Access to grocery stores in Dallas

by Nathan Berg and James Murdoch

Abstract: *This paper presents geo-spatial information concerning access to grocery stores in Dallas County, Texas. A map shows the spatial distribution of neighborhoods classified according to the number of grocery stores within a one-mile radius. Neighborhood-level data from the Texas Health and Human Services Commission and US Census reveal distinct demographic characteristics in areas with many versus few grocery stores. No-grocery-store neighborhoods are predominantly low-income and concentrated in southern Dallas, and African-American neighborhoods have significantly fewer grocery stores than Hispanic neighborhoods. Disparities in access to nutritious food suggest the possibility of a breakdown in food security, afflicting as many as 400,000 low-income residents. The demographic correlates of grocery store access are analyzed in light of economic and behavioral theories of consumers' decisions about what to eat and firms' choices of where to locate stores.*

Keywords: Food Security, Grocery Stores, Neighborhoods, Imitation

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Biographical note:

Nathan Berg is Associate Professor of economics at University of Texas-Dallas and Director of Science at the Williams Institute's Center for Urban Economics. He has published numerous articles on behavioral economics in outlets such as *Journal of Economic Behavior and Organization, Social Choice and Welfare* and *Contemporary Economic Policy.* Berg was a Fulbright Scholar in 2003 and his research has been cited in *Business Week*, Canada's *National Post*, *The Village Voice*, *The Advocate* and *Atlantic Monthly.* Berg spent 2005 at the Max Planck Institute-Berlin's Center for Adaptive Behavior and Cognition. His recent work applies behavioral economic theory to the analysis of neighborhood dynamics in urban environments.

James Murdoch is Professor of Economics and Public Policy at the University of Texas-Dallas. He is a Senior Fellow at the J. McDonald Williams Institute and Director of the Center for Urban Economics. Murdoch has authored numerous articles in environmental economics, public economics, and defense economics in such journals as *Quarterly Journal of Economics*, *Review of Economics and Statistics*, and *Journal of Public Economics*. His current research is focused on identifying drivers of neighborhood change and the application of spatial analysis, spatial econometrics, and public economic theory to local economic growth and development.

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I. Access to stores and food security

Many of us take for granted that there are grocery stores in our neighborhoods selling a wide variety of nutritious food at relatively low cost. This paper reports new evidence suggesting that access to reasonably priced, nutritious food is a much more difficult problem than is commonly recognized, affecting 400,000 or more residents in Dallas County, Texas.

The issue of lack of access to reasonably priced and nutritious food in low-income neighborhoods has been documented in a number of American cities by social scientists and medical researchers (Anderson *et al.*, 2003; Haas *et al.*, 2003; Block *et al.*, 2004; Gary *et al.*, 2004; Ball and Crawford, 2005). One important finding is that healthy foods necessary for following dietary guidelines issued by mainstream medical and government health organizations are mostly unavailable in low-income neighborhoods (Jetter and Cassady, 2005). Compounding the issue of access is the issue of cost. Drewnowski *et al.* (2004) report that healthy food costs considerably more in low-income neighborhoods, with calculations of the additional cost per calorie in the U.S. and abroad for diets rich in healthy food. A related finding is that food sold in low-income neighborhoods typically contains high concentrations of unhealthy fats, carbohydrates, and additives, which contribute to health problems such as obesity, diabetes and heart disease (Gordon-Larsen *et al.*, 2003; Bowman *et al.*, 2004).

Another fact relevant for understanding recent trends in obesity and its complications (Zhang and Wang, 2004) concerns the economics of food. While the price of fresh fruit and vegetables increased substantially over the last 100 years, the average price of one calorie remained almost the same, thanks to cheaper foods with high densities of energy—that is, high fat, high sugar, and high concentrations of carbohydrates (Drewnowski, 2003; Drewnowski and Darmon, 2005).

Most policy approaches aimed at improving unhealthy diets in low-income areas focus on education. The behavioral model underlying such interventions is the economic cost-benefit framework, whereby consumers are assumed to weigh a large set of dietary alternatives, using information provided by informational campaigns to re-compute the costs and benefits of each element in that set, and ultimately choose the one with highest net benefits. Education interventions depend crucially on the assumption that decisions about what to eat are a function of the information consumers possess rather than less deliberative behavioral patterns, which served humans well in environments with scarce supplies of food but are poorly matched to the contemporary food environment.

