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Neighbors' income distribution: economic segregation and mixing in US urban neighborhoods☆

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Abstract

The paper describes within-neighborhood economic segregation in US metropolitan areas in 1985 and 1993. It uses the neighborhood clusters of the American housing survey, standardized by metropolitan area income and household size, to explore income distribution within neighborhoods at a scale much smaller than the census tract (a representative sample of households or 'kernels' and their 10 closest neighbors). Joint and conditional distributions portray neighbors' characteristics conditional on the kernel's housing tenure, race, and income. The paper documents both significant income mixing in the majority of US urban micro neighborhoods and the extent of income mixing within neighborhoods of concentrated poverty.

JEL classifications: D31; C14; R21; R38
Keywords: Income distribution; Neighborhood effects; Neighborhood income distribution; Economic segregation; Income sorting and mixing; Mixed income housing; Housing policy

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1. Introduction

The distribution of income in residential neighborhoods matters. Since Alfred Marshall, economists have known of the role of nonmarket interactions and externalities in cities, and we know that for firms urban diversity increases the value of those interactions (Quigley, 1998). The same is true for households: a rapidly growing literature in economics documents the importance for households of nonmarket social interactions and externalities in cities (Glaeser, 2000). Income homogeneity or diversity is one of many dimensions of neighborhood social interactions yet unlike racial segregation, economic segregation as a feature of US neighborhoods attracted little attention from economists until recently. Nonmarket social interactions occur whenever one household's characteristics affect its neighbors' behaviors or socioeconomic outcomes. For example, if neighbors provide role models (positive or negative) or labor market connections then the productivity of investment in children's education may be affected by a neighborhood's income distribution, (Durlauf, 2003).

The value of neighborhood interactions has attracted policymakers' attention and led to policy initiatives intended to take advantage of positive externalities associated with mixing households of different income levels in neighborhoods.[1] Yet we know surprisingly little about the degree of economic mixing or segregation within US neighborhoods, certainly much less than we know about racial segregation.

Using a representative sample of US urban households and their immediate neighbors, the American housing survey's neighborhood clusters data, this paper provides a portrait of the distribution of income and other socioeconomic characteristics among the immediate neighbors of a random sample of US households in 1985 and 1993. There is no unique definition of a neighborhood and economic segregation in neighborhoods can be viewed at many scales (Ellen, 1999, pp. 13–14; White, 1987). What we know about income distribution within US urban neighborhoods has been limited by the data available. The most disaggregated data that US studies have used are decennial census data for census tracts (with an average population of 4000): mean and median family and household income, per capita income and poverty rates. In household-level micro data sets spatial detail is concealed to preserve respondents' privacy. The smallest geographical identification is metropolitan area for the American housing survey and PUMA's (with a population of 40,000 or more) for the Census Public Use Microdata. Because spatial detail was not available in these household level data sets, it was impossible to use them to analyze income distribution for smaller areas. Yet many neighborhood interactions take place at the scale of neighbors on the same block or in the same apartment building, rather than in the neighborhoods of several thousand people represented by census tracts.[2]

This paper presents the results of an empirical study of income mixing in neighborhoods of US cities using the neighborhood clusters data, a relatively neglected

[1] See Cityscape (1997) for discussion of several such policy experiments.

[2] Mayer (2001), using census and PUMS data, estimates the variance of income within census tracts for each state. Bradbury (1996) studies regional trends, Mayer (1996) considers intra-metropolitan differences in income inequality and Madden (1996, 2000) emphasizes metropolitan areas.

feature of the American housing survey. We briefly discuss theoretical and policy issues immediately below. Section 2 provides a detailed description of the neighborhood clusters data of the American housing survey (AHS) and of the measures of income used here, notably the HUD-adjusted median family income (HAMFI). Section 3 discusses alternative measures of income mixing and summarizes our findings on the income distribution of US neighborhoods. We find that a substantial degree of income mixing characterizes the great majority of urban neighborhoods where mix of incomes is the outcome of market forces. In particular, in 1993 over two thirds of the micro neighborhoods included at least one household (out of 10) with an income of 30% of HAMFI (the poorest one sixth of the sample); over half of all neighborhoods included at least one household with an income of 150% of HAMFI (the richest one fifth of the sample[3]). Section 4 reviews our conclusions and briefly discusses policy implications.

