Residential Mortgage Foreclosure and Neighborhood Change

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Abstract

We use New Orleans as a case study to explore residential mortgage foreclosure as one mechanism linking prior black population and changes in employment levels with changes in aggregate income, housing tenure, vacancy rates, and black population size. Mortgage foreclosure data are merged with 1980 and 1990 census data aggregated at the block group level.

Structural equation modeling results indicate that both economic change and prior racial composition are associated with reductions in median block group incomes. Racial transition and loss of employment and income also increased foreclosure rates. Economic change and prior racial composition together impact neighborhoods through their effects on income and foreclosure rates, which in turn differentially affect vacancy rates, the change in black population, and the housing tenure status of residents. The differential effects of these variables point to the persistence of a dual housing market for blacks and whites in New Orleans.

Keywords: Minorities; Mortgages; Neighborhood

Introduction

Explaining neighborhood change is a central problem in urban social science. Economic theories focus on residential preferences and the interplay of supply-demand relationships in local housing markets. Some economic analysts substantiate the formal theory with the argument that the overseas export and relocation to the suburbs of high-wage manufacturing jobs left lower-paid service sector jobs and worse living conditions for many central-city residents (Galster, Mincy, and Tobin 1997; Squires 1994; Wilson 1987, 1996). Institutional and place stratification theories present an alternative approach that emphasizes how racial stereotypes affect decisions on lending and residential location made by residents, real estate agents, and bankers (Farley et al. 1994; Massey and Denton 1993; South and Crowder 1997). This article investigates the additional hypothesis that residential mortgage foreclosure is one factor that mediates the effects of economic market factors and racial variables on homeownership patterns, housing vacancy rates, and changes in the racial composition of urban neighborhoods. This investigation should hold considerable interest for urban planners and policy makers.

Residential mortgage foreclosure is the legal process whereby a lender separates a delinquent borrower from a vested interest in mortgaged property. Consider two theoretical explanations of the relationship between foreclosure and the larger process of neighborhood change: First, the economic argument that layoffs caused by downsizing in a major industry typically reduce both the real income of homeowners and the value of owner-occupied housing. Deterioration of the ratio between the value of mortgages and the market value of houses in a declining housing market is associated with higher mortgage default rates and out-migration from the city (Case and Shiller 1996; Cunningham and Capone 1990). A second approach supplements the first with the argument that the existence of a dual housing market and ongoing racial residential transition, together with economic restructuring, can cause foreclosure to exert different effects on neighborhood outcomes, depending on the changing racial mix of different neighborhoods.

We start with a theoretical discussion that integrates residential mortgage foreclosure into debates about the priority of economic and racial variables to explain neighborhood change. We then turn to a quantitative analysis of neighborhood change that models the relationship between changes in employment levels and incomes on the one hand and home values, foreclosure rates, racial transition, and other neighborhood outcomes on the other. We estimate structural equation models of the impact of changes in employment from 1980 to 1990 on *changes* in block group income and housing values as they affected foreclosure rates and *changes* in vacancy rates, the percent black population, and the proportion of owner-occupied housing units.

Theories of neighborhood change

Economic approaches to neighborhood change

Economic approaches to neighborhood change tend to emphasize either the natural selection of neighborhood characteristics based on individual preferences and market competition or the unfolding of contradictions in the institutional arrangements that support capital expansion. The discussion that follows integrates residential mortgage foreclosure into economic accounts of neighborhood change and develops hypotheses to guide the quantitative analysis.

An economic approach to neighborhood change begins with the proposition that the geographic separation of households according to real income levels is at the core of the neighborhood succession process (Grigsby et al. 1987). The classic stage model provides a theoretical account of the process of neighborhood succession (Bradbury, Downs, and Small 1982; Downs 1981; Faris 1967). According to the stage model, competition for city land results in rapid development and increasing

land values in the central business district. More affluent residents respond to eventual downtown congestion by seeking cheaper land and better housing on the urban fringe (Muth 1969). Many landlords then proceed to divide central-city housing into smaller units and reduce investment in maintenance and renovation of aging downtown housing stock. Less affluent residents move in, often as renters, and eventually come to dominate the neighborhood as the deteriorating housing stock filters down the status hierarchy. The end result is relatively high rents and overcrowding, together with declining land values in the central city, as families with similar socioeconomic status and ethnic identity reside next to each other.

The underlying economic argument in the stage model of residential succession proposes that the relative cost of housing allows those with sufficient income to choose a housing submarket that suits their preferences (Muth 1969). This not only helps construct middle- and upper-income housing submarkets, it also constricts, via the filtering process, the location of lower-income submarkets. The essentials of filtering, and hence of racial and ethnic transition, can be boiled down to the depreciation or appreciation of housing prices and rents to reflect changes in the income profile of residents and neighborhood desirability (Grigsby et al. 1987).

The stage theory does not explain the causes of economic change or the differences in real income as they affect urban neighborhoods. The neo-Marxist explanation of inequality and neighborhood change links global shifts in capital expansion to local conflicts over land use as they affect incomes, rents, and housing prices (Harvey 1973; Logan and Molotch 1987). According to this account, foreign economic competition in the 1970s contributed to reductions in corporate profits, higher trade deficits, and increased borrowing by business and homeowners that upset previously favorable economic conditions. Subsequent restructuring of core industries in the United States replaced employment in manufacturing and middle management with service sector jobs in the transition to a more globally oriented and information-driven economy. Real incomes and housing prices declined, and existing housing stock deteriorated in many urban areas that lost core manufacturing jobs (Grant 1995; Harrison and Bluestone 1988).

Lower incomes and home values create the conditions for decline across the spectrum of urban neighborhoods. Widespread job loss and declining economic prospects can turn already high mortgage debt burdens into a crisis in which vacancy rates increase and people lose property to foreclosure.