Unfortunately, information and education-based policy interventions have achieved little in terms of modifying behavior (Horgen and K.D. Brownell, 2002; Brownell, 2005). In assessing such failures, critics point to neglect of the role of the food environment, defined by the availability or lack of healthy food. In contrast to information and

education-based interventions, initiatives with the identical aim of modifying dietary decisions—but using tools based on the theory that the structure of the food environment is the most important determinant of what people eat—have achieved impressive successes in the U.S. and abroad (Swinburn *et al.*, 1999; Catford, 2003; Borron, 2003; Wansink, Painter and Lee, 2006).

Eating healthy is notoriously difficult when one is surrounded by only unhealthy food alternatives. Lack of access to a grocery store typically means lack of access to fresh vegetables, fruits and meats. For those who buy food primarily from convenience stores and fast food restaurants, more than convenience is at stake. Eating healthy is especially difficult for low-income consumers because healthy food is significantly more expensive than unhealthy food that offers extra calories per dollar of food expenditure. The diet that results from exposure to environments with limited access to healthy food exposes residents living in such environments to high risks of obesity and other pathological health outcomes.

Given recent recognition of the important role played by the food environment, this paper uses geo-spatial data from the Texas Health and Human Services Commission (HHSC) and the US Census Bureau to statistically describe access to grocery stores in Dallas Country, Texas. These data allow us to present a map classifying neighborhoods according to the number of grocery stores within one mile. The data also reveal neighborhood-level spatial correlations linking three key variables—lack of access to grocery stores, median neighborhood income, and number of clients of HHSC programs—together with other demographic variables. This empirical evidence is intended to address the question of whether the current spatial distribution of food suppliers achieves satisfactory food security, indicated as a research priority in the theoretical work of Sobal *et al.* (1998)

In addition to providing a laboratory for social scientific inquiry into policies on economic development, the focus on Dallas County serves a secondary aim of providing regional policy makers with suggestions based on economic and psychological theory concerning how to improve food security. Even in the absence of consensus on any one approach to addressing challenges concerning food security, different observers should at least be able to agree on the existence of fundamental problems and the behavioral issues they imply, as seen in the data presented below.

The theoretical grounding for the policy discussions that follow derive from the general point of view that—while acknowledging the critical role of individual choice and the importance of designing policies that maximally preserve it—the food environment exerts a strong and often determinative force influencing the dietary decisions that individuals make (Thaler, 1991; Estabrooks *et al.*, 2003; Molnar *et al.*, 2004; Robert and Reither, 2004; Romero, 2005; Proscio, 2006). Thus, the shape of consumers and firms' choice sets becomes a primary focus, especially when nutritional choice sets in low-income neighborhoods differ dramatically from those in affluent suburbs.

The structure of the paper proceeds as follows. Section 2 describes a possible economic puzzle implied by the lack of grocery stores in low-income neighborhoods and how psychological theory can provide relevant insight. Section 3 presents our map of grocery-store access in Dallas Country, Texas, based on several geo-spatial and neighborhood-level data sources. Section 4 compares demographic characteristics in neighborhoods with many and few grocery stores, and Section 5 discusses barriers to improvement in access based on interview data collected from business executives who choose where to locate new stores. Section 6 describes limitations of traditional policy approaches to stimulating economic redevelopment in light of psychological theories of firms' location choices. Section 7 presents our conclusions.

II Theory

Roles of grocery stores and positive neighborhood externalities

A variety of stores sell food. These include grocery stores, convenience stores, restaurants, butchers, and produce specialists. Despite this variety, grocery stores seem to play a special role in generating different qualities and levels of economic activity in different neighborhoods, and in the determination of residents' physical health. Grocery stores usually offer a wide range of foods meeting different nutritional needs and sell food at lower prices than restaurants and convenience stores, thanks to economies of scale. With regard to neighborhood economies, grocery stores are important because other retailers often decide to locate stores in a neighborhood only after a grocery store has gone in. The implication is that the presence of grocery stores stimulates synergistic flows of business investment, enhances neighborhood quality, and consequently delivers improvements in the wellbeing of nearby residents.

