Environment and Planning A 2004, volume 36, pages 1215 – 1241

DOI:10.1068/a3610

Gentrification, segregation, and discrimination in the American urban system

Elvin K Wyly
Department of Geography, University of British Columbia, 1984 West Mall, Vancouver, BC V6T 1Z2, Canada; e-mail: ewyly@geog.ubc.ca

Daniel J Hammel
Department of Geography and Geology, Illinois State University, PO Box 4400, Normal, IL 61790-4400, USA; e-mail: dhammel@ilstu.edu
Received 15 January 2003; in revised form 9 June 2003

Abstract. Recent discussions of the 'geography of gentrification' highlight the need for comparative analysis of the nature and consequences of inner-city transformation. In this paper, the authors map the effects of housing-market and policy changes in the 1990s, focusing on 23 large cities in the USA. Using evidence from field surveys and a mortgage-lending database, they measure the class selectivity of gentrification and its relation to processes of racial and ethnic discrimination. They find a strong resurgence of capital investment in the urban core, along with magnified class segregation. The boom of the 1990s and policies targeted towards 'new markets' narrowed certain types of racial and ethnic disparities in urban credit markets, but there is evidence of intensified discrimination and exclusion in gentrified neighborhoods.

> "As the Nation celebrated a new era, its home ownership rate had moved to an historic high ... . Public housing—especially the isolated, distressed clusters of high-rises scarring cities from Newark to Chicago to St. Louis to Oakland—had experienced a rebirth ... . And in cities like Atlanta, Baltimore, and Washington, D.C., public housing tenants now lived side-by-side with neighbors who, a few years earlier, might not have considered visiting the area, much less settling down in it."
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> HUD (2000, page 50)

> "The spotlight of the Olympics provided the catalyst to 'remove the problem' of public housing from the doorstep of the corporate and academic institutions that could not abide or accommodate the proximity of poor people ... a national landmark was sacrificed to the 'downtown business agenda' and partially funded by unsuspecting U.S. taxpayers who financed a public relations program instead of providing necessary support for public welfare."
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> Keating and Flores (2000, pages 305 – 306)

> "The revanchist city is a city of occasionally vicious revenge wrought against many of the city's most dependent—unemployed and homeless people, racial and ethnic minorities, women and immigrants, gays and lesbians, the working class. It has everything to do with a defence and reconstruction of the lines of identity privilege."
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> Smith (1997, page 129)

These three quotes, torn out of the context of wildly divergent debates and discourses, offer a glimpse of the complex reconstruction of American urbanism in the 1990s. The US Department of Housing and Urban Development (HUD, 2000), in a lavish, glossy compendium of its accomplishments targeted at the new presidential administration, celebrates the transformation of contemporary US urban policy—a 'vision for change' emphasizing homeownership, flexible devolution, and the creative use of market forces to rebuild low-income inner-city neighborhoods

devastated by generations of discrimination and disinvestment. Larry Keating and Carol Flores (2000), in a rich history of the nation's first federally subsidized public housing development, highlight the hard-edged realities of displacement and gentrification in this new policy regime, where race and class isolation are invoked to justify redevelopment schemes that often yield even more severe forms of segregation and exclusion. And Neil Smith (1997), in a penetrating analysis of the fate of theory and praxis in urban movements for social justice since the 1960s, draws a clear link between the vengeful, 'revanchist', spatial politics of gentrification and the white middle-class appropriation of the tactics of raced and gendered identity politics pursued with a steadfast commitment to liberal individualism and private property rights. The 1990s, it seems, have given us something different, a new political-economic configuration of poverty, wealth, and racial stratification at the core of the US city (Goldberg, 1998). What do these changes mean for those living in the new urban frontier of different cities? Have the resurgence of capital investment and the reinvention of federal housing policy hardened the lines of class and race privilege in the city? Have discrimination and segregation worsened? If so, can we discern any clear patterns in the geography of these inequalities?

In this paper, we offer a provisional map of contemporary gentrification in the US urban system. Our empirical measures are based on mortgage lending trends, which provide only a limited and partial view of neighborhood change. Yet lending patterns yield unparalleled insights into certain market and policy dynamics that played a prominent role in the long boom of the 1990s. We analyze these trends by (a) measuring the extent and strength of gentrification in a selected set of cities, (b) testing whether gentrification is associated with intensified processes of racial or ethnic segregation and discrimination, and (c) ascertaining whether and how these processes vary among different metropolitan areas.

The new political economy of American gentrification

Our analysis is premised on a stream of recent work on the interdependencies among housing finance, state policies, and the resurgence of gentrification in many US cities (Hackworth, 2001; 2002a; 2002b; Hackworth and Smith, 2001; Smith, 1996; Smith and DeFilippis, 1999; Wyly and Hammel, 1999; 2000). Each of these topics, of course, taps into a rich vein of scholarly and applied research with a long history. In the 1990s, however, several forces came together to alter the patterns and processes of neighborhood change at the urban core.

The details of this transformation are elaborated on elsewhere (Hackworth, 2002a; 2002b; Wyly and Hammel, 1999; 2000) but the essence of the story can be briefly summarized. After the macroeconomic shocks of the 1970s undermined the limited redistributive efforts of the US federal government, liberal social policy goals became increasingly untenable unless pursued through fiscally conservative, market-oriented means. This change reflected the ascendance of an activist and sophisticated movement of neoliberalism, emphasizing a recommitment to the primacy of markets over the welfare state and emerged from political-economic shifts across the globe and throughout all domains of economic and social policy (Watts, 2000). But in the 1990s many of the clearest expressions of neoliberal principles appeared in the housing market, where the uniquely 'hidden' nature of US urban policy (Glickman, 1980; 1984) created a vacuum for new kinds of intervention.

Beginning in the late 1980s and accelerating after Clinton's election in 1992, explicit shifts in federal housing policy combined with the imperatives of financial service competition to strengthen the ties between inner-city neighbourhoods and national and international capital markets. Conceived as a fusion of the goals of revived capital

accumulation and the stated goals of racial equity, the new policy regime emphasized the untapped potential of 'new markets' of inner-city neighborhoods, low-income and moderate-income households, recent immigrants, and other groups traditionally excluded from mainstream financial institutions (Listokin and Wyly, 2000). The rush to serve new markets was centered on homeownership and financed through progressively flexible terms on mortgage credit and provided substantial opportunities for lenders and investors. Despite concerns over the risks of delinquency and default in affordable loan portfolios in the early 1990s, the tight labor markets and income gains of the long economic expansion kept risks low. Investors flocked to mortgage-backed securities for the relative safety of such securities, and for their utility as 'hedges' against the more volatile yield profiles of alternative investments, maintaining a plentiful supply of capital for front-line lenders to reinvest in further rounds of loans.

Indeed, the securities sold by the government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac grew increasingly popular with investors in the 1990s. Fannie Mae (dubbed from the acronym for the Federal National Mortgage Association) and Freddie Mac (the Federal Home Loan Mortgage Corporation) were created as government agencies to ease liquidity bottlenecks between housing and the capital markets but were privatized as shareholder-traded companies many years ago (though retaining certain benefits as quasi-public enterprises). The GSEs buy billions of dollars of loans from banks and other lenders, selling the pooled loans on Wall Street. A near-universal consensus that Fannie and Freddie are 'too big to fail'—that the federal government would step in to resolve any impending crisis—makes their securities especially popular, and many investors now see these mortgage-backed securities as successors for the benchmark 30-year US Treasury Bond (sales of which were discontinued in October 2001). Primary-market lenders—as well as insurers, appraisers, home improvement contractors, loan servicers, and real estate agents—all stood to gain from expanded volume and responded enthusiastically as many of the risks were securitized on the secondary market. All of these trends combined to yield the desired results: a boom in lending to inner-city neighborhoods and minorities and a steady rise in the homeownership rate.

But intensified reinvestment also magnified two different types of inequalities. On the one hand, the discovery of 'new markets' also attracted a wave of high-risk, high-cost mortgage companies and brokers specializing in lending to applicants with blemished or 'subprime' credit histories. Especially in the home-improvement, refinance, and home equity markets, lenders found ways of extracting substantial profits from low-income owners in once-redlined inner-city neighborhoods—sometimes using deceptive and high-pressure tactics to strip out homeowners' equity through high interest rates and fees, eventually forcing borrowers into default and foreclosure (see HUD – Treasury Joint Task Force, 2000). On the other hand, intensified reinvestment unleashed more powerful gentrification forces in those parts of the urban core where 'revitalization' and 'renaissance' had established a foothold in the 1970s or 1980s. Mortgage capital, once instrumental in the creation of rent gaps, now fueled the fires of gentrification by lubricating the dynamic sorting of 'highest and best-use' functions.

The effects of these changes are being documented in a new wave of research on gentrification, public housing, and urban policy (Bennett, 1998; Hackworth, 2002a; 2002b; Keating and Flores, 2000; Lees, 2000; Slater, 2002; Smith and DeFilippis, 1999), but much of the literature is trapped in long-running theoretical debates over the causes of gentrification, and there have been few comparative studies of the links between local contingencies and national or global processes. After several generations of research, surprisingly little is known about the extent, nature, and consequences of gentrification in different cities. In this paper, we seek to obtain comparative, *inter*urban insight on important *intra*urban processes.

Much of the history of American urban studies can be read through the rich and contentious literature on bank discrimination (that is, where banks refuse to lend to minority *borrowers*, regardless of where they live) and racial redlining (where banks refuse to lend to anyone, regardless of race, who lives in a minority *neighborhood*). Steve Holloway (1998; Holloway and Wyly, 2001) has shown that these two facets of racial bias, once tightly linked and nearly synonymous, have been unhinged in the dynamism of today's residential migration patterns: the severity of discrimination thus depends in part on the race and class character of the place where it occurs. Holloway's work has focused on the intensification of exclusion and discrimination in 'lily-white' elite suburbs. Yet segregation and discrimination have always been central themes in the gentrification literature as well and are at the heart of recent influential and critical theories of urban change (Davis, 1992; Mitchell, 1995; 1997; Smith, 1996; 1997). We seek to measure and map these processes as a step towards understanding the dynamics and implications of a geography of gentrification (Hammel, 1999; Lees and Bondi, 1995; Ley, 1981; Slater, 2002).