Hypothesis 1. Employment decline reduces median block group income and the mean value of owner-occupied housing.

William Julius Wilson (1987, 1996) advances a dual labor market explanation of recent patterns of urban decline that is largely compatible with the approach outlined above. He argues that changes in the structure of economic opportunity provide the impetus for residential succession and the concentration of poverty. Economic restructuring shifted many jobs from the central city to the suburbs and from the primary manufacturing sector to the secondary service sector; such restructuring has interacted with black migration patterns to intensify the spatial and racial distribution of urban poverty. Many middle-class blacks migrated out of the central city for the suburbs, and Wilson believes that the proportion of unemployed and underemployed minority residents has increased and that poverty has become more concentrated in central-city neighborhoods. This suggests a second hypothesis.

Hypothesis 2. Declines in employment and income are concentrated in block groups with the largest proportion of low-income black residents.

In a recent book, Paul Jargowsky (1997) reinforces Wilson's argument that structural change in the economy disadvantaged those with inferior education and job skills and interacted with the suburbanization of employment to drive more affluent residents out of cities. A major consequence of the out-migration of affluent residents is an increase in the proportion of lower-skilled blacks without stable employment who reside in more impoverished urban neighborhoods.

Economics research has identified higher mortgage default risk and higher default rates when an economic boom is followed by a sharp downturn. This is especially true if home buyers borrow money at high interest rates and pay inflated prices for property during the boom (Stone 1986). Lower housing prices can create a situation where a borrower, suddenly laid off from work, owes more money on a home than it is worth on the open market. When incomes and house prices decline, foreclosure may be considered a viable option for people who try to get out from under an investment gone sour. Case and Schiller (1996) report that uneven patterns of decline in housing prices in Boston and Los Angeles County in the 1980s were associated with higher mortgage default rates. This reasoning suggests a third hypothesis.

Hypothesis 3. Lower employment and lower median block group income reduce home values and increase residential mortgage foreclosure rates.

The logic here is that foreclosure rates are increased by the combined effects of economic restructuring and recession on the value of owner-occupied housing. Lower employment and income levels in a neighborhood reduce the demand for owner-occupied housing, which in turn reduces housing values and increases foreclosure rates. This is a consequence of both the inability of borrowers to pay their mortgages and the lack of demand for houses in a depressed market. As a result, dis-

tressed homeowners are unable to sell their homes at prices above the mortgage balance and choose foreclosure instead.

Hypothesis 3a. Higher foreclosure rates are associated with higher vacancy rates, increases in the proportion of black residents, and lower levels of owner-occupied housing.

Racial transition and declining rates of owner occupancy occur when displaced white homeowners lose their homes to foreclosure before they leave the city. Racial residential succession occurs as poorer black residents move into these formerly white neighborhoods. Vacancy rates also rise, due both to high foreclosure rates and to the job loss that forces residents to move. Out-migration and higher foreclosure and vacancy rates then contribute to lower levels of resident homeownership. So far, the discussion has stressed the economic impetus for racial transition and neighborhood decline. Attention must now be directed to the important independent impact of racial variables on the process of neighborhood change.

Race discrimination and neighborhood succession

Douglas Massey and his colleagues supplement economic explanations of residential succession with the argument that racial segregation itself is an institutional process that concentrates poverty (especially during economic downturns) and affects the entire process of neighborhood change (Eggers and Massey 1992; Massey 1990; Massey and Denton 1993; Massey and Eggers 1990). Other scholars have also argued that race discrimination in housing markets restricts the validity of market explanations of neighborhood change (Cook 1988; Galster 1990; Galster and Hill 1992; Squires 1994). From this perspective, race has independent effects on neighborhood change. This approach suggests a fourth hypothesis.

Hypothesis 4. The prior racial composition of a block group has significant net effects on median block group income, mean house value, foreclosure rates, and subsequent changes in neighborhood racial composition.

The specific effects of prior racial composition on subsequent neighborhood outcomes are determined by additional variables like race discrimination and overall patterns of residential differentiation. The interaction among these variables signals caution in the expectation that patterns of racial residential succession will unfold everywhere according to precisely the same market logic (Lee and Wood 1991; Taeuber and Taeuber 1965). Consider the important argument that private housing suppliers and financial intermediaries often restrict lending in neighborhoods where the minority population is increasing; this

tactic can drive down housing prices before poorer in-migrants drive down incomes. The early stages of neighborhood decline then cause panic among investors and white homeowners who sell out at low prices to block-busting real estate agents (Megbolugbe, Hoek-Smit, and Linneman 1996). Eventually, a "tipping point" is reached where greater than expected out-migration occurs because in-mover minorities are perceived to be undesirable neighbors.

Lee and Wood (1991) argue that this logic must be further specified to account for regional variation in the process of racial residential succession. They find that most census tracts with large black populations in cities located in the western United States actually experienced stable or declining black populations in the 1970s. In addition, Taeuber and Taeuber (1965) argue that the availability of vacant land and relative changes in black and white populations significantly affect the process of racial residential succession. They maintain that the classic succession model is most applicable to northern cities that experience rapid increases in black population. In a southern city like New Orleans, with very little vacant land, a declining white population, and small natural increases in black population, the process may unfold differently. For example, Taeuber and Taeuber (1965) find that, particularly in southern cities, more affluent blacks lead the invasion into formerly all-white neighborhoods so racial residential succession does not necessarily reduce median block group income or occupational status. This argument contradicts predictions about the effects of racial residential succession on block group income derived from classic succession theory and presented in Hypothesis 3 above. A related corrective is that house values may increase as blacks succeed whites in a neighborhood, both because higher-income blacks replace lower-income whites and because of the premium prices paid by black home buyers as a result of increased demand in a dual housing market (Taeuber and Taeuber 1965). This logic suggests an alternative hypothesis.