Grocery stores should thrive in low-income neighborhoods

It may not sound surprising that stores gravitate toward neighborhoods where residents have high incomes, but there are at least four economic reasons why grocery stores should thrive in low-income neighborhoods. First, low-income residents spend a higher fraction of their income on essentials like food. Economic theory predicts that the typical low-income resident spends a lot less on luxuries like vacations, but not very much less on necessities like food. After all, everyone has to eat. And because there is no good substitute for food, low-income residents therefore spend a higher percentage of their incomes on food.

A second advantage that grocery stores moving to low-income neighborhoods could expect is cost savings resulting from lower rents and real estate prices. A third potential advantage would be access to greater labor supply in high-unemployment neighborhoods and consequent labor cost savings. A fourth reason why stores entering urban neighborhoods could enjoy higher-than-average profits is the absence of competition. With no other grocery stores for miles, a new grocery store could expect more customers and, all else equal, greater sales revenue. On the other hand, costs such as crime—or the perception of crime—might be higher. We return to the issue of crime below.

Attracting stores into urban environments

Enticing stores to be the first one to move into a neighborhood without already-thriving retail turns out to be much tougher than is predicted by standard economic theory. One reason is that firms tend to condition their own action upon the actions of other firms (Berg, 2007a). In other words, a firm's location choices usually depend on the observed location choices of other firms. For example, some firms report that they would consider moving to a location only if that location has a laundromat and a Home Depot within one mile (Weissbourd, 1999). This implies a high degree of inter-dependency among firms' choices of location, and the possibility of inefficient lock-in (similar to the market dominance of the inferior VHS technology over Betamax) at suboptimal spatial distributions that systematically miss business opportunities in urban environments.

Berg's (2007b) interview data show that the theory of stores moving into neighborhoods that offer more economical rents rarely happens in practice, for a variety of complex reasons that may have more to do with the psychology of business owners than with profit maximization. These empirical findings can be organized in a mathematical model of imitation in location choice (Berg, 2007a), which predicts that imitation serves as an efficient shortcut to profit maximization in high information environments, but leads to aggregate inefficiency in low-information environments (e.g., urban ghettos with virtually no retail and consequently no new information being generated about changing business conditions and profit opportunities). In a complementary methodological approach that uses graph theoretic representations of networks among firms, Horaguchi (forthcoming) shows how networks based on collaborative arrangements in production and innovation can lead to persistently unequal clusters.

In addition to using other firms' locations, it is well known that many firms consider neighborhood demographics as important factors in deciding where to locate new stores. Chief among these is neighborhood income. There is growing awareness, however, that neighborhood income is an unreliable predictor of store revenues.

For example, recent experience of retailers with sophisticated demand forecast models, such as Starbucks and Home Depot, show that these firms have earned profits far in excess of what their demand forecast models predicted as a result of locating stores in low-income neighborhoods previously regarded as unprofitable (Weissbourd, 1999; Helling and Sawicki, 2003; Sabety and Carlson, 2003). Cydnie Horwat, Vice President of Starbuck's Store Development, writes: "Our Urban Coffee Opportunities joint venture has essentially shown that Starbucks can penetrate demographically diverse neighborhoods in underserved communities, such as our store in Harlem, which is not something that we had previously looked at" (Francica, 2000).

This raises questions. Why would Starbucks have overlooked a profitable opportunity for so long? And why did it require a new, joint initiative to discover that the coffee giant could operate profitably in ethnically mixed, low-income neighborhoods? Are neighborhoods that retailers avoid really less profitable, or do interdependencies among firms' location decisions lead to inefficient lock-in at a status quo that is biased against

such neighborhoods, simply because firms have decided against them in the past? And finally, should we be surprised that sophisticated firms, even those that conduct extensive market research, condition their location decisions strongly on observed choices of other firms instead of independently weighing the costs and benefits associated with each among many candidates drawn from a large consideration set?

Crime and neighborhood perceptions

Interviewing top executives at a broad range of businesses in Dallas, Berg (2007b) asked these respondents how they had made high-stakes decisions about where to locate stores. He also asked if respondents had considered particular low-income neighborhoods in southern Dallas. The interviews revealed that most businesses considered only a short list of potential locations, and that concerns over crime eliminated low-income areas from consideration, without any quantitative cost-benefit calculation in the vast majority of cases. A number of respondents said that, even if they received a subsidy equal to their entire rental costs for a year, they would not consider locating a store in what they perceived to be a high-crime neighborhood.