Mapping the new inner city

Since the early 1990s we have been conducting fieldwork and building a simple database of gentrified neighborhoods in US cities. Our long-term goal is to map reinvestment in the thirty largest cities of the USA, but, at this point, we have completed work in only twenty three (table 1). Our list does not yet include New York, Los Angeles, or Miami—a shortcoming that precludes consideration of the dramatic growth in diverse immigration to these cities, but also neutralizing the common criticism that certain inequalities persist 'only in New York', or 'only in Los Angeles', or some other supposedly singular place. All cities may be unique, but we have spent enough time

Table 1. Authors' neighborhood field surveys, 1994 – 2001.

City	Date of baseline fieldwork	Number of census tracts	
		core	fringe
Atlanta	October 2000	9	2
Baltimore	September 2001	4	9
Boston	March 1998	14	11
Chicago	August 1995	37	32
Cincinnati	October 2000	4	5
Dallas	October 2000	10	5
Denver	October 2000	6	8
Detroit	July 1998	3	4
Fort Worth	October 2000	1	0
Indianapolis	October 2000	4	1
Kansas City	October 2000	2	3
Milwaukee	August 1995	6	7
Minneapolis – St Paul	January 1994	7	19
New Orleans	October 2000	4	3
Oakland	October 2000	1	3
Philadelphia	July 1998	13	7
Phoenix	October 2000	1	2
Saint Louis	October 2000	3	4
San Diego	October 2000	8	9
San Francisco	October 2000	21	13
San Jose	October 2000	2	4
Seattle	July 1998	9	12
Washington, DC	July 1995	17	11
Total		186	174

in a sufficient number of unique places (including many that rarely surface in the gentrification literature) to venture a few comparative generalizations.

Our field methodology involves three main steps (Hammel and Wyly, 1996; Wyly and Hammel, 1998; 1999). First, we use standard census reports from 1960 and 1970 to identify neighborhoods that endured sustained disinvestment in the postwar wave of urban development and suburbanization; we designate these neighborhoods as the 'inner city'. Given the varied historical geographies of urban disinvestment and suburban expansion, we define the inner city in Northern and Eastern cities as those census tracts with 1960 median incomes (for families and unrelated individuals, roughly analogous to 'household' income) below citywide medians. We use 1970 data for cities in the South and West, where spatial disparities between center and edge generally developed later (this criterion applies to Atlanta, Dallas, Fort Worth, New Orleans, Oakland, Phoenix, San Diego, San Francisco, and San Jose).

Second, we consult scholarly, applied, and local press literature to identify neighborhoods discussed in terms of gentrification, revitalization, renewal, renaissance, and other familiar keywords. At this stage we also calibrate discriminant analysis models based on 1970, 1980, and 1990 census tract data before going 'into the field' in the inner city to conduct block-by-block field surveys of visible housing reinvestment. We distinguish between intensely redeveloped 'core' gentrified areas, and 'fringe' neighborhoods where reinvestment appears to be pushing the 'frontier' or seems to be in its early stages. At every step, our methods are designed to be inherently conservative—to yield underestimates that do not capture class turnover that is spatially diffuse, sporadic, or divorced from significant capital investment. Our earliest field investigations predate the boom of the late 1990s, further underestimating the intensity and extent of gentrification in some cities.

In the third stage, once we have finalized the neighborhood taxonomy on the basis of fieldwork, we can update and refine the models for predictive use elsewhere—to identify tracts with population and housing characteristics (measured in census summaries) that are similar to gentrified areas verified through our 'ground truth' in the field. Each iteration of this technique strengthens the cumulative reliability and validity of the model for initial reconnaissance prior to fieldwork in other cities.

It is also a simple matter to link the neighborhoods identified in our field surveys with any data reported at the tract scale. Here we use a dataset that measures key facets of the homeownership market. The Home Mortgage Disclosure Act (HMDA), enacted by the federal government in 1975 and substantially amended in 1989, requires almost all banks, thrifts, and mortgage companies doing business in any metropolitan area to report certain information on every application for mortgage credit secured by a residence. Reporting criteria are based on asset size and location for traditional banks and savings institutions and on a combination of assets, location, and lending volume for 'nondepository' mortgage companies (see FFIEC, 2003). For structures with fewer than five living units (considered 'single-family' in the regulations), lenders must report certain borrower characteristics, the amount requested, the purpose, and the outcome of the application. These data are far from perfect: the files contain no downpayment information; disclosure of home equity lines of credit is optional and inconsistent; and, of course, the records miss anyone who does not go to a lender, such as buyers wealthy enough to buy outright, those who inherit homes, or people who borrow from wealthy relatives. And the data miss rental transactions, retail investment, and small business activity (see Blanton et al, 1999). Nevertheless, these data are the only publicly available information on household-level credit transactions at the neighborhood scale, and they give an unparalleled level of detail and comparability on one component of residential capital investment in all cities in the USA.

Recentralization and reinvestment

What do these data tell us about gentrification in the 1990s? At the metropolitan scale, most mortgage investment goes to the suburbs, leaving a minor trickle of capital washing back into the urban core. Between 1993 and 2000, total single-family loans in the suburbs of our twenty-three metropolitan areas topped US $1.5 trillion, whereas gentrified areas attracted only US $35.3 billion (table 2). At the scale of the inner city, however, the infusion is quite significant, and measured in terms of the *growth* of home purchase and home improvement lending, core and fringe gentrified neighborhoods stand out from the rest of the metropolis (table 2). Capital commitments to home-buyers in core districts advanced faster than twice the suburban rate and those in fringe gentrified areas accelerated more than three times as fast. Refinance investment provides no clear distinction between the categories, but this is to be expected with the mixture of old and new residents and the varied balances of loans made during various points in the interest-rate cycle. (Loans for multifamily properties also reveal an ambiguous pattern.) Nevertheless, purchase and 'rehab' loans provide critical indicators of the substantial risks accepted by residents and financial institutions and, on these benchmarks, the evidence points to a strong surge of gentrification in the boom of the 1990s.

Table 2. Single-family capital investment, 1993 – 2000: percentage change in inflation-adjusted commitments of prime, conventional mortgage capital (source: authors' tabulations of loan records reported to the FFIEC, 1994 – 2001).

	Home purchase	Home improvement	Refinance		Total[a]
			1995 – 1998	1999 – 2000	
Core gentrified	219	37.9	364	−47.8	24.2
Fringe gentrified	279	42.9	408	−41.9	11.1
Inner city	177	5.4	337	−35.7	55.3
Rest of central city	104	3.75	417	−49.1	460
Suburbs	81.7	−20.1	404	−53.5	1507

[a] Total loan commitments, 1993 – 2000, in billions of 2000 US dollars.

The broad picture, however, conceals enormous metropolitan variations. When we standardize investment growth in gentrified areas according to the suburban growth rate between 1993 and 2000 the resulting pattern suggests no single regional or economic explanation (see figure 1, over). Core districts in cities well-known in the gentrification literature—Boston, Philadelphia, Baltimore, Chicago, San Francisco—show substantial recentralization, with investment growing at two to five times the suburban rate. Much faster growth (more than five times the suburban rate) appears in an unlikely set of cities with very small areas of gentrification (Fort Worth, Milwaukee, New Orleans) and in the overheated housing market of Silicon Valley (San Jose). Fringe reinvestment appears most pronounced in older cities of the Northeast and Midwest, although the highest rates—more than five times that of the suburbs in Philadelphia, Detroit, Indianapolis, and St Louis—are biased by low absolute measures [figure 1(b)]. Chicago stands at the peak in absolute terms, with fringe tracts receiving $508 million in prime, conventional home- purchase loans in 2000—an increase of almost 500% since 1993, and a growth pace 4.3 times the suburban rate. Cities in the South and West exhibit much weaker fringe reinvestment in the context of rapid metropolitan growth and decentralization: Denver's fringe growth rate of 322%, for instance, looks unremarkable in light of suburban growth of 168%.

Searching for a definitive causal model to 'explain' these variations is not our purpose. We simply wish to draw attention to the intimate contingency of gentrified landscapes—spaces and places created by diverse and sometimes countervailing processes. Our central concern is with the *consequences* of changes underway in these urban landscapes—patterns of class and racial segregation and discrimination.

Gentrified exclusion?

Gentrification has inspired more than thirty years of intense, interdisciplinary, and (some have concluded) intractable debate. If there is a common thread in the concerns of scholars, activists, residents, and local officials it is the question of how to interpret the spatial expression and constitution of social inequality: is it possible to achieve reinvestment and diversity at the neighborhood scale without segregation, polarization, and displacement? If anything has changed in the 1990s, we would expect to see it in two aspects of the inner-city housing market. First, we would expect a simple strengthening of the old familiar *patterns* of residential segregation, as capital investment and homeownership policy facilitate increased selectivity in gentrifying neighborhoods along lines of class, race, and ethnicity. A second and much more controversial hypothesis is that gentrification intensifies well-documented processes of racial and ethnic discrimination.

Theories of contingent discrimination

Several streams of theoretical and empirical inquiry in housing economics and policy studies suggest that neighborhood context mediates lending discrimination. The most well-developed framework comes from the work of Holloway (1998; Holloway and Wyly, 2001), who has examined neighborhood-level variations in a variety of economic and institutional facets of lending-industry practices (Browne and Tootell, 1995; Munnell et al, 1992; 1996; Turner and Skidmore, 1999). Holloway's work emphasizes the worsened bias faced by minority homebuyers in wealthy white suburbs; but several aspects of his work are directly relevant in parts of the inner city.

First, gentrification alters many of the exclusionary housing-market practices that take place outside a bank office (but that nevertheless lead to adverse impact discrimination) (Turner and Skidmore, 1999; Yinger, 1995). Even if we accept the notion that competition will help to root out blatant discrimination (an irrational forfeiture of profit opportunities to satisfy a preference for bigotry), these 'nonbank' practices are crucial. Realtor steering and borrower preselection will change if new upscale units are built in a neighborhood full of working-class households in older homes; the arriving gentrifiers will benefit from the coordinated lending, insurance, and appraisal relationships established by developers and will thus escape the information externality problems faced by previous residents and buyers. The information externality hypothesis portrays bank lending in the inner city as a prisoner's dilemma: banks are reluctant to lend in areas where other banks do not lend (and where there are thus too few loans to judge risk and profitability potential accurately). In the long run, gentrification could actually ease information externality problems by reacquainting lenders with long-neglected neighborhoods; but this comes at the price of magnified disparities during a transitional period.

