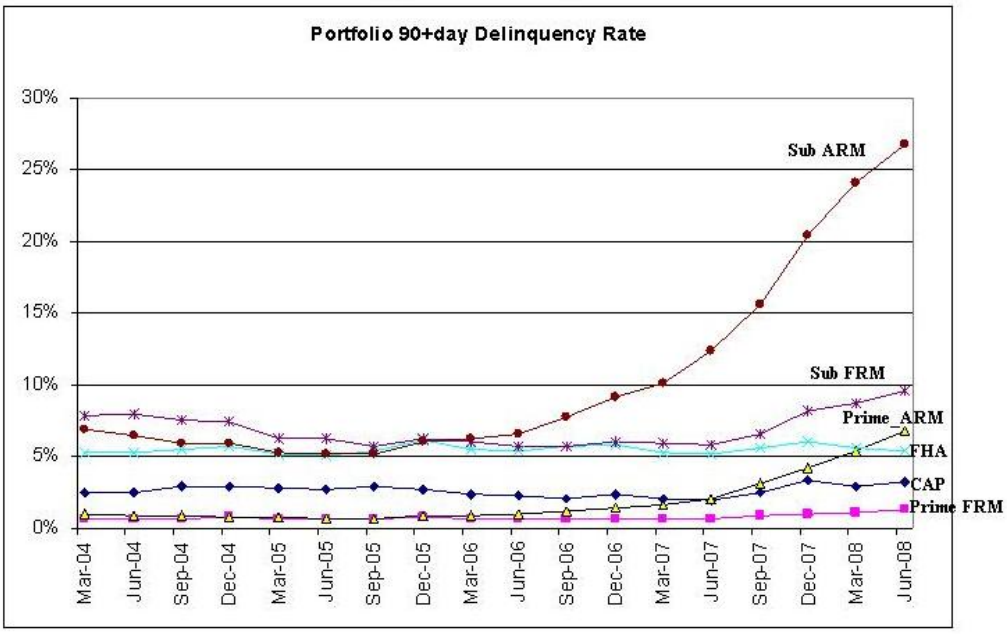
Zelman, I.L., D. McGill, J. Speer and A. Ratner. Mortgage Liquidity du Jour, Underestimated No More. *Credit Suisse*, March 12, 2007.

Exhibit 1 Construction of Subprime Study Sample

	# of Observations
	Subprime
Step 1 Subprime Loans meeting the following criteria: home purchase loans, first-lien; single family house, 30-year amortization, conforming loans with a minimum loan amount of $10,000 only	544,849
Step 2 Exclude loans with no or limited documentation or missing information for the following variables: LTV, Fico score, DTI**,** documentation	86,697
Step 3 Exclude loans not in zip codes with CAP activities and loans without complete payment history	42,065

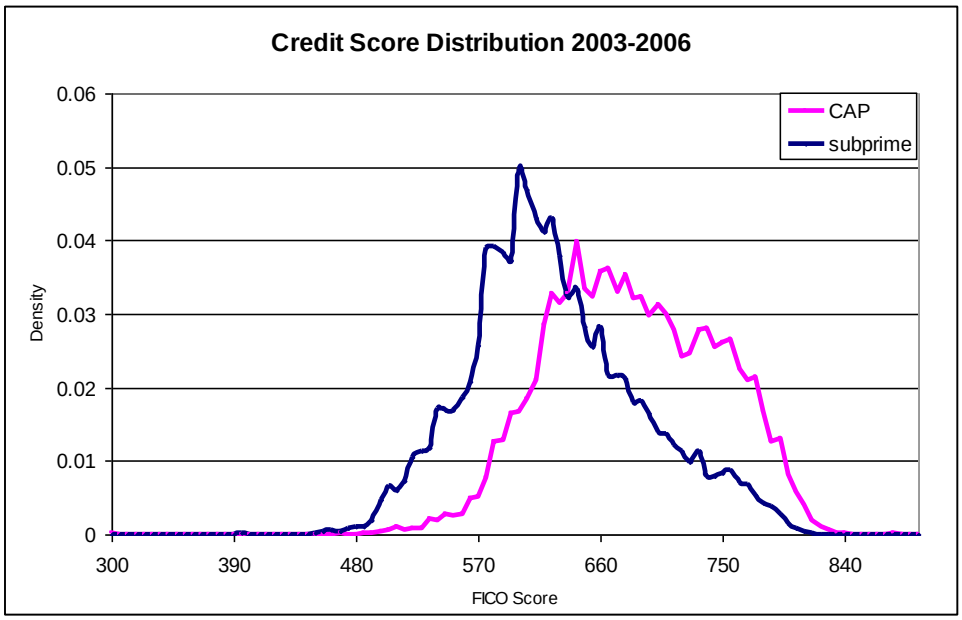
Note: based on authors' calculation from LPS. Subprime loans here include B&C loans and high-cost ARMs (with a margin greater than 300 basis points).

Exhibit 2 90-day Delinquency Rate by Loan Types



Source: Mortgage Banker Association (2008) and Self-Help

Exhibit 3 CAP and Subprime FICO Score Distribution (2003-2006)



Source: Lender Processing Services, Inc. (LPS) and Self-Help

Exhibit 4 Descriptive Statistics (Mean or Percentage)

Variable	CAP	Subprime
Debt-to-income ratio*		
DTI<28%	0.126	0.163
DTI 28-36%	0.278	0.158
DTI 36-42%	0.315	0.178
DTI>42%	0.281	0.501
FICO score*		
<580	0.031	0.213
580-620	0.109	0.263
620-660	0.224	0.225
660-720	0.324	0.192
>=720	0.312	0.107
LTV*		
<80%	0.037	0.369
80-90%	0.050	0.381
90-97%	0.090	0.167
>=97%	0.823	0.083
Loan characteristics		
Loan_amt*	100.86	148.1
ARMs*	-	0.903
Broker*	-	0.808
Prepayment penalty*	-	0.495
Note Rate*	6.66%	7.87%
Neighborhood/Local characteristics		
HHI index (in 10,000, 2005)*	0.051	0.036
Mean area FICO Score (2005)*	688.6	685.2
Share of minority *	0.293	0.482
Education distribution*		
Share of less high school	0.199	0.239
Share of high school	0.318	0.283
Share of some college	0.272	0.292
Share of college and above	0.211	0.186
Geography: top 5 states		
	OH (22.3%)	CA (19.2%)
	NC (14.6%)	TX (11.0%)
	IL (12.6%)	FL (10.1%)
	GA (11.4%)	IL (9.1%)
	OK (5.8%)	GA (5.3%)
Origination Year		
2003	2,670	4,680
2004	2,581	18,380
2005	2,251	11,703
2006	1,719	7,302
N	9,221	42,065

Note: * Bivariate χ^2 test or t test significant at the 0.01 level.

Exhibit 5 Logistic regression models predicting propensity scores

	2003		2004		2005		2006	
	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
dti<28	-0.172	0.088	0.006	0.941	0.616	0.000	1.324	0.000
dti 28-36	-1.369	0.000	-1.252	0.000	-0.603	0.000	0.216	0.018
dti 36-42	-1.411	0.000	-1.486	0.000	-0.837	0.000	-0.160	0.060
dti>42								
cscore<580	4.632	0.000	3.943	0.000	4.182	0.000	1.900	0.000
cscore 580-620	2.040	0.000	2.237	0.000	2.846	0.000	1.245	0.000
cscore 620-660	1.431	0.000	1.121	0.000	1.438	0.000	1.021	0.000
cscore 660-720	0.850	0.000	0.550	0.000	0.632	0.000	0.483	0.000
cscore >=720								
loan_amt	0.012	0.000	0.013	0.000	0.011	0.000	0.010	0.000
qtr1	0.055	0.585	-0.553	0.000	0.606	0.000	1.137	0.000
qtr2	-0.019	0.843	-0.062	0.407	0.315	0.000	0.891	0.000
qtr3	-0.545	0.000	0.070	0.342	0.073	0.372	0.601	0.000
qtr4								
HHI (in 10,000)	-14.763	0.000	-18.747	0.000	-21.058	0.000	-23.296	0.000
area credit score	-0.004	0.046	-0.004	0.053	-0.002	0.438	0.000	0.937
pctmin	-0.007	0.001	0.006	0.001	0.017	0.000	0.014	0.000
pct_less_high								
pct_high	-0.124	0.000	-0.077	0.000	-0.057	0.000	-0.144	0.000
pct_somecoll	0.062	0.000	0.049	0.000	0.054	0.000	0.015	0.037
pct_coll	-0.082	0.000	-0.067	0.000	-0.058	0.000	-0.092	0.000
_cons	6.015	0.000	5.411	0.000	2.164	0.177	6.127	0.001
Pseudo R^2	0.42		0.36		0.38		0.35	
	N=7,350		N=20,961		N=13,954			N=9,021

Exhibit 6 Description of matching schemes and resample sizes

Scheme	Description of matching method	N of original sample	N of the new sample	
		CAP	CAP	Subprime
Match1	Nearest 1-to-1 using caliper=0.1	9,221	5,558	5,558
Match2	Nearest 1-to-1 using caliper=0.25σ	9,221	6,349	6,349
Match3	Nearest 1-to-many using caliper=0.1	9,221	3,943	35,971
Match4	Nearest 1-to-many using caliper=0.25σ	9,221	3,944	36,236

Note: For the one-to-one nearest neighbor with caliper match, the subprime loan with the closest propensity score within a caliper for the first CAP loan was selected after the sample was randomly ordered. We then removed both cases from further consideration and continue to select the subprime loan to match the next CAP loan. For the one-to-many match, subprime loans were matched with CAP loans with the closest propensity score within a caliper after all the loans were randomly sorted. Instead of removing the matched cases after matching as in the one-to-one match, we kept the matched CAP loans in the sample and continued to find the matching CAP loan for the next subprime loan.

Exhibit 7 Significance tests of the resamples

Variable	Match 1		Match3	
Debt-to-income ratio	CAP	Subprime	CAP	Subprime
DTI<28%	0.229	0.221	0.223	0.218
DTI 28-36%	0.261	0.249	0.242	0.233
DTI 36-42%	0.375	0.391	0.397	0.403
DTI>42%	0.135	0.139	0.138	0.146
FICO score				
<580	0.047	0.049	0.165	0.164
580-620	0.15	0.155	0.251	0.241
620-660	0.256	0.241	0.296	0.292
660-720	0.305	0.305	0.165	0.164
>=720	0.242	0.25	0.123	0.139
LTV (* for match 1)				
<80%	0.042	0.314	0.044	0.305
80-90%	0.062	0.276	0.066	0.282
90-97%	0.11	0.209	0.117	0.208
>=97%	0.786	0.201	0.773	0.204
Loan characteristics				
loan_amt*	109.4	109.7	112.0	113.2
ARMs*		0.864		0.880
Broker*		0.696		0.682
Prepayment penalty*		0.413		0.422
Note Rate*	0.066	0.078	0.066	0.078
N	5,558	5,558	3,943	35,971**

Note: * Bivariate χ^2 test or t test significant at 0.01 level. **Statistics based on Match 3 are weighted average and the weight is the inverse of number of subprime loans that matched to one CAP loan.

Exhibit 8 Performance measures of the new samples

	Whole sample		2003-2004 Sample		2005-2006 Sample	
	% of 90-day	% prepayment	% of 90-day	% prepayment	% of 90-day	% prepayment
CAP	8.98	18.46	7.64	25.73	10.94	7.84
Subprime	19.81	38.27	12.97	50.06	29.81	21.04
N	11,116		6,600		4,516	

Note: Observation period is from origination to March 2008; if a loan was 90-day delinquent and then prepaid, it is considered as a 90-day delinquency only.