Higher rates of shoplifting (i.e., shrinkage costs) and increased expenditures on in-store security clearly affect a store's profits. But our data suggest that, rather than computing the costs of going into relatively unknown urban environments to see if they might be offset by large revenues, blanket perceptions of crime eliminate most such neighborhoods from consideration without any quantitative analyses of profitability whatsoever. To understand why, it is helpful to recall the distinction between actual rates of reported crime and perceptions about the likelihood of crime.

Bray (2007) shows that, even in neighborhoods with high rates of reported crime, it is oftentimes only one or two city blocks that generate the vast majority of criminal incidents. This raises the question of whether it is proper to classify entire neighborhoods with aggregate crime statistics, given that these crimes are spatially concentrated in subregions of neighborhoods, and that trajectories of criminal activity change quickly and are difficult to map with precise spatial units of measure.

Bridging economic and psychological theory

The empirical results and policy discussions below draw on a mixture of standard economics and the judgment-and-decision-making literature in psychology. This seems to be especially useful for understanding decisions that humans have been making for thousands of years (e.g., what and how much to eat) relative to more recent decision tasks (e.g., choosing a vacuum cleaner to buy). In the case of deciding what and how much to eat, for example, seemingly minor environmental variables, such as distance to the nearest food source, have strong conditioning effects on the decisions consumers make, even when transportation costs are minimal. At the same time, firms use simplifying shortcuts to choose where to locate—shortcuts that approximate profit maximization in high-information regions such as suburbs where major chain grocers have an immense

amount of experience opening new stores. But these shortcuts systematically fail to uncover genuine economic opportunity in less well-understood urban environments.

III Mapping access to grocery stores in Dallas

In July 2006, we identified the location of all mainline chain grocery stores in Dallas Country, Texas, and classified US Census neighborhood block groups according to the number of such stores within a one-mile radius. Figure 1 shows the results. The shade of the block groups shows the number of grocery stores within one mile, with dark areas indicating few stores and light areas more stores. Black areas indicate neighborhood block groups with no stores within one mile, which are concentrated in southern Dallas. This raises the question of how access to grocery stores correlates with neighborhood income, ethnicity, and other neighborhood characteristics.

[Figure 1 about here]

IV Who lives in neighborhoods without grocery stores?

To answer the question of who lives in neighborhoods with no grocery stores nearby, Table 1 compares the characteristics of residents in neighborhoods that have zero grocery stores within a mile with neighborhoods having three or more neighborhoods within a mile. Table 1 shows that the ethnic compositions of these two types of neighborhoods are starkly different: no-grocery-store neighborhoods have an average Percent White that is roughly half that of neighborhoods with several stores. No-grocery-store neighborhoods are on average twice as African-American as neighborhoods with three or more stores.   Interestingly, these two types of neighborhoods differ hardly at all in terms of Percent Hispanic.

[Table 1 about here]

According to US Census data on neighborhood income, the average median income of no-grocery-store neighborhoods is almost $20,000 less than three-or-more-store neighborhoods, and the number of HHSC clients in no-grocery-store neighborhoods is almost double. In ordered probit regressions of number of stores on all the variables in Table 1 (together with age-of-residents variables, physical area of the neighborhoods, and neighborhood population), the variable Percent African-American has, by far, the largest magnitude effect. A neighborhood's total population, which averages around 1,400 residents, would have to increase by roughly 100,000 to increase the probability of an additional store by the same magnitude as it decreases in response to a change in the neighborhood's ethnic composition from all white to all black. Similarly, a neighborhood's median income would have to nearly double to raise the probability of an

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additional store by the same magnitude it falls when ethnic composition changes from all white to all black.

Why does ethnic composition have such a pronounced effects in the case of African-American ethnicity, but not in the case of Hispanic ethnicity? This question, which clearly arises from our data, is not easily answered by these data. Pursuing the important question of ethnicity as a correlate of spatial distributions of stores would, however, be a worthwhile topic for future research.