1.1. Determinants of neighborhood economic segregation or heterogeneity

For the vast majority of US households, neighbors' incomes and other characteristics are the market-driven outcome of individual choices.[4] Households' tastes for housing space, quality and access to jobs and amenities, together with their incomes and assets, define demand for housing types and locations. Prices set in the housing market determine what housing units and neighborhoods households can afford.

Two models central to urban economics predict that incomes in market-driven urban neighborhoods will be quite homogeneous. Tiebout (1956) implies that households sort themselves into communities with similar tastes and incomes. The monocentric city model predicts that households who differ only in terms of income will occupy successive (concentric) zones in a monocentric city; their location in space will depend on the income elasticity of demand for housing and the cost of commuting (Mills, 1967; Muth, 1969). On the supply side of the housing market, spatial differences in the price of land contribute to the formation of new neighborhoods of homogeneous units. These models together suggest that market forces are a powerful source of spatial bias toward intra-neighborhood homogeneity (Vandell, 1995).

Introducing more realistic features to the housing market, however, blurs this picture. Wheaton (1977) cast doubt on the monocentric city model's predictions of income segregation when he found empirically that income elasticities of housing demand and commuting cost were very similar, and therefore bid price functions were almost identical across income groups. A second important source of income mixing in neighborhoods is transaction costs. Changing housing consumption usually requires moving. Because the cost of moving is high (including both out of pocket costs and loss of location-specific social and human capital), most households move infrequently. We expect that some households will be consuming more or less housing than they would choose if they moved. Moreover, among movers consider-

[3] Tables 4 and 5.

[4] Neighborhoods of concentrated public housing where eligibility depends on income are an exception.

ation of the cost of future moves may lead households to incorporate expectations in choosing a housing unit, so that they too may consume more or less housing than they need immediately. Owner-occupiers may choose to change housing consumption in place, reducing housing consumption by subdividing and renting out part of a dwelling, or increasing it by investing in additions and improvements. Renters can reduce housing consumption in place by sharing or increase it by expenditures on improvements in rented dwellings.

Housing choices and the resulting income distribution in neighborhoods also reflect market failures, as households interact with and face constraints set (and discrimination) by other agents in the market such as lenders, landlords, and real estate agents. Policies, some designed to remedy market imperfections, in turn interact with individual choices in the housing market to determine the distribution of household incomes in neighborhoods. Policies that increase moving costs reduce mobility and hence increase the likely dispersion of neighborhood incomes.[5] Both tenure discounts given by landlords and rent controls increase diversity in incomes within rental buildings. If households care about their neighbors' characteristics including heterogeneity (Schelling, 1978), then households' location decisions further interact to generate the distribution of incomes within and across neighborhoods. Schelling's model implies that neighborhood heterogeneity can be expected to persist, provided it stays below some threshold value. On the supply side, a deteriorating housing stock that is gradually (but not uniformly) replaced or rehabilitated (often at higher densities) over time will add further complexity.

2. The data

This paper uses the American housing survey's neighborhood clusters data to look at income distribution in 'micro neighborhoods.'[6] In 1985, 1989, and 1993, 1% of the dwelling units in the AHS national core urban sample were designated as kernels for neighborhood clusters. The nearest neighbors of each kernel were interviewed (approximately 10 in 1985; more in 1989 and 1993). In our data, a *cluster* therefore consists of a randomly chosen member of the national AHS sample of urban dwelling units, the *kernel*, together with the dwellings closest to it, its *neighbors* (Hadden and Leger, 1990, pp. 1–51). Regarding the location of the clusters, the public dataset identifies only the metropolitan area (or state for nonmetropolitan urban clusters) and type of place (metropolitan central city, metropolitan suburban or nonmetropolitan urban, etc.) of each cluster. Ioannides (2002) establishes the representativeness of the sample and provides additional details on the data.

The clusters data allow us to study spatial income distribution at a much finer grain than is possible with other data sets. The *kernel*s are a representative sample of the entire population of urban dwellings. The *clusters*, however, are not a random

[5] For example, in California Proposition 13 limits the tax on a property to 1% of its purchase price, until the property is resold. Movers face property taxes based on current market values when they buy.