Exhibit 9 MNL regression results of default and prepayment (Match 1 in Exhibit 6)

		2003-2004 Sample				2005-2006 Sample			
		Model 1		Model 2		Model 1		Model 2	
	Variable	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Default	put	0.041	0.000	0.044	0.000	0.050	0.000	0.052	0.000
	dti 28-36	0.581	0.000	0.585	0.000	0.083	0.528	0.093	0.480
	dti 36-42	0.632	0.000	0.599	0.000	0.025	0.847	0.018	0.890
	dti>42	0.323	0.029	0.522	0.000	-0.241	0.065	0.015	0.907
	cscore<580	2.414	0.000	2.196	0.000	1.682	0.000	1.477	0.000
	cscore 580-620	1.991	0.000	1.790	0.000	1.278	0.000	1.057	0.000
	cscore 620-660	1.471	0.000	1.286	0.000	1.033	0.000	0.907	0.000
	cscore 660-720	0.634	0.000	0.512	0.001	0.448	0.004	0.388	0.011
	unpaid balance (in log)	-0.357	0.000	-0.266	0.008	-0.163	0.079	-0.066	0.482
	loan age (in log mon)	1.007	0.000	1.084	0.000	1.043	0.000	1.093	0.000
	area credit score	-0.010	0.000	-0.009	0.000	-0.012	0.000	-0.010	0.000
	average interest rate	-0.128	0.346	-0.142	0.299	0.522	0.000	0.507	0.000
	area unemp rate	0.044	0.120	0.045	0.106	0.045	0.120	0.025	0.393
	y2003 (y2005)	-0.078	0.389	-0.153	0.097	-0.607	0.000	-0.491	0.000
	subprime	1.592	0.000			1.596	0.000		
	sub_arm			0.540	0.004			0.361	0.033
	sub_arm&ppp			1.546	0.028			1.898	0.000
	sub_bro			1.945	0.000			1.446	0.000
	sub_bro&ppp			1.985	0.000			1.527	0.000
	sub_bro&arm			1.661	0.000			1.898	0.000
	sub_bro&arm&ppp			1.987	0.000			1.818	0.000
	cons	0.818	0.544	-0.963	0.482	1.291	0.347	-1.241	0.371
Prepay	put	-0.015	0.000	-0.013	0.000	-0.007	0.061	-0.006	0.185
	dti 28-36	0.289	0.000	0.301	0.000	-0.045	0.760	0.015	0.920
	dti 36-42	0.348	0.000	0.354	0.000	0.058	0.683	0.149	0.311
	dti>42	0.015	0.825	0.119	0.088	-0.300	0.030	-0.175	0.248
	cscore<580	0.142	0.322	-0.001	0.996	-0.090	0.663	-0.012	0.956
	cscore 580-620	0.080	0.321	-0.006	0.945	0.237	0.069	0.274	0.045
	cscore 620-660	0.323	0.000	0.262	0.000	-0.193	0.131	-0.140	0.285
	cscore 660-720	0.149	0.005	0.139	0.008	-0.076	0.521	-0.114	0.344
	unpaid balance (in log)	0.329	0.000	0.298	0.000	-0.055	0.537	-0.117	0.201
	loan age (in log mon)	0.459	0.000	0.512	0.000	0.697	0.000	0.699	0.000
	area credit score	0.001	0.381	0.002	0.091	0.007	0.001	0.008	0.001
	average interest rate	-0.197	0.007	-0.187	0.011	0.200	0.203	0.188	0.237
	area unemp rate	-0.016	0.338	-0.022	0.185	-0.029	0.409	-0.031	0.375
	y2003 (y2005)	-0.021	0.640	0.029	0.519	0.278	0.003	0.317	0.002
	subprime	0.922	0.000			1.238	0.000		
	sub_arm			0.611	0.000			1.132	0.000
	sub_arm&ppp			1.685	0.000			2.289	0.000
	sub_bro			0.437	0.000			1.207	0.001
	sub_bro&ppp			0.979	0.000			-0.241	0.510
	sub_bro&arm			1.080	0.000			1.660	0.000
	sub_bro&arm&ppp			1.340	0.000			0.947	0.000
	cons	-11.241	0.000	-11.612	0.000	-11.908	0.000	-11.495	0.000
	Log likelihood		-16790.3		-16683.1		-8262.9		-8157.0
	N		N=192,179 of 6,600 loans				N=93,646 of 4,516 loans		

Note: *sub_arm* represents subprime retail originated ARMs without prepayment penalty;
sub_ arm&ppp represents subprime retail originated ARMs with prepayment penalties;
sub_bro represents subprime broker originated fixed-rate mortgages without prepayment penalties; *sub_bro&ppp* represents subprime broker originated fixed-rate mortgages with prepayment penalties;
sub_bro&arm represents subprime broker originated ARMs without prepayment penalties; *sub_bro&arm&ppp* represents subprime broker originated ARMs with prepayment penalties.

Exhibit 10 MNL regression results of default and prepayment (Match 3 in Exhibit 6)

		2003-2004 Sample				2005-2006 Sample			
		Model 1		Model 2		Model 1		Model 2	
	Variable	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Default	subprime	1.448	0.000			1.616	0.000		
	sub_arm			0.482	0.003			0.189	0.208
	sub_arm&ppp			1.658	0.000			2.073	0.000
	sub_bro			1.721	0.000			1.418	0.000
	sub_bro&ppp			1.770	0.000			1.581	0.000
	sub_bro&arm			1.638	0.000			1.906	0.000
	sub_bro&arm&ppp			1.843	0.000			1.833	0.000
	cap								
Prepay	subprime	0.940	0.000			1.308	0.000		
	sub_arm			0.666	0.000			1.192	0.000
	sub_arm&ppp			1.544	0.000			2.220	0.000
	sub_bro			0.510	0.000			1.235	0.000
	sub_bro&ppp			0.901	0.000			-0.451	0.111
	sub_bro&arm			1.052	0.000			1.751	0.000
	sub_bro&arm&ppp			1.385	0.000			1.073	0.000
	cap								
	N	N=341,367 of 16,604 loans				N= 528,292 of 23,310 loans			

Note: see note in Exhibit 9 for the definition of different loan products.
There should be 8 dummies for different combinations of loan features but the sample sizes of the buckets of retail-originated fixed-rate subprime with and without prepayments are too small, which does not allow us conduct meaningful analysis.

Exhibit 11 Estimated cumulative default and prepayment rate
(24 months after origination for a borrower with impaired credit score of 580-620)

	2004 Origination		2006 Origination	
	Default	prepayment	Default	prepayment
CAP	4.08%	10.34%	13.32%	7.47%
Subprime	16.28%	22.81%	47.04%	17.69%
sub_arm	6.53%	17.93%	16.82%	20.82%
sub_arm&ppp	13.48%	41.43%	43.30%	39.42%
sub_bro	24.15%	13.92%	40.61%	18.76%
sub_bro&ppp	23.33%	22.48%	47.84%	4.74%
sub_bro&arm	17.30%	25.37%	51.00%	24.27%
sub_bro&arm&ppp	21.82%	30.40%	53.78%	13.36%

Note: see note in Exhibit 9 for the definition of different loan products. The predicted cumulative default and prepayment rate is as of 24 months after origination for a borrower with a FICO score between 580-620 and holding a mortgage originated in 2004 or 2006, with the mean value of other regressors. The estimation is based on regression results in Exhibit 9.

Exhibit 12 MNL Regression Results of Default and Prepayment
(with proxy of unobservable heterogeneity)

		2003-2004 Sample						2005-2006 Sample					
		Model 1		Model 3		Model 4		Model 1		Model 3		Model 4	
	Variable	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z		
Default	put	0.041	0.000	0.041	0.000	0.041	0.000	0.050	0.000	0.049	0.000	0.049	0.000
	dti 28-36	0.581	0.000	0.571	0.000	0.582	0.000	0.083	0.528	0.081	0.543	0.078	0.560
	dti 36-42	0.632	0.000	0.606	0.000	0.632	0.000	0.025	0.847	0.024	0.859	0.018	0.893
	dti>42	0.323	0.029	0.349	0.019	0.323	0.030	-0.241	0.065	-0.232	0.077	-0.243	0.063
	cscore<580	2.414	0.000	2.271	0.000	2.413	0.000	1.682	0.000	1.628	0.000	1.690	0.000
	cscore 580-620	1.991	0.000	1.921	0.000	1.990	0.000	1.278	0.000	1.237	0.000	1.274	0.000
	cscore 620-660	1.471	0.000	1.422	0.000	1.471	0.000	1.033	0.000	1.015	0.000	1.032	0.000
	cscore 660-720	0.634	0.000	0.614	0.000	0.634	0.000	0.448	0.004	0.441	0.004	0.448	0.004
	unpaid balance (in log)	-0.357	0.000	-0.308	0.002	-0.357	0.000	-0.163	0.079	-0.122	0.240	-0.152	0.114
	loan age (in log mon)	1.007	0.000	0.996	0.000	1.007	0.000	1.043	0.000	1.040	0.000	1.042	0.000
	area credit score	-0.010	0.000	-0.010	0.000	-0.010	0.000	-0.012	0.000	-0.012	0.000	-0.012	0.000
	average interest rate	-0.128	0.346	-0.143	0.297	-0.128	0.348	0.522	0.000	0.518	0.000	0.522	0.000
	area unemp rate	0.044	0.120	0.038	0.186	0.044	0.121	0.045	0.120	0.044	0.121	0.045	0.120
	y2003 (y2005)	-0.078	0.389	-0.097	0.289	-0.077	0.393	-0.607	0.000	-0.602	0.000	-0.608	0.000
	rate_sp			0.075	0.033					0.038	0.274		
	rate_resid					-0.002	0.961					0.020	0.573
	subprime	1.592	0.000	1.446	0.000	1.594	0.000	1.596	0.000	1.515	0.000	1.559	0.000
	cons	0.818	0.544	0.268	0.846	0.814	0.546	1.291	0.347	0.719	0.629	1.237	0.371
Prepay	put	-0.015	0.000	-0.014	0.000	-0.014	0.000	-0.007	0.061	-0.018	0.000	-0.018	0.000
	dti 28-36	0.289	0.000	0.291	0.000	0.297	0.000	-0.045	0.760	-0.062	0.686	-0.139	0.356
	dti 36-42	0.348	0.000	0.356	0.000	0.360	0.000	0.058	0.683	0.082	0.579	-0.049	0.739
	dti>42	0.015	0.825	-0.008	0.906	0.002	0.975	-0.300	0.030	-0.123	0.386	-0.299	0.031
	cscore<580	0.142	0.322	0.264	0.068	0.117	0.405	-0.090	0.663	-0.734	0.001	-0.022	0.916
	cscore 580-620	0.080	0.321	0.136	0.099	0.072	0.376	0.237	0.069	-0.184	0.187	0.139	0.298
	cscore 620-660	0.323	0.000	0.361	0.000	0.324	0.000	-0.193	0.131	-0.373	0.004	-0.211	0.102
	cscore 660-720	0.149	0.005	0.158	0.003	0.143	0.007	-0.076	0.521	-0.159	0.181	-0.080	0.497
	unpaid balance (in log)	0.329	0.000	0.309	0.000	0.335	0.000	-0.055	0.537	0.338	0.002	0.129	0.157
	loan age (in log mon)	0.459	0.000	0.466	0.000	0.464	0.000	0.697	0.000	0.679	0.000	0.688	0.000
	area credit score	0.001	0.381	0.000	0.626	0.001	0.350	0.007	0.001	0.008	0.000	0.006	0.012
	average interest rate	-0.197	0.007	-0.184	0.012	-0.186	0.011	0.200	0.203	0.163	0.304	0.186	0.241
	area unemp rate	-0.016	0.338	-0.014	0.408	-0.014	0.385	-0.029	0.409	-0.022	0.528	-0.022	0.527
	y2003 (y2005)	-0.021	0.640	-0.023	0.613	-0.019	0.675	0.278	0.003	0.273	0.003	0.239	0.010
	rate_sp			-0.068	0.000					0.399	0.000		
	rate_resid					-0.059	0.002					0.367	0.000
	subprime	0.922	0.000	1.004	0.000	0.977	0.000	1.238	0.000	0.505	0.000	0.601	0.000
	cons	-11.24	0.00	-10.74	0.00	-11.39	0.00	-11.91	0.00	-17.37	0.00	-12.46	0.00
	Log likelihood	-16790.3		-16780.3		-16785.1		-8262.9		-8211.7		-8219.2	

Note: Model 1 is the same as the one in Exhibit 9. *rate_sp* represents the difference between the mortgage note rate and the average interest rate of 30-year fixed-rate mortgages from the Freddie Mac Primary Mortgage Market Survey in the same month. *rate_resid* represents the residue of the risk premium variable from OLS models of risk premium.

CommunityDividend

Did the CRA cause the mortgage market meltdown?

Two Federal Reserve economists examine whether available data support critics' claims that the Community Reinvestment Act spawned the subprime mortgage crisis.

Neil Bhutta - Economist
Glenn B. Canner - Economist
March 2009

As the current financial crisis has unfolded, an argument that the Community Reinvestment Act (CRA) is at its root has gained a foothold. This argument draws on the fact that the CRA encourages commercial banks and savings institutions (collectively known as banking institutions) to help meet the credit needs of lower-income borrowers and borrowers in lower-income neighborhoods.[1/] Critics of the CRA contend that the law pushed banking institutions to undertake high-risk mortgage lending.

This article discusses key features of the CRA and presents results from our analysis of several data sources regarding the volume and performance of CRA-related mortgage lending. On balance, the evidence runs counter to the contention that the CRA lies at the root of the current mortgage crisis.

Assessing banks in context

The CRA directs federal banking regulatory agencies, including the Federal Reserve, to use their supervisory authority to encourage banking institutions to help meet the credit needs of all segments of their *local* communities. These communities, referred to hereafter as *CRA assessment areas*, are defined as the areas where banking institutions have a physical branch office presence and take deposits, including low- and moderate-income areas. The banking agencies periodically assess the performance of banking institutions in serving their local communities, including their patterns of lending to lower-income households and neighborhoods, and take the assessments into consideration when reviewing the institutions' applications for mergers, acquisitions, and branches.

The CRA emphasizes that banking institutions fulfill their CRA obligations within the framework of safe and sound operation. CRA performance evaluations have become more quantitative since 1995, when regulatory changes were enacted that stress actual performance rather than documented efforts to serve a community's credit needs. However, the CRA does not stipulate minimum targets or even goals for the volume of loans, services, or investments banking institutions must provide. While it is fair to say that the primary focus of CRA evaluations is the number and dollar amount of loans to lower-income borrowers or areas, the agencies instruct examiners to judge banks' performance in light of 1) each institution's capacity to extend credit to lower-income groups and 2) the local economic and market conditions that might affect the income and geographic distribution of lending.

Timing and originations

Before we turn to our analysis of CRA lending data, we have two important points to note regarding the

CRA and its possible connection to the current mortgage crisis.