Hypothesis 4a. In the context of economic recession and racial residential succession, block groups with large increases in the proportion of black population experience increases in mean house values.

The idea that black and white neighborhoods are served by different housing markets suggests that in predominantly black neighborhoods and in neighborhoods experiencing racial residential succession, house prices may fluctuate at rates different from those found in predominantly white neighborhoods—especially if population and housing demand are declining in white neighborhoods and are increasing in predominantly black ones.

Social choice theories argue that there are important racial differences in residential preference. Prior research reveals that most blacks prefer to live in fully integrated neighborhoods, while most whites prefer to live in neighborhoods in which their race is numerically dominant (Clark 1991; Farley et al. 1978). Recent work by Farley and colleagues (1994) on racial segregation in Detroit supports both Galster's (1990) and Massey and Denton's (1993) argument that whites who endorse negative stereotypes about blacks are more uncomfortable with black neighbors and are more likely to move away from mixed neighborhoods.

Both institutional and social choice theories of neighborhood succession suggest that a significant relationship exists between race discrimination, residential mortgage foreclosure, and changes in the income and racial composition of urban neighborhoods. Massey and Denton (1993) argue that under conditions of investor panic or discrimination related to recent increases in black population, mortgage default and abandonment are likely to increase and signal great decay in a neighborhood. The contention here is that racial residential transition combines with economic decline to increase foreclosure and other neighborhood outcomes. Lenders are most apprehensive about neighborhood instability, and recently integrated neighborhoods are often defined as unstable (Massey and Denton 1993). Any economic downturn, increase in vacancy rates, or increased fear of mortgage default in these transition neighborhoods restricts loan availability and loan terms, which in turn force buyers into new areas.

Data, variables, and methods

Data and variables

New Orleans is an ideal setting for the study of mortgage foreclosure and neighborhood change. While national rates of residential mortgage foreclosure increased threefold from 1975 to 1985 (Stone 1986), foreclosures in New Orleans increased fivefold in a single year, from 247 in 1987 to 1,255 in 1988. A panel data set was constructed at the block group level from the 1980 and 1990 *U.S. Census of Population and Housing, Summary Tape File 3A* (U.S. Bureau of the Census 1982, 1992). Variables constructed for the analysis, along with their means and standard deviations, are listed in table 1. Data on residential mortgage foreclosures in New Orleans were collected from Civil District Court records and were later merged with the census data. Foreclosure cases were coded from properties sold at judicial foreclosure sales be-

Table 1. **Variables, Measurement, and Descriptive Statistics**

Variable	Description	Measurement	Mean (Standard Deviation)
hsinc80	Median household income in 1980	Constant dollars, 1982–84 = 100	$18,131 ($10,284)
hsinc90	Median household income in 1990	Constant dollars	$16,022 ($11,412)
meanva80	Mean value of owner-occupied housing in 1980	Constant dollars	$51,902 ($39,330)
meanva90	Mean value of owner-occupied housing in 1990	Constant dollars	$45,514 ($35,429)
chgval	Percent change in mean value of owner-occupied housing from 1980 to 1990	Mean value of owner-occupied housing in 1990 – mean value of owner-occupied housing in 1980 / mean value of owner-occupied housing in 1980	−3.2 (.41)
propbl80	Proportion black in block group in 1980	Black population / total population in block group	.54 (.38)
propbl90	Proportion black in block group in 1990	Black population / total population in block group	.61 (.37)
bl9080	Change in proportion black in block group from 1980 to 1990	Proportion black in 1990 – proportion black in 1980	.071 (.14)
chghsld	Percent change in number of households from 1980 to 1990	Number of households in 1990 – number of households in 1980 / number of households in 1980	−0.3 (2.4)
chginc	Percent change in median household income from 1980 to 1990	Median household income in 1990 – median household income in 1980 / median household income in 1980	−10.3 (.30)
serocc80	Employed in personal services occupation in 1980	Proportion of those employed in block group employed in personal service occupations in 1980	.156 (.109)

Table 1. **Variables, Measurement, and Descriptive Statistics** *(continued)*

Variable	Description	Measurement	Mean (Standard Deviation)
agmine80	Agriculture + mining employment in 1980	Proportion of those employed in block group employed in agriculture and mining in 1980	.026 (3.3)
propfc	Proportion of units in block group foreclosed from 1985 to 1990	Total foreclosures from 1985 to 1990 / total units in block group in 1990	.018 (.01)
chgemp	Change in percentage of block group residents employed from 1980 to 1990	Proportion employed in block group at any job in 1990 – proportion employed at any job in 1980	.024 (.11)
chgvac	Change in percentage of all housing units vacant from 1980 to 1990	Percent vacant in 1990 – percent vacant in 1980	.078 (.09)
chgown	Change in percentage of all housing units owner-occupied from 1980 to 1990	Percent owner-occupied in 1990 – percent owner-occupied in 1980	3.0 (.13)
exec80	Percentage of all employed persons in block group employed as executives in 1980	Number of executives in 1980 / total number of employed persons in 1980	8.7 (8.1)
chgsercra	Change in ratio of all those employed in service and craft occupations from 1980 to 1990	Percent change in employment in all service occupations from 1980 to 1990 / percent change in employment in operative and craft occupations from 1980 to 1990	.58 (7.36)

tween 1985 and 1990.[1] These years were chosen to capture the period before a rapid drop in oil prices created an economic crisis for the city, the crisis period, and the start of the recovery. The address of each foreclosed property was geocoded, and the appropriate census block group number was matched to it using Arcview. The measure of foreclosure constructed for this article is the proportion of properties foreclosed (*propfc*) in a block group from 1985 to 1990.