[6] US Bureau of the Census (1996).

sample of neighborhoods as we usually think of them. The clusters are neighborhoods defined with a very small grain, at the scale of the building or a block or short street. An important feature of the micro neighborhoods defined by our data set is that the households potentially interact with each other frequently, on stairs, in elevators, on the sidewalk, at the mailbox, bus stop, or in the street or playground.

Because the cost of living (and particularly of housing) varies from place to place, we normalize incomes by the median family income for the urban area where the cluster is located. We use the HUD adjusted area median family income (HAMFI) for this purpose.[7] This measure is calculated annually by HUD, and based on the median family income for the metropolitan area. Because median income reflects earnings in the local job market, it serves as a proxy, albeit imperfect, for the relative cost of living including housing prices in different metropolitan areas. While HAMFI is established using median *family* income, ours is a sample of *households* and not families. Median household income is significantly lower than median family income. Because HAMFI is based on *family* income, it does not correspond to the true median for our sample of *households*. In 1993, for example, US median *household* income was $31,241, which corresponds to 75.5% of $41,365, the average value of HAMFI in our sample for that year (US Bureau of the Census, 1985, 1993). In the same year, 52% of households in our entire sample have income above 80% of HAMFI, and only 40% have incomes greater than HAMFI. Income in the data includes all sources of earned and unearned income; it does not include the imputed rental value of owner-occupied housing.

We also used the household size weights defined by HUD for use in deriving HAMFI to calculate normalized income for each household. In deciding to use the normalized data, we are assuming that it is neighbors' standard of living or (roughly) per capita disposable income that matters. In our data, therefore, a single elderly individual and a family of six with the same disposable income and in the same metropolitan area will be in different categories of income relative to HAMFI.

Table 1 summarizes our data: the value of HUD adjusted area median family income (HAMFI), sample size and income distribution disaggregated into eight categories relative to HAMFI. We use these income categories throughout our analysis. The lower panel of Table 1 shows that each HAMFI category corresponds to between 9 and 16% of all households (i.e., in most cases more than a decile of the income distribution)[8]

[7] The definition and use of the HUD-adjusted area median family income (HAMFI) is described in US Department of Housing and Urban Development (1996). HAMFI data are available from HUD (US Department of Housing and Urban Development, 2004). The US Bureau of the Census defines a *household* as a person or a group of people who occupy a housing unit. The *householder* is a person in whose name the housing unit is owned, being bought, or rented. A *family household*, or just a *family*, consists of a householder and one or more people living together in the same household who are related to the householder by birth, marriage or adoption—it may also include people unrelated to the household (US Bureau of the Census, 2001).

[8] Table 4 shows the income distribution of kernels (a representative sample of the US population) relative to the HAMFI categories. It is close though not identical to the distribution for kernels and neighbors in Table 1.

Table 1
HUD-adjusted median family income (HAMFI), by type of place sample: kernels and neighbors, American housing survey

Year:	1985				1993			
Region:	All	Central city	Suburban	Urban nonmetro	All	Central city	Suburban	Urban nonmetro
Number of observations	6215	2946	2606	663	9207	4126	4105	976
Total (%)	100	47	42	11	100	45	45	11
HAMFI $ Mean (HUD-adjusted median family income)	30,845	29,879	32,299	24,197	41,365	40,958	42,798	32,862
Frequency distributions of household incomes by type of place								
Household income relative to HAMFI								
0.0–0.3	16	21	10	16	17	22	12	14
0.3–0.5	12	14	10	13	13	15	12	14
0.5–0.8	16	17	16	17	18	18	17	19
0.8–1.0	13	11	15	9	12	12	14	9
1.0–1.2	9	8	11	9	9	8	9	10
1.2–1.5	11	10	12	9	10	9	11	11
1.5–2.0	11	9	13	11	10	8	12	9
>2.0	12	10	13	15	11	9	12	14
Total	100	100	100	100	100	100	100	100

in 1985. The data are disaggregated according to three types of place: central city, suburban, and urban nonmetropolitan.

3. Evidence and measures of income mixing in US

Instead of computing indices of segregation or dissimilarity (Jargowsky, 1997; Massey and Denton, 1988), we use the clusters data to describe the distribution of incomes in the micro neighborhoods surrounding the kernels directly in terms of distributions and conditional statistics. When income is measured as a proportion of HAMFI, the majority of US micro neighborhoods show a considerable (and perhaps surprising) degree of mixing.