Second, gentrification is likely to magnify subtle (and often unintentional) forms of discrimination in the underwriting process, particularly those associated with the 'cultural affinity' hypothesis (Hunter and Walker, 1995). This framework emphasizes how differential treatment is most likely among *marginally* qualified applicants: loan officers (usually white) may unconsciously feel a greater affinity for the individual circumstances of white buyers and thus may be more inclined to make the effort to

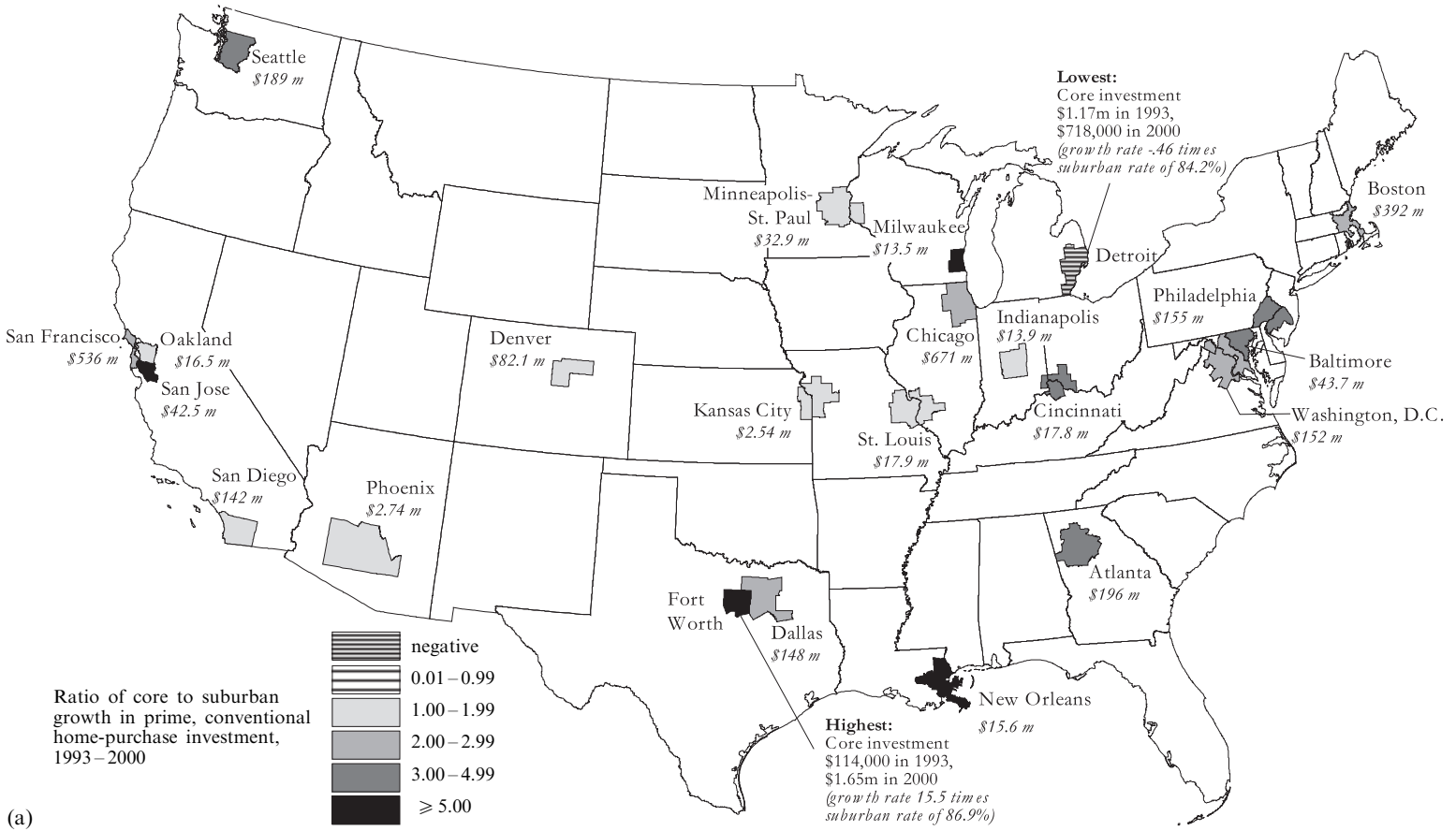
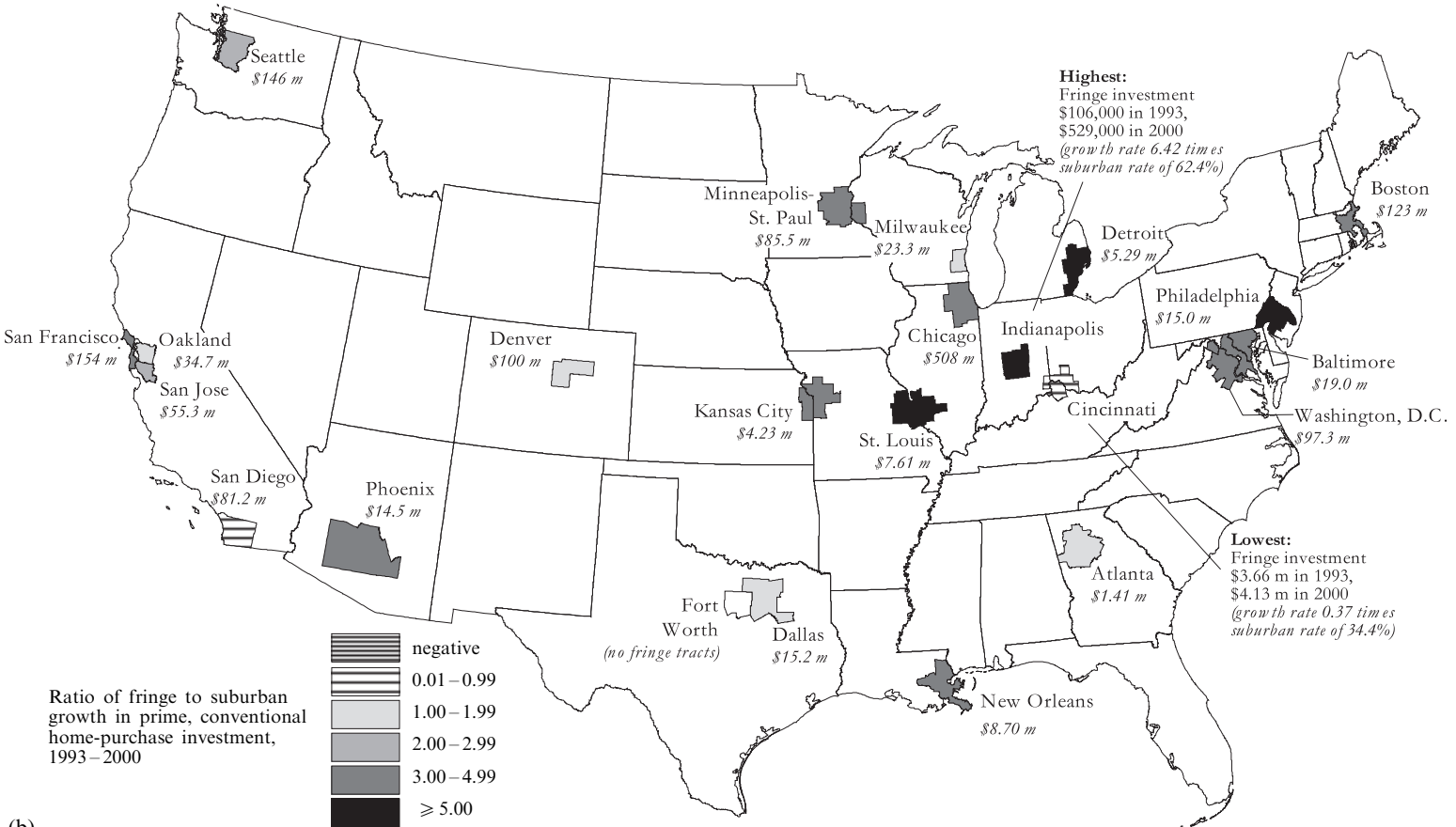


Figure 1. Mortgage reinvestment in (a) core and (b) fringe gentrified neighborhoods, 1993 – 2000: change in inflation-adjusted commitments of prime, conventional home-purchase loans in the specified gentrified tracts, expressed as a ratio of suburban growth rates. Figures beneath city names report lending volume in (a) core and (b) fringe gentrified neighborhoods in 2000 (source: FFIEC, 1994 – 2000).



(b)

Figure 1 (continued).

coach them to ensure approval (for example, prodding borrowers to obtain documentation to explain blemishes on a credit report). To the degree that this 'thick-file' syndrome persists, it will be magnified where gentrification creates a diverse stream of minority and white borrowers. The result will be worsened relative treatment of moderate-income African Americans (many of whom have poorer credit histories because of unstable employment, implicit biases in the credit reporting industry, and other factors tied into broader discriminatory forces in US society) in neighborhoods where they are competing against high-income white professionals (many of whom have blemished credit entirely for consumption and debt-related reasons).

