

Mapping Opportunity: A Critical Assessment

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Abstract

Interest continues to grow in spatial opportunity structures and their role in shaping housing policy, community development, and equity planning. To this end, many have tried to quantify the geography of opportunity and quite literally plot it on a map. In addition, the Department of Housing and Urban Development is requiring its grant recipients to prepare Fair Housing Assessments based in part on opportunity maps. In this paper we explore the conceptual foundations and analytical methods that underlie the current practice of opportunity mapping. We find that opportunity maps can inform housing policy and metropolitan planning but that greater consideration should be given to the variables included, the methods in which variables are geographically articulated and combined, and the extent to which the public is engaged in opportunity mapping exercises.

Introduction

The spatial pattern of factors that shape opportunities for low-income residents to escape the cycle of poverty has been an important topic of public policy and lively subject of research for many years. Conceptually, the notion of spatial opportunity is both simple and intuitive: neighborhoods, as unique packages of resources, institutions and socializing agents, play a significant role in determining the welfare and life chances of their residents. In sociology, there is a long tradition of scholarship on opportunity structures, the impacts of which are often called neighborhood effects. A growing interest, however, has emerged in the last few decades as spatial opportunity structures have caught the interest of researchers in many fields and have begun to permeate discussions of urban policy, particularly around issues of housing policy, community development, and equity planning. These discussions often center on the need to use strategic investments, residential mobility programs, or both, to create a more equitable distribution of opportunity.

To this end, many attempts have been made to quantify the geography of opportunity and quite literally plot it on a map by combining evidence from studies on neighborhood effects with rapidly expanding spatial data resources and GIS technology. Recently, these opportunity maps have not only become increasingly common but their preparation has been encouraged and facilitated by the US Department of Housing and Urban Development (HUD). On one hand, the increasing prominence of opportunity mapping is a useful and important step forward for equity planning. Maps are powerful means of displaying the concept of opportunity and its variation across space. On the other hand, the institutionalization of opportunity mapping portends a need to examine critically the

foundations that underlie the construction of opportunity maps and their application in planning and public policy. A closer look at the conceptual foundations and analytical methods that underlie these exercises offers important lessons not just for the practice of opportunity mapping but also for the practice of equity planning in general. That is what we attempt here.

Our analysis is based on our experience in opportunity mapping for the Baltimore metropolitan area. As part of a consortium of local and regional governments, nonprofit organizations, and educational institutions that received a Sustainable Communities Regional Planning Grant from HUD, we were both members of the “Opportunity Collaborative” and consultants hired to perform the analysis. Our work was informed by opportunity mapping examples conducted in other metropolitan areas, many by the Kirwan Institute for the Study of Race and Ethnicity at Ohio State University, to which we owe a significant intellectual debt. Our experience in Baltimore, however, forced us to confront many technical and conceptual issues that we believe have not been examined carefully or addressed openly.

Historical context

The notion that the physical and social characteristics of the places where people live can affect their behavior and long-term well-being is not new. Early research can be traced to the early 1920s and the birth of the Chicago School of social science (Sampson, 2008). And while access to opportunity pertains to many social science disciplines and to many public

policy domains, the concept has been most closely examined by sociologists and applied in the fields of housing policy and civil rights, especially in the post war period.

In some ways, theories about spatial opportunity and responses in housing policy are inseparable; much of the best research on neighborhood effects is drawn from housing programs and the outcomes of their participants. The nuances of these evolving housing policies, and the differences in their administration and design, continue to provide insights into the dynamics of spatial opportunity.

US Fair Housing Policy. Despite popular belief in American meritocracy and the fabled “equality of opportunity,” social scientists and housing policy experts have long recognized that neighborhoods are important determinants of social mobility that can significantly impact the lives of their residents. In part for this reason, housing—especially fair housing—policy in the United States has always been a turbulent and contentious domain. Fair Housing policy was born in the 1960s in the wake of the civil rights movement, a period that featured a growing counterculture, racially concentrated poverty, and violent civic unrest. In response, the Civil Rights Act was passed in 1964, and shortly thereafter, President Johnson signed the Civil Rights Act of 1968, including Title VIII, better known as the Fair Housing Act. The Fair Housing Act banned discrimination on the basis of race, color, religion, and national origin and established the principle that HUD must administer its programs in ways that “*affirmatively further fair housing*” (National Fair Housing Alliance 2009).

Since its passage, the Fair Housing Act has been amended on multiple occasions, served as the foundation for key fair housing legal actions, and shaped the substance and administration of multiple HUD housing programs. Further, the Fair Housing Act has served as the foundation for lawsuits against HUD and local public housing authorities for concentrating public and subsidized housing in low-income, minority neighborhoods. Because neighborhoods with concentrations of low-income minorities provide fewer opportunities than more affluent white neighborhoods, litigants have successfully argued, placing subsidized housing units in these neighborhoods does not affirmatively further fair housing and thus violates the Fair Housing Act.