Methods

In this article, neighborhoods are considered coterminous with census block groups (about an eight-square-block area), so shared demographic and spatial attributes operationally define a neighborhood. Hypotheses about the process of neighborhood change are evaluated with a combination of descriptive statistics and structural equation models. Descriptive statistics illustrate the contours of economic restructuring in New Orleans and establish the extent of neighborhood change. Structural equation models are then estimated to better understand the *process* of neighborhood change. The computational algorithms in structural equation models minimize the differences between sample covariances and covariances predicted by the model (see Bollen 1989).[2] The model-

[1] For a mortgage default case to be defined as a foreclosure, the property must be sold at judicial auction. A total of 4,321 properties were sold at judicial auctions between 1985 and 1990: 27 in 1985; 46 in 1986; 247 in 1987; 1,255 in 1988; 1,506 in 1989; and 1,240 in 1990. An additional 707 default cases were dismissed (did not go to sale) during this period. The final data set contains 4,174 residential mortgage foreclosures. The 147 missing foreclosure cases are not statistically different (Student's t test, $p < 0.01$, two-tailed) from the spatially matched cases on five important attributes (loan amount, interest rate, monthly payment, outstanding balance, and appraisal value).

[2] Consider the following formula to describe the structural equation models estimated in this article:

$\eta = \beta\eta + \Gamma\xi + \zeta$, where,
η = an $M \times 1$ vector of latent endogenous random variables,
β = the coefficient matrix of the latent endogenous variables,
Γ = the coefficient matrix of latent exogenous variables,
ξ = the $N \times 1$ matrix of exogenous latent variables, and
ζ = an $M \times 1$ vector of errors (Bollen 1989).

The presence of outliers, observations distinct or distant from the bulk of the data, seriously affect parameter estimates in structural equation models (Bollen 1989). An examination of extreme values of endogenous variables and of regression residuals prompted the removal of 38 block groups from the data input for the structural equation models. Most of the block groups removed from the analysis had very few residents in either 1980 or 1990.

The structural parameters listed in table 4 (betas) are unstandardized regression coefficients that indicate the change in the expected value of the dependent variable after a unit increase in the predictor variable, holding other predictors and errors constant (Bollen 1989).

fitting procedure is designed to provide support for the plausibility of the theoretical propositions that underlie the model. The path analysis reported in this article follows the logic of Eggers and Massey's (1992) longitudinal study of urban poverty and measures most variables (except percent black 1980, and percent foreclosures, 1985 to 1990) as a change of proportion from 1980 to 1990 (see table 1).[3] Several models are estimated, and some hypotheses are examined with hierarchical nested models where the set of parameters estimated in one structural equation model is a subset of those estimated in another. Sequential chi-square difference tests are then performed to evaluate the fit of successive models (Anderson and Gerbing 1988; Loehlin 1992).[4] All models were estimated with SAS, Proc-Calis (SAS Institute, Inc. 1993).

Economic restructuring in New Orleans

Economic restructuring in New Orleans can be explained within the city's context as a regional center of the global petroleum industry. Rapid increases in oil prices and oil production in the 1970s created boom conditions in the local economy that included rising housing prices and expanded construction of new housing to accommodate a rapid in-migration (Maruggi 1997). High oil prices continued to stimulate

[3] Calculating change of proportions tends to magnify the effects of small changes in the value of any variable or areal unit with few inhabitants. This problem was largely neutralized by removing outlier block groups from the analysis as detailed in the preceding note. The use of change scores in structural equation models also requires the assumption that predictor variables are causally prior to outcome variables at each time point (Allison 1990). For example, our model proposes that foreclosures in a block group from 1985 to 1990 occurred before changes in percent black population or vacancy rates. As is always the case with structural equation models, we relied on theory to establish causal order and then estimated models as specified. While the model fits the data very well and none of the significant paths shown in the final model remains significant with the causal arrow reversed, results should be interpreted as evidence of a significant association between changes in the variables specified and not necessarily as indicative of a strict causal relationship.

[4] The likelihood ratio chi-square test of the fit of structural equation models follows a different logic from the hypothesis tests typically associated with regression analysis. The likelihood ratio chi-square statistic helps evaluate the null hypothesis that sample moments have a structure identical to that specified by the model. A higher probability of chi-square is fit to models *closer* to the perfect fit (Bollen 1989). If the model is indeed valid, its restrictions will be true in the population, and the value of chi-square will *exceed* the critical value normally associated with statistical significance. Models are typically modified to reduce chi-square or reduce the number of parameters estimated without increasing chi-square too much.

The sequential chi-square difference test examines the difference in fit of successive nested models, that is, models where the set of freely estimated parameters in M–2 is a subset of those estimated in M–1 (Anderson and Gerbing 1988). The null hypothesis here is that there is no significant difference between the two nested models.

lending in the New Orleans housing market through the 1981–82 recession (see table 2). The rapid decline of oil prices in 1986, however, severely curtailed petroleum industry investment and plunged the local economy and the local housing market into a deep recession.

Table 2. **Shifts in New Orleans Metropolitan Statistical Area Economic and Employment Indicators, 1980 to 1995**

Sector	1980	1990	1995	Percent Change 1980 to 1990
Mining	22,800	17,700	13,800	−22
Construction	31,500	25,300	27,500	−20
Manufacturing	66,600	49,000	47,400	−22
Services	117,100	154,500	186,600	32
Total nonagricultural employment	563,200	556,200	599,700	−1.5
Residential construction contracts ($millions)	316.1	152.9	390.2	−52
Housing starts	6,861	2,100	4,029	−69
Crude oil price ($)	28.28	22.35	17.27	−21
Hotel/Motel sales ($millions)	206.0	428.2	561.0	107
Population (thousands)	1,310	1,284	1,315	−2

Source: Maruggi 1997.