The first point is a matter of timing. The current crisis is rooted in the poor performance of mortgage loans made between 2005 and 2007. If the CRA did indeed spur the recent expansion of the subprime mortgage market and subsequent turmoil, it would be reasonable to assume that some change in the enforcement regime in 2004 or 2005 triggered a relaxation of underwriting standards by CRA-covered lenders for loans originated in the past few years. However, the CRA rules and enforcement process have not changed substantively since 1995.[2/] This fact weakens the potential link between the CRA and the current mortgage crisis.

Our second point is a matter of the originating entity. When considering the potential role of the CRA in the current mortgage crisis, it is important to account for the originating party. In particular, independent nonbank lenders, such as mortgage and finance companies and credit unions, originate a substantial share of subprime mortgages, but they are not subject to CRA regulation and, hence, are not directly influenced by CRA obligations. (We explore subprime mortgage originations in further detail below.)

The CRA may directly affect nonbank subsidiaries or affiliates of banking institutions. Banking institutions can elect to have their subsidiary or affiliate lending activity counted in CRA performance evaluations. If the banking institution elects to include affiliate activity, it cannot be done selectively. For example, the institution cannot "cherry pick" loans that would be favorably considered under the law while ignoring loans to middle- or higher-income borrowers.

In the next section, we discuss the data analysis we undertook to assess the merits of the claims that the CRA was a principal cause of the current mortgage market difficulties. The analysis focuses on two basic questions. First, what share of subprime mortgage originations is related to the CRA? Second, how have CRA-related subprime loans performed relative to other loans? We believe the answers to these two questions will shed light on the role of the CRA in the subprime crisis.

CRA-related lending volume and distribution

In analyzing the available data, we consider two distinct metrics of lending activity: loan origination activity and loan performance. With respect to the first question posed above concerning loan originations, we determine which types of lending institutions made higher-priced loans, to whom those loans were made, and in what types of neighborhoods the loans were extended.[3/] This analysis therefore depicts the fraction of subprime mortgage lending that could be related to the CRA.

Using loan origination data obtained pursuant to the Home Mortgage Disclosure Act (HMDA), we find that in 2005 and 2006, independent nonbank institutions—institutions not covered by the CRA—accounted for about half of all subprime originations. (See Table 1.) Also, about 60 percent of higher-priced loan originations went to middle- or higher-income borrowers or neighborhoods, populations not targeted by the CRA. (See Table 2.) In addition, independent nonbank institutions originated nearly half of the higher-priced loans extended to lower-income borrowers or borrowers in lower-income areas (share derived from Table 2).

In total, of all the higher-priced loans, only 6 percent were extended by CRA-regulated lenders (and their affiliates) to either lower-income borrowers or neighborhoods in the lenders' CRA assessment areas, which are the local geographies that are the primary focus for CRA evaluation purposes. The small share of subprime lending in 2005 and 2006 that can be linked to the CRA suggests it is very unlikely the CRA could have played a substantial role in the subprime crisis.

To the extent that banking institutions chose not to include their affiliates' lending in their CRA examinations, the 6 percent share overstates the volume of higher-priced, lower-income lending that CRA examiners would have counted.[4/] It is possible, however, the examiners might have considered at least some of the lower-income lending outside of CRA assessment areas if institutions asked that it be considered in their CRA performance evaluations. No data are available to assess this possibility; however, the majority of the higher-priced loans made outside of assessment areas were to middle- or higher-income borrowers. In our view, this suggests it is unlikely that the CRA was a motivating factor for such higher-priced lending. Rather, it is likely that higher-priced lending was primarily motivated by its apparent profitability.

It is also possible that the remaining share of higher-priced, lower-income lending may be indirectly attributable to the CRA due to the incentives under the CRA investment test. Specifically, examiners may have given banks "CRA credit" for their *purchases* of lower-income loans or mortgage-backed securities containing loans to lower-income populations, which could subsequently affect the supply of mortgage credit.

Although we lack definitive information on banks' CRA-induced secondary market activity, the HMDA data provide information on the types of institutions to which mortgages are sold. The data suggest that the link between independent mortgage companies and banks through direct secondary market transactions is weak, especially for lower-income loans. (See Table 3.) In 2006, only about 9 percent of independent mortgage company loan sales were to banking institutions. (Figure not shown in table.) And among these transactions, only 15 percent involved higher-priced loans to lower-income borrowers or neighborhoods. In other words, less than 2 percent of the mortgage originations sold by independent mortgage companies in 2006 were higher-priced, CRA-credit-eligible, and purchased by CRA-covered banking institutions.

Analyzing loan performance

To assess the relative performance of CRA-related, higher-priced loans, we use data from First American LoanPerformance (LP) on subprime and alt-A mortgage securitizations to compare delinquency rates for subprime and alt-A loans in lower-income neighborhoods relative to those in middle- and higher-income neighborhoods. The LP data do not provide information on borrower income or the type of originating institution, but do indicate the ZIP Code of the property, which we use to group loans into neighborhood income categories.[5/] The results indicate that the 90-days-or-more delinquency rate as of August 2008 for subprime and alt-A loans originated between January 2006 and April 2008 is high regardless of neighborhood income, with delinquency rates comparable across neighborhood income categories. (See Table 4.)[6/]

In order to gauge more precisely the possible effects of the CRA, we use the LP data again and focus attention on the subset of ZIP Codes that are similar, in principle, except for their relationship to the CRA. Specifically, we focus only on ZIP Codes right above and right below the CRA eligibility threshold. (A neighborhood meets the CRA threshold if it has a median family income equivalent to 80 percent or less of the median family income of the broader area.) As such, the only major difference between these two sets of neighborhoods should be that the CRA focuses on one group and not the other. This analysis indicates that subprime loans in ZIP Codes that are the focus of the CRA (those just below the threshold) have performed virtually the same as loans in the areas right above the threshold.[7/] (See Table 5.)

To gain further insight into the risks of lending to lower-income borrowers or areas, we also compared

the performance of first mortgages originated and held in portfolio under the nationwide affordable lending programs operated by the NeighborWorks® America (NWA) partners to the performance of loans of various types as reported by the Mortgage Bankers Association of America. Many loans originated through NWA programs are done in conjunction with banking institutions subject to the CRA, so the performance of these loans provides another basis to address the relationship between the CRA and the subprime crisis. Along any measure of the severity of loan delinquency or the incidence of foreclosure, the loans originated under the NWA program have performed better than subprime loans.[8/] (See Table 6.) Although the performance of loans in the NWA portfolio provides one benchmark to compare the performance of CRA-related loans with other loans, it is only one portfolio of such loans; further research of this type could provide a stronger base from which to draw conclusions.

Another way to measure the relationship between the CRA and the subprime crisis is to examine foreclosure activity across neighborhoods that are classified by income. Data made available by RealtyTrac on foreclosure filings from January 2006 through August 2008 indicate that most foreclosure filings (e.g., about 70 percent in 2006) have taken place in middle- or higher-income neighborhoods. More important, foreclosure filings have increased at a faster pace in middle- or higher-income areas than in lower-income areas that are the focus of the CRA.[9/] (See Table 7.)

Two basic points emerge from our analysis of the available data. First, only a small portion of subprime mortgage originations is related to the CRA. Second, CRA-related loans appear to perform comparably to other types of subprime loans. Taken together, the available evidence seems to run counter to the contention that the CRA contributed in any substantive way to the current mortgage crisis.

Neil Bhutta and Glenn B. Canner are economists in the Division of Research and Statistics at the Board of Governors of the Federal Reserve System. The views expressed are those of the authors and do not necessarily reflect those of the Board of Governors or members of its staff.

1/ Lower-income households are determined by comparing the income of the household to the median family income of the metropolitan statistical area (MSA) or statewide non-MSA in which the property being purchased or refinanced is located. "Lower" is less than 80 percent of the median, "middle" is 80 to 119 percent, and "higher" is 120 percent or more. Lower-income neighborhoods are determined by comparing the median family income of the census tract where the property being purchased or refinanced is located to the MSA or statewide non-MSA median family income. Income categories for census tract classification have the same numerical thresholds as those applied for households.

2/ The change in the CRA rules in 2005 focused primarily on reducing burden for smaller lenders and expanding the focus of the CRA to include some middle-income census tracts in distressed rural areas. No changes were made that encouraged lenders to relax their underwriting standards.

3/ A higher-priced loan is defined as a loan where the spread between the annual percentage rate on the loan and the rate on Treasury securities of comparable maturity is above designated thresholds. For first-lien loans, the focus of attention in this article, the designated threshold is 3 percentage points. For junior-lien loans, the threshold is 5 percentage points. The definition was adopted as part of Regulation C (the regulation that implements the Home Mortgage Disclosure Act) and was intended to identify loans that fell in the subprime portion of the mortgage market.

4/ About one-fifth of the higher-priced loans extended in the banking institutions' local communities were extended by their affiliates.

5/ We classify ZIP Code-based delinquency data by relative income in two different ways. First, we use information published by the U.S. Census Bureau on income at the ZIP Code Tabulation Area (ZCTA) level of geography. Because the ZCTA data provide an income estimate for each ZIP Code, delinquency rates can be calculated directly from the LP data based on the ZIP Code location of the properties securing the loans (see www.census.gov/geo/ZCTA/zcta.html). Second, we calculate delinquency rates for each relative income group (lower, middle, and higher) as the weighted sum of delinquencies divided by the weighted sum of mortgages, where the weights equal each ZIP Code's share of population in census tracts of the particular relative income group. Relative income is based on the 2000 census and is calculated as the median family income of the census tract divided by the median family income of its MSA or a nonmetropolitan portion of the state. The two approaches yield virtually identical results.

6/ A virtually identical relationship across neighborhood income groups is found if the pool of loans evaluated is expanded to cover those originated between January 2004 and April 2008. The only material difference is that the levels of delinquency are lower for both subprime and alt-A loans for the larger sample of loans. Such a relationship is expected, since loans that are relatively long-lived tend to perform well over time.

7/ See footnote 6.

8/ No information was available on the geographic distribution of the NWA loans. The geographic pattern of lending can matter, as certain areas of the country are experiencing much more difficult housing conditions than other areas. Also, no information was available on the age of the loans, which can have an important effect on performance.

9/ These data are reported at the ZIP Code level. We calculate the statistics by relative income group in Table 7 as before; see footnote 6. Foreclosure filings have been consolidated at the property level, so separate filings on first- and subordinate-lien loans on the same property are counted as a single filing.

Data Tables

CIVIL RIGHTS

and the Mortgage Crisis

UNITED STATES COMMISSION ON CIVIL RIGHTS

September 2009

U.S. COMMISSION ON CIVIL RIGHTS

The U.S. Commission on Civil Rights is an independent, bipartisan agency established by Congress in 1957. It is directed to:

- Investigate complaints alleging that citizens are being deprived of their right to vote by reason of their race, color, religion, sex, age, disability, or national origin, or by reason of fraudulent practices.
- Study and collect information relating to discrimination or a denial of equal protection of the laws under the Constitution because of race, color, religion, sex, age, disability, or national origin, or in the administration of justice.
- Appraise federal laws and policies with respect to discrimination or denial of equal protection of the laws because of race, color, religion, sex, age, disability, or national origin, or in the administration of justice.
- Serve as a national clearinghouse for information in respect to discrimination or denial of equal protection of the laws because of race, color, religion, sex, age, disability, or national origin.
- Submit reports, findings, and recommendations to the President and Congress.
- Issue public service announcements to discourage discrimination or denial of equal protection of the laws.

MEMBERS OF THE COMMISSION

U.S. Commission on Civil Rights
624 Ninth Street, NW
Washington, DC 20425

(202) 376-8128 voice
(202) 376-8116 TTY

www.usccr.gov

This report is available on disk in ASCII Text and Microsoft Word 2003 for persons with visual impairments. Please call (202) 376-8110.

Cover photo: "Suburban American Flag." David Gilder, 2006. Photo: istockphoto.com.

CIVIL RIGHTS

and the

Mortgage Crisis

UNITED STATES COMMISSION ON CIVIL RIGHTS

September 2009

LETTER OF TRANSMITTAL

The President
The President of the Senate
The Speaker of the House

Sirs and Madam:

The United States Commission on Civil Rights transmits this report, *An Examination of Civil Rights Issues With Respect to the Mortgage Crisis,* pursuant to Public Law 103-419. The purpose of the report is to examine whether federal efforts to increase homeownership rates among minority and low-income individuals may have unintentionally weakened underwriting standards and lending policies to the point that too many borrowers were vulnerable to financial distress and heightened risk of default, thereby setting conditions for the current mortgage crisis. It also examines the policies of federal agencies in enforcing prohibitions against mortgage fraud and lending discrimination.

To that end, the Commission studied federal policies aimed at increasing low-income and minority homeownership, including the Community Reinvestment Act and the Department of Housing and Urban Development's lending goals for government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac, and the critiques regarding the relationship of such policies to the mortgage crisis. As part of its analysis, the Commission also considered the impact of the growth of securitization on lending practices, including the availability of subprime mortgages and other kinds of credit, as well as the manner in which such credit was made available on the secondary market. This analysis involved gathering information from the GSEs and some eleven federal agencies with various levels of regulatory responsibility over the housing market and lending standards.