We work first with means and coefficients of variation (standard deviation divided by the mean) of incomes in neighborhood. They allow us to compare the dispersion of income within the immediate neighborhoods of kernels with different incomes. A simple example helps interpret these statistics. Consider a population with two types of households: rich and poor. Households can be allocated to neighborhoods of equal size in many ways that range between two extremes. One is "complete sorting," where rich and poor are completely segregated. The rich live in rich neighborhoods, and the poor in poor neighborhoods. The mean income in rich neighborhoods is the income of the rich and the mean income in poor neighborhoods is the income of the poor. With complete sorting, the coefficient of variation of income (CV) within the neighborhood is zero in all neighborhoods. The second is "complete mixing," where each neighborhood has the same proportion of rich and poor as the population. The CV of income in each neighborhood is nonzero and equal to the CV of income in the population. When neighborhoods are characterized by complete mixing, there is no heterogeneity across neighborhoods: all are identical.

How much variation is there in US neighborhood incomes? Our results suggest that most of the heterogeneity of income previously observed at the census tract level is preserved at the smallest scale of neighborhood. Table 2 shows descriptive statistics

Table 2
Income distribution and dispersion

	1985	1993
Distribution of kernel households' incomes ($)		
Mean	29,755	36,712
Standard deviation	25,937	31,320
Coefficient of variation	0.87	0.85
Distribution of the coefficient of variation of neighborhood median income ($)		
Mean	0.60	0.63
Minimum	0.07	0.08
Q1	0.46	0.49
Q2 (Median)	0.58	0.60
Q3	0.71	0.74
Maximum	0.19	0.18

Table 3
Characteristics of neighbors conditional on kernel household housing tenure and race, 1993

1993	Characteristics of all kernels	Neighbor characteristics conditional on kernel			
		Renter kernels	Owner kernels	White kernels	Nonwhite kernels
Mean income $	36,712	29,090	43,903	39,802	30,809
CV of income	0.85	0.92	0.77	0.81	0.96
Mean age	49.3	46.1	51.8	50.0	47.4
CV of age	0.36	0.40	0.33	0.35	0.36
Mean years of education	13.0	12.6	13.3	13.1	12.4
CV of education	0.26	0.27	0.23	0.24	0.27
Mean number of children	0.70	0.68	0.65	0.63	0.85
CV of children	1.56	1.70	1.62	1.67	1.52
White	0.82	0.75	0.87	0.93	0.32
Owner	0.60	0.26	0.83	0.64	0.46
Income below 0.5 of HAMFI	0.30	0.43	0.21	0.26	0.44
Income above 1.0 of HAMFI	0.40	0.28	0.49	0.44	0.29
Number of observations	812	3201	5084	6516	1380

for income for all kernels (a random sample of the population of households) and for all neighborhoods. The median CV for neighborhoods were, respectively, for 1985 and 1993, 0.58 and 0.60, and the mean CV 0.61 and 0.63. While this is not complete mixing (the coefficient of variation of income in the population was 0.87 and 0.85, respectively, for the two years), it is far from complete segregation in all but a few neighborhoods. The upper and lower bounds describe a few very homogeneous neighborhoods (the lower bound looks close to complete segregation), considerable dispersion in the majority of neighborhoods (the interquartile range is 0.49–0.74 in 1993), and a few very heterogeneous neighborhoods (the maximum CV is 1.80).

The characteristics of neighborhoods differ depending on the kernel's own characteristics. How does housing tenure affect the mean income of a kernel's neighborhood? Table 3 shows statistics on income and other socioeconomic characteristics of neighbors conditional on housing tenure and race. Renter kernels live, not surprisingly, in neighborhoods with lower mean income than owner kernels ($29,090 compared to $43,903) but where incomes are more diverse (the CV of income is 0.92 for renters and 0.77 for owners). The coefficients of variation for other socioeconomic characteristics show renters' neighborhoods characterized by more diversity than owners' with respect to age, education, and numbers of children. Other rows in Table 3 show the proportion of neighbors with discrete socioeconomic characteristics: renter kernels have fewer owner neighbors, as well as more neighbors with income below 0.5 HAMFI and fewer neighbors with income above HAMFI. Neighbors of owner kernels are older, have more education and fewer children.[9]

[9] In an earlier paper (Hardman and Ioannides, 1999), we refer to such statistics as *Schelling statistics:* the type of statistics needed to express preferences over neighbors' characteristics in the style of Schelling (1978). Ioannides (2004) restricts attention to parametric tools in examining the interdependence of neighbors' incomes.