Zip-code-level analysis
Table 2 lists Dallas County zip codes without a chain grocery store. Combining this information regarding access to grocery stores with neighborhood income data indicates at least four zip codes that likely face the double challenges of severe financial need and nutritional deficits. Low-income families' budgets would be stretched thin in virtually any neighborhood. Lack of access to supermarkets compounds the problem, because healthy food becomes even costlier to obtain, or simply unavailable.

[Table 2 here]

One interesting implication of these patterns of grocery store access and neighborhood income is that income is, at best, a partial proxy for wellbeing. These data suggest, for example, that it is probably better to be low-income in a moderate-income neighborhood than low-income in a neighborhood with a high concentration of low-income households. Low-income families in moderate-income neighborhoods at least have better access to good food. In contrast, spatial concentrations of poverty are associated with poor shopping alternatives, and safety nets such as food stamps will be less effective at mitigating nutritional deficiencies in these areas.

Problems using income as proxy for wellbeing among children

The household's economic conditions would seem to have a profound impact on the wellbeing of young children (Bridgman and Phillips, 1998). By definition, poverty is a lack of sufficient purchasing power to obtain the basic necessities of food and shelter.[1] Children living in poor households often suffer from insufficient calorie intake; an unhealthy mix of protein, carbohydrates, and fats; and substandard housing with unhealthy environmental conditions.

Healthcare can be one of the household's most expensive budget items, and low-income households face a distinct set of challenges with regard to health. Using data from the 1992–94 National Health Interview Survey (NHIS), Newacheck and Halfron (1989) found that the prevalence of disabilities in children was greater for populations from low-income and single-parent families than for other families; they noted that disabilities

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[1] See http://www.census.gov/hhes/income/defs/poverty.html for information on the definition of poverty.

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generally stemmed from respiratory and mental conditions, suggesting a link to environmental conditions and nutrition. Other studies investigating frequencies of hospitalization and emergency room visits also seem to imply that family income, even controlling for initial health status, is correlated with severity of illness in children.

Although it may seem obvious that income is a key indicator of childhood wellbeing, actually measuring economic conditions and then establishing the correct pathways linking these economic conditions to children's welfare is a difficult task involving formidable methodological challenges. For example, consider the welfare of a child in a family whose income clearly falls below the poverty line, who therefore has no difficulty qualifying for Medicaid, compared with a child in a working-poor family without insurance who does not qualify for Medicaid. The child from the slightly higher income but uninsured family may actually be worse off.

The Children's Health Insurance Program (CHIP)[2] is specifically designed for such children, but eligible children frequently fail to get the services to which they are entitled. In 2004, 21% of children in Texas were without private healthcare coverage, Medicaid, or CHIP. Current estimates suggest that approximately 45,000 Dallas County children are eligible for Medicaid but not enrolled in the program (Easley and Chamberlain, 2007). In testimony presented to the 80th Texas Legislature House Human Services Committee, Hagert (2007) describes a system of overloaded case workers facing ever-increasing demand for services. The result is that, in Texas, only half of the eligible households receive food stamps, and approximately half of the uninsured children who could receive Medicaid/CHIP never get enrolled in the program to receive benefits.

Danziger *et al* (2002) analyzed survey data from single mothers on welfare in 1997. They found that by 1999, families that had moved off welfare and begun working were *financially* better off; however, of those working, more than a third did not have health insurance, and 13% had no insurance for their children. Conversely, almost all individuals on some form of welfare had medical coverage for themselves and their children. Therefore, "better off" in terms of earned income does not automatically translate into better off by other measures that clearly affect wellbeing.

Another relevant example of divergence between income and wellbeing would be a family in a neighborhood with many poor families and no grocery stores whose income is rising faster than inflation, but not as fast as food prices and the transportation costs associated with obtaining food. The family's real income is paradoxically rising while its ability to consume essential nutritional and healthcare inputs into wellbeing is declining.

The point is that the simple causal statement, "childhood wellbeing is caused by family income," does not adequately capture the multiple dimensions of the economic conditions that affect childhood wellbeing--in particular, possible divergence among income, food

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[2] See http://www.hhsc.state.tx.us/chip/index.html.

security and healthcare. Measures of average family income, income per capita, and average household income are therefore incomplete indicators for child welfare.