The Commission also looked at issues of predatory lending, mortgage fraud, and lending discrimination and assessed the efforts of eight federal agencies with responsibility for enforcing the Fair Housing and Equal Credit Opportunity Acts to combat such practices. The result, we hope, will contribute to the growing body of literature for consideration by policy makers as they examine whether existing lending policies require revision, modification, or elimination to avoid a future similar crisis while enhancing the possibility that the American dream of homeownership remains an attainable goal for low and middle-income Americans.

On August 7, 2009, the Commission approved this report. The vote was as follows: Chapters 1-5 and the appendix were approved by Commissioners Reynolds, Thernstrom, Kirsanow and Taylor, with Commissioners Yaki, Melendez, Heriot and Gaziano abstaining. The Commission declined to adopt findings and recommendations to this report with six Commissioners voting against adoption, and with Vice Chair Thernstrom and Commissioner Melendez abstaining. The report includes a joint statement and separate rebuttal statements submitted by Commissioners Melendez and Yaki, a separate statement by Vice Chair Thernstrom, and a joint rebuttal statement by Commissioners Gaziano, Reynolds, Kirsanow, and Taylor.

For the Commissioners,

Gerald A. Reynolds
Chairman

TABLE OF CONTENTS

FIGURES

TABLES

By far the highest rate of foreclosure is attributable to subprime ARMs. While the rate of foreclosure for such loans declined from 2001 to 2005, it began to rise dramatically thereafter. By 2006, the rate of foreclosure for such loans had risen to 5.6 percent, and had increased to 13.4 percent by 2007. The rate of foreclosure in 2008 was 22.2 percent. By that point, the gap in foreclosure rates between prime ARMs and subprime ARMs, which had been at 2.9 percentage points in 2005, had increased to 16.5 percentage points.

V. Community Reinvestment Act

This section seeks to determine to what extent the requirements of the CRA may have affected residential mortgage lending practices and the existing mortgage crisis.

The mortgage lending data presented in this section are restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.[26] Conventional mortgage loans exclude those made by the Federal Housing Administration (FHA loans) and those guaranteed by the Veterans Administration (VA loans) and the Rural Housing Service of the U.S. Department of Agriculture (RHS Loan Programs).[27]

In order to analyze the effect of the CRA, this section examines practices of banking institutions and their affiliates and independent mortgage companies. This analysis compares and contrasts Performance with regard to a variety of factors in order to determine to what extent the CRA has played a role over approximately the last decade.

In this regard, section A compares the number and monetary value of (i) prime loans; (ii) subprime loans; and (iii) subprime loans by banking institutions and affiliates within their CRA assessment areas. Section B then examines the decreasing amount of mortgage lending within CRA assessment areas. Section C then examines the distribution of subprime loans from 2004 to 2007 by examining differences between loans made to low- and moderate-income individuals as compared to middle- and upper-income individuals. This section looks not only at loan counts and the monetary value of such loans, but the percent distributed by year and by lender type. Section D undertakes a similar analysis with regard to prime loans.

Sections E and F then analyze the race and types of neighborhoods that receive different types of loans. Section E examines mortgage lending by neighborhood income for the year 2006, while Section F examines mortgage lending by race for the same year.

---

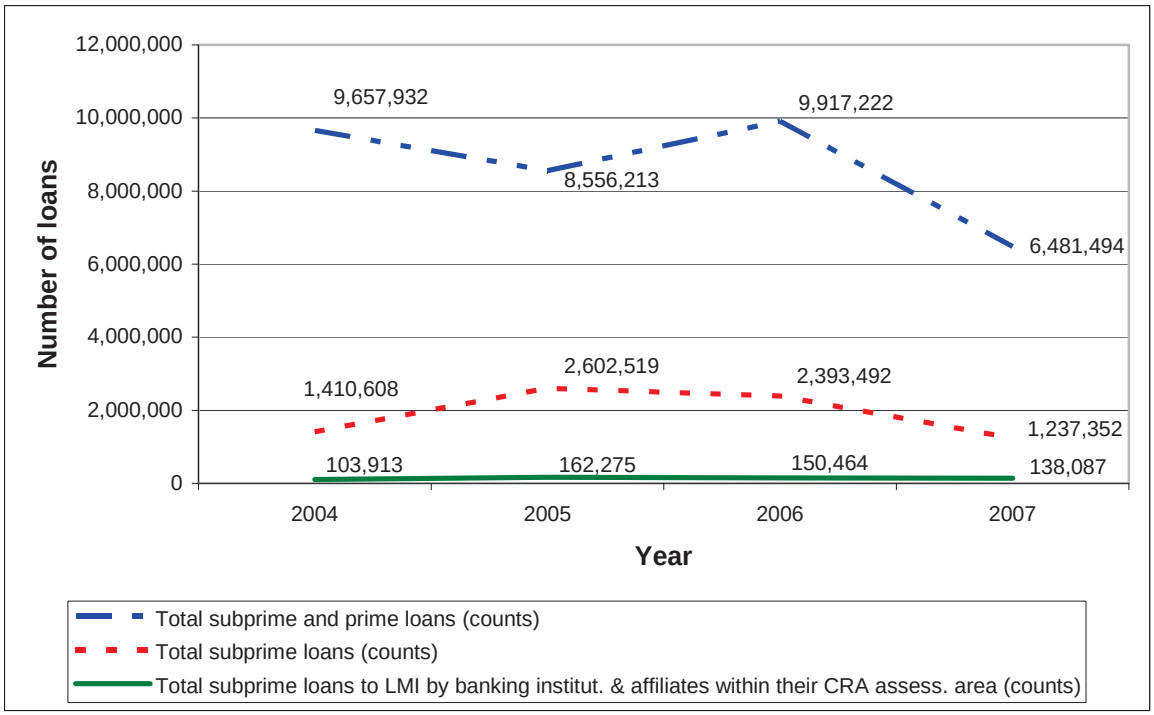
[26] Neighborhood income level in the context of the CRA is defined in relation to a designated geographic area's median family income; "lower income" is defined as less than 50 percent of the area's median family income; "moderate income," from 50 percent to less than 80 percent; "middle income," 80 percent to less than 120 percent; and "upper income," greater than or equal to 120 percent. Lower income neighborhoods include low- and moderate-incomes ones, the focus of the CRA. Non-lower income neighborhoods include middle and higher income ones. *See* The Federal Reserve, Briefing on CRA and Credit Scoring Issues to the U.S. Commission on Civil Rights, January 7, 2009 ("definition" and "the CRA"). Glenn B. Canner, senior advisor, The Federal Reserve, e-mail to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Apr. 29, 2009.

[27] Mortgage-X Mortgage Information Service, *Types of Mortgage Loans*, <http://mortgage-x.com/library.loans.htm> (last accessed Feb. 24, 2009).

A. Number and Monetary Value of Prime v. Subprime Loans

Figure 3.13 contrasts (i) the number of all loans (subprime and prime) originated, with (ii) all subprime loans originated, and (iii) all subprime loans originated by banking institutions and their affiliates within their CRA assessment areas to low- and moderate-income borrowers/neighborhoods.

Figure 3.13
Subprime (Higher-Priced) and All Home Mortgage Loans (Loan Counts) Originated, 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, senior advisor, The Federal Reserve, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

Caption: During this period, the number of subprime loans compared to all loans originated was no more than 30.4 percent at its peak in 2005. At the same time, during its peak in 2007 the number of subprime loans made to low and moderate income borrowers/neighborhoods was no more than 11 percent of all such loans originated.

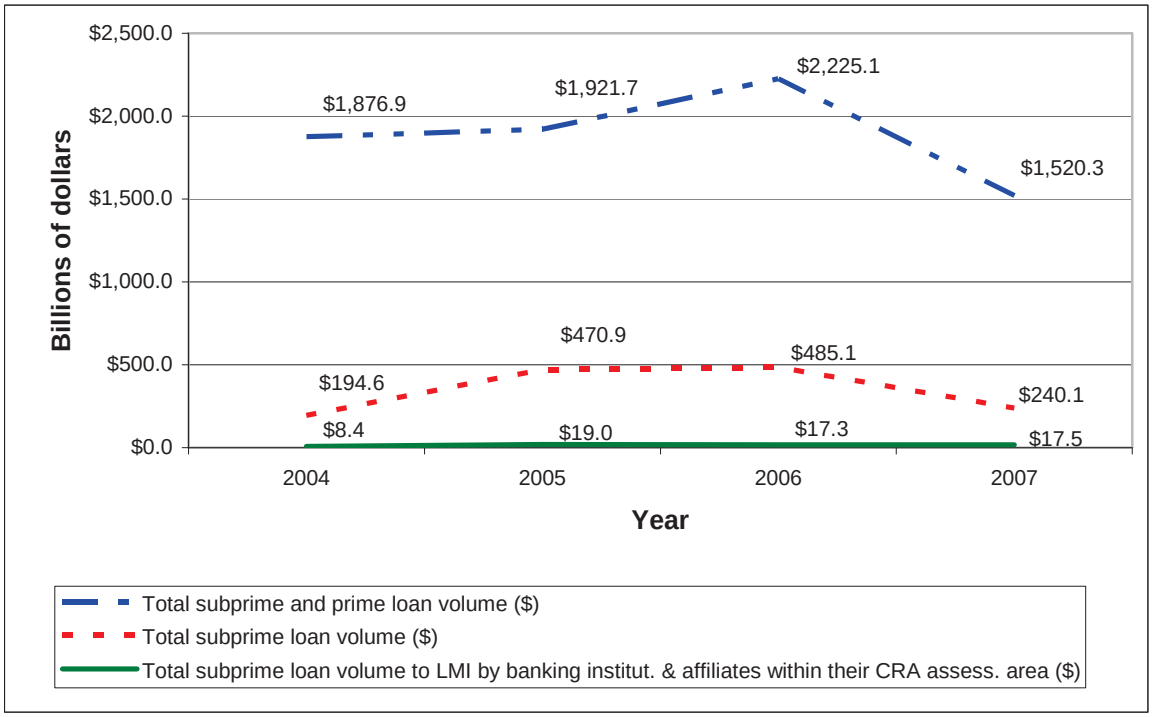
Figure 3.13 shows that, from 2004–2007, the total number of subprime loans made up just 14.6 percent of the total market in 2004, but that the number of such loans rose to 30.4 percent of the total market in 2005 as the market peaked. The share then fell to 24.1 percent in 2006, and by 2007 had decreased to 19.1 percent.[28]

[28] The figure for each year is obtained by calculating the percentage that the total number of subprime loans constituted of the total number of subprime and prime loans originated.

The total number of subprime loans that banking institutions and their affiliates made in their CRA assessment areas to low- and moderate-income borrowers/neighborhoods represented an even smaller fraction of the total number of subprime loans originated. Specifically, such loans constituted a mere 7 percent of all subprime loans in 2004, 6 percent in 2005 and 2006, and 11.0 percent in 2007.[29]

Figure 3.14 presents the same three categories, measured by the monetary value of the loans.

Figure 3.14
Subprime (Higher-Priced) and All Home Mortgage Loans (Billions of Dollars), 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, senior advisor, The Federal Reserve, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

Caption: During this period, the monetary value of subprime loans compared to all loans originated was no more than 24.5 percent at its peak in 2005. Meanwhile, at its peak in 2007, the monetary value of subprime loans made to low and moderate income borrowers/neighborhoods was no more than 7 percent of all such loans originated.

[29] The figure for each year is obtained by calculating the percentage that the total number of subprime loans banking institutions and their affiliates originated to low- and moderate-income borrowers/neighborhoods within their CRA assessment areas constituted of the total number of subprime loans originated.

HMDA data show that the monetary value of subprime loans constituted 10.4 percent of overall volume in 2004, a percentage that climbed to 24.5 percent in 2005, decreased to 21.8 percent in 2006 and fell to 15.8 percent in 2007.[30]

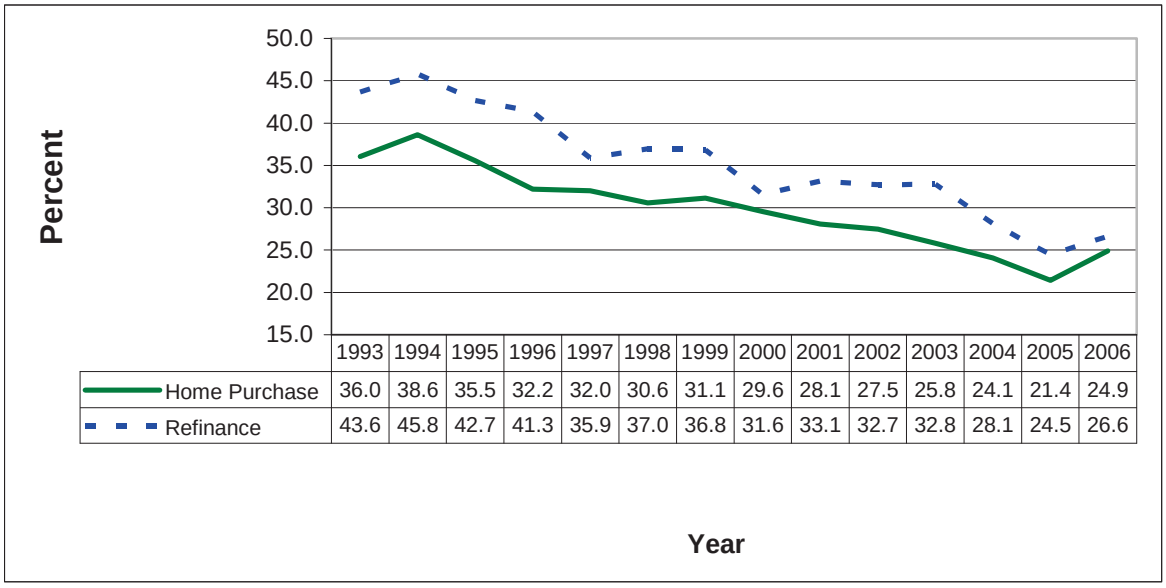
Most notably, the monetary volume of subprime loans made by banking institutions and their affiliates to lower-income borrowers/neighborhoods within their CRA assessment areas comprised a very small segment of all subprime loans originated. Specifically, such loans accounted for only 4 percent of overall volume from 2004 to 2006. By 2007, the figure had risen to only 7 percent.[31]

Based on Figures 3.13 and 3.14, the data indicate that, whether measured by number of loans, or monetary value of loans, subprime loans reached their peak in 2005 and never exceeded more than 30.4 percent of the number of loans or 24.5 percent of the value of loans. In addition, said data reflect that subprime loans made by banking institutions or their affiliates in their CRA assessment areas remained a marginal segment of the overall market.