The second tool we use is measures of the joint distribution and conditional distributions of kernel incomes and of neighborhood (cluster) incomes. To describe neighborhood incomes, we use quantiles of the income distribution of the cluster. Table 4 reports the frequency distribution of kernel household income and of neighborhood median income by income category in 1985 and 1993. Differences between those two years are small, and the remainder of the discussion here is restricted to 1985. Not surprisingly, the distribution of neighborhood median incomes is more concentrated than that of kernel household incomes.

Table 5 provides additional detail for the 1993 income distribution of all neighborhoods. Extremes of the income distribution are quite widely represented: the majority of neighborhoods include at least one household that falls in the lowest category of the income distribution. The first data column of Table 5, the distribution of neighborhood *minimum* income by income category, shows that 68.5% of all neighborhoods have at least one household with income in the lowest HAMFI category (the poorest 17% of households). From the last column of Table 5 (the distribution of neighborhood *maximum* income), we see that 56.6% of neighborhoods have at

Table 4
Frequency distributions of household incomes and median incomes of neighborhoods

Income as % of HAMFI	1985		1993	
	Household income: % of households	Neighborhood median income: % of clusters	Household income: % of households	Neighborhood median income % of clusters
0–30	16	13	17	13
30–50	13	12	13	16
50–80	16	27	18	27
80–100	13	18	12	16
100–120	9	10	9	12
120–150	10	11	10	9
150–200	11	5	10	5
200–	12	4	11	2
Total	100	100	100	100

Table 5
Frequency distributions of neighborhood income statistics, 1993: all neighborhoods

	Neighborhood min. income	Neighborhood Q1 income	Neighborhood median income	Neighborhood Q3 income	Neighborhood max. income
0.00–0.30 of HAMFI	68.5	31.5	12.8	5.2	2.4
0.30–0.50 of HAMFI	19.5	27.4	16.2	6.7	2.1
0.50–0.80 of HAMFI	8.2	24.0	26.6	18.0	8.3
0.80–1.00 of HAMFI	1.7	8.5	15.9	12.1	6.1
1.00–1.20 of HAMFI	1.1	4.4	12.4	14.9	9.6
1.20–1.50 of HAMFI	0.9	2.6	8.8	18.9	14.9
1.50–2.00 of HAMFI	0.0	1.4	4.7	15.1	24.1
>2.00 of HAMFI	0.0	0.4	2.5	9.1	32.5
Total	100	100	100	100	100

least one household with income in one of the two top HAMFI categories (the richest 20% of households).

At the same time, the lowest income families are concentrated. The fourth column (the income bound of the third quartile) identifies neighborhoods of concentrated poverty: it shows that in 5.2% of all neighborhoods, at least three fourths of all neighbors had incomes in the lowest HAMFI category. Moreover, in 4.5% of neighborhoods there were *no* neighbors with incomes higher than 50% of HAMFI (summing the first two rows of the last column, showing the distribution of neighborhood maximum income).

Fig. 1 illustrates the income distribution of all neighborhoods by graphing the data in Table 5. The three curves show the cumulative distribution of kernels ranked by Q1 (the lower bound of the interquartile range), by neighborhood median, and by Q3 (the upper bound of the interquartile range). The horizontal axis of the graph shows the income category for each neighborhood income measure. The vertical axis shows the cumulative distribution of kernels in neighborhoods in which the Q1 (median, Q3) falls in successive categories. For example, about 25% of all kernel households live in neighborhoods in which neighbors' *median* income falls in or below the range 0.3–0.5 HAMFI.