Third, race and class turnover alter the incentives confronting certain types of lenders. Banks holding large numbers of loans previously extended in a neighborhood have a considerable interest in the stability of the value of the collateral and will obviously avoid doing anything that might undermine this value. In the race-conscious context of US housing markets, white people commonly equate an increase in minority population with neighborhood decline. Research by Reynolds Farley and co-workers (Farley et al, 1997) indicates that white people tend to define an 'integrated' neighborhood in more 'lily-white' terms than do minorities, so lending to minorities will reduce the bid prices offered by white people wherever minorities are seen as 'out of place' or as 'too numerous' (Holloway, 1998; LaCour-Little, 1999). Certain themes in the gentrification literature corroborate this interpretation, showing how mainstream banks remain hesitant to lend in gentrifying areas until they see the results achieved by maverick developers or sweat-equity white professionals; perhaps gentrification gets underway with full force only once a 'reverse tipping-point' is reached (see Schelling, 1972). Yet the portfolio risk argument is extremely difficult to test, and its applicability in gentrified neighborhoods is unclear. Farley et al's evidence also shows that some white people do prefer modestly mixed communities—and this tolerance is positively correlated with income and education (Farley et al, 1997). Moreover, as noted earlier, most lenders now sell a substantial fraction of their loans to Fannie Mae and Freddie Mac and thus have fewer direct concerns with local property values. Banks do, however, have choices after making large, so-called 'jumbo' loans that exceed the value thresholds set by the GSEs. These larger loans can be quite profitable but are not as easily sold in standard pools on the secondary market—and thus they often require more careful scrutiny by underwriters and appraisers. Once a bank approves a jumbo loan, the institution can choose between selling the note (to another bank, an investment trust, life insurance company, etc) or holding the note in portfolio. The interest in excluding minorities to avoid frightening white people is likely to be strongest for banks with large portfolios of jumbo loans concentrated in neighborhoods where racial transition is underway or anticipated.

Finally, property insurance companies have an interest in preserving the class and race exclusivity of gentrification. There is widespread evidence, from numerous court cases, paired-testing audits, and other techniques, of insurance discrimination against minority *buyers* and *neighborhoods* (Squires et al, 2001), but it is impossible to analyse the relations between the treatment of individuals and places, as the industry is not subject to the reporting requirements governing banks. To the degree that insurance discrimination persists, insurers will be encouraged by gentrification that creates white, upper-middle-class enclaves—and will be reluctant to insure minorities or lower-income households trying to enter these enclaves, for fear of helping to drive a process of neighborhood change that they believe will increase risks of fire, theft, and other compensable losses. As lenders usually cannot approve a loan without property insurance, seemingly discriminatory bank decisions may be a product of insurance industry practices.

Modeling segregation and discrimination

Our two hypotheses, then, concern the nature of US gentrification and how it changed in the 1990s: we propose that it has become more exclusive in terms of race and class, thus magnifying segregation, and that it has intensified racial discrimination in urban credit markets. To evaluate the empirical validity of these arguments, we must analyze the dynamics of the demand and supply sides of the residential mortgage credit market. Consider first the demand side, where we seek to determine whether there is anything distinctive in the profile of homebuyers and owners in gentrified neighborhoods:

$$\ln\left(\frac{P_{\text{Gentrified}}}{1-P_{\text{Gentrified}}}\right) = \boldsymbol{\beta}_{\text{MSA}}\boldsymbol{H}^{\text{T}} + \boldsymbol{\beta}_{L}\boldsymbol{L}^{\text{T}} + \boldsymbol{\beta}_{D}\boldsymbol{D}^{\text{T}} + \boldsymbol{\beta}_{R}\boldsymbol{R}^{\text{T}} + \boldsymbol{\beta}_{A}\boldsymbol{A}^{\text{T}} + \varepsilon_{i}\,, \tag{1}$$

where $P_{\text{Gentrified}}$ is the probability that a buyer will purchase a house in a gentrified neighborhood; $\boldsymbol{H}^{\text{T}}$ is a vector coded for different housing markets; $\boldsymbol{L}^{\text{T}}$ is a vector of loan, applicant, and financial characteristics; $\boldsymbol{D}^{\text{T}}$ is a vector of borrower demographic circumstances; $\boldsymbol{R}^{\text{T}}$ is a vector of applicant racial and/or ethnic identity; $\boldsymbol{A}^{\text{T}}$ is a vector representing the action taken on the loan request; and ε_{i} is an error term. We can also measure institutional divisions in the lending industry ($\boldsymbol{I}^{\text{T}}$), which reflect the interaction of regulatory conditions, capital investment trends, and variations in marketing, outreach, and consumer preferences:

$$\ln\left(\frac{P_{\text{Gentrified}}}{1-P_{\text{Gentrified}}}\right) = \boldsymbol{\beta}_{\text{MSA}}\boldsymbol{H}^{\text{T}} + \boldsymbol{\beta}_{L}\boldsymbol{L}^{\text{T}} + \boldsymbol{\beta}_{I}\boldsymbol{I}^{\text{T}} + \boldsymbol{\beta}_{D}\boldsymbol{D}^{\text{T}} + \boldsymbol{\beta}_{R}\boldsymbol{R}^{\text{T}} + \boldsymbol{\beta}_{A}\boldsymbol{A}^{\text{T}} + \varepsilon_{i}\,, \tag{2}$$

In this model, the $\boldsymbol{\beta}_{\text{MSA}}$ coefficients measure the contextual variation in gentrification across the urban system, and $\boldsymbol{\beta}_{L}$ and $\boldsymbol{\beta}_{R}$ illuminate the class and race selectivity of gentrified neighborhoods. If the resurgence of gentrification in the 1990s has involved intensified segregation, these coefficients should indicate a shift towards more affluent, Anglo-white borrowers—especially among homebuyers (who are more likely than home-improvement and refinance applicants to be new arrivals to the neighborhood). Conversely, weakened coefficient estimates for income and the categories for racial and ethnic minorities would support the notion of broader access to homeownership and credit without neighborhood polarization. We can estimate equation (2) separately with the dependent variable specified as 'core' or 'fringe' to test for differences in segregation and integration.

On the supply side, neighborhood location is moved to a right-hand-side predictor and the loan decision is our dependent variable:

$$\ln\left(\frac{P_{\text{Deny}}}{1-P_{\text{Deny}}}\right) = \boldsymbol{\beta}_{\text{MSA}}\boldsymbol{H}^{\text{T}} + \beta_{1}\,\text{CORE}_{i} + \beta_{2}\,\text{FRINGE}_{i} + \beta_{3}\,\text{INNER}_{i} + \varepsilon_{i}\,, \tag{3}$$

where P_{Deny} is the probability that an applicant will be refused; CORE, FRINGE, and INNER are dummy variables for properties in the core gentrified, fringe gentrified, or inner-city gentrified areas; β_{1}, β_{2}, and β_{3} test for broad variations in credit flows after accounting for metropolitan context. Then we add the characteristics of borrowers and lenders:

$$\ln\left(\frac{P_{\text{Deny}}}{1-P_{\text{Deny}}}\right) = \boldsymbol{\beta}_{\text{MSA}}\boldsymbol{H}^{\text{T}} + \beta_{1}\,\text{CORE}_{i} + \beta_{2}\,\text{FRINGE}_{i} + \beta_{3}\,\text{INNER}_{i} + \boldsymbol{\beta}_{L}\boldsymbol{L}^{\text{T}} + \boldsymbol{\beta}_{I}\boldsymbol{I}^{\text{T}} + \boldsymbol{\beta}_{D}\boldsymbol{D}^{\text{T}} + \boldsymbol{\beta}_{R}\boldsymbol{R}^{\text{T}} + \varepsilon_{i}\,. \tag{4}$$

Statistically significant, positive $\boldsymbol{\beta}_{R}$ coefficients are consistent with bias against racial and ethnic minorities, although it is not possible with this approach to distinguish among various *types* of discrimination. The approach is also vulnerable to the charge of omitted-variable bias: higher rejection rates among minorities could result from unmeasured applicant differences in, inter alia, downpayments, employment

stability, or credit records. But if omitted-variable bias is used to discount the meaning of the $\boldsymbol{\beta}_R$ estimates, it cannot also be used to dismiss geographical variations in racial inequality (unless there is systematic selection bias, with credit-constrained minorities more likely to seek out gentrified neighborhoods):

$$\ln\left(\frac{P_{\text{Deny}}}{1-P_{\text{Deny}}}\right) = \boldsymbol{\beta}_{\text{MSA}}\boldsymbol{H}^{\text{T}} + \beta_1\,\text{CORE}_i + \beta_2\,\text{FRINGE}_i + \beta_3\,\text{INNER}_i + \boldsymbol{\beta}_L\boldsymbol{L}^{\text{T}} + \boldsymbol{\beta}_I\boldsymbol{I}^{\text{T}} + \boldsymbol{\beta}_D\boldsymbol{D}^{\text{T}} + \boldsymbol{\beta}_R\boldsymbol{R}^{\text{T}} + \boldsymbol{\beta}_4(\boldsymbol{R}^{\text{T}}\times\text{CORE}_i) + \boldsymbol{\beta}_5(\boldsymbol{R}^{\text{T}}\times\text{FRINGE}_i) + \varepsilon_i\,. \quad (5)$$

In this model, the $\boldsymbol{\beta}_4$ and $\boldsymbol{\beta}_5$ parameters test the hypothesis that racial disparities in gentrified neighborhoods are significantly different from inequalities elsewhere in the city. If Smith's (1996; 1997) revanchist city applies to homeownership inequalities and lending practices in gentrified neighborhoods, we would expect strong, statistically significant, positive coefficient estimates on these terms. Conversely, if inner-city reinvestment has expanded opportunities for minority owners and buyers (possibly at the expense of renters) then we should see a weakening or reversal of these coefficients over the 1990s.

We constructed a database of all HMDA applications backed by single-family loans in each of our twenty-three metropolitan areas in 1993 and 2000. We estimated a series of logit models, using as predictors a set of loan and applicant variables that generally follow the conventions of the discrimination literature (Holloway, 1998; La-Cour-Little, 1999; Turner and Skidmore, 1999). Several measures, however, merit discussion. We calculated a payment-to-income ratio for each loan request, using the prevailing interest rate to amortize the principal and interest expense required to service the requested loan amount. We also coded dummy variables for government-subsidized requests [insured by the Federal Housing Administration (FHA)] for loans where the borrower intended to live in the collateral home, and for so-called 'jumbo' loans that exceeded the limits established by the GSEs Fannie Mae and Freddie Mac. Institutional divisions ($\boldsymbol{I}^{\text{T}}$) are measured by dummy variables for the federal bank regulatory agencies (with the omitted category set for independent mortgage companies regulated by HUD and for lenders classified by HUD as subprime. For demographic characteristics, the disclosure files provide little information; still, it is possible to identify loans where the primary applicant is female, and also to make inferences about the 'traditional' family courted by US banks (here defined as loan requests filed by male, non-Hispanic white primary applicants with female, non-Hispanic white coapplicants). Racial and ethnic identity is measured by the limited set of categories on the mandated form that is presented to borrowers along with a request for self-identification; particularly noteworthy is the category for 'race unreported', where borrowers decide not to provide the information, or the application is taken by telephone or other means where loopholes in the regulations have been responsible for rising rates of nondisclosure (Huck, 2001; Wyly and Holloway, 2002).