Over the past two decades, the New Orleans economy has been restructured and diversified to reduce dependence on the petroleum industry with an expanded service sector (primarily tourism; see table 2). While the process unfolded differently in many other major cities, the outcome was similar—steep declines in manufacturing employment and a rapid increase in the size of the service sector. In the case of New Orleans, major oil companies reacted to lower oil prices in the mid-1980s by closing regional offices and laying off thousands of employees. Previous centers of high-wage employment in mining, manufacturing, and construction all declined significantly. Housing starts in 1990 were one-third the 1980 level. Consistent with predictions in Hypothesis 1, economic recession was associated with a 15 percent decline in the population of New Orleans, from 568,000 in 1980 to 482,290 in 1995.

Expansion of health and professional service employment has brought many high-wage jobs to the city since 1980. However, the net effect of economic restructuring was a 10 percent *decline* in real median household income (see table 1). Recessionary economic conditions were also associated with a real decrease of 3 percent in the mean value of owner-occupied housing in the city, and an increase of 7.8 percent in all types of housing units left vacant. These data clarify the extent of decline in many New Orleans neighborhoods and provide initial support for the predictions of Hypothesis 1 about the negative effects of economic restructuring on local housing markets and neighborhoods.

Structural equation modeling results

Overview

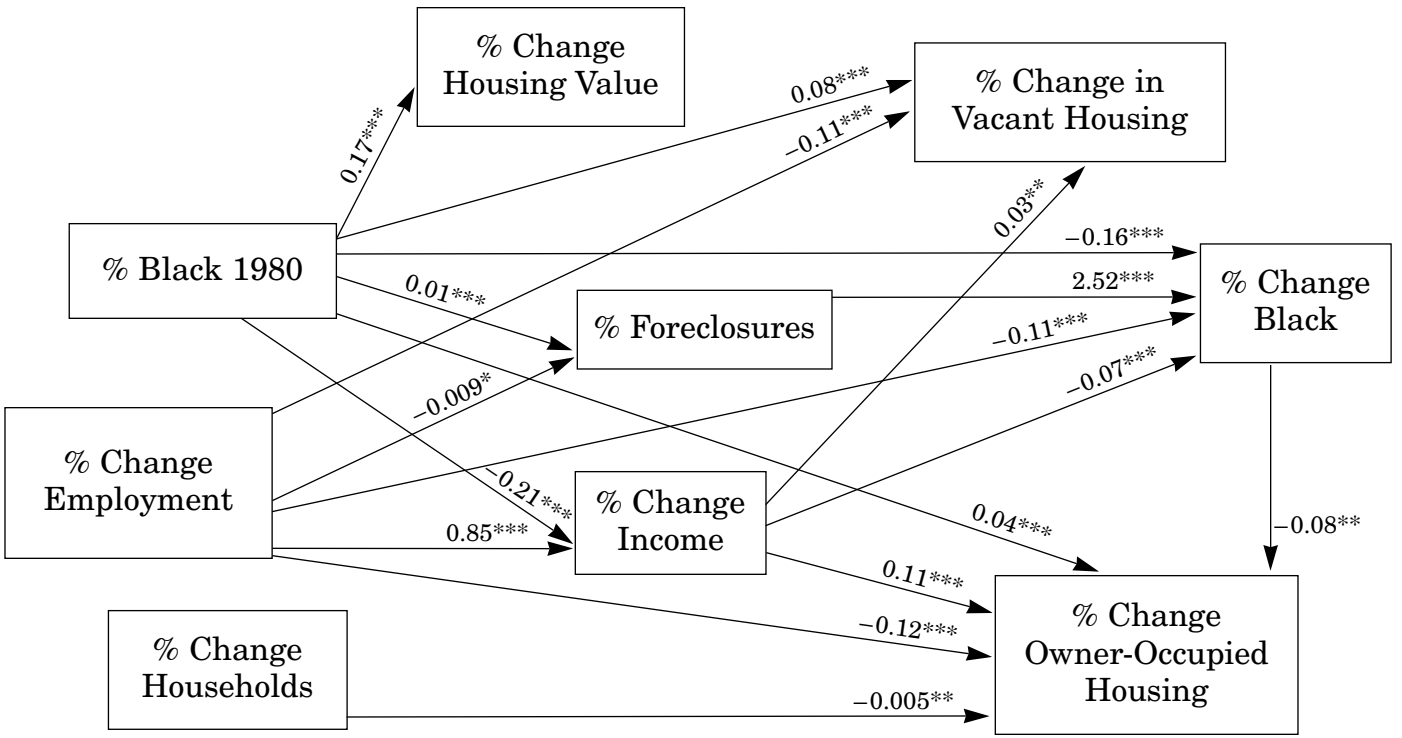
Table 3 and figure 1 summarize results of the structural equation models of neighborhood change. Likelihood ratio chi-square and goodness of fit statistics presented in table 3 reflect strong models. Goodness of fit measures of 0.90 and above on the Bentler-Bonnett Normed Fit Index (NFI) are desirable, as are values of 0.95 and above on the Adjusted Goodness of Fit Index (AGFI) and Comparative Fit Index (CFI) (Bollen 1989; Hitt et al. 1996).