One case is particularly germane for our work in Baltimore. *Thompson v. HUD* was filed in 1994 on behalf of a class of African American public housing residents in Baltimore. Like several other public housing desegregation cases, the *Thompson* case was triggered by plans to relocate residents of public housing units, that was about to be demolished, into neighborhoods with similarly high levels of segregation. The plaintiffs claimed, and the judge agreed, that the city and housing authority had created a deeply segregated system of public housing and had done so with HUD's approval. These decisions, the judge ruled, were largely driven by opposition in suburban white neighborhoods and thus beyond the reach of the city housing authority. The Court therefore found HUD liable; it had failed its duty to affirmatively further fair housing (Poverty and Race Research Action Council 2005; Kline, 2007)

In part as a result of the Thompson and similar decisions, HUD began to place stricter requirements on state and local governments. In 2000, HUD began asking State and entitlement recipients to conduct Analysis of Impediments to Fair Housing Choice (AI), defined “as a comprehensive review of a state’s or entitlement jurisdiction’s laws, regulations and administrative policies, procedures and practices.” (US HUD undated) Currently, HUD requires recipients of Sustainable Communities planning grants to conduct Regional Fair Housing Equity Assessments (FHEAs) as part of their final deliverables (US HUD 2014). The FHEA is similar to the AI, but additionally requires grantees to examine physical infrastructure, including considerations of housing-employment-transportation linkages and whether the uneven provision of municipal services create an impediment to fair housing (US HUD, undated). Recently, HUD proposed new rules requiring all recipients of HUD funds to conduct FHEAs on a periodic basis. (US HUD 2013) These additional provisions in the FHEA signal an increasing conviction that physical neighborhood attributes contribute to well being and inequality of opportunity.

Experiments in Residential Mobility. In addition to several critical court cases, the specific strategies for affirmatively furthering fair housing has been shaped by two major policy experiments: the Gautreaux program, and the Moving to Opportunity (MTO) experiment. The Gautreaux (quasi) experiment occurred as part of a court-ordered legal settlement in 1976 to redress purported racial discrimination by the Chicago Housing Authority (CHA) (Rosenbaum and Deluca 2008). The settlement resulted in the establishment of a residential mobility program for low- income black families to relocate to new neighborhoods, and encouraged them to move to predominantly white suburbs.

The program (named Gautreaux after the original plaintiff) continues to be one of the most important sources of information on residential mobility and neighborhood effects.

Although the Gautreaux program was voluntary, and participants were not randomly selected, initial results were startlingly positive, and studies showed large and significant gains in employment and education for parents and children who moved to white, suburban neighborhoods

The promising results of the Gautreaux program prompted HUD to launch a more comprehensive and rigorous study of the effects of offering families housing vouchers to move to higher opportunity neighborhoods. The Moving to Opportunity (MTO) experiment was authorized by Congress in 1992. Participants in the program came from extremely poor neighborhoods in Baltimore, New York, Chicago, Los Angeles, and Boston and were randomly assigned to one of three groups: an experimental group received housing counseling and a restricted voucher that could only be used in census tracts with low poverty rates (less than 10%, using 1990 data). A second group received regular Section 8 vouchers with no restrictions, and a third control group remained in public housing.

The results were notably different from Gautreaux. MTO movers in the experimental group had no significant gains in long-term employment, earnings, or educational outcomes (Orr et al., 2003). Further, the majority of MTO movers (who were African American) stayed within the central city rather than relocating to nearby suburbs. Often, this meant that movers' new neighborhoods were largely similar to their original neighborhoods (save for lower poverty rates). Many families stayed in the same school districts, and in

predominantly black neighborhoods (DeLuca & Rosenblatt, 2010; Briggs, Popkin & Goering, 2010)

These experiments in movement to opportunity provided substantial new insights. The Gautreaux quasi experiment demonstrated that low-income black residents who relocate to white suburban neighborhoods could realize significant gains in housing quality, employment, and education. The MTO experiment, however, demonstrated that moving low-income residents to better neighborhoods is no panacea, and that neighborhood effects are complex, and require a great deal of additional research if they are to be understood.

The Geography of Opportunity and Neighborhood Effects

Galster & Killen (1995) proposed the term 'geography of opportunity' to refer to the various ways in which geography influences individuals' economic outcomes and perhaps even modify the innate and acquired characteristics of individuals ... [and their] ability to plan and sacrifice for the future" (pp. 9, 12). In the Galster and Killen formulation, the geography of opportunity is both a state and a process. John A. Powell, perhaps the father of opportunity mapping, defines it more simply. According to Powell, the term opportunity structure refers to "those resources and services that contribute to individual and family stability and advancement" (Powell 2003). Today, geography of opportunity is used even in popular media, and closing the spatial opportunity gap is an increasingly understood goal of sustainable urban development. What is less understood, however, is how the gap should be defined and measured, which specific neighborhood effects or resources are

most important for providing ladders into the middle class, and how the gap should be closed through spatial policy measures.

In the post-war period, the literature on the spatial distribution of various elements of opportunity has grown exponentially. Often traced to the work of Herbert Gans (1968) and more recently William Julius Wilson (1987), the search for neighborhood effects has been described by Sampson et al (2002) as a “cottage industry.” The effects of neighborhoods, independent of the characteristics of individuals who live in those neighborhoods, have been explored on a wide range of outcomes--such as educational achievement, deviant behavior, health, income social mobility and more. Attributes of neighborhood quality tested for their effects on well being include: the quality of local schools, housing, and the environment, as well a access to employment, public transportation, social capital, civic institutions, and more. According to Ham et al (2012, p.3), however, “the large volume of work on neighborhood effects not only reflects the interest in the topic, but possibly also reflects the fact that we are still a long way from answering the question about how important these effects actually are.” More specifically, according to Ham et al., still very little is known about which attributes of neighborhoods affect well being, how long one has to live in the neighborhood for the neighborhood to have effects, how long those effects last, the spatial structure of those effects, and the causal pathways through which those effects are manifest. Some doubt that they exist at all. In a recent review of the literature, for example, Cheshire (2012, p291) concludes: “The evidence reviewed here, particularly the most recent findings from the cohort studies and the MTO project, does not support the

conclusion that neighborhood effects are quantitatively all that important nor that moving the poor to affluent neighborhoods on balance improves their welfare.”