To measure segregation and changes in exclusivity, we estimated equation (2) separately for 1993 and 2000 for all single-family loan requests filed in each of the twenty-three metropolitan areas. To evaluate the discrimination hypothesis we narrowed the dataset to home purchase applications in central cities, estimating equations (3), (4), and (5) to reveal the incremental effects of borrower and lender characteristics. Results are reported in fit diagnostics, coefficient estimates ($\boldsymbol{\beta}$), odds ratios [$\exp\boldsymbol{\beta}$], and standardized coefficients:

$$100[\exp(\beta_i\sigma_i) - 1]\,,$$

where β_i is the estimated coefficient for predictor variable i, and σ_i is its standard deviation.

Continuity and change in segregation

In a diffuse metropolitan settlement fabric, gentrification seems marginal or even trivial: considering all single-family loan purposes in our twenty-three metropolitan areas, only 1 in 81 applicants sought credit for a home in a gentrified neighborhood (compared with 1 in 94 in 1993). It is no simple matter to predict locational variations (note the weak diagnostics in table 3), especially with the inclusion of millions of affluent suburbanites. Yet applicants in gentrifying areas do stand out on several measures; they are disproportionately high-income, single white males seeking moderately large loans under the terms of private-market, conventional credit from mainstream banks and mortgage companies. Many facets of this profile were durable through the 1990s, although there were some differences by loan purpose (tables 4 and 5, over). Urban and regional contrasts in gentrification also remained stable. Compared with the reference category (Chicago) and accounting for all other factors in the models, core gentrification was most significant in Boston and San Francisco and was weakest in Detroit, Phoenix, and Forth Worth. Fringe gentrification is much more variable, with fluctuating indications of substantial reinvestment (stronger than Chicago) in Denver, Minneapolis – St Paul, San Diego, San Francisco, San Jose, Seattle, and Washington, DC. Much weaker effects appear in Atlanta, Dallas, Detroit, Indianapolis, Philadelphia, Phoenix, and St Louis.

Several findings are directly relevant to the segregation hypothesis. In 1993 homebuyers choosing core gentrified neighborhoods had substantially higher incomes: we see a 48.6% increase in the odds with a one-standard-deviation increase in applicant income (from \$77 000 to \$151 000 in constant 2000 US dollars), even after accounting for all other factors in the model. Other loan purposes display a similar selectivity. Between 1993 and 2000, the effect weakened slightly for refinance requests, but selectivity increased dramatically for renovation applications (from a one-standard-deviation increment of 63% to 103%) and home purchase requests (49% to 90%). At the same time, core gentry borrowers became more heavily indebted and generally less likely to make use of FHA-insured credit or subprime lenders. This strong evidence of class exclusivity overshadows racial segregation, although of course these processes are inseparable. All else being constant, African American (black), Hispanic, and Asian or Pacific Islander borrowers are substantially less likely to 'wind up' in core gentrified areas.

Table 3. Fit diagnostics for the loan-selection models.

	Home purchase		Home improvement		Refinance	
	1993	2000	1993	2000	1993	2000
(a) *Core gentrification selection*						
Number of observations	899 784	1 648 312	318 445	418 240	1 881 171	1 264 777
Percentage correctly classified	77.0	79.4	74.0	74.4	77.7	75.1
Nagelkerke pseudo-R^2	0.12	0.13	0.11	0.11	0.12	0.12
Likelihood ratio χ^2 (df = 47)	8 845***	22 051***	1 848***	2 811**	17 861***	9 251***
Hosmer and Lemeshow χ^2 (df = 8)	67.7***	109.5***	5.8	16.6*	139.2***	28.4***
(b) *Fringe gentrification selection*						
Number of observations	899 784	1 648 312	318 445	418 240	1 881 171	1 264 777
Percentage correctly classified	74.0	74.5	65.2	68.6	69.4	69.0
Nagelkerke pseudo-R^2	0.10	0.09	0.07	0.07	0.08	0.07
Likelihood ratio χ^2 (df = 47)	4 880***	11 091***	960***	1 491**	7 222***	4 966***
Hosmer and Lemeshow χ^2 (df = 8)	20.4**	32.0***	19.9*	6.9	57.5***	48.5***

*Significant at $P < 0.05$; **significant at $P < 0.01$; ***significant at $P < 0.001$.
Note: df, degrees of freedom

Table 4. Selection models for core gentrified neighborhoods: standardized coefficients.

	Purchase		Improvement		Refinance	
	1993	2000	1993	2000	1993	2000
Metropolitan context (reference: Chicago)						
Atlanta	−16.4	−13.5	−4.1†	−2.6†	−14.6	−10.5
Baltimore	−12.8	−13.2	−13.5	−12.3	−14.8	−9.4
Boston	7.2	−5.4	−0.7†	1.1†	−2.0	−6.7
Cincinnati	−22.1	−20.6	−15.3	−17.6	−18.2	−18.9
Dallas	−8.7	−9.4	1.6†	−0.4†	−3.1	−3.1
Denver	−14.2	−15.0	−5.7	−12.1	−15.6	−14.1
Detroit	−67.2	−72.6	−75.8	−72.7	−81.1	−71.5
Fort Worth	−48.9	−50.3	−40.7	−88.5†	−42.2	−43.1
Indianapolis	−16.0	−19.4	−21.8	−14.6	−16.8	−19.3
Kansas City	−40.6	−39.2	−43.7	−30.2	−34.1	−38.6
Milwaukee	−18.8	−16.1	−20.5	−9.0	−22.2	−14.8
Minneapolis–St Paul	−20.3	−25.8	−24.8	−17.8	−20.6	−20.0
New Orleans	−8.1	−10.3	−9.0	−5.0	−9.3	−13.4
Oakland	−37.4	−46.9	−32.0	−30.5	−44.7	−39.9
Philadelphia	−6.3	−5.7	−11.2	−7.5	0.1†	−4.7
Phoenix	−55.0	−58.6	−51.8	−35.3	−46.2	−48.8
St Louis	−23.8	−23.9	−20.4	−16.0	−20.1	−15.5
San Diego	−6.6	−15.8	−5.6	−2.5†	−12.4	−8.2
San Francisco	12.0	3.8	11.4	17.0	11.3	10.5
San Jose	−28.7	−24.1	−21.3	−15.5	−41.8	−24.3
Seattle	−3.6	−6.2	3.5†	−2.4†	−5.8	−6.9
Washington, DC	−20.8	−21.4	−21.1	−15.5	−22.2	−15.3
Applicant finances and loan type						
Applicant income	48.6	90.1	62.9	102.9	99.0	85.6
Applicant income squared	−22.3	−29.0	−23.3	−42.9	−40.4	−25.9
Payment ratio	−2.9†	16.2	36.0	41.3	13.4	25.7
Payment ratio squared	4.3	−4.3	−16.3	−40.3	−3.5	−3.7
FHA-insured loan	−26.8	−40.3	−13.4	−8.3	−10.6	−13.1
Loan exceeds GSE limit	8.6	2.4	0.9†	−3.5	7.3	8.1
Owner occupancy	−6.5	−6.7	−9.1	−6.6	−14.9	−13.6
Lender type						
Commercial bank (OCC)	0.0†	11.3	19.8	26.0	4.0	0.7†
Commercial bank (FRB)	10.6	6.4	13.6	14.1	5.7	−1.0†
Commercial bank (FDIC)	−7.9	5.6	−3.4†	2.1†	−6.4	−0.1†
Savings and loan (OTS)	3.5	6.7	−1.8†	13.0	0.6†	−1.5†
Credit union (NCUA)	0.0†	−2.4	−0.7†	2.7†	−4.0	−1.3†
Subprime institution	−10.1	−21.8	5.5†	−25.0	2.7	−22.7
Applicant demographic characteristics and loan decision						
Female applicant	−3.8	−2.6	−1.4†	1.4†	2.3	0.1†
Traditional white family	−49.1	−41.9	−46.1	−36.5	−47.5	−37.3
Native American	−5.2	−2.9	−4.6†	−0.8†	−3.8	−5.5
Asian or Pacific Islander	−21.3	−19.3	−17.5	−17.9	−26.1	−14.7
Black	−10.7	−16.3	−13.9	−13.4	−6.4	−10.0
Hispanic	−23.3	−26.7	−8.6	−19.7	−15.6	−20.6
Other race	−8.5	−7.3	−5.9	−7.6	−7.3	−3.2
Race unreported	−8.4	−12.2	−9.3	−13.0	−13.9	−15.6
Loan offer declined	1.7†	2.4	7.9	0.5†	−0.1†	−1.8†
Application denied	4.0	2.3	4.2†	−4.1†	4.3	−5.7
Application withdrawn	1.4†	3.9	6.7	1.2†	2.8	−2.4†
Application incomplete	−0.2†	0.9†	5.3	1.6†	0.5†	−2.1†

† Parameter estimate not significant at $P = 0.05$; all other estimates shown are significant.
Note: FHA, Federal Housing Administration; GSE, government-sponsored enterprise; OCC, Office of the Comptroller of the Currency; FRB, Federal Reserve Bank; FDIC, Federal Deposit Insurance Corporation; OTS, Office of Thrift Supervision; NCUA, National Credit Union Administration.

Table 5. Selection models for fringe gentrified neighborhoods: standardized coefficients.