Even high-quality income data do not necessarily describe the economic conditions of families without normalizing for the costs of living in particular areas. Deviney and Hagert (2006) estimate that it takes a family of four more than $43,000 to cover the basic necessities of living in Dallas. This is more than twice the poverty line for a family of four, suggesting that the federal poverty line does not provide the correct contextual information for identifying needs in Dallas County.

One way to rationalize the study of correlates of income as presented in Table 1 is to use a household production model usually attributed to Gary Becker (Becker, 1991). The household transforms inputs, including time, to produce outputs it wants, and these outputs determine the overall level of wellbeing. The inputs (e.g., food) must be purchased, and time has opportunity cost in terms of lost income.

In this household production framework, income is important for wellbeing because it enables the purchase of more inputs and, hence, finances more of the outputs that improve wellbeing. With this structure, it is easy to see that there will be a considerable degree of heterogeneity in how households produce outputs, and hence improve wellbeing. Some production profiles will have both husband and wife working while buying childcare inputs in explicit childcare markets, while others will "purchase" childcare from grandparents. Others may form households of two or more families in order to economically utilize inputs, given wages and other constraints. Therefore, to accurately indicate the wellbeing of young children with measures of income, these measures need to be parsed in a way that controls for this heterogeneity.

V Barriers to improvements in access

In standard economic theory, firms decide on locations by considering a long list of possible locations, weighing the costs and benefits of each possible location, and choosing the one with maximum net benefits. The theory that firms are already doing the best that they possibly can leads to a stark, and misdirected, conclusion about neighborhoods without retail and business investment. This conclusion, which economists are beginning to challenge, is that abandoned neighborhoods are abandoned for good reason—precisely because there are no profitable opportunities there.

Using interviews with local business owners, Berg (2007b) found that most businesses consider only a few locations before choosing where to locate stores, and that the locations they do consider were nearly always areas that had been discovered more or less by accident—while dining out, running errands, or driving through town on other business, rather than explicitly searching for locations. This is not necessarily a bad strategy, because when business owners find areas that appeal to them and their employees, their customers are likely to find it appealing as well. Therefore, deciding on locations by considering a few places based on positive personal experiences can provide

a good shortcut to profit maximization in well-established retail centers. However, it can also lead to the unhealthy side-effect of neighborhoods that are ignored for long periods of time despite genuine profit opportunities. Once retail disappears from a neighborhood, the flow of information and new experiences in the minds of potential investors shuts down, and there is little chance that the neighborhood will even receive consideration by store owners choosing where to invest next.

Another interesting aspect of the psychology of location choice to emerge from interview studies is that firms frequently imitate their peers. Ask small business owners how they chose their locations, and many will tell you that they looked for an area with a grocery store, or another form of desirable retail activity, in the vicinity, and eliminated alternatives from there. Ask larger businesses like Home Depot and Starbucks how they decide where to put new stores, and they will likely tell you that they want drugstores and other basic retail already in place before they consider investing.

But if everyone is waiting for someone else to move first into neighborhoods that badly need redevelopment, then it may never get started. This is a kind of uneconomic lock-in at a suboptimal status quo, with systematic underinvestment in neighborhoods that hold genuine economic opportunity. These opportunities will only be discovered by those bold enough to consider new urban areas without existing retail and engage in a broad-ranging process of consideration, thinking through costs and benefits to discover untapped potential in low-income neighborhoods.

VI Policy tools

Economists who work on urban development often analyze policy tools, such as Tax Increment Financing (TIFs), or other means of providing subsidies in the form of reduced taxes for businesses that invest in particular areas of the city. Behavioral economics models that attempt more realistic explanations of firms' location decisions suggest at least two significant problems with the standard policy approach. First, most business owners do not choose locations from large consideration sets. Rather, most business owners pay attention only to a few candidate locations before making a decision.   Small changes in the costs and benefits associated with moving to a low-income neighborhood in a TIF zone are unlikely to push that location into wide consideration among potential investors.

Because most businesses, large and small, consider on a few candidates before deciding on a location, the key aim of policy should be for overlooked areas (e.g., neighborhoods in southern Dallas) to make it into psychological contention—that is, into the short list of locations that investors can easily bring to mind and then consider as serious candidates. If a business owner never considers stigmatized or long-ignored neighborhoods, then a tax subsidy is not likely to change his or her consideration set or decisions about where to locate stores.