Thus, while policy makers have embraced the concept of spatial opportunity broadly, the literature on neighborhood effects introduces great difficulty into attempts to operationalize access to ‘opportunity’ in a spatial dimension. For one, the literature stresses that conceptions of opportunity remain tentative and contested. They are based on a limited understanding of complex, social and economic systems, and should be actively challenged, examined and redefined as better information becomes available (Ellen and Turner 2010). Furthermore, the concept of opportunity clearly has multiple dimensions rather than a single overriding metric. Definitions of opportunity are based on values and needs, both of which are subjective and unique to persons and families in different circumstances¹. Given this reality, how should opportunity be defined? Who should define it? And how should planners and policymakers use opportunity maps to address social equity in urban development?

Opportunity Mapping

The practice of opportunity mapping has several intellectual roots. As a technical exercise, opportunity mapping builds on techniques developed for suitability analysis by Ian McHarg (Collins et al, 2001). Ostensibly, opportunity mapping involves the identification of areas well suited to promote social mobility by combining GIS layers of various social, economic, and environmental variables. More conceptually, the practice builds on equity mapping developed by Toulmin (1988) and Truelove (1993) and applied by Talen (1998). This body

of research defines equity in terms of proximity or access to various public facilities or neighborhood attributes. The current practice of opportunity mapping, however, was developed in the context of fair housing litigation. Specifically, in the case of *Thompson v HUD*, John A. Powell testified as follows:

The segregation of African American public housing residents isolates them from the opportunities that are critical to quality of life, health, stability, and social advancement. The safe and stable neighborhoods, successful schools and employment opportunities generally available to Whites in the greater Baltimore region have been denied to African American public housing residents in the City of Baltimore. To remedy this segregation two objectives must be met: 1) the remedy must give African American public housing residents the opportunity to live in racially integrated areas in the Baltimore region and 2) the remedy must affirmatively connect African American public housing residents to high opportunity neighborhoods in the Baltimore region.

Powell then introduced opportunity maps that includes measures in three categories-- economic opportunity and mobility, educational opportunity, and neighborhood health— computed an overall opportunity index, and showed that minorities and Section 8 voucher holders are disproportionately located in low opportunity areas. In recent years, opportunity mapping exercises have been conducted in metropolitan areas across the nation including Seattle, Austin, Minneapolis, Chicago, Baltimore, Boston, and many other places. Much of the work has been conducted by the Kirwan Institute at the Ohio State University.²

The process through which these maps are created is now somewhat standardized:

- 1) Select variables that measure the presence or lack of opportunity
- 2) Collect data and assign values to common geographic units
- 3) Normalize the data and assign to subcategories
- 4) Compute a composite opportunity index
- 5) Create thematic maps
- 6) Overlay with other variables of interest

While seemingly logical and uncontroversial, the standard opportunity mapping process involves a number of computational tasks that significantly influence the results of the analysis yet are rarely carefully considered or documented. In what follows, we identify several such tasks and report decisions we made regarding each of those tasks in our work in Baltimore. We do not claim that the decisions we made are necessarily best or appropriate in all opportunity mapping exercises. We do claim that it is important to make these decisions transparent and to illustrate the implication of each of these decisions.

Variable Selection. As discussed above, the determinants of opportunity remain highly uncertain. In general, they include variables that capture the quality of local public services, including education; access to employment, environmental quality, and housing and neighborhood quality. With the explosion of available socio-economic data, there are many variables that could be used in opportunity analysis, though many data series are not available for geographies smaller than counties. Further, American Community Survey data, among the most frequently used and readily available, have very high margins of

error due to sampling variability. Other data—crime data in particular—are extremely difficult to obtain for an entire metropolitan area, at least at the geographic scale necessary to differentiate neighborhood variation³.

To assist in the variable selection process we formed an Opportunity Advisory Panel (OMAP) made up of Baltimore stakeholders and subject area experts to whom we presented a wide range of variables. . After reviewing candidate variables the OMAP identified over 100 variables as pertinent to opportunity in the region. Many of the variables were highly correlated, and we considered reducing the variables to a smaller set using factor analysis. (redacted 2012) The OMAP decided, however, that variable reduction using factor analysis could obscure the underlying data and did not object to giving greater weight to factors that included highly correlated variables.

Geographic assignment. Opportunity mapping involves the identification of multiple variables that shape the structure of opportunity in a region. This requires the assignment of those factors to a common geographic unit. The overwhelming choice of base geographic unit in opportunity mapping, is the census tract. The reasons are fairly obvious: census tracts comport reasonably with the notion of neighborhoods and many data series are readily available at this scale. For these reasons, we used census tracts as well.⁴

Not all data, however, come as attributes of census tracts. School quality data come as attributes of specific schools or their catchment areas. Road capacity measures come as attributes of lines. Data on churches, health care facilities, and employers comes as

attributes of points. The attributes of these points, lines and polygons must be assigned to census tracts. The simple approach to such assignment is to assign the attributes of polygons to census tracts using proportional allocation, and to add or average the attributes of lines or points within a census tract. But there are other approaches that perhaps in certain cases make more sense. A particular census tract, for example, may have no hospital beds but could be located close to census tracts that do. Similarly, a particular census tract may have few jobs, but could be located close to others that do. Thus a better measure of access to hospital beds or jobs might be a distance weighted average to hospitals or jobs in other census tracts. Further, because accessibility has less to do with distance than it does with time, measures of Euclidian distance to a particular resource may be misleading. Thus a better measure of access to jobs might be the total number of jobs accessible within a half hour or 45-minute commute by bike, car, bus, or train. Such measures, of course, require the use of travel demand models (or travel time skims) that enable identification of travel time—perhaps by different modes. For still others, spatial interpolation methods, such as kriging or inverse-distance weighting (IDW) that estimate accessibility levels at unobservable locations may be necessary⁵.