B. Mortgage Lending Within CRA Assessment Areas 1993-2006

Figure 3.15 documents home purchase and refinance mortgage lending within CRA assessment areas, irrespective of neighborhood income.

Figure 3.15
Mortgage Lending Within CRA Assessment Areas, 1993–2006



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Home Purchase	36.0	38.6	35.5	32.2	32.0	30.6	31.1	29.6	28.1	27.5	25.8	24.1	21.4	24.9
Refinance	43.6	45.8	42.7	41.3	35.9	37.0	36.8	31.6	33.1	32.7	32.8	28.1	24.5	26.6

[30] The figure for each year is obtained by calculating the percentage that the total volume subprime loans constituted of the total volume of subprime and prime loans originated.

[31] The figure for each year is obtained by calculating the percentage that the total volume of subprime loans banking institutions and their affiliates originated to low- and moderate-income borrowers/neighborhoods within their CRA assessment areas constituted of the total volume of subprime loans originated.

Note: The Figure shows the percentage of mortgage loans originated by deposit-taking organizations within their assessment areas. This graph was presented by Ren S. Essene and William C. Apgar, "The 30th Anniversary of the CRA: Restructuring the CRA to Address the Mortgage Finance Revolution in *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act,* A Joint Publication of the Federal Reserve Banks of Boston and San Francisco, February 2009, p. 22, exhibit 1: Assessment Area Lending Has Fallen Steadily. The source of the raw data for the graph is the JCHS enhanced HMDA database.

Source: Ren Essene, policy analyst, Federal Reserve Bank of Boston, PowerPoint file "Exhibit 1: Assessment Area Lending has Fallen" to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Mar. 25, 2009, 11.01 p.m.

Caption: Within CRA assessment areas, home mortgage lending and home refinancing particularly had been decreasing steadily from 1993 to 2006.

As reflected in Figure 3.15, mortgage lending within CRA assessment areas has decreased steadily over time. From 1993 to 2006, home purchase mortgage lending in CRA assessment areas, as a percent of all home purchase loans, decreased from 36.0 percent to 24.9 percent, a drop of 11.1 percentage points.[32]

In the same period, mortgage lending in CRA assessment areas for home refinancing decreased at a higher rate, falling from 43.6 percent to 26.6 percent, a drop of 17.0 percentage points. This decrease, at a time when overall mortgage lending was increasing, indicates that persons in lower-income neighborhoods were increasingly using banking institutions and their affiliates outside the CRA areas, as well as to independent mortgage companies.[33]

C. Distribution of Subprime Loans 2004-2007

Subprime loans traditionally have been made to those of low or moderate incomes. People of lower income often have lower levels of creditworthiness and, thus, are charged higher rates of interest on loans. The next set of Figures examines how such loans were distributed between low- and moderate-income borrowers/neighborhoods and middle- and upper-income borrowers/neighborhoods, for the period 2004-2007. Noticeably, as housing prices increased, even those with higher levels of income began obtaining subprime loans.

---

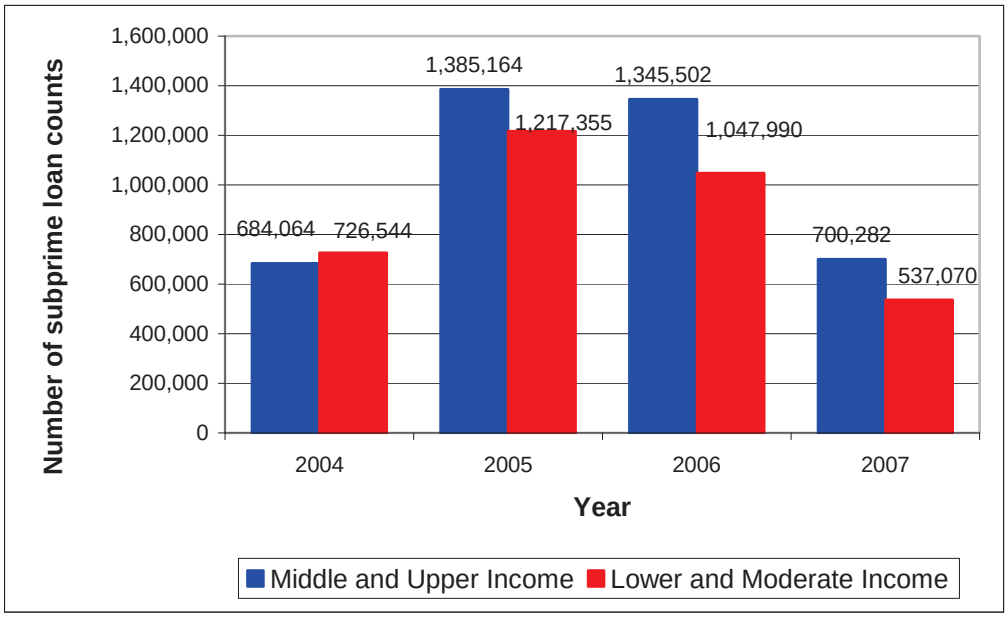
[32] *See* Ren S. Essene and William C. Apgar, "The 30th Anniversary of the CRA: Restructuring the CRA to Address the Mortgage Finance Revolution," *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act,* A Joint Publication of the Federal Reserve Banks of Boston and San Francisco, February 2009, p. 22. *See also* KEVIN PARK, "SUBPRIME LENDING AND THE COMMUNITY REINVESTMENT ACT," JOINT CTR. FOR HOUSING STUDIES OF HARV. U.

[33] One possible explanation for this phenomenon was as follows:

> I don't want to say it's in the cultural DNA, but a lot of us who are older than 30 have some memory of disappointment or humiliation related to banks," Mr. Grannum said. "The white guy in the suit with the same income gets a loan and you don't?" "So you turn to local brokers, even if they don't offer the best rates." This may help explain an unusual phenomenon: Upper-income black borrowers in the region are more likely to hold subprime mortgages than even blacks with lower incomes, who often benefit from homeownership classes and lending assistance offered by government and nonprofits.

Michael Powell and Janet Roberts, *Minorities Affected Most as New York Foreclosures Rise*, N.Y. TIMES, May 16, 2009, at A1.

Figure 3.16
Distribution of Subprime (Higher-Priced) Mortgage Loans (Loan Counts) by Income of Borrowers and/or Neighborhood, 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, senior advisor, The Federal Reserve, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

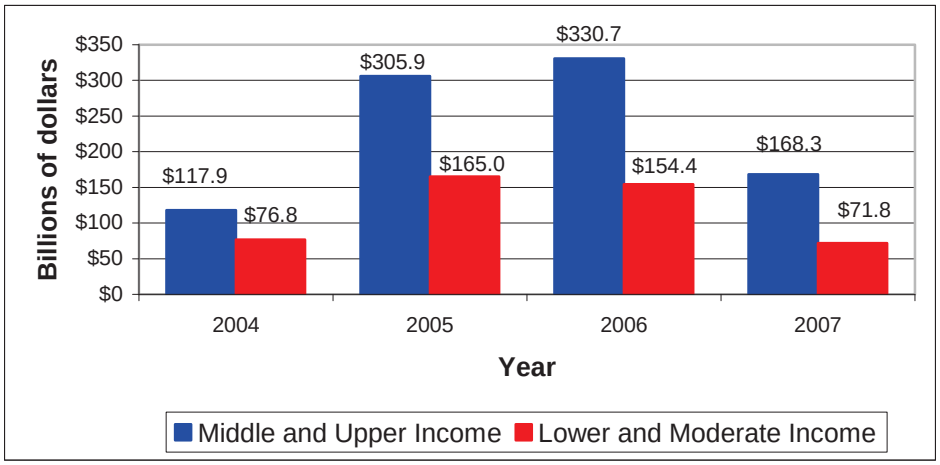
Caption: For three of the four years of this period, a smaller number of subprime loans were originated to low- and moderate-income borrowers/neighborhoods than to middle- and upper-income ones, with most being made in 2005.

Figure 3.16 shows that, except in 2004, the number of subprime loans made to low- and moderate-income borrowers/neighborhoods by financial institutions was smaller than that to middle- and upper-income ones. The number of such loans to low and moderate borrowers was among the highest in 2005 and 2006 and evidenced considerable variation over time. Rising from about 726,000 in 2004, such loans peaked at 1.2 million in 2005, an increase of 67.6 percent. In 2006, the number of such loans decreased somewhat, by 13.9 percentage points, but remained above a million. By 2007, they had fallen precipitously, bottoming out at about 537,000, a decrease of 48.8 percentage points over the previous year.

For every year, other than 2004, the number of middle- and upper-income subprime loans exceeded those for low- and moderate-income groups.

Figure 3.17 shows the distribution of subprime loans broken down by volume.

Figure 3.17
Distribution of Subprime (Higher-Priced) Mortgage Loan Volume (Billions of Dollars) by Income of Borrowers and/or Neighborhood Income, 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

Source: The Reserve Board, "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, senior advisor, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

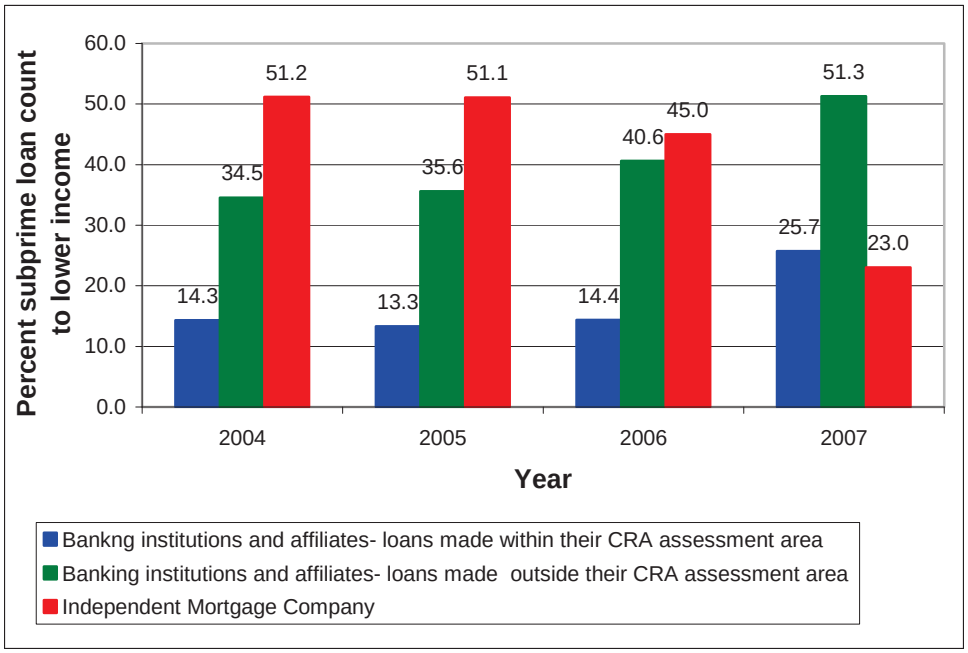
Caption: The monetary value of subprime loans to low- and moderate-income borrowers/neighborhoods is consistently lower than that to middle- and upper-ones and evidenced decline. Meanwhile, the overall monetary value of subprime loans had grown substantially since 2004, noticeably in 2005 and 2006.

Figure 3.17 reflects that, during this period, the monetary volume of subprime loans to middle- and upper-income borrowers/neighborhoods consistently exceeded those made to lower- and moderate-income groups. Indeed, during the critical years of 2005, 2006, and 2007, subprime loans to lower- and moderate-income borrowers/neighborhoods were often less than half the dollar value of subprime loans made to middle- and upper-income borrowers/neighborhoods.

In addition, Figure 3.17 reflects the growth of subprime loans generally over this period. For example, the total value of subprime loans reflected in Figure 3.17 for 2004 was 194.7 billion. By 2005 that figure had risen to 470.9 billion, and by 2006 the figure had reached 485.1 billion.

The next set of Figures seeks to examine to what extent subprime loans were made within CRA assessment areas. For that purpose, Figure 3.18 presents the number of subprime loans originated by different lender types, including independent mortgage companies.