The income distribution in all neighborhoods cannot reflect accurately the income distribution experienced by kernel households in different income categories. Fig. 2 therefore shows the *conditional* neighborhood median income for *kernels* in each of the eight income categories. Each curve traces the cumulative distribution of median neighborhood income for kernel households in a given income category. With complete mixing kernels at every income level would live in neighborhoods with the same median income, one that would match that of the entire population. The curve for every kernel income would then jump from zero to 100% at the population's median

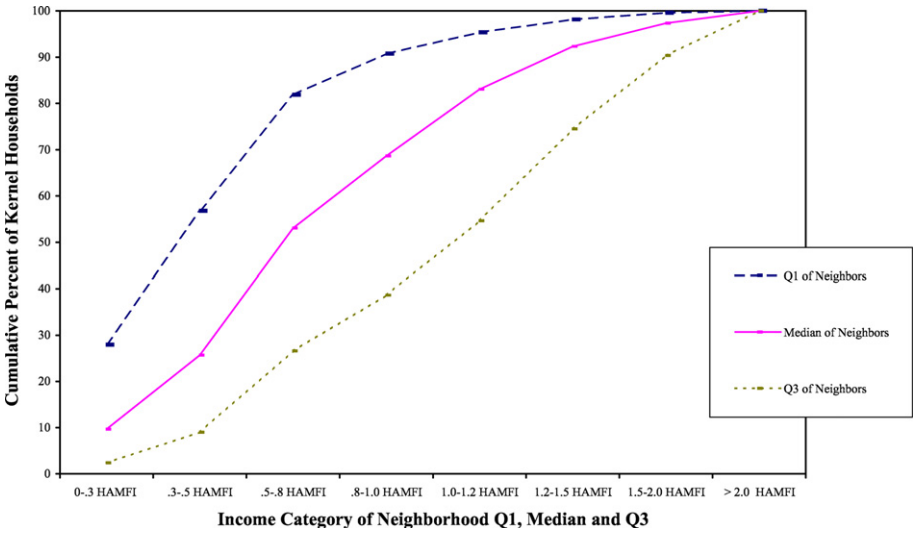

Fig. 1. Median and interquartile range of income distribution for neighbors of all kernels 1993.

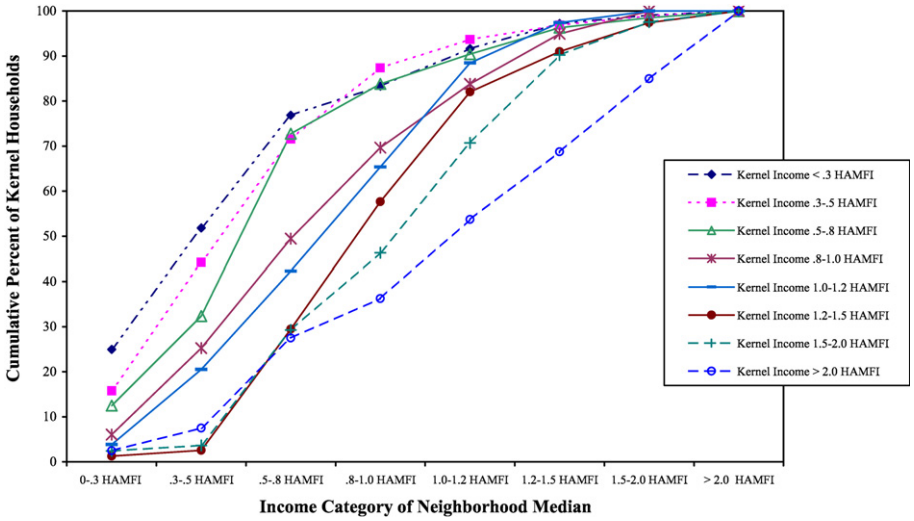

Fig. 2. Cumulative median of income distribution for neighbors by kernel income category 1993.

income. With complete sorting, on the other hand, the median income of neighbors would be identical to the kernel's income, concentrated in each type of neighborhood. The cumulative distribution for each (segregated) income group would jump from 0 to 100% at the corresponding income category. In fact, we see neither extreme. Neighbors' median incomes are dispersed for each kernel income level, but the distribution of median neighbors' income rises as the income of kernels rises. To see this clearly, consider the kernels with incomes of 1.0–1.2 of HAMFI, (shown by the curve marked by bars). Among those kernels, 42% live in neighborhoods with median neighborhood income at or below 0.5–0.8 of HAMFI.