For our work in Baltimore we were fortunate to have precise catchment boundaries for every school, point locations for every employer, and access to a travel demand model capable of computing travel commute times and commute sheds for multiple modes. We therefore used the spatial assignment technique that we judged to make the most sense for each particular variable.⁶ Again we would not assert that our method of geographic assignment for every variable was correct, but we can say with confidence that the best

method of geographic assignment is rarely obvious, and can make a big difference in the values assigned to particular census tracts.

Normalization and ranking. Because measures of access to opportunity typically include variables expressed in different units—e.g., average income in dollars, minority populations in percent, and job opportunities in number of jobs—computing an aggregate measure of opportunity requires converting each variable to some common unit of measure. The typical procedure is to convert all measures to z-scores. Z-scores are well understood, convert numerical values into standard deviations from the mean, and can thus be easily compared, averaged, or added. For these reasons, we converted all our measures to z-scores as well. The down side of z-scores, however, is that they can mask information in the underlying data. That is, z-scores cannot reveal whether income levels in a census tract are above or below the poverty level, how many jobs are within a half hour commute shed, or what percent of the population is a member of an underrepresented minority. Further, Z-scores can only indicate the relative difference from the mean of a particular variable and thus cannot be evaluated absolutely. It is impossible to say that z-scores beyond a certain threshold represent a particular level of opportunity without qualifying that level relative to the entire distribution.

Aggregation and weighting. Because z-scores can be added and averaged, the standard procedure in opportunity mapping is to group measures into 3-7 categories, and to compute an overall opportunity measure as the average of the 3-7 categories. Categories the OMAP selected for Baltimore include: Education, Housing and Neighborhood Quality,

Social Capital, Public Health and Safety, Employment and Workforce, and Transportation and Mobility. Again following standard practice, we presented scores for each category in quintiles, though for display purposes, we divided and presented the opportunity index for some variables in more than 100 discrete intervals. Determining each of these classifications required judgment: the number of opportunity categories, the assignment of variables to categories and the number of variables in each category are all somewhat arbitrary decisions, and can influence the result and opportunity index.

Once opportunity indices are computed for each category, an overall opportunity index can be computed based on the category rankings. Standard practice is to weight all variables equally in the computation of an index for each category and to weight each of the categories equally in the computation of the overall opportunity index. In our work in Baltimore, however, we asked the OMAP members to weight each of the variables and used the average of their weights to compute the opportunity index for each category. We then weighted each category equally to compute the overall index. Again, because there is no correct way to select and weight variables and categories, we relied on feedback from the OMAP. The maps for each subcategory are presented in figures 1-6. What is noteworthy is that the spatial patterns of some measures of opportunity, such as education and neighborhood quality differ dramatically from other measures, such as job accessibility. Regardless of travel mode, access to jobs and social institutions tend to be greater in the central city; access to quality education and social capital tends to be greater in the suburbs.

[Figures 1-6 about here]

Application-Utilization. Opportunity mapping has been used in a variety of ways and in a number of applications. Because of its historical antecedents, its most common application has been to analyze the placement of subsidized or public housing units. By overlaying the location of subsidized housing units over the opportunity maps it is easy to identify the number or share of units that are located in high or low opportunity areas. This is the kind of analysis that was used to support the *Thompson v. HUD* decision in Baltimore (Kline, 2007). Similarly, it is easy to identify the number and share of minority residents that live in high and low opportunity areas. Opportunity maps can also be used for community engagement, to analyze and plan for specific corridors or regions, to develop community investment strategies, and more (Reece et al., undated). The composite opportunity map we prepared for Baltimore overlaid with the point locations of subsidized housing units is presented in figures 7 and 8. As shown in table 1, and what is likely to be true in most metropolitan areas, subsidized and public housing, minority populations, and low income residents are disproportionately located on low opportunity areas.

Table 1

	Households		Very Low		Low		Moderate		High		Very High	
	<i>total</i>		<i>total</i>	%								
Black	173,167		65,514	38%	36,980	21%	34,757	20%	20,101	12%	15,539	9%
Hispanic	20,480		2,766	14%	3,338	16%	4,676	23%	5,509	27%	4,097	20%
White	423,378		31,069	7%	80,805	19%	79,963	19%	116,341	27%	112,023	26%
Elderly	314,492		48,610	15%	62,236	20%	56,027	18%	74,710	24%	71,231	23%
Federal Assistance	36,480		13,529	37%	7,800	21%	5,931	16%	5,361	15%	3,727	10%
LHHC Units	18,263		6,302	35%	4,516	25%	4,466	24%	948	5%	2,031	11%
Total	1,001,037		159,325	16%	194,339	19%	188,471	19%	230,642	23%	223,263	22%

The Limitations of Opportunity Mapping

With assistance and encouragement from HUD, opportunity maps have been prepared in many metropolitan areas. But like any quantitative exercise, opportunity mapping has limitations, and recognition of those limitations can perhaps make the exercise even more useful. We focus here on two fundamental limitations: the presumed validity of the variables used to construct the opportunity index (face validity), and the process through which opportunity maps are constructed (construct validity).

Face validity. Face validity pertains to whether a measure actually measures what it purports to measure. Research on neighborhood effects and our experience in Baltimore suggest that many of the indicators traditionally used in opportunity mapping exercises may be formulated incorrectly and lack a compelling connection to the concept of opportunity. Put differently, many of the indicators chosen for opportunity mapping fail to make a connection to upward mobility that is supported by research, and perhaps signal a misunderstanding of neighborhood effects literature. The problem of face validity in opportunity mapping stems from two sources. 1) The extent to which the variables used to construct the index are truly related to opportunity and 2) the way in which the variables are measured, geographically assigned, normalized, weighted and aggregated.