Figure 3.18
Percent Distribution of Subprime (Higher-Priced) Mortgage Loans (Loan Counts) to Lower-Income of Borrowers and/or Neighborhoods by Lender Type, 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, senior advisor, The Federal Reserve, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

Caption: Independent mortgage companies dominated the market for subprime loans to low and moderate borrowers/neighborhoods from 2004 through 2006. Banking institutions and their affiliates made the smallest percentage of subprime loans within their assessment areas but growth of such loans outside these areas was discernable, particularly in 2006 and 2007.

As reflected above, independent mortgage companies made the highest percentage of such loans for three of the four years, with their market share falling precipitously in 2007.[34] In the first two years, they consistently claimed a majority of subprime loans. By 2006, however, that share had decreased to 45 percent and, by 2007, their market share fell further to 23.0 percent.

Of the subprime loans made by banking institutions and their affiliates, the smallest percentages were originated within an institution's CRA assessment area. From 2004 to 2006, for example, the figures were consistently low, 14.3, 13.3, and 14.4 percent, respectively. Only in 2007 did this share in the market increase rising to 25.7 percent.

[34] The rather dramatic increase and decrease in market shares in 2007 on the part of the banking institutions and their affiliates and the independent mortgages, respectively, might be explained by a reduction in the number of lenders. In 2007, 169 lenders that reported data for 2006 ceased operations and did not report in 2007. With the exception of two lenders, all were independent mortgage companies. The Federal Reserve, Briefing on the 2007 HMDA Data to the U.S. Commission on Civil Rights, Jan. 28, 2009.

At the same time, progressively higher percentages were originated outside CRA assessment areas. Such loans initially increased modestly, rising from 34.5 percent in 2004 to 35.6 percent in 2005. They then increased to 40.6 in 2006, and finally to 51.3 percent in 2007. Between 2004 and 2007, there was an increase of 16.8 percentage points.

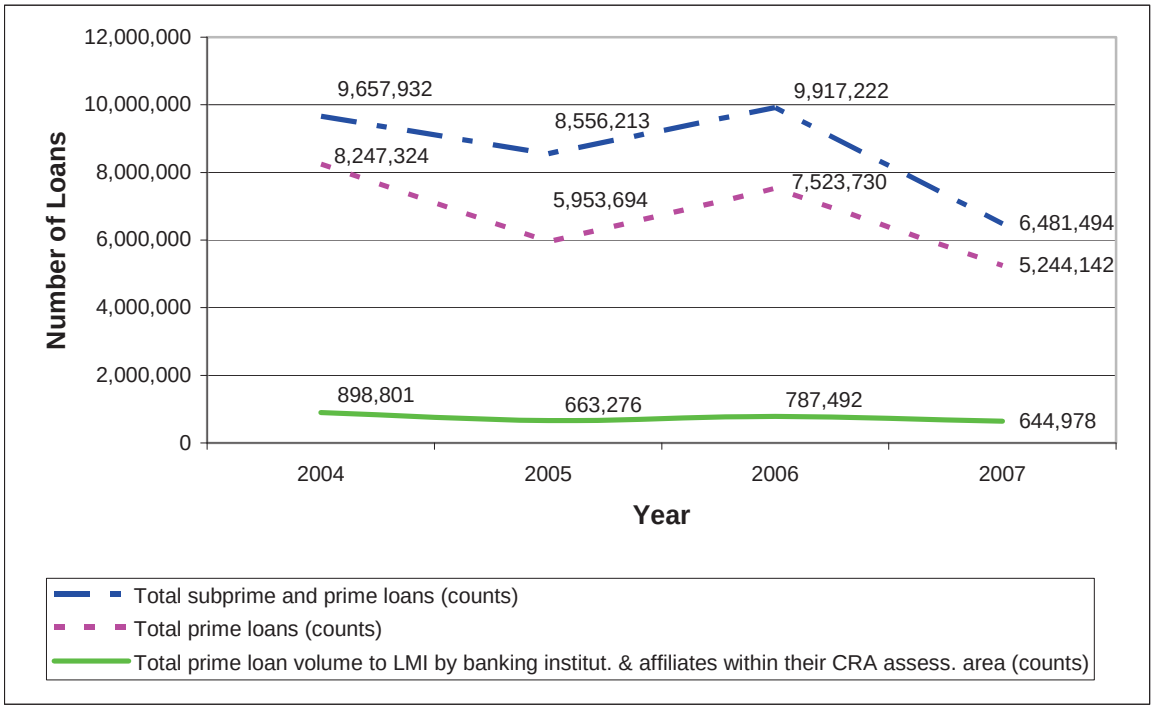
Based on Figures 3.16-3.18, two major points can be discerned. First, during the time period in question, middle- and upper-income borrowers/neighborhoods were the largest consumers of subprime loans. This is so whether measured by number of loans or monetary volume. Second, as reflected in Figure 3.18, the largest percent of subprime loans, by a substantial margin, was made by either independent mortgage companies or banking institutions outside their CRA assessment areas.

Both of these findings call into question not only the argument that the CRA played a major role in the current mortgage crisis, but also the CRA's continued relevance as a means to ensure sound lending to low- and moderate-income borrowers/neighborhoods.

D. Distribution of Prime Loans 2004-2007

The focus of the next examination is on the extent of prime loans originated within CRA assessment areas. To that end, Figure 3.19 examines the number of such loans, while Figure 3.20 examines their monetary value.

Figure 3.19
Distribution of Prime (Lower-Priced) and All Home Mortgage Loans (Loan Counts) Originated, 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

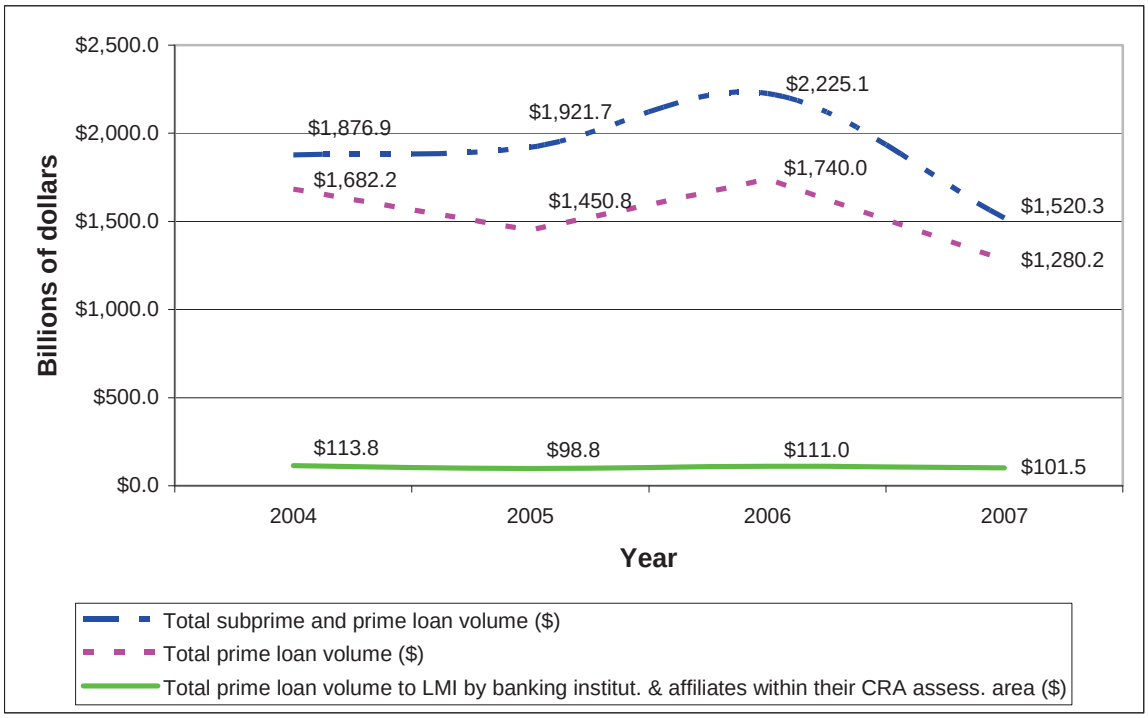
Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, The Federal Reserve, senior advisor, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

Caption: During this period, prime loans constituted a substantial percentage of all loans originated, no less than 69.6 percent in 2005. In contrast, at its peak in 2007 prime loans to low- and moderate-income borrowers/neighborhoods comprised no more than 12 percent of all prime loans originated.

As reflected in Figure 3.19, the total number of prime loans constituted a substantial proportion of all loans originated (prime and subprime), particularly in 2004 and 2007. In percentage terms, prime loans constituted 85.4 percent of the total in 2004, 69.6 percent in 2005, 75.9 percent in 2006, and 80.9 percent in 2007.[35]

At the same time, the number of prime loans that banking institutions and their affiliates originated to low- and moderate-income borrowers/neighborhoods within their CRA assessment areas was consistently a very small portion of all prime loans originated. In percentage terms, such loans represented only 11 percent of the total in 2004 and 2005, 10 percent in 2006, and 12 percent in 2007.[36]

Figure 3.20
Distribution of Prime (Lower-Priced) and All Home Mortgage Loans (Billions of Dollars), 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, senior advisor, The Federal Reserve, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

---

[35] The figure for each year is obtained by calculating the percentage that the total number of prime loans constituted of the total number of subprime and prime loans originated.

[36] The figure for each year is obtained by calculating the percentage that the total number of prime loans banking institutions and their affiliates originated to low- and moderate-income borrowers/neighborhoods within their CRA assessment areas constituted of the total number of prime loans originated.

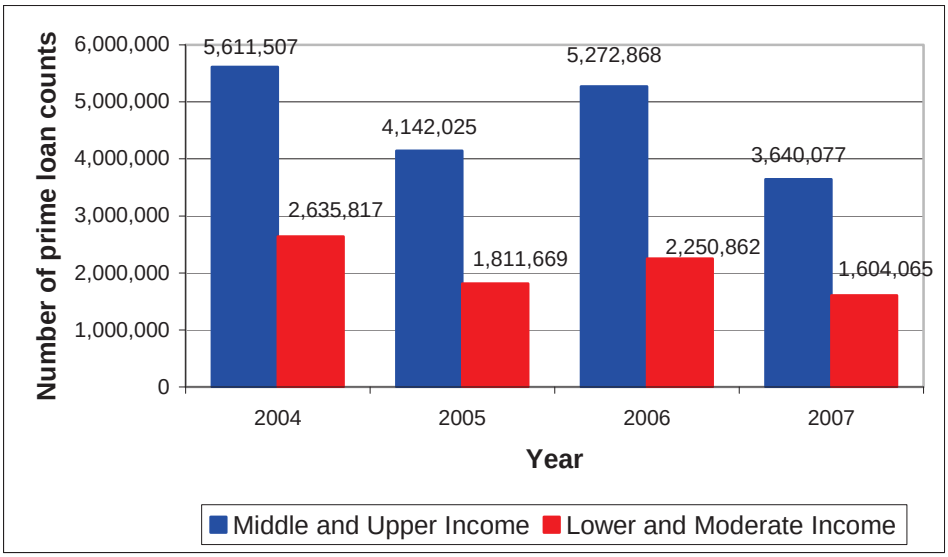
Caption: During this period, the monetary value of prime loans constituted a substantial percentage of all loans originated, no less than 75.5 percent in 2005. In contrast, the monetary value of prime loans to low- and moderate-income borrowers/neighborhoods constituted a significantly lower percentage of all prime loans originated, no more than 8 percent in 2007.

Figure 3.20 presents similar results by examining the monetary value of such loans. HMDA data show that, during the period in question, the volume of prime loans made up a substantial portion of the total of all loans (subprime and prime) originated, particularly in 2004 and 2007. From a high of 89.6 percent in 2004, the monetary share of prime loans bottomed out in 2005 to 75.5 percent, but rose to 78.2 percent in 2006 and climbed to 84.2 percent in 2007.[37]

Most notably, the volume of prime loans that banking institutions and their affiliates originated to low- and moderate-income borrowers/neighborhoods within their CRA assessment areas is consistently a very small portion of all prime loan volume originated, a finding similar to that relating to prime loan counts. Such loans represented only 7 percent of the total in 2004 and 2005, 6 percent in 2006, and 8 percent in 2007.[38]

The next set of Figures examines the distribution of prime mortgages between middle- and upper-income and low- and moderate-income borrowers/neighborhoods. The evidence indicates that middle- and upper-income individuals were the primary recipients of prime mortgage loans.

Figure 3.21
Distribution of Prime Mortgage Loans (Loan Counts) by Income of Borrowers and/or Neighborhood, 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

[37] The figure for each year is obtained by calculating the percentage that the total volume prime loans constituted of the total volume of subprime and prime loans originated.

[38] The figure for each year is obtained by calculating the percentage that the total volume of prime loans banking institutions and their affiliates originated to low- and moderate-income borrowers/neighborhoods within their CRA assessment areas constituted of the total volume of prime loans originated.