	Purchase		Improvement		Refinance	
	1993	2000	1993	2000	1993	2000
Metropolitan context (reference: Chicago)						
Atlanta	−58.6	−71.7	−91.0†	−53.6	−54.5	−57.1
Baltimore	−5.6	−3.2	−1.1†	11.3	−7.0	13.3
Boston	0.0†	−3.3	−3.2†	10.0	−11.0	3.8
Cincinnati	−17.3	−21.7	−10.8	−10.9	−14.9	−9.2
Dallas	−22.3	−37.1	−11.5	−10.0	−11.9	−1.2†
Denver	4.6	3.3	19.5	19.4	1.7†	15.8
Detroit	−62.1	−51.8	−55.5	−44.8	−57.1	−44.7
Indianapolis	−43.6	−41.5	−19.5	−23.4	−43.5	−26.8
Kansas City	−21.1	−21.1	−4.0†	1.7†	−20.6	−3.2†
Milwaukee	−0.7†	−5.0	2.2†	5.9	2.5	0.9†
Minneapolis–St Paul	9.1	−0.5†	21.9	38.4	8.2	31.7
New Orleans	−6.2	−10.9	−6.3†	−5.5†	−10.6	−10.3
Oakland	−6.9	−25.0	−7.0	0.7†	−16.1	−4.3
Philadelphia	−36.2	−31.1	−25.3	−20.3	−22.3	−12.6
Phoenix	−32.2	−33.9	−16.1	−21.7	−21.5	−16.2
St Louis	−29.7	−21.9	−18.0	−10.3	−24.1	−8.1
San Diego	15.4	−6.9	4.0†	12.7	1.6†	13.1
San Francisco	12.2	0.5†	0.0†	14.2	2.5	15.4
San Jose	−1.5†	−7.6	1.0†	11.4	−6.6	10.3
Seattle	19.2	2.1	19.1	23.9	15.4	17.8
Washington, DC	−6.2	−16.5	−6.2†	16.1	−14.8	10.0
Applicant finances and loan type						
Applicant income	−1.6†	48.2	22.0	21.9	25.8	32.0
Applicant income squared	1.9†	−21.4	−9.4†	−9.8	−15.0	−14.1
Payment ratio	−22.6	11.1	26.5	34.4	2.1†	21.3
Payment ratio squared	10.8	−4.3	−14.1	−56.4	−0.4†	−9.0
FHA-insured loan	−13.0	−29.1	−4.6†	−7.3	−4.9	−7.4
Loan exceeds GSE limit	−9.3	2.2†	0.6†	−1.5†	−2.7†	3.7
Owner occupancy	−8.1	−10.7	−13.9	−13.1	−16.7	−19.7
Lender type						
Commercial bank (OCC)	11.3	14.5	32.9	30.5	4.1	5.1
Commercial bank (FRB)	22.4	11.9	14.6	15.6	3.4	2.3†
Commercial bank (FDIC)	2.8†	8.5	13.6	8.1†	−3.0	5.0
Savings and loan (OTS)	5.0	10.2	10.7	13.0	−0.2†	−0.8†
Credit union (NCUA)	−0.2†	0.2†	8.7†	5.4†	−0.1†	−2.4†
Subprime institution	−11.3	−13.0	14.4	−9.3	10.3	−11.0
Applicant demographic characteristics and loan decision						
Female applicant	−3.8	−1.2†	4.3†	−7.8	0.7†	−0.4†
Traditional white family	−48.2	−40.7	−30.7	−36.5	−44.5	−32.8
Native American	−3.5	−1.3†	−1.3†	−3.7†	−3.8	−2.1†
Asian or Pacific Islander	−15.3	−18.5	−5.9	−14.7	−22.5	−12.2
Black	−8.5	−10.9	3.0†	−0.5†	−0.4†	4.8
Hispanic	−15.5	−20.4	−2.6†	−11.4	−8.9	−6.4
Other race	−5.4	−9.5	−5.8†	−1.7†	−7.0	−3.0
Race unreported	−10.0	−11.8	−1.9†	−21.0	−11.0	−11.0
Loan offer declined	−2.3†	3.0	5.0†	1.3†	−2.0†	0.3†
Application denied	3.1†	0.6†	8.9	3.1†	11.0	0.4†
Application withdrawn	4.3	2.2	2.2†	0.0†	4.6	−0.1†
Application incomplete	−1.1†	2.8	−0.1†	1.8†	1.8†	0.2†

† Parameter estimate not significant at $P = 0.05$; all other estimates shown are significant.
Note: see table 4.

The fringe is even more dynamic. Class and race selectivity is modest in the renovation and refinance markets (where the data do not allow us to separate recent arrivals from long-term residents). In the strongest effect, increasing the income of a refinance applicant from \$70 000 to \$129 000 (in 2000) boosts the fringe odds by 32%. But the home purchase market, where we are more likely to see new arrivals to the neighborhood, seems to have undergone a turnaround. In 1993, rising income had no significant effect on whether a loan request would be filed in a fringe tract, and higher debt ratios made it less likely. Seven years later, fringe debt ratios had nearly equalized with the rest of the city, and increasing income from \$80 000 to \$147 000 boosted fringe gentry odds by 48%. All the evidence suggests a strengthening class selectivity and durable racial divisions in core gentry areas and a pronounced shift in fringe neighborhoods with an influx of affluent white buyers alongside a more diverse mix of existing residents.

Exclusion and discrimination

The loan denial analysis points to a subtle mixture of continuity and change in credit rationing (tables 6 and 7, over). Results for the control variables highlight four sets of findings. First, context matters: metropolitan housing markets retain distinctive conditions of overall credit selectivity. In 1993, rejections are more prevalent in Detroit and Oakland, and are less likely in Denver and the Twin Cities (Minneapolis – St Paul). These variations narrowed by the end of the decade, and adding borrower-level and lender-level measures alters but does not eliminate regional contrasts. Second, fundamental underwriting criteria remained stable: estimates changed little for applicant income, debt burden, jumbo loans, and owner occupancy. A one-standard-deviation increase in income reduced denial odds by 44% in 1993 and by 47% in 2000. Third, institutional divisions changed somewhat, with a tightening among banks and thrifts (compared with independent mortgage companies) alongside more aggressive innovation and flexibility in FHA programs (Listokin and Wyly, 2000; Pennington-Cross and Yezer, 2000). Changes in the subprime market have increased rejection odds for applicants filing purchase requests at these companies (the odds ratios jump from 2.6 to 4.8). Although these firms aggressively push high-cost credit in the home equity and refinance markets, such practices are less profitable (and more tightly regulated) in the purchase market (HUD – Treasury Joint Task Force, 2000). Fourth, we find support for the consensus view that public policy, market competition, and community activism have reduced racial disparities. In 1993 an African American applicant was 2.3 times more likely to be rejected than an otherwise identical white Anglo American; by 2000 this ratio dropped below 1.6. Similar improvements are apparent for other minorities, although disparities remain. These findings are important but by no means definitive. For years, industry advocates dismissed high rates of minority rejection by emphasizing the problems of omitted-variable bias; thus we must consider the possibility that evidence of improvement reflects a larger pool of minorities with better credit. It is possible that changing industry practices matter less than the expanded ranks of well-qualified minorities working hard and helped along by the boom of the 1990s.

The key findings appear with the gentrification and interaction terms. In 1993 lending decisions in gentrified neighborhoods were not significantly different from those rendered elsewhere in the city—and there is a slight increase in denial odds when considering applicant and lender characteristics, although the effect disappears once again with inclusion of the interaction terms in model 3 (table 6). By the end of the decade, however, a loan request in a core gentry tract was 0.71 times as likely to be turned down, and a request in a fringe area was 0.81 times as likely to be rejected (model 1, table 7). Most of this shift can be explained in terms of the variables added in models 2 and 3.

Table 6. Home purchase denial models, 1993.

	Model 1			Model 2			Model 3		
	param. est	exp β	std coeff.	param. est	exp β	std coeff.	param. est	exp β	std coeff.
Intercept	−2.2306***	0.11		−1.8571***	0.16		−1.8524***	0.16	
Metropolitan context (reference: Chicago)									
Atlanta	0.4875***	1.63	9.4	0.3347***	1.40	6.3	0.3374***	1.40	6.4
Baltimore	0.1029**	1.11	1.5	−0.1411***	0.87	−2.0	−0.1396***	0.87	−2.0
Boston	0.2572***	1.29	3.2	0.158***	1.17	2.0	0.1562***	1.17	2.0
Cincinnati	0.18***	1.20	2.5	0.0198	1.02	0.3	0.0209	1.02	0.3
Dallas	0.4374***	1.55	11.4	0.4652***	1.59	12.1	0.4669***	1.60	12.2
Denver	−0.1603***	0.85	−5.7	0.00549	1.01	0.2	0.0067	1.01	0.2
Detroit	0.7162***	2.05	9.8	0.2736***	1.32	3.6	0.2721***	1.31	3.6
Fort Worth	0.6301***	1.88	10.4	0.6973***	2.01	11.6	0.6979***	2.01	11.6
Indianapolis	−0.0135	0.99	−0.3	0.0961**	1.10	2.1	0.0969**	1.10	2.1
Kansas City	0.3251***	1.38	4.7	0.3328***	1.40	4.9	0.3333***	1.40	4.9
Milwaukee	−0.0666	0.94	−1.0	−0.2113***	0.81	−3.3	−0.2127***	0.81	−3.3
Minneapolis–St Paul	−0.3702***	0.69	−6.0	−0.2237***	0.80	−3.7	−0.222***	0.80	−3.7
New Orleans	0.5264***	1.69	6.8	0.2527***	1.29	3.2	0.2534***	1.29	3.2
Oakland	0.7178***	2.05	8.7	0.7527***	2.12	9.2	0.7553***	2.13	9.2
Philadelphia	0.4809***	1.62	10.0	0.2588***	1.30	5.3	0.2592***	1.30	5.3
Phoenix	0.3718***	1.45	13.9	0.5981***	1.82	23.3	0.5994***	1.82	23.3
St Louis	0.5054***	1.66	5.8	0.4078***	1.50	4.6	0.4095***	1.51	4.6
San Diego	0.361***	1.44	8.6	0.5908***	1.81	14.4	0.5937***	1.81	14.5
San Francisco	0.5268***	1.69	8.7	0.7757***	2.17	13.1	0.7749***	2.17	13.1
San Jose	0.5115***	1.67	14.6	0.7293***	2.07	21.5	0.7347***	2.09	21.7
Seattle	0.00564	1.01	0.1	0.2678***	1.31	4.7	0.2695***	1.31	4.8
Washington, DC	0.1036*	1.11	1.1	−0.0117	0.99	−0.1	−0.00957	0.99	−0.1
Tract type									
Core gentry	−0.0577	0.94	−0.9	0.1359***	1.15	2.2	0.00745	1.01	0.1
Fringe gentry	0.0811	1.08	1.0	0.1419***	1.15	1.8	0.0438	1.05	0.6
Inner-city	0.5336***	1.71	19.0	0.3023***	1.35	10.3	0.3016***	1.35	10.3

(continued)

Table 6 (continued).