As discussed above, every purported measure of opportunity—local public services, job accessibility, crime, poverty, social and cultural capital, and environmental justice—has a plausible relationship to opportunity. But for each category, the research that links the

variable to opportunity is limited. For some variables, such as education, social and cultural capital and poverty, the body of evidence is quite strong; for others—such as employment accessibility, crime, and environmental quality – the evidence is considerably weaker. For none of the variables, we would argue, is the evidence unassailable. ⁷

Even if one takes as given that each measure used to compute opportunity is valid, there is no evidence to validate an index computed as an unweighted geographic index presented in quintiles. There is no research of which we are aware that suggests education, crime, social capital, neighborhood quality, access to jobs and perhaps other variables should be combined in an aggregate opportunity index, let alone weighted equally. To be fair, there is no evidence to conclude that such aggregation or weighting is wrong, but there is also no evidence to conclude that such an index is “right”.

Construct Validity. Besides the problem of face validity, opportunity can be challenged on the basis of construct validity—that is, the process through which opportunity maps are constructed. As described above, opportunity maps are typically produced by a team of consultants, or planning staff, sometimes with the assistance of an advisory group. In many ways, however, the practice of opportunity mapping follows the once-dominant comprehensive rational model; competency is presumed on behalf of a (set of) technical expert(s) in the identification and selection of relevant data, computation of appropriate metrics, and subsequent rational interpretation and action. Each of these actions is presumed to be established in objective and value-neutral social science. Indeed, much like

the rational planning model, the technical aspects of opportunity mapping can be over simplified and mask the fact that multiple subjective decisions must be made at each level.

As the practice of opportunity mapping expands across the nation it is increasingly susceptible to reliance on technical experts, obfuscation of technical details, acquiescence to standardized practice, and misuse. Indeed, in our Baltimore experience, we observed many of these tendencies. Over our objections, the OMAP included only a small group of analysts and interested stakeholders; wider participation and dissemination was intentionally declined. Some maps were deemed politically acceptable, while others viewed as controversial were quietly suppressed. Race was particularly controversial. Some advocates argued strongly that we should strictly follow the procedures used by John Powell in the *Thompson* case. Others strongly objected to the notion that opportunity can be high in rural areas because it was antithetical to principles of 'smart growth'. Despite the controversy and arbitrary nature of many technical decisions, some just wanted the task finished, so the results could be used to encourage low-income housing development in high opportunity areas. There was little support for engaging a wider constituency, enabling specific constituencies to select measures of opportunity particularly important to them, zoom into the areas in which they are particularly interested, selectively weight categories, or produce opportunity maps that are appropriate for families with children, the aged, the invalid, or transit-dependent. Neither was there support for creating a simple software tool that could be used by housing voucher holders.⁸

In some ways, these behaviors are unsurprising. First, broad inclusion and participation is truly difficult at a regional scale. Programs designed to solicit values and ideas from a large populous can be expensive, time-consuming, and difficult to administer. Second, the requisite skills for creating opportunity maps, including GIS proficiency, data collection and spatial analysis are highly specialized and not widespread (though becoming more so). Third, the contentious nature of selecting opportunity indicators carries strong political implications for public officials. When policies are challenged in public discourse, the media, or the courtroom, officials seek authoritative justifications to help legitimize their decisions. Opportunity maps can only provide such authority if they are perceived as indisputable and objective—qualities they do not possess.

If opportunity continues to be defined only by planning agencies, researchers and other technical experts, it risks embedding class, race, age, and other biases and distortions into ‘objective’ and ‘value-neutral’ science⁹. Although attempts to map opportunity are becoming more common in metropolitan planning, these considerations are rarely acknowledged or made explicit.¹⁰

From Neighborhood quality to social opportunity

Despite their limitations, we believe opportunity maps can provide information useful for the design of housing policy and metropolitan equity planning in ways that overcome the drawbacks identified above. But this will require changes in both the substance and process of opportunity mapping

On the issues of substance, there is unfortunately no substitute for careful analysis of barriers to opportunity in general and barriers that confront particular populations in particular metropolitan areas. There is little doubt that neighborhoods in every metropolitan area differ in quality with respect to public services, education, crime, environmental quality, and more. The standard method of opportunity analysis can produce an ordinal ranking of neighborhoods in several neighborhood quality factors as well as an overall neighborhood quality index. But the construction of a neighborhood quality index is not the same as a careful analysis of impediments to opportunity for distinct classes of residents in distinct metropolitan areas. Addressing the needs of low-income residents and identifying policies that will result in a more equitable region will likely require more in-depth data analysis and qualitative research. Using standard procedures, an opportunity map of the most just and equitable city in the United States – however, defined—will still have one-fifth of its census tracts ranked in the highest and lowest opportunity class.

The appeal of a summary index that, to some extent, includes all measures that matter is universally appealing. But such a measure is almost certainly misleading. No matter how an aggregate index is computed—no matter what measures, no matter what weights—the first thing an intelligent analyst wants to know is why a given neighborhood scores high or low in the aggregate measure. This, of course, leads the analyst to explore the variation in the measures used to compute the aggregate index, how those measures were computed, assigned to neighborhood, and weighted to compute the over all index. In short, the aggregate measure is of little use without the ability to explore the underlying data used to

compute that measure (Sawacki & Flynn, 1996). From a policy perspective, most analysts would shy from recommending that housing should be located in a high opportunity areas without understanding how the opportunity index was constructed and whether it matters more how the variation of specific factors—such as educational quality, access to low-skill but high paying jobs, and the presence of social capital building institutions diverge. For this type of analysis, a software platform that allows different opportunity constructs to be explored and combined on the fly is infinitely more useful than an aggregate index.¹¹

Furthermore, the structural elements that contribute to neighborhood quality may be a substantially different set than those that provide *opportunities for social mobility*. In most opportunity mapping exercises, this distinction is either misunderstood or recognized incompletely. Research on neighborhood effects highlights the importance of social capital and social process. Sampson et al (2008), for example, call for a deeper focus on cultural, normative, and collective-action perspectives, more attention to peer networks and the connection between neighborhoods and social processes, and better research designs that address selection bias. While it is important to ensure equal access to high-quality neighborhoods, it is significantly more important to provide equal access to opportunity-rich communities. Neighborhood quality is a much broader construct, incorporating elements such as aesthetic design, ease of mobility, neighborhood amenities and more. But a neighborhood quality index is not the same as a careful assessment of opportunity.