In Fig. 2, the curves for kernels in the three lowest income categories (together representing the poorest 30% of the household income distribution) are very similar. The curve representing kernels in the highest income group (top 10% of the household income distribution) has a strikingly different distribution of neighborhood median income. This graph portrays a group of homogeneous middle/high-income neighborhoods. We see in Table 5 that even in these relatively homogeneous high-income neighborhoods there is some diversity in terms of HAMFI: 8.8% of all neighborhoods had Q1 of neighborhood income of 100% of HAMFI or more, meaning that fewer than one quarter of neighbors had incomes below the top 40% of the income distribution of households. Only 0.4% of neighborhoods had Q1 of neighborhood income in the top income category (in the top 11% of the income distribution of households) and no neighborhoods were observed with minimum income in the top two income categories (20% of the income distribution of households).

The heterogeneity in high-income neighborhoods partly reflects the definition of income used which does not include the imputed rental value of owner-occupied housing. Some low-income households in higher income neighborhoods have high-permanent incomes, but low-current incomes either because of short term fluctua-

tions in income (unemployment for example) or because they are living on significant nonhuman wealth.

Another way to use the conditional distribution is to consider who lives in *neighborhoods* with different median income levels. For Fig. 3, we classify neighborhoods by the median income of the cluster. Each curve traces the cumulative distribution of kernel income (shown on the horizontal axis) in the neighborhoods in one median income category. It shows the cumulative probability that a neighborhood with a given median income will have a kernel with a median income in or below each successive income category. With complete mixing, the median income in all neighborhoods would be identical and the curve would trace the distribution of income in the population. With complete segregation, each curve would rise vertically at the corresponding income category. In Fig. 3, neighborhood median incomes are associated with distinct patterns of neighborhood income distribution.

Neighborhoods in the two lowest median income categories look quite similar, and contrast with the neighborhoods in the two highest income categories which have a quite distinct pattern. However, it is important to remember that the curves do not represent equal numbers of neighborhoods. Neighborhoods in the two lowest income categories together represent 29% of all neighborhoods (see column 3 of Table 5). In the very poorest neighborhoods, those with median income of 0.3 HAMFI or less, 37% of kernels have income of 0.3 HAMFI or less, and 20.5% of kernels have income of 0.3–0.5 HAMFI; 7% of kernels in these neighborhoods have income of 1.2 HAMFI or more. The income distribution in neighborhoods with median income of 0.3–0.5 HAMFI is similar (46% of kernels with income of 0.5 HAMFI or less and 5% of kernels with income of 1.2 HAMFI or more).

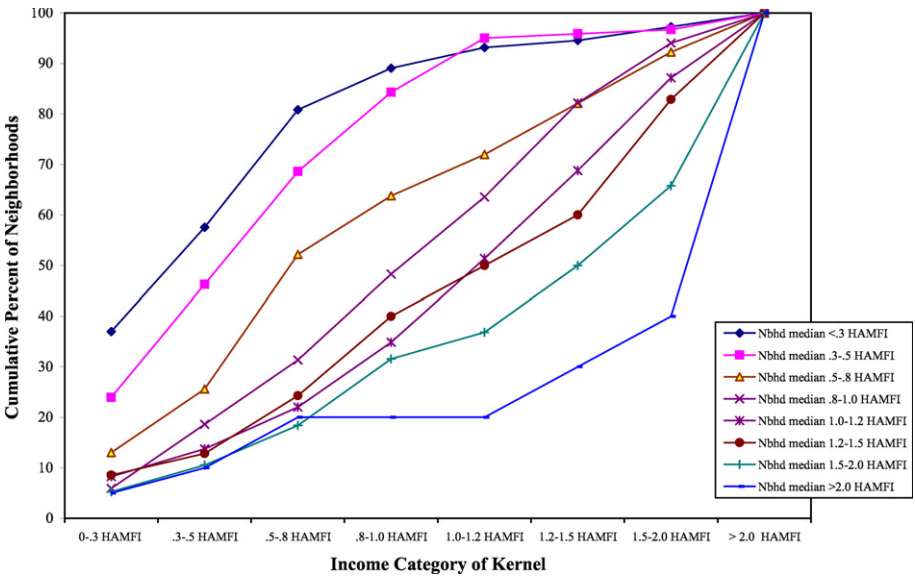

Fig. 3. Cumulative kernel income by median of neighborhood income 1993.