Table 3. **Structural Equation Model of Neighborhood Change in New Orleans, 1980 to 1990**

Description of Path	Hypothesized Direction	Coefficient	(*t*)
% black, 1980, to % change households	–		
% change employment to % change households	–		
% black, 1980, to % change income	–	−0.215***	−6.63
% change employment to % change income	+	0.853***	8.00
% black, 1980, to % change house value	+/–	0.174***	4.02
% change income to % change house value	+		
% black, 1980, to % foreclosure	+	0.011***	7.64
% change employment to % foreclosure	–	−0.009*	−1.87
% change employment to % change black	–	−0.112**	−2.41
% change income to % foreclosure	+		
% change house value to % foreclosure	–		
% black, 1980, to change % black	+	−0.157***	−10.8
% change income to % change black	–	−0.074***	−4.46
% change house value to % change black	–		
% foreclosure to % change black	+	2.52***	6.91
% black, 1980, to change % vacant	+	0.080***	8.58
% change employment to change % vacant	–	−0.114***	−3.64
% change income to change % vacant	–	0.028**	2.47
% change house value to change % vacant	–		
% change households to change % vacant	–		
% foreclosures to change % vacant	+		
% change black to change % vacant	+		
% black, 1980, to change % owner occupancy	–	0.041***	2.89
% change employment to change % owner occupancy	–	−0.118***	−2.61
% change households to change % owner occupancy	–	−0.005**	−2.33
% change income to change % owner occupancy	+	0.106***	6.51
% foreclosure to change % owner occupancy	–		
% change house value to change % owner occupancy	+		
% change black to change % owner occupancy	–	−0.082**	−2.16

Note: See table 1 for a description of the variables.
* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$.
Model chi-square = 15.35 with 16 degrees of freedom, $p < 0.50$.
NFI: 0.984.
AGFI: 0.984.
CFI: 0.999.

Figure 1. **Empirical Neighborhood Change Structural Equation Modeling**



* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$.

An elaborated model containing all of the theoretically relevant relationships was estimated first. The results of this fully elaborated model are not shown in table 3, which presents results for only the final structural equation model. The elaborated model delivers strong fit indices (NFI = 0.988; AGFI = 0.974; CFI = 0.996) and a statistically nonsignificant chi-square statistic (chi-square = 11.03 with 7 degrees of freedom, $p < 0.14$), which suggests that the model is a plausible representation of the observed covariances in the data.

The elaborated theoretical model was modified with the removal of statistically insignificant paths (see table 3): To simplify the presentation of results, details of only the more parsimonious model presented below are discussed in the text. This model demonstrates very strong fit indices and a nonsignificant chi-square score ($p < 0.50$), which means that we *fail* to reject the null hypothesis that the model provides a valid fit to the observed covariances in the data. A sequential chi-square difference test indicates that the more parsimonious model is clearly superior to the fully elaborated one.

Discussion of the final model

Table 3 presents unstandardized regression coefficients, their respective t statistics, and the statistical significance of all paths. Consistent with predictions in Hypotheses 1 and 4, model results indicate that changes in employment and the prior black population had significant effects on changes in median block group income in New Orleans between 1980 and 1990. Income declined significantly more in block groups having a larger black population in 1980 than in block groups having a smaller black population, while block groups where a larger proportion of the 1980 population was employed in 1990 had significantly higher median incomes in 1990. Neither change in employment nor 1980 black population have significant effects on change in the number of households in a block group.

It is important to discuss the lack of a significant path between change in median block group income and change in mean house value. Consistent with earlier research on racial residential succession, this finding may be largely the consequence of a dual housing market for blacks and whites in New Orleans (Taeuber and Taeuber 1965). The mean value of owner-occupied housing may hold steady or even rise despite lower median incomes if, as predicted in Hypothesis 4a, an increased demand for housing by in-migrant black residents drives up rents and house values. Despite the negative correlation between mean house value in 1990 and percent black population in 1980 ($r = -0.44$, $p < 0.01$; see the appendix) but consistent with the prediction in Hypothesis 4a, significant increases in the mean value of owner-occupied housing from

1980 to 1990 are found in block groups with a larger percent black population in 1980.

To elaborate, residents of block groups with over 95 percent black residents in 1980 experienced a 19.3 percent median decline in real income *and* an increase of 12.25 percent in mean house values from 1980 to 1990, while median incomes increased by 6.8 percent and mean house values declined by 10.8 percent in block groups with less than 15 percent black residents in 1980. These data provide initial support for the argument that blacks and whites participate in different housing markets and, in this case, suggest that home buying by blacks in some lower-income black neighborhoods drove up house prices there. These increases in house prices in black neighborhoods were offset by lower house prices in higher-income and predominantly white neighborhoods.

The final model provides strong support for the independent effects of race on housing foreclosure and neighborhood change summarized in Hypothesis 4. These findings suggest the need to specify the predictions of Hypotheses 1 and 2 about the effects of economic change on housing foreclosure and neighborhood succession in light of regional differences in residential succession patterns and the persistence of dual housing markets. Changes in median income and mean house values do not have significant effects on foreclosure rates, while increased employment levels in a block group are associated with lower foreclosure rates. Most important, percent black population in 1980 has a significant and positive effect on foreclosure rates, which in turn significantly increase black population. So, block groups with higher foreclosure rates have significantly larger increases in black population than block groups with smaller rates, which suggests that foreclosure can accelerate the process of racial transition. It is possible that, contrary to Massey and Denton's (1993) predictions, increased racial equity in loan origination in the New Orleans housing market in the 1980s may have helped increase black homeownership and allowed some blacks to buy into both predominantly black neighborhoods and transition neighborhoods where out-migrating whites were displaced by economic recession. The effects of economic recession on black homeowners then contributed to higher foreclosure rates.

This positive effect of foreclosure rate on changes in black population is not reproduced in all-black neighborhoods. The direct effect of percent black in 1980 on change in black population is negative. This suggests that the impact of foreclosure on racial residential transition occurred most in block groups with a smaller but preexisting black population rather than in block groups that were already predominantly black in 1980. This is also reflected in the negative total effect (–0.114) of percent black population in 1980 on change in black popu-

lation.[5] These results are also consistent with findings reported in an earlier article (Lauria and Baxter 1999) that foreclosure rates accelerated racial transition in New Orleans block groups with black populations above zero and increasing in the 1980s, but that foreclosure rates did not significantly affect racial transition in block groups that were already predominantly black in 1980.