	Model 1			Model 2			Model 3		
	param. est	exp β	std coeff.	param. est	exp β	std coeff.	param. est	exp β	std coeff.
Applicant finances and loan type									
Applicant income				−0.00722***	0.99	−44.0	−0.00728***	0.99	−44.2
Applicant income squared				6.26×10^{-6}***	1.00	43.4	6.22×10^{-6}***	1.00	43.1
Payment ratio				−0.00686***	0.99	−7.1	−0.00698***	0.99	−7.2
Payment ratio squared				0.000024***	1.00	4.3	0.000024***	1.00	4.3
FHA-insured loan				−0.0563***	0.95	−2.5	−0.0574***	0.94	−2.5
Loan exceeds GSE limit				0.3941***	1.48	12.4	0.392***	1.48	12.3
Owner-occupancy				−0.17***	0.84	−3.6	−0.1691***	0.84	−3.5
Lender type									
Commercial bank (OCC)				0.3776***	1.46	14.5	0.3769***	1.46	14.5
Commercial bank (FRB)				−0.0308	0.97	−1.1	−0.0313	0.97	−1.1
Commercial bank (FDIC)				0.3044***	1.36	7.4	0.3036***	1.36	7.4
Savings and loan (OTS)				0.0565***	1.06	2.2	0.0559***	1.06	2.2
Credit union (NCUA)				0.4351***	1.55	3.5	0.4345***	1.54	3.5
Subprime institution				0.9684***	2.63	19.8	0.9664***	2.63	19.8
Applicant demographic characteristics									
Female applicant				−0.1631***	0.85	−6.9	−0.1632***	0.85	−6.9
Traditional white family				−0.1249**	0.88	−5.8	−0.1248***	0.88	−5.8
Native American				0.3772***	1.46	2.7	0.3775***	1.46	2.7
Asian or Pacific Islander				0.093***	1.10	2.2	0.0917***	1.10	2.2
Black				0.8233***	2.28	31.0	0.8241***	2.28	31.0
Hispanic				0.3872***	1.47	11.3	0.3852***	1.47	11.3
Other race				0.4381***	1.55	3.6	0.4573***	1.58	3.8
Race unreported				0.7044***	2.02	13.7	0.7103***	2.04	13.8

(continued)

Table 6 (continued).

	Model 1			Model 2			Model 3		
	param. est	exp β	std coeff.	param. est	exp β	std coeff.	param. est	exp β	std coeff.
Finance, loan type, and demographics									
Income × core tract							0.00107***	1.00	2.7
Income × fringe tract							0.00104	1.00	1.6
Jumbo loan × core tract							−0.051	0.95	−0.4
Jumbo loan × fringe tract							0.2624	1.30	1.0
Payment ratio × core tract							0.00091	1.00	0.3
Payment ratio × fringe tract							0.00353	1.00	0.9
Black × core tract							−0.0132	0.99	−0.1
Black × fringe tract							−0.069	0.93	−0.2
Hispanic × core tract							0.6147***	1.85	1.5
Hispanic × fringe tract							−0.4936**	0.61	−1.3
Asian × core tract							0.1852	1.20	0.6
Asian × fringe tract							−0.122	0.89	−0.3
Other race × core tract							−0.9303	0.39	−1.0
Other race × fringe tract							−0.4841	0.62	−0.5
Unreported race × core tract							−0.00761	0.99	0.0
Unreported race × fringe tract							−0.4087	0.67	−0.9
Number of observations	255 483			255 483			255 483		
Percentage concordant	56.1			66.4			66.4		
χ^2 against null model	3 472***			10 334***			10 369***		
χ^2 against model 1				6 862***			6 897***		
χ^2 against model 2							35***		

*Significant at $P < 0.10$; **significant at $P < 0.05$; ***significant at $P < 0.01$.
Note: param. est., parameter estimate; std coeff., standardized coefficient; see also the note to table 4.

Table 7. Home purchase denial models, 2000.

	Model 1			Model 2			Model 3		
	param. est	exp β	std coeff.	param. est	exp β	std coeff.	param. est	exp β	std coeff.
Intercept	−1.7515***	0.17		−1.7299***	0.18		−1.7239***	0.18	
Metropolitan context (reference: Chicago)									
Atlanta	0.0536**	1.06	1.2	−0.0414*	0.96	−0.9	−0.04*	0.96	−0.9
Baltimore	0.1496***	1.16	2.2	−0.0755**	0.93	−1.1	−0.0734**	0.93	−1.1
Boston	−0.2412***	0.79	−2.9	−0.0254	0.98	−0.3	−0.0249	0.98	−0.3
Cincinnati	0.0267	1.03	0.3	−0.1537***	0.86	−1.7	−0.1537***	0.86	−1.7
Dallas	0.1362***	1.15	3.6	0.1104***	1.12	2.9	0.1109***	1.12	2.9
Denver	−0.1795***	0.84	−6.0	0.0167	1.02	0.6	0.0161	1.02	0.6
Detroit	0.668***	1.95	11.4	0.2187***	1.24	3.6	0.2188***	1.25	3.6
Fort Worth	0.276***	1.32	5.0	0.2163***	1.24	3.9	0.2146***	1.24	3.9
Indianapolis	0.1032***	1.11	2.0	0.0684***	1.07	1.3	0.0664***	1.07	1.3
Kansas City	−0.1359***	0.87	−2.0	−0.3532***	0.70	−5.1	−0.3541***	0.70	−5.1
Milwaukee	0.0477	1.05	0.6	−0.318***	0.73	−4.0	−0.3175***	0.73	−4.0
Minneapolis–St Paul	−0.3235***	0.72	−4.9	−0.2341***	0.79	−3.5	−0.2317***	0.79	−3.5
New Orleans	−0.026	0.97	−0.3	−0.0321	0.97	−0.4	−0.0316	0.97	−0.3
Oakland	−0.1041***	0.90	−1.4	0.022	1.02	0.3	0.0225	1.02	0.3
Philadelphia	−0.0908***	0.91	−1.8	−0.2969***	0.74	−5.7	−0.2958***	0.74	−5.7
Phoenix	−0.0884***	0.92	−3.1	0.0377**	1.04	1.4	0.0363**	1.04	1.3
St Louis	0.3275***	1.39	4.0	−0.0976***	0.91	−1.2	−0.0976***	0.91	−1.2
San Diego	−0.4116***	0.66	−9.4	−0.1974***	0.82	−4.6	−0.1967***	0.82	−4.6
San Francisco	−0.4525***	0.64	−6.1	−0.0348	0.97	−0.5	−0.0478	0.95	−0.7
San Jose	−0.144***	0.87	−3.8	0.0745***	1.08	2.0	0.0798***	1.08	2.2
Seattle	−0.6673***	0.51	−9.7	−0.3021***	0.74	−4.5	−0.3002***	0.74	−4.5
Washington, DC	−0.2258***	0.80	−2.7	−0.119***	0.89	−1.5	−0.1131***	0.89	−1.4
Tract type									
Core gentry	−0.3458***	0.71	−5.9	0.00544	1.01	0.1	−0.0891	0.92	−1.5
Fringe gentry	−0.2164***	0.81	−3.0	−0.0227	0.98	−0.3	−0.2889***	0.75	−4.0
Inner-city	0.4788***	1.61	19.2	0.188***	1.21	7.2	0.1887***	1.21	7.2

(continued)

Table 7 (continued).

	Model 1			Model 2			Model 3		
	param. est	exp β	std coeff.	param. est	exp β	std coeff.	param. est	exp β	std coeff.
Applicant finances and loan type									
Applicant income				−0.00862***	0.99	−46.6	−0.00862***	0.99	−46.6
Applicant income squared				9.75×10^{-6}***	1.00	45.2	9.70×10^{-6}***	1.00	44.9
Payment ratio				−0.0103***	0.99	−10.8	−0.0104***	0.99	−10.9
Payment ratio squared				0.000044***	1.00	6.9	0.000044**	1.00	6.9
FHA-insured loan				−0.402***	0.67	−14.6	−0.4024***	0.67	−14.6
Loan exceeds GSE limit				0.3393***	1.40	12.5	0.3265***	1.39	12.0
Owner-occupancy				−0.1343***	0.87	−3.7	−0.1333***	0.88	−3.7
Lender type									
Commercial bank (OCC)				0.4089***	1.51	20.2	0.4092***	1.51	20.2
Commercial bank (FRB)				0.1005***	1.11	3.2	0.1***	1.11	3.1
Commercial bank (FDIC)				0.2316***	1.26	5.7	0.2316***	1.26	5.7
Savings and loan (OTS)				0.4102***	1.51	16.2	0.4104***	1.51	16.2
Credit union (NCUA)				0.1997***	1.22	2.0	0.1996***	1.22	2.0
Subprime institution				1.5608***	4.76	88.5	1.5592***	4.76	88.4
Applicant demographic characteristics									
Female applicant				−0.0489***	0.95	−2.2	−0.0495***	0.95	−2.2
Traditional white family				−0.2231***	0.80	−8.5	−0.2249***	0.80	−8.6
Native American				0.1277**	1.14	1.0	0.1263**	1.14	1.0
Asian or Pacific Islander				0.0596***	1.06	1.5	0.0494**	1.05	1.2
Black				0.443***	1.56	17.1	0.4354***	1.55	16.8
Hispanic				0.3181***	1.37	10.4	0.3087***	1.36	10.1
Other race				0.2487***	1.28	3.0	0.2509***	1.29	3.0
Race unreported				0.4041***	1.50	14.8	0.4041***	1.50	14.8

(continued)

Table 7 (continued).