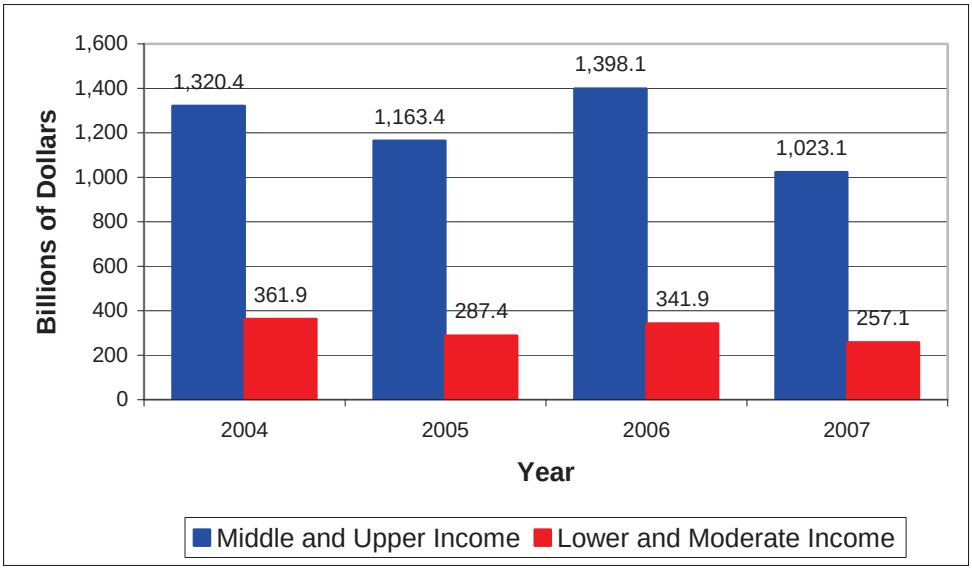
Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, The Federal Reserve, senior advisor, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009, 1:33 pm.

Caption: During this period, more than twice the number of prime loans was made to middle- and upper-income borrowers/neighborhoods than to low and moderate ones.

As reflected in Figure 3.21, financial institutions consistently originated a higher number of prime loans to middle- and upper-income borrowers. During each of the four years examined, the number of prime mortgage loans made to middle- and upper-income borrowers/neighborhoods was more than twice that to low- and moderate-income borrowers/neighborhoods.

Figure 3.22 examines similar information with regard to the volume of such loans. While Figure 3.21 indicated that middle- and upper-income borrowers/neighborhoods received the largest number of prime loans, Figure 3.22 reflects that the monetary value of such loans is even greater, with the monetary value of loans to middle- and upper-income borrowers/neighborhoods often exceeding three times the value of such loans to low- and moderate-income borrowers/neighborhoods.

Figure 3.22
Prime Mortgage Loan Volume (Billions of Dollars) by Income of Borrowers and/or Neighborhood Income, 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

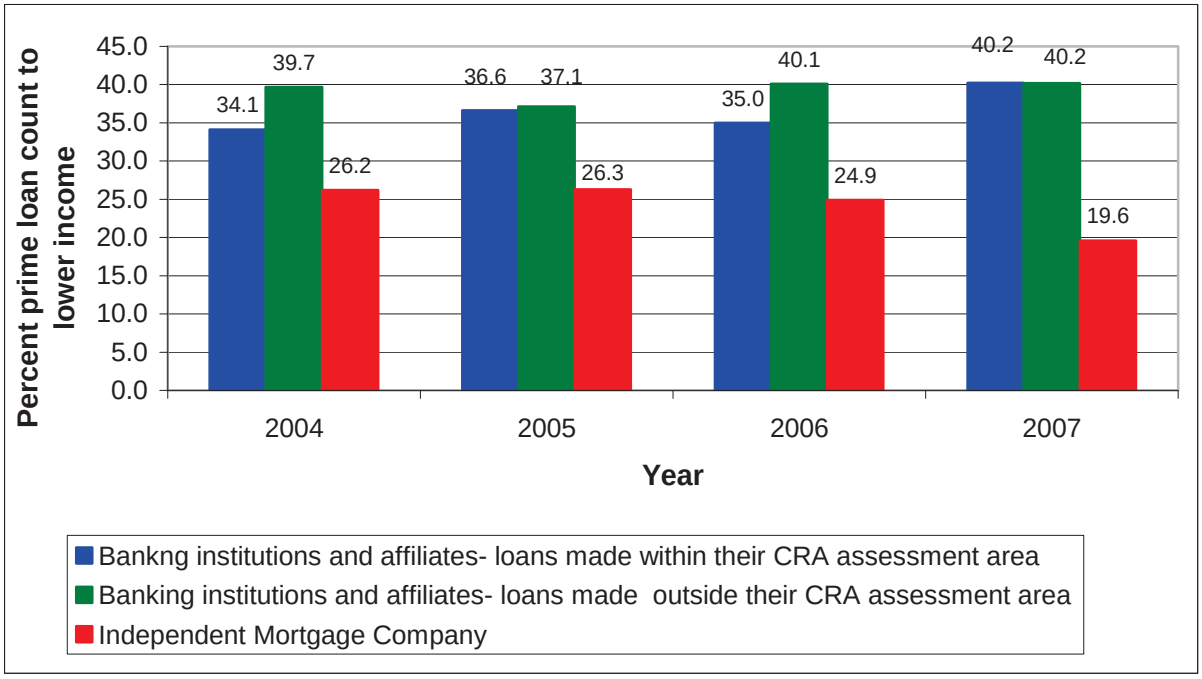
Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, senior advisor, The Federal Reserve, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

Caption: For this period, the monetary value of prime loans to middle and upper income borrowers/neighborhood exceeds that to low and moderate ones by more than three times.

In sum, as was the case with subprime lending, CRA-related prime loans made up only a minor part of the market, and the largest number and value of prime loans went to middle- and upper-income borrowers/neighborhoods.

The next series of Figures examines the extent to which prime loans made to low- and moderate-income borrowers/neighborhoods occur within CRA assessment areas. As reflected in Figure 3.23, and in this case unlike the situation with subprime loans,[39] the percentage of prime loans made within a CRA assessment area is very similar to those made outside the CRA assessment area.

Figure 3.23
Percent Distribution of Prime (Lower-Priced) Mortgage Loans (Loan Counts) to Low- and Moderate-Income Borrowers and/or Neighborhoods by Lender Type, 2004–2007



Note: Restricted to conventional first liens on home purchase and refinance loans for owner-occupied properties.

Source: "Statistics on Mortgage Lending from HMDA Data," EXCEL spreadsheet, Glenn B. Canner, senior advisor, The Federal Reserve, to Sock-Foon C. MacDougall, social scientist, U.S. Commission on Civil Rights, Feb. 19, 2009.

Caption: Banking institutions and their affiliates made similar percentages of prime loans within and outside their CRA assessment areas while independent mortgage companies made the least, no more than 26.3 percent.

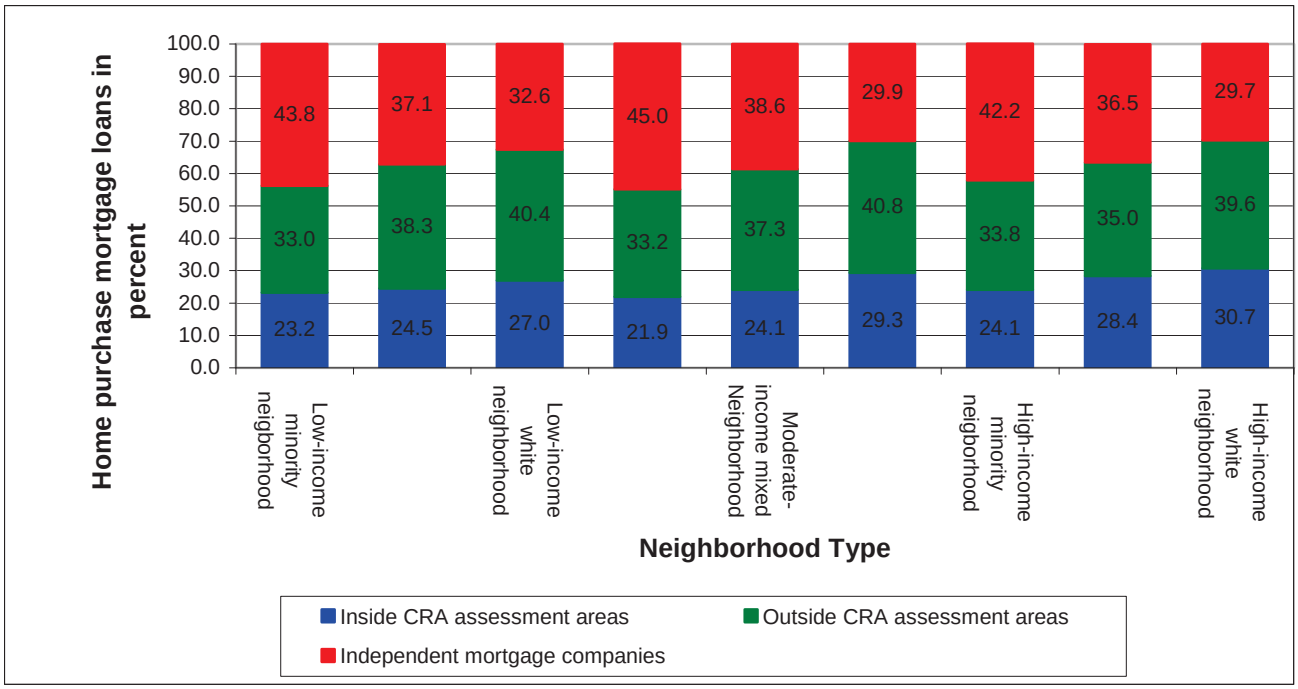
In the case of prime loans, the percentages originated to low- and moderate-income borrowers/neighborhoods within and outside the CRA assessment areas were generally similar. Loans made within CRA assessment areas ranged from 34.1 to 40.2 percent of the total, while loans made outside the areas ranges from 37.1 to 40.2 percent. In contrast, the independent mortgage companies, which focused primarily on subprime lending, originated the lowest percentages of prime loans, which decreased steadily over time from 26.2 percent in 2004 to 19.6 percent in 2007.

[39] *See* Figure 3.18.

E. Mortgage Lending by Neighborhood Income, 2006

Figures 3.24 to 3.25 take a snapshot of mortgage lending in neighborhoods with different mixes of racial/ethnic populations and income levels for the year 2006. Figure 3.24 reviews home purchase lending.

Figure 3.24
Home Purchase Mortgage Loans by Type of Neighborhood Income, 2006



Note: First-lien loans for owner occupied properties only. The small share of loans originated by credit unions is included in "outside assessment area" totals.

Source: Ren S. Essene and William C. Apgar, "The 30th Anniversary of the CRA: Restructuring the CRA to Address the Mortgage Finance Revolution," *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act*, A Joint Publication of the Federal Reserve Banks of Boston and San Francisco, February 2009, p. 23 exhibit 2: Assessment Area Lending Lags in Low-income and Minority Areas. The source of the raw data for Exhibit 2 is the JCHS enhanced HMDA database, 2006.

Caption: In 2006, banking institutions and their affiliates were less likely to make home purchase mortgage loans within CRA assessment areas irrespective of the racial/ethnic composition and income level of the neighborhoods. Independent mortgage companies were more likely to make the highest percentage of home purchase mortgage loans in minority neighborhoods regardless of income level.

As reflected in Figure 3.24, in 2006, irrespective of the racial composition and income level of neighborhoods, banking institutions and their affiliates were still less likely to make home purchase loans within their CRA assessment areas than outside them. For example, of the total number of loans made in low-income minority neighborhoods, banking institutions and their affiliates originated 23.2 percent within their assessment areas compared to 33.0 percent outside of them. Among the loans made in moderate-income White neighborhoods, banking institutions and their affiliates originated 29.3 percent within their CRA assessment areas compared to 40.8 percent outside of them. Across the nine types of racial/ethnic income neighborhoods, the proportions of home purchase loans within CRA

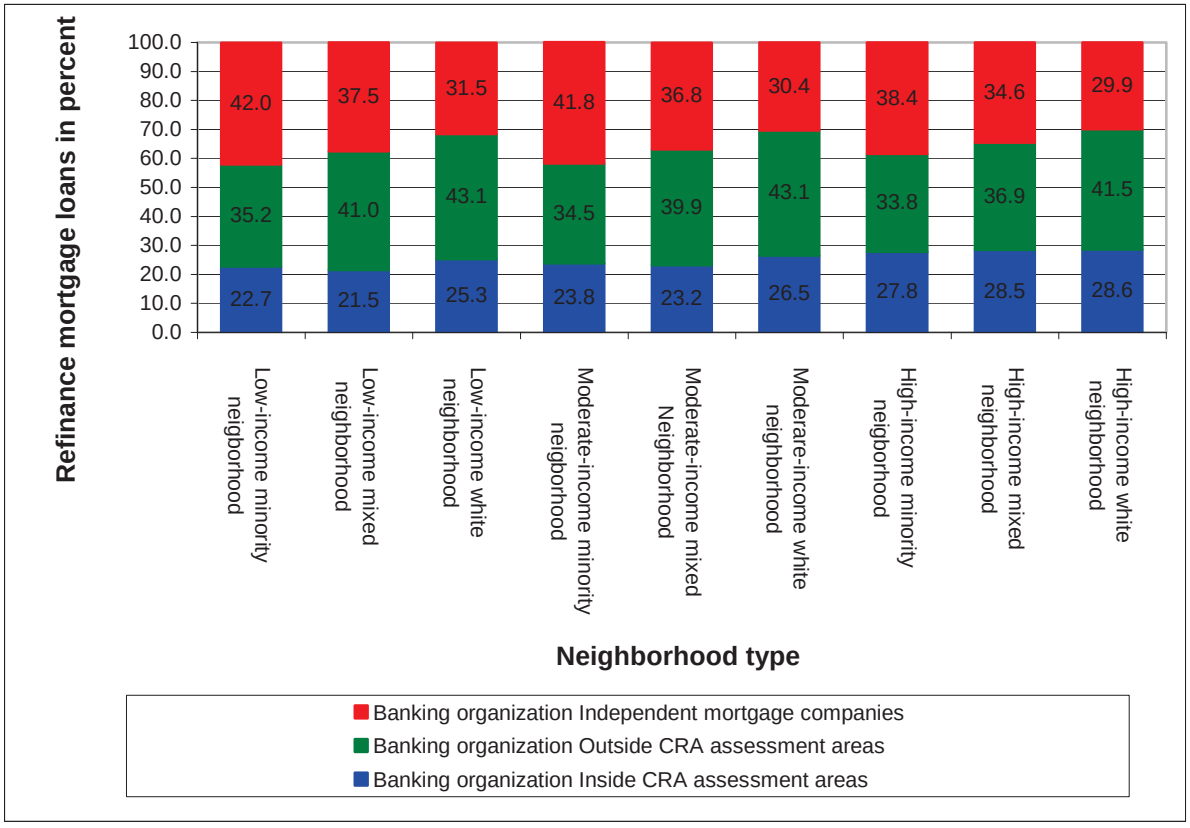
assessment areas were narrowly bounded, between 21.9 and 30.7 percent, a range of just 8.8 percentage points.