The four neighborhood types in the center of the graph in Fig. 3, corresponding to neighborhood median incomes from 0.5 to 1.5 HAMFI, represent almost two thirds of all neighborhoods (Table 5) and are characterized by substantial income mixing, with both tails of the income distribution represented. In these neighborhoods, 18–40% of kernels have incomes of 1.5 HAMFI or more while 13–26% of kernels have incomes of 0.5 HAMFI or less.

A minority of high-income households live in quite segregated neighborhoods. From Fig. 2, we see that the 7.2% of neighborhoods with median income of 1.5 HAMFI or more house about 31% of kernels with income above 2.0 HAMFI and 10% of kernels with income of 1.2–1.5 HAMFI. Fig. 3 shows that in the 4.7% of all neighborhoods with median income of 1.5–2.0 HAMFI, 11% of kernels have incomes of 0.5 HAMFI or less while 16% have income of 1.5–2.0 HAMFI and another 34% have income of 2.0 HAMFI or more. In the richest and most segregated 2.5% of neighborhoods, with median income of 2.0 HAMFI or more, 7% of kernels have incomes of 0.5 HAMFI or less and 70% of kernels have income of 2.0 HAMFI or more.

4. Policy implications and conclusions

The results of our study have both immediate and long run implications for public policy. The mix of household incomes in US residential neighborhoods, like the mix of races and ethnicity, is determined by the housing market, planning, and other elements of public policy. The impact of public policy has sometimes been intentional and at other times unforeseen. Public housing and neighborhoods with large lot zoning come to mind as extreme examples of planned (intentional) segregation by income. Planned unit developments encourage developers to mix structure types, thereby increasing the probability of appealing to a heterogeneous mix of household types and incomes; inclusive zoning laws in some states encourage or require developers to include cheaper or subsidized (“affordable”) units in new developments. Other policy decisions have a powerful albeit unintended influence on the degree of income mixing, from the tax treatment of owner occupied housing to zoning, and subdivision regulations which limit the heterogeneity of the housing stock (such as regulations which limit accessory apartments and home businesses).

This study makes it clear that many low-income households are dispersed; however in significant numbers of neighborhoods the poor are quite concentrated. Some of the most income-segregated neighborhoods are the site of public housing, where residents’ eligibility depends on their income. Recent policies have set out to use federal resources to induce greater mixing of households by income as well as race, in the hope that it will lead to positive peer interactions among heterogeneous households, increase the human capital of low-income youth and workers through peer effects and information flows,[10] and even reverse “epidemic” forces of urban decay,

[10] Bratt (1989, pp. 336–338) discusses the ways in which mixed-income housing may help remove “the stigma associated with living in a ‘project.’”

particularly those attributed to negative peer interactions in homogeneous low-income neighborhoods. HUD's moving to opportunity (MTO) program is a policy directly aimed at inducing households to take advantage of beneficial neighborhood effects. While mixed-income housing thus seems to offer direct and indirect benefits, planning and evaluation must be grounded in knowledge of the extent of income diversity or mixing that arises without deliberate public intervention as a baseline. This paper and the earlier work summarized here set out to provide such a baseline.

The availability of micro data for US neighborhoods allows us to begin to explore a topic, the extent of income mixing in market-driven neighborhoods, which has relevance and importance for cities throughout the world yet in most such data are not available. Racial mixing is important as it interacts with income mixing, and detailed measures of segregation such as those used by Massey and Denton (1988, 1993) and by Jargowsky (1987) at the metropolitan scale could be fruitfully applied to the neighborhood level.

A next step is to explore further the dynamics of within-neighborhood income distribution. Schelling (1971) predicts that the dynamics can be rich. How many of the neighborhood outliers are households whose low income is transitory? To what extent are neighborhoods "mixed" because some residents experience temporary shocks that cause their income to be unusually high or low? Or are neighborhood incomes "mixed" because some households have unusually high (or low) tastes for housing or neighborhood characteristics? Such households would choose to live in neighborhoods where they spend much more (or less) of their income on housing than the neighborhood average. Are neighborhoods mixed because moving is costly? Or have "outliers" chosen to stay because they have and value strong ties to their neighborhood? Each potential explanation has different policy implications that warrant further attention in future research.

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