From Technocracy to Inclusivity

As currently practiced, opportunity mapping is a technical exercise often performed by consultants and local planning staff. Equity planners, however, have been advocating for more inclusive planning processes for a number of years. Indeed, contemporary planning literature has been highly critical of procedures that over-value the role of analysts and experts. Instead, public deliberation among a diverse set of stakeholders is widely viewed as a better way to address uncertainty (and equity) in planning for a number of reasons. As stated by Davidoff, (1965) “appropriate policy in a democracy is determined through political debate. The right course of action is always a matter of choice, never of fact.”

Public engagement strategies are important and useful for overcoming the drawbacks of technocratic processes. A more engaged and deliberative model of opportunity mapping should embody the following elements:

- Broad participation and inclusion
- Two-way communication about opportunity structures
- Transparent and flexible assumptions
- Embedded opportunities for critique, augmentation or modification

Participation and inclusion means that opportunity mapping should incorporate as many voices as possible. This goes beyond the formation of an advisory panel to engaging underrepresented groups in the conversation. Much has been learned, for example from interview and other qualitative methods of extracting information from Gautreaux and MTO participants. (DeLuca & Rosenblatt, 2010; Briggs, Popkin, Goering, 2010)

Two-way communication means that channels of information flow in two directions. As users interact with an opportunity map, they absorb information about how opportunity structures operate on social mobility, and where they are scattered throughout a metropolitan region. In exchange, users' interactions with the opportunity map and their preferences about indicators and weights help planners better understand the needs and values of all citizens (as opposed to those with technical training)

Embedded opportunities for critique and augmentation means that any citizen, researcher or interested stakeholder is actively encouraged to update, refute or rebuild the model in any way they see fit. When they do so, and document their reasoning, it fosters greater understanding about multiple conceptions of opportunity. Ultimately, in this new framework, opportunity mapping is about integrating voices to build consensus around integrating communities.

Conclusion

Opportunity mapping is an increasingly popular method of exploring issues of equity in regional planning and housing policy. Like many other commonly used tools and techniques, opportunity mapping owes much of its popularity to direct and indirect support from HUD. Just recently, HUD proposed replacing the current requirements for Analysis of Impediments to Fair Housing (AI)—for which no format or standards exist—with a standardized Fair Housing Equity Assessment (FHEA) ostensibly based on opportunity analysis. Further, HUD plans to provide comprehensive, nationally uniform data and to incorporate language in the Consolidated Plan and Public Housing Authority

Plan regulations that directly ties the priority setting, commitment of resources, and specific activities of those plans into the AFH.¹² That is, HUD proposes to require local governments to conduct opportunity analysis, provide data for doing so, and prescribe how such analysis should be used.

For reasons we describe above, our assessment of opportunity analysis and mapping leaves us concerned about HUD's proposed rules. In an assessment of the lessons from the MTO and Gautreaux experiments, Briggs and Turner (2006) surmise:

both common sense and a growing body of research evidence teach us that living in a racially isolated, high poverty community undermines a family's well-being and life chances, yet conversely, we know much less about how to define the "opportunity rich" neighborhoods to which we should be helping families move. We suggest that, instead of simple proxies, such as a neighborhood's racial composition or poverty rate, destination neighborhoods should be targeted on the basis of concrete opportunities, such as community safety, quality schools, or access to skill-appropriate jobs.

We agree with Turner and Briggs that simple proxies such as racial composition and poverty rate are poor proxies for opportunity. We also agree that better measures of opportunity are likely to include measures of community safety, quality schools, and access to skill-appropriate jobs. But the shortcomings of opportunity mapping can not be overcome simply by adding more variables into the analysis. Additional research is needed

on how these and other factors contribute to opportunity and social mobility, how such factors should be measured and used to construct opportunity indexes and maps, and how such indexes and maps should be used to further social equity. A simple additive index of readily available data presented in quintiles is as likely to mislead as inform.

What's more, it is unlikely that the more research on neighborhood effects alone will provide the critical information that is still lacking. As stated by Darcy and Gwyther (2012, 264):

“new knowledge requires a new epistemological and methodological framework: one that requires residents as situational knowledge producers to examine the so-called problem of disadvantaged neighborhoods; one that enables situated knowledge producers to pose the questions and to seek answers through a rigorous exchange of local knowledge, and one where academics take on a supporting role that facilitates, inspires and nurtures’ the emergence of this new knowledge—a knowledge that is truly embed with the epistemological value of the lived experience.”

The proposed HUD rules include requirements for public participation in the conduct of assessments of fair housing, including for local public housing authorizes, input from residents, resident councils and Resident Advisory Boards. That is certainly appropriate. But in most fields, models are not deemed credible or appropriate for policy analysis and development until they are calibrated against real world behavior in real work contexts. Opportunity mapping, we suggest, has yet to pass this test.