Of greatest significance, the percentages of home purchase loans originated by banking institutions and their affiliates within their CRA assessment areas to minority neighborhoods were the lowest compared to other types of racial/ethnic neighborhoods irrespective of income level. For example, in low-income neighborhoods, the percentage of loans to minorities was 23.2 percent compared to 24.5 percent and 27.0 percent to mixed neighborhoods and White neighborhoods, respectively. In moderate-income neighborhoods, the comparable figures were 21.9 percent in minority neighborhoods matched against 24.1 percent and 29.3 percent in mixed and White neighborhoods respectively. Similarly, in high income neighborhoods, the percentage of loans to minority neighborhoods was 24.1 percent compared to 28.4 percent and 30.7 in mixed and White neighborhoods, respectively.

Tellingly, independent mortgage companies are most likely to make the highest percentage of house purchase loans in minority neighborhoods, regardless of income level.

Figure 3.25 reviews similar information with regard to refinance mortgage lending. Again, the figures only relate to a single year, 2006.

Figure 3.25
Refinance Mortgage Loans by Type of Neighborhood Income, 2006



Note: First-lien loans for owner occupied properties only. The small share of loans originated by credit unions is included in "outside assessment area" totals.

Source: Ren S. Essene and William C. Apgar, "The 30th Anniversary of the CRA: Restructuring the CRA to Address the Mortgage Finance Revolution, Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act, A Joint Publication of the Federal Reserve Banks of Boston and San Francisco, February 2009, p. 23 exhibit 2: Assessment Area Lending Lags in Low-income and Minority Areas. The source of the raw data for Exhibit 2 is the JCHS enhanced HMDA database, 2006.

Caption: In 2006, banking institutions and their affiliates were less likely to make refinance mortgage loans within CRA assessment areas regardless of the racial/ethnic composition and income level of the neighborhoods. Independent mortgage companies were most likely to make the highest percentages of refinance mortgage loans to minority neighborhoods irrespective of income level.

As was the case of home purchase loans, irrespective of the racial composition and income levels of neighborhoods, banking institutions and their affiliates were less likely to originate refinance loans within their CRA assessment areas than outside them. However, unlike with home purchase loans, the percentages of refinance loans banking institutions and their affiliates made within their assessment areas was lowest for minority neighborhoods only in high income areas, 27.8 percent. In low- and moderate-income areas, it was racially mixed neighborhoods that received the lowest share, 21.5 percent and 23.2 percent, respectively.

Across the nine types of racial/ethnic income neighborhoods, the proportions of refinance purchase loans within CRA assessment areas are clustered closely together, between 21.5 and 28.6 percent, a range of only 7.1 percentage points.

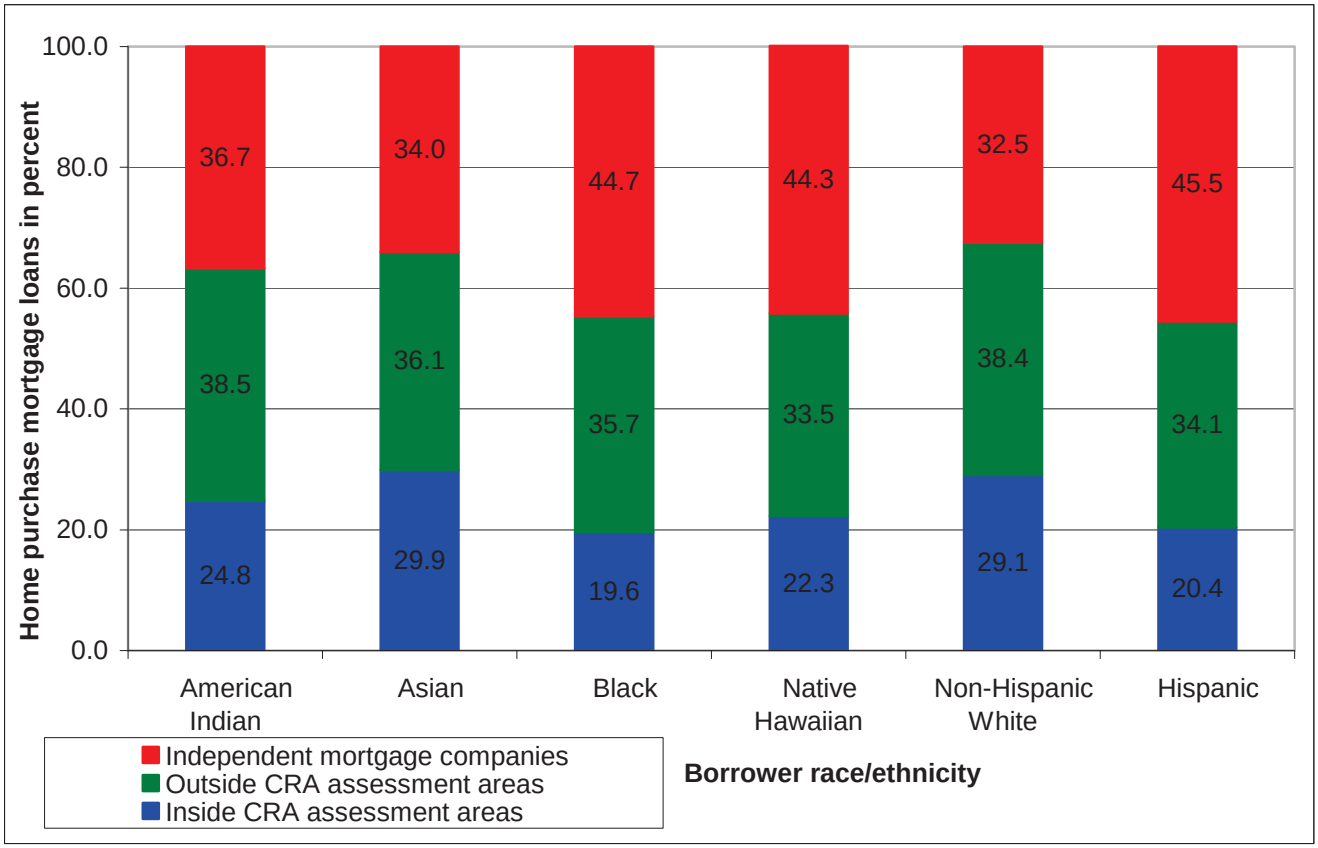
Again independent mortgage companies continued to be most likely to make the highest percentage of refinance loans in minority neighborhoods, regardless of income.

F. Mortgage Lending By Race

Figures 3.26 to 3.27 shift the focus to borrower race and ethnicity in examining home purchase and refinance lending. This analysis is particularly informative in determining the degree to which CRA loans are ultimately obtained by various racial and/or ethnic groups.

Figure 3.26 documents home purchase lending practices for the year 2006.

Figure 3.26
Home Purchase Loans by Race, 2006



Note: First-lien loans for owner occupied properties only. The small share of loans originated by credit unions is included in "outside assessment area" totals.

Source: Ren S. Essene and William C. Apgar, "The 30th Anniversary of the CRA: Restructuring the CRA to Address the Mortgage Finance Revolution, *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act*, A Joint Publication of the Federal Reserve Banks of Boston and San Francisco, February 2009, p. 23 exhibit 2: Assessment Area Lending Lags in Low-income and Minority Areas. The source of the raw data for Exhibit 2 is the JCHS enhanced HMDA database, 2006.

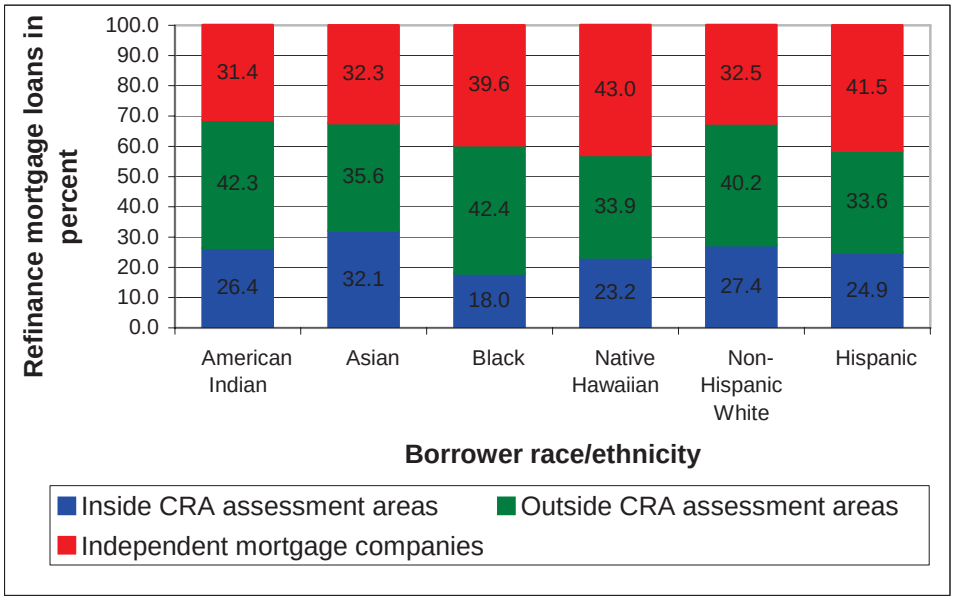
Caption: Banking institutions and their affiliates were less likely to make home purchase loans within their assessment areas regardless of the race or ethnicity of the borrowers.

The data in Figure 3.26 indicate that, in 2006, banking institutions and their affiliates were less likely to make home purchase loans within their assessment areas, irrespective of the race or ethnicity of the borrowers. For example, home purchase loans made to Blacks within CRA assessment areas equaled 19.6 percent. Such loans made outside the CRA areas, however, equaled 35.7 percent. Similar percentages apply with equal force to other groups. For Hispanics, the respective figures were 20.4 percent versus 34.1 percent; for Whites, 29.1 percent versus 38.4 percent; and for Asians/Pacific Islanders, 29.9 percent versus 36.1 percent.

While a single year is hardly determinative, for 2006, the minorities who were to most benefit from the CRA, were more likely to obtain loans from other sources.

Figure 3.27 examines the same information with regard to home refinance lending practices. Again, the figures only apply to 2006.

Figure 3.27
Home Refinance Loans by Race/Ethnicity, 2006



Note: First-lien loans for owner-occupied properties only. The small share of loans originated by credit unions are included in "outside assessment area" totals.

Source: Ren S. Essene and William C. Apgar, "The 30th Anniversary of the CRA: Restructuring the CRA to Address the Mortgage Finance Revolution," *Revisiting the CRA: Perspectives on the Future of the Community Reinvestment Act*, A Joint Publication of the Federal Reserve Banks of Boston and San Francisco, February 2009, p. 23 exhibit 2: Assessment Area Lending Lags in Low-income and Minority Areas, p. 23. The source of the raw data for Exhibit 2 is the JCHS enhanced HMDA database, 2006.

Caption: Banking institutions and their affiliates were less likely to make home refinance loans within their assessment areas regardless of the race or ethnicity of the borrowers.

Figures for refinance loans mirror those in Figure 3.26, regarding home purchase loans. In both cases, banking institutions and their affiliates were less likely to make loans within their CRA assessment areas, regardless of the race or ethnicity of borrowers. For example, the percentage of refinance loans to Black borrowers within CRA assessment areas was 18 percent, while the percentage of such loans outside the area was 42.4 percent. The respective figures for Hispanics were 24.9 percent and 33.6 percent, while the percentages for Whites were 27.4 percent and 40.2 percent.

VI. HUD's Lending Goals

This next section examines the performance of GSEs generally, and Fannie Mae and Freddie Mac in particular, with regard to HUD's lending goals. First, this section examines performance of Fannie Mae and Freddie Mac against the HUD lending goals. These reflect that, until the market began to collapse, the goals were being met.