Change in median block group income had mixed effects on neighborhood outcomes in New Orleans during the 1980s. Change in income does not have a significant direct effect either on change in mean house value or on foreclosure rates. Block groups with larger changes in median income experienced significantly smaller changes in black population than block groups with smaller changes in median household income because incomes dropped most in block groups that were already predominantly black in 1980, so the percent black population could not change much despite steep declines in real income.

The direct effect of percent black population in 1980 on change in vacancy rates is positive. Block groups with larger black populations in 1980 had significantly larger increases in housing vacancy rates from 1980 to 1990. The positive total effect of percent black population in 1980 on change in vacancy rates (0.074) that operates through change in income reflects the strong influence of the prior black population on vacancy rates.[6] These results support the predictions of Hypothesis 4 and reinforce Massey and Denton's (1993) argument that higher vacancy and foreclosure rates send signals of decline that resonate through the social and economic institutions of poor black neighborhoods.

The model provides an interesting portrait of changes in owner-occupied housing in New Orleans and still more evidence of the existence of a dual housing market for black and white residents. Economic recession and declining real incomes did not prevent a net increase in the overall rate of owner occupancy in New Orleans during the 1980s. However,

[5] The total effect of one variable on another in a structural equation model is the sum of the direct effect and all indirect effects. Direct effects are the unstandardized regression coefficients that describe each path in the model. An indirect effect is the product of a compound path that links two variables (Duncan 1975; Loehlin 1992).

[6] We reestimated the final model after dividing the sample of block groups into those with less than the mean proportion of black residents in 1980 (< 0.54, $N = 290$) and those with more than the mean proportion of black residents in 1980 (> 0.54, $N = 320$). Neither percent black in 1980 nor change in income significantly affects change in vacancy rates in block groups that were predominantly black in 1980. Vacancy rates did increase significantly more in block groups below the mean proportion of black residents in 1980 ($t = 3.11$, $p < 0.01$), and in block groups with larger percentage increases in income from 1980 to 1990 ($t = 1.78$, $p < 0.10$). This is consistent with the argument that vacancies increased in transition block groups that had significant but not overwhelmingly black populations in 1980 and in affluent white block groups where some residents left the city.

owner occupancy declined significantly where population and employment declined most and where black population increased most. Owner occupancy increased significantly in block groups where income increased and in block groups with a larger percent black population in 1980. So, as one would expect, where employment and income increased, resident homeownership increased; but where employment and income decreased, which occurred most in block groups with significant increases in black population, resident homeownership declined. It appears that homeownership increased in both affluent white and predominantly black neighborhoods, providing evidence that remnants of a dual housing market persist in New Orleans.

The apparently spurious increase in resident homeownership in block groups with larger black populations in 1980 is reinforced by the small positive total effect (0.016) of black population in 1980 on change in resident homeownership. The total effect includes the indirect effects on owner occupancy of changes in income and foreclosure rates on change in the black population. High rates of residential mortgage foreclosure and rapid increases in black population drove down resident homeownership, but the process was not as severe in block groups that were already predominantly black in 1980. These block groups still have a lower proportion of resident homeowners than predominantly white block groups, but *declines* in resident homeownership in the 1980s occurred in block groups where decline in employment and higher foreclosure rates accompanied racial transition. Overall, foreclosure was not directly implicated in changes in either the vacancy rate or the proportion of owner-occupied units in a block group. It had indirect effects, operating through its strong effect on change in black population.

Intraurban migration and neighborhood change

Without individual-level data, it is impossible to discover the true extent to which changes in block group income, house values, and foreclosure rates represent changes in the fortunes of people who already live in a neighborhood or the extent to which these changes occur because people with higher or lower incomes move into or out of the neighborhood from other parts of the city.[7] As suggested earlier, prior research suggests that the presence of a large minority population is associated with the out-migration of whites from a neighborhood. Although affluent blacks tend to lead the invasion of formerly all-white neighborhoods, blacks who move out of poor neighborhoods are more likely than whites to move into another poor neighborhood. Blacks are also more likely than whites to move from a nonpoor to a poor neighborhood (South and Crowder 1997).

[7] We thank George Galster for this important insight.

To examine the effects of intraurban migration on neighborhood outcomes, the sample of block groups was divided into those where less than 20 percent of the residents had moved to their current address from another address in the city between 1985 and 1990 (N = 122), and those where more than 40 percent of the residents had moved to their current address from another address in the city since 1985 (N = 132). Difference of means tests of neighborhood change measures in the two categories of block groups are instructive (see table 4).

Table 4. **Difference of Means of New Orleans Block Groups, 1980 to 1990**

Variable	Less than 20% Intraurban Migration	Greater than 40% Intraurban Migration	Probability of Equal Means
% black, 1980	0.412	0.678	< 0.01
% change black, 1980 to 1990	0.016	0.117	< 0.01
Median household income, 1980	24,609	13,670	< 0.01
% change income, 1980 to 1990	−0.029	−0.166	< 0.01
Mean house value, 1980	67,719	36,823	< 0.01
% change house value, 1980 to 1990	−0.048	0.024	< 0.20
% foreclosures, 1985 to 1990	0.013	0.023	< 0.01
% change vacancy rate, 1980 to 1990	0.040	0.106	< 0.01
% change owner occupancy, 1980 to 1990	0.048	0.005	< 0.01
Change in number of households, 1980 to 1990	−21.12	−34.54	< 0.26
Number of block groups	122	132	

Note: See table 1 for a description of the variables.