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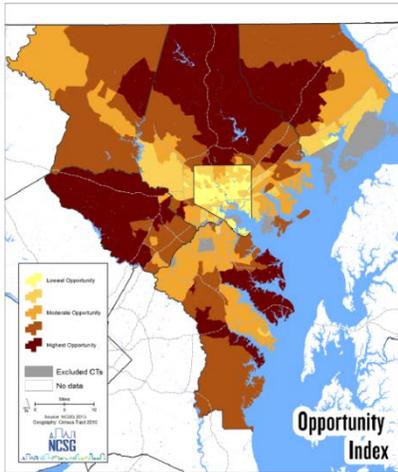
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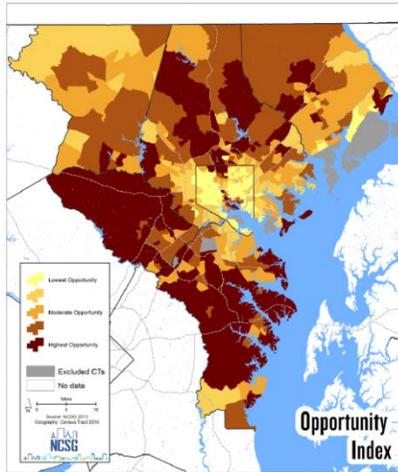
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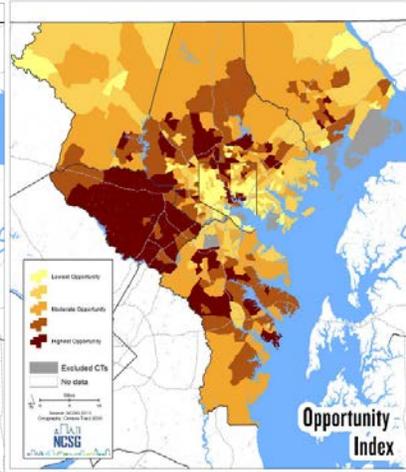
Education Index



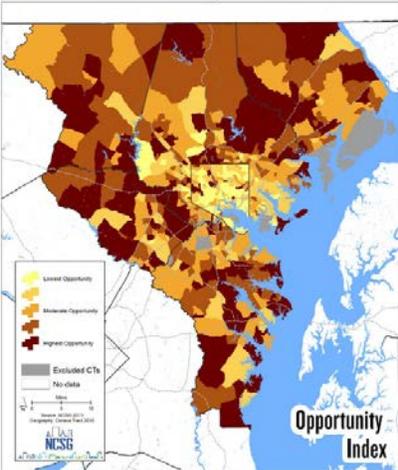
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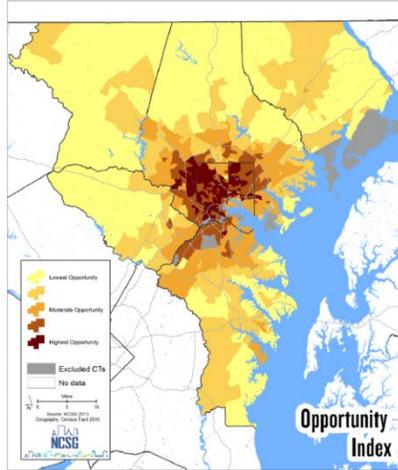
Social Capital Index