	Model 1			Model 2			Model 3		
	param. est	exp β	std coeff.	param. est	exp β	std coeff.	param. est	exp β	std coeff.
Finance, loan type, and demographics									
Income × core tract							0.000131	1.00	0.4
Income × fringe tract							0.000954*	1.00	1.8
Jumbo loan × core tract							0.2161***	1.24	2.0
Jumbo loan × fringe tract							0.0106	1.01	0.1
Payment ratio × core tract							0.000134	1.00	0.1
Payment ratio × fringe tract							0.0051*	1.01	1.6
Black × core tract							0.2252**	1.25	1.0
Black × fringe tract							0.2094*	1.23	0.8
Hispanic × core tract							0.3398**	1.41	1.0
Hispanic × fringe tract							0.4603***	1.59	1.4
Asian × core tract							0.2296*	1.26	0.9
Asian × fringe tract							0.3106**	1.36	1.0
Other race × core tract							−0.1267	0.88	−0.3
Other race × fringe tract							−0.0792	0.92	−0.1
Unreported race × core tract							−0.1191	0.89	−0.8
Unreported race × fringe tract							0.0675	1.07	0.4
Number of observations	490 365			490 365			490 365		
Percentage concordant	55.0			73.8			73.8		
χ^2 against null model	5 861			50 795***			50 845***		
χ^2 against model 1				44 934***			44 984***		
χ^2 against model 2							50***		

*Significant at $P < 0.10$; **significant at $P < 0.05$; ***significant at $P < 0.01$.
Note: param. est., parameter estimate; std coeff., standardized coefficient; see also the note to table 4.

But with the inclusion of interaction terms, and after controlling for all other effects, rejection in fringe gentry areas is only 0.75 times as likely as otherwise identical applications elsewhere. Interaction terms suggest that lenders may be more reluctant to lend to high-income buyers in gentrified areas compared with wealthy buyers elsewhere—at least when the risk cannot quickly be shifted to Fannie Mae or Freddie Mac. The evidence for intensified discrimination is more consistent. In 1993 African Americans and most other minorities faced no different chances in gentrified districts after accounting for all other factors (model 3, table 6). In 2000 African Americans trying to buy homes in core gentrified neighborhoods were 1.25 times more likely to be turned down compared with identically qualified African Americans looking elsewhere; a similar ratio (1.23) prevails in the fringe. Disparities are slightly higher for Asians and Pacific Islanders, raising even more intricate interpretive questions: the vast majority of lending research focuses on inequalities between native-born non-Hispanic white people and native-born non-Hispanic African Americans, and there is very little comparable research on Asian Americans (but see Listokin and Listokin, 2001). Hispanic people seem to have faced the most turbulent situation. In 1993 Hispanic buyers faced severe exclusion from core gentry areas, but were substantially *less* likely to be rejected in the fringe (with interaction term odds ratios of 1.85 and 0.61, respectively). By the end of the decade, Hispanic applicants in fringe tracts faced denial odds 1.59 times greater than if they had applied elsewhere.

These results corroborate the hypothesis that gentrification was associated with intensified racial discrimination. Given the limitations of our analysis—single-equation models of one type of housing transaction—we can offer few causal explanations. Gentrification may worsen discrimination, but it is also possible that heightened barriers of exclusion were a precondition for expanded reinvestment. Intensified discrimination may result from any combination of preselection and steering, information externality dynamics, cultural affinity biases, portfolio risk considerations, and loan insurance discrimination. All that is clear is that these landscapes were shaped by greater class segregation and racialized exclusion in the 1990s.

Local trajectories of exclusion

On theoretical grounds, neighborhood change and racial stratification may be understood as necessary social relations in contemporary US urbanization, but, in concrete terms, these processes interact in historically contingent and locally specific ways (Beauregard, 1990; Goldberg, 1998). Our analysis thus far captures the rough outlines of metropolitan-level variations but obscures the details. We estimated a new set of denial models for the 144 165 households who asked for purchase loans in core or fringe gentrified neighborhoods in all years between 1993 and 2000. We also refined our analysis to respond to the most widespread criticism of these kinds of denial models, omitted-variable bias with respect to applicant credit (see Browne and Tootell, 1995; Munnell et al, 1992; 1996; Turner and Skidmore, 1999). It is possible to construct an instrumental variable measuring, for each applicant, the likelihood that an underwriter will recommend rejection specifically for reasons of poor credit (see Abariotes et al, 1993; Holloway, 1998; Holloway and Wyly, 2001). This approach is by no means perfect, in part because the denial reasons used to construct the credit variable are optional (and thus banks are able, if they choose, to hide discrimination behind the veil of 'bad credit' denials). But adding this instrument allows an especially conservative test for bias in credit markets. We estimated separate denial models for each racial and ethnic group, including applicants with no reported racial information. We used the parameters of these denial equations to calculate the probability of rejection for an 'average' applicant (mean income, debt burden, etc) in gentrified neighborhoods in each of these cities. (Owing to the small number of applications involved, these models

Table 8. Racial exclusion effects in gentrified neighborhoods: minority/white ratio of intercept probabilities from home purchase denial models (logistic regressions estimated with applicant, loan, and institutional controls and credit instruments).

City[a]	Black	Hispanic	Asian	Other	Unreported
Atlanta	2.33	1.44	0.99	2.28	2.09
Baltimore	2.82	1.37	2.36	3.21	1.65
Boston	1.83	1.56	1.16	1.57	1.42
Chicago	2.48	2.13	1.16	1.53	1.74
Cincinnati	1.79	3.48	ns	3.23	1.53
Dallas	2.61	1.73	1.03	1.30	1.30
Denver	2.12	2.16	1.16	2.59	2.15
Detroit	3.23	ns	ns	ns	2.46
Indianapolis	1.37	1.22	ns	ns	1.08
Kansas City	2.21	1.74	ns	ns	1.62
Milwaukee	2.55	2.70	0.80	2.04	3.14
Minneapolis – St Paul	3.00	2.15	1.49	3.01	2.43
New Orleans	1.58	1.00	0.35	2.43	1.52
Oakland	2.54	2.57	2.35	2.04	1.62
Philadelphia	2.58	2.21	1.53	1.17	2.25
Phoenix	1.64	1.66	0.98	ns	1.79
San Diego	1.81	1.93	1.18	1.48	1.60
San Francisco	1.66	2.52	1.47	1.48	1.40
San Jose	3.59	2.22	1.79	1.64	1.39
Seattle	1.89	2.05	1.30	1.38	1.14
St Louis	2.74	1.49	0.32	4.16	2.26
Washington DC	2.59	1.93	1.69	1.67	1.80
Unweighted mean ratio	2.32	1.96	1.28	2.12	1.79
Number of observations	10 772	4 818	6 407	1 492	11 719
Total denial rate for home buyers in core and fringe areas	19.1	18.5	13.8	16.2	15.4

ns, indicates insufficient number of applicants to estimate denial probability (or, intercept parameter is not significant at $P < 0.10$).
[a] Fort Worth is excluded owing to the small number of applications included.

exclude Forth Worth; we also chose not to estimate denial models for the small number of American Indian and Alaskan Native homebuyers.) By dividing minority probabilities by those for non-Hispanic white applicants we obtain a conservative indicator of racial and ethnic exclusion in different neighborhoods.

The results are striking (table 8). Even after giving every benefit of the doubt to the supply side (including a measure of credit history that may itself capture discrimination), it is clear that minority homebuyers in gentrified neighborhoods are much more likely than are white applicants to be turned away. On average, black applicants are 2.33 times more likely to be excluded than identically qualified white applicants; this ratio is almost as high for applicants identifying themselves as 'other' (2.28), and only slightly lower for Hispanic (1.44) and racially 'unknown' (2.09) applicants. But racial exclusion varies widely. Exclusion is borne most heavily by African Americans in Atlanta, Boston, Chicago, Dallas, Detroit, Indianapolis, Kansas City, Philadelphia, San Jose, and Washington, DC. Polarization in gentrified neighborhoods follows a stark black – white dichotomy in cities of the East and South (with the exception of Silicon Valley). In other places the bias seems directed towards Hispanic people (Cincinnati, Oakland, San Diego, San Francisco, and Seattle). In no city does exclusion of Asian and Pacific Islander buyers post the highest ratios among the different

'minority' groups, although in some cities (Oakland, Philadelphia, San Jose, and Washington) Asians and Pacific Islanders fare worse than those identifying themselves as 'other'. In Milwaukee and Phoenix, the most severe exclusion falls on applicants without reported race and ethnicity information—the result of a complex intersection of industry changes and regulatory loopholes (Huck, 2001; Wyly and Holloway, 2002). It is also possible to interpret the results in an alternative comparison, reading the ratios down each column rather than across each row: relative to white people, African Americans have the best chance of equal treatment in gentrified areas in Indianapolis, New Orleans, and Phoenix; they face the worst exclusion in the 'white-hot' housing market of San Jose, but also in the chronically weak land market of Detroit. Only twenty-six Hispanic buyers sought homes in New Orleans's gentrified districts between 1993 and 2000, but these households appeared to enjoy equal chances to those of white people; by contrast, Hispanic applicants faced exclusion rates over 2.5 in Cincinnati, Milwaukee, Oakland, and San Francisco.

Conclusions

A generation ago, Harvey (1973, page 11) conceived of urbanism "as a vantage point from which to capture some salient features in the social processes operating in society as a whole—it becomes, as it were, a mirror in which other aspects of society can be reflected". Gentrification affects a tiny slice of the contemporary, dispersed metropolis, but in the USA it certainly provides an important vantage point from which to see some of the social processes of recent years—rapid economic growth, sustained housing inflation, public policies of privatized deregulation, and the imposition of market discipline on an ever broader range of social relations. In turn, gentrification is itself a reflection, part of a dynamic, complex, and powerful 'new segregation' (Goldberg, 1998). Our empirical analysis in this paper has been straightforward: we have found a pronounced strengthening of capital investment in the urban core; an increase in class segregation, especially where reinvestment pushes beyond established enclaves; and a significant link between gentrification and worsened processes of racial and ethnic discrimination. Yet historical and geographical context matter in how we judge these findings, as the inequalities of contemporary gentrification interact with the broader polarization of the US metropolis.

Acknowledgements. We are grateful to the editor, Tom Slater, Winifred Curran, and the anonymous referees for valuable comments and criticisms on earlier versions. We retain all responsibility for any shortcomings.

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