Significantly more foreclosures occurred in the high-migration block groups, which also had significantly larger black populations and larger increases in that population, larger declines in median income, and much larger increases in housing vacancy rates than the low-migration block groups. Consistent with earlier research, it appears that large numbers of lower-income black residents migrated into already poor neighborhoods with high foreclosure and vacancy rates. While inconclusive, these results suggest that intraurban migration had a significant effect on changes in the economic and housing characteristics of New Orleans neighborhoods in the 1980s. What is also clear is that changes in these neighborhoods were affected by the combination of white residents who left the city, the large number of blacks who moved to new residences within the city, and those residents of either race who stayed in the same house and experienced changes in economic and social fortune.

Discussion and conclusion

This article investigated the impact of economic change and the racial distribution of population on housing foreclosure and other neighborhood outcomes in New Orleans. Economic restructuring there was framed theoretically by an account of shifts in the institutional supports of capital expansion and a dual-labor-market theory of change in the availability and sectoral distribution of employment. Economic explanations were combined with accounts of how racial differences in the housing market and racial preferences in residential location affect the overall process of urban differentiation. It was hypothesized that the combined effects of economic and racial variables are evident in the ways that housing foreclosure affects the process of neighborhood change.

Structural equation modeling demonstrates that reductions in the proportion of employed residents in a neighborhood combine with racial variables to best account for the observed process of neighborhood succession. Extensive lending in the New Orleans housing market during an economic boom caused by high oil prices created a situation where large numbers of residential mortgage foreclosures accelerated an ongoing process of racial transition when petroleum companies later downsized in response to falling oil prices. Foreclosure and housing vacancy rates rose as higher unemployment contributed to housing abandonment and racial transition.

Resident homeownership increased during the economic recession in both affluent white areas and in neighborhoods that were predominantly black in 1980. In light of these results, simple economic stage and filtering models must be specified to reflect the impact of dual housing markets for blacks and whites as race complicates market rationality in lower-income neighborhoods where blacks buy despite difficult economic times. Homeownership did decline significantly where employment decline and higher foreclosure rates accompanied racial transition in block groups with a preexisting but not a predominantly black population in 1980.

Housing foreclosure is most clearly implicated in the process of racial residential succession. Foreclosure rates were high in predominantly black neighborhoods and in neighborhoods where racial transition was most rapid. These are not the same neighborhoods because so many block groups in New Orleans were already over 95 percent black by 1980 (N = 146 or 23 percent of all block groups). What happened was that more affluent and less affluent black people moved into these already black neighborhoods, some as resident homeowners and some as renters. Residential mortgage foreclosure is most strongly and directly implicated in the racial transition of block groups with smaller but growing black populations. This finding suggests that the option theory of foreclosure and public policy on foreclosure should account

for the effects of racial prejudice on the decision to let property go to foreclosure in a declining housing market.

These results are also consistent with both a racial tipping argument that some whites in transition neighborhoods abandon their homes to foreclosure before they leave the city and the argument that job loss increases the risk of moving from a poor neighborhood to a poorer one (South and Crowder 1997). However, these results still provide slightly less support for economic succession theories of neighborhood change and Wilson's (1996) contention that joblessness is the definitive stimulant of neighborhood decline than for Massey and Denton's (1993) argument that racial variables are the primary cause of neighborhood change. New Orleans may serve as a critical case study of how neighborhood succession unfolds by a different logic in some places than it does in others and that housing policy should perhaps be decentralized to reflect that variability.

It is important to conclude that even though the findings reported in this article may represent a critical case study of a single southern city, they must be evaluated further in a comparative analysis of neighborhood change in several cities. In addition, the application of structural equation modeling techniques to the problem of neighborhood change is quite new, so these initial results must be evaluated with caution. However, the structural equation models estimated in this article do help elaborate and specify the process of neighborhood change proposed by a variety of other scholars. Future attempts to model the neighborhood succession process appear promising.

Appendix

Table A.1. **Correlation of Variables in the Analysis**

Variable*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. propbl80																
2. chgemp	–0.096															
3. chginc	–0.258	0.319														
4. chgval	0.150	–0.015	0.010													
5. propfc	0.328	–0.010	–0.128	0.048												
6. chghsld	–0.079	0.077	0.040	0.002	–0.048											
7. bl9080	–0.252	–0.133	–0.133	–0.095	0.185	–0.035										
8. chgvac	0.347	–0.144	–0.006	0.059	0.158	–0.088	–0.125									
9. exec80	–0.512	0.063	0.091	–0.124	–0.237	0.044	0.035	–0.254								
10. chgown	0.088	0.016	0.182	0.048	0.001	–0.210	–0.156	0.107	–0.033							
11. agmine80	–0.262	0.029	0.013	–0.065	–0.055	–0.018	0.107	–0.107	0.251	0.069						
12. serocc80	0.640	–0.050	–0.114	0.110	0.141	–0.106	–0.177	0.306	–0.454	0.092	–0.159					
13. meanva80	–0.507	0.174	0.240	–0.285	–0.191	0.030	–0.005	–0.232	0.518	–0.018	0.255	–0.423				
14. meanva90	–0.439	0.166	0.303	0.077	–0.185	–0.038	–0.050	–0.209	0.465	0.017	0.233	–0.370	0.846			
15. chgsercra	0.024	0.020	0.023	0.018	0.106	0.005	–0.033	0.073	0.006	0.036	0.069	–0.088	–0.004	–0.008		
16. hsinc90	–0.539	0.189	0.461	–0.090	–0.148	0.004	0.027	–0.264	0.501	0.015	0.282	–0.454	0.765	0.786	0.009	
17. hsinc80	–0.602	0.055	–0.002	–0.155	–0.150	0.123	0.151	–0.371	0.620	–0.147	0.316	–0.580	0.702	0.662	–0.049	0.826

* See table 1 for a description of the variables.

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