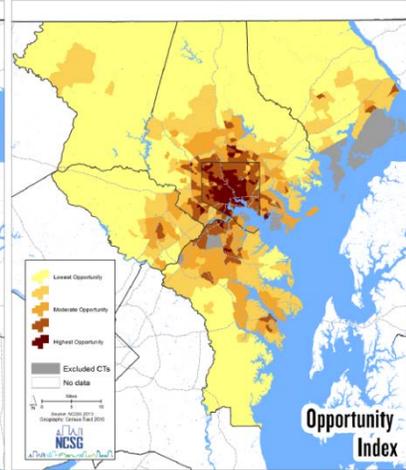
Public Health & Safety Index

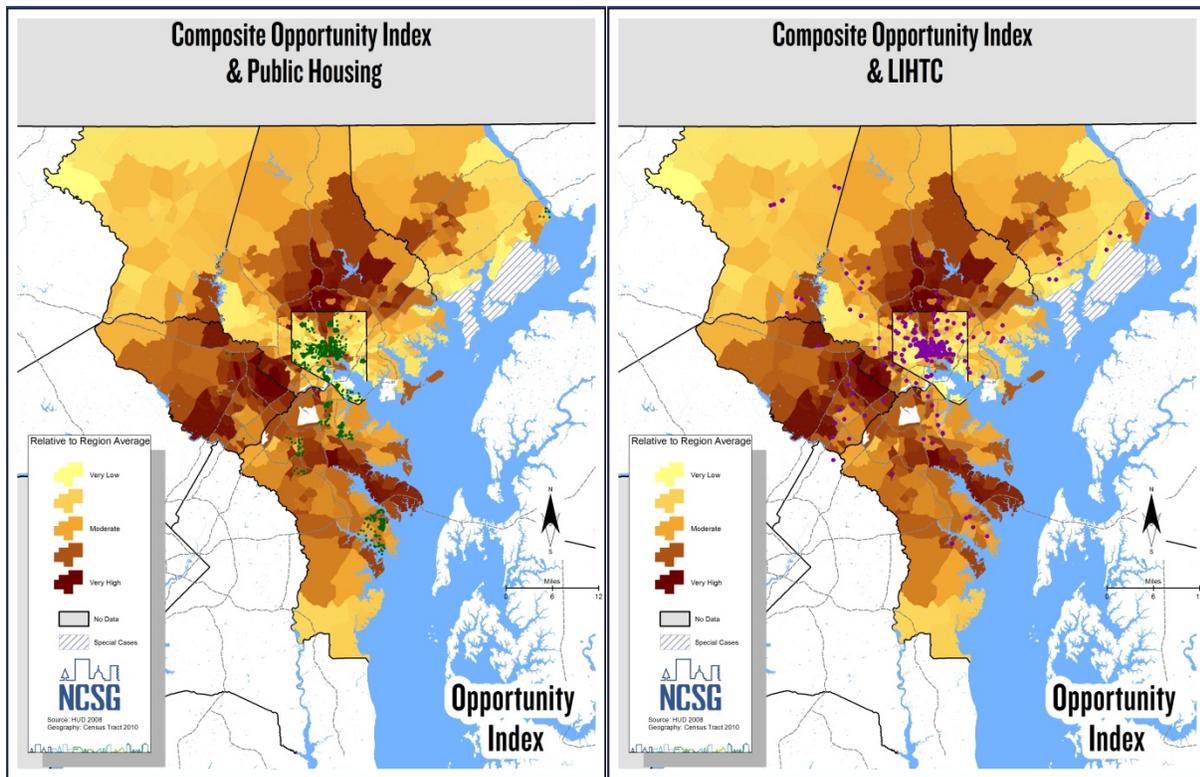


Employment & Workforce Index



Transportation & Mobility Index





1 For instance, is health more important than economic security? Does educational opportunity matter for families without children? Do opportunities for healthy lifestyles lead to better economic decisions? Is one element of opportunity (e.g. public safety) a requisite for another (e.g. education)? Are the relationships bi-directional?

2 See: <http://kirwaninstitute.osu.edu/opportunity-communities/mapping/>

3 The commonly used crime data sources are the FBI Uniform Crime Reports (UCR) of and the National Incident Based Reporting System (NIBRS). However, these data are aggregated to the municipal level, which are suitable for our analysis. The Applied Geographic Solutions (AGS) were used in this analysis. The crime

risk index is derived from the UCR data and was estimated at the block group level by modeling more than 65 socioeconomic characteristics taken from the Census. Then the data was aggregated to the census tract level.

⁴ See Sampson et al for a discussion on the suitability on census tracts as measures of neighborhoods in this kind of analysis.

⁵ Spatial interpolation method (e.g. Kriging or IDW) is used to estimate the accessibility of a given census tract based on the accessibility of surrounding census tracts by using distance decay function.

⁶ Specifically, we proportionately allocated school performance measures to census tracts based on their proportional representation in those tracts. We assigned job accessibility measures based on 30 and 45-mile commute sheds by automobile, transit, and walking. We represented access to churches and religious institutions by kriging....

⁷ In a recently published document, the Kirwan Institute provided a list of indicators most commonly used in its opportunity mapping exercises, each of which included a short justification, and citations to appropriate research. For example, the first indicator in the list is Adult Educational Attainment (operationalized as “Adults age 25 and older with an Associate’s degree or higher”). The report then argues that this is an important indicator of opportunity because “Workers with higher levels of education earn more income than workers with less education. The earnings gap between education levels continues to increase. (J. C. Day & E. C. Newburger, *The big payoff: Educational attainment and synthetic estimates of work-life earnings* (2002)” (Reese et. al, 2013). While we make no objection to the fact that more education leads to higher incomes, and educational attainment is an important indicator of opportunity, we fail to recognize a spatial connection between these concepts. If a low income family relocated into an area with higher educational attainment, it would not experience an increase in household income simply because new neighbors have more education. It would, however, have access to disproportionately powerful social networks and cultural cues that are likely to flow from high status individuals. Thus, while the indicator itself may be important, we suggest that it is important to clarify the means through which neighborhoods provide pathways to opportunity.

⁸ We have since created such a tool. See: <http://oppmap.facet.com/>

⁹ As a quick illustration, consider that opportunity defined by a young family of four may be quite different from opportunity defined by an elderly, transit-dependent couple. In the first case, education and employment are likely to be important indicators, while in the latter case, mobility and social services are more likely to be important factors. Even if planners and policymakers were somehow able to transcend their own biases, an attempt to define an encompassing opportunity structure would clearly be inaccurate or alienating for some groups.

¹⁰ Process is critical in assuring a productive participatory mapping exercise. Mechanisms for incorporating the results of the mapping process must be agreed upon and clearly communicated to participants. The process should be community-led and facilitated with technical assistance and support from the public sector agency. Participatory mapping projects can also be helpful in clarifying the perspectives of the community from the local population, often presenting a unique and different view of the community than what is popularly believed in the wider region. If you were born tomorrow, and placed into a randomly chosen neighborhood, how would the structural characteristics of the neighborhood—independent from any family or personal characteristics—shape your life course in ways that facilitate or inhibit social mobility?

¹¹ Transparent and flexible assumptions mean that documentation is provided for each indicator in an index. This may include a brief paragraph how an indicator is theorized to interact with opportunity, as well as citations and hyperlinks to supporting documents. Indicators should also be easily interchangeable to allow comparison between alternatives, or to accommodate different values or new information.

¹² . To facilitate this new approach, HUD will provide states, local governments, insular areas, and public housing agencies (PHAs), as well as the communities they serve, with data on patterns of integration and segregation; racially and ethnically concentrated areas of poverty; access to education, employment, low-poverty, transportation, and environmental health, among other critical assets; disproportionate housing needs based on the classes protected under the Fair Housing Act; data on individuals with disabilities and families with children; and discrimination. From these data, program participants will evaluate their present environment to assess fair housing issues, identify the primary determinants that account for those issues, and set forth fair housing priorities and goals. <http://www.gpo.gov/fdsys/pkg/FR-2013-07-19/pdf/2013-16751.pdf>