A second problem with the tax subsidy approach relates to the psychology of imitation. When neighborhoods emerge as attractive new destinations for business investment, one of the main mechanisms for clustering is that business owners become persuaded of the potential profits at that location after seeing other businesses betting their own capital there. When new stores are motivated in part by temporary tax benefits, however, the signaling value concerning those new locations is reduced. In other words, if a business owner sees another owner go into a previously stigmatized neighborhood (in part) because of temporary tax subsidies, the resulting inference in favor of follow-on moves into the same neighborhood is weaker than would be the case without tax incentives. In contrast, when everyone sees a firm betting 100% of its own capital on a location previously thought to be unprofitable, the signal is much stronger in attracting further rounds of investment.

Marquee project
In light of behavioral economic models highlighting the important role of the food environment in consumers' dietary decisions and the role of information signaling in the logic of imitation that goes into firms' decisions about where to locate stores, one promising approach to stimulating economic activity and physical health in low-income neighborhoods would be a so-called marquee project. A marquee project is noticeable and aimed at attracting residents from other parts of the city to a previously overlooked neighborhood. Helpful to achieving this goal might be a retail development with a high-quality mix of local and national retailers, together with a long-ranging roster of planned attractions to draw residents from other parts of the city and build new, positive experiential capital. New developments in areas where perceptions of crime problems are widespread could benefit greatly from highly visible increases in police foot patrols encompassing a multiple-block radius around the marquee project, helping shift impressions of the business opportunities in that neighborhood in a positive direction.

To emphasize the importance of using sophisticated attractions (in addition to the establishment of attractive new physical retail facilities) to draw people to new areas and leave new experiences in their minds, it is worth repeating that marquee project planning should strategically aim to generate new geographic flows of people within a city and draw on distinctive cultural features of neighborhoods in surprising ways. Building beautiful physical facilities and turning around perceptions about crime are only half of what is needed for entrepreneurs and investors to begin thinking of a location as a serious candidate for investment capital. To make it into that short list of consideration, investors need to first experience neighborhoods targeted for redevelopment as consumers. Once positive consumer experiences take hold as part of investors' experiential capital, then the natural psychological mechanisms of recognition-based decision making and imitation can work in favor of redevelopment. The prototypical investor has eaten dinner there, met colleagues for coffee there, taken in a concert there, competed in a bike race there, shopped at urban vegetable markets there, etc. And based on one or more such experiences, the destination comes easily to mind as part of the business owner's intuitive sense about attractive locations for investing in new stores.

In theoretical models and interview data, positive consumer experiences in the minds of business owners play a critical role when deciding where to locate new stores. By promoting high-quality events in redeveloped low-income neighborhoods—bike races, film festivals, petting zoos, and local food fairs—residents in these neighborhoods will benefit directly and indirectly from improvements in neighborhood quality. Beyond the immediate and direct benefits of such events, the follow-on effects should be many orders of magnitude more important as new retail investment flows into neighborhoods undergoing redevelopment. One contribution of behavioral theory here is to identify the importance of those who own businesses elsewhere in the city traveling to neighborhoods in need of redevelopment and enjoying positive experiences as consumers, which is then associated with positive investment opportunities.

It should be clear that food security—in the form of access to healthy food—plays a key role in this idea for priming investments of many kinds to flow toward low-income residents. Food is a biological and social conduit for building ties with other people. Food provides a means of articulating ethnic and cultural specificity in a way that many can enjoy. And food readies the body for school and work, thus facilitating accumulations of human capital more commonly studied by social scientists.

The positive side of these findings is that cities possess a number of policy tools that can be used to stimulate redevelopment. Building experiential capital among residents and potential investors is key—and the more flamboyant, the better. A marquee project drawing residents (i.e., potential small business investors) from throughout the city is a likely tool for creation of new experiential capital. Once a few first-movers enter previously abandoned neighborhoods, the imitation shortcut quickly amplifies its effect with many further and larger rounds of investment into the area. Attracting one or two new grocery stores to neighborhoods without access to nutritious food could also significantly improve residents' wellbeing while stimulating a broader range of complementary economic activities.

VII Conclusion

The main contribution of this paper is to map neighborhoods in Dallas County, Texas, according to the number of grocery stores in the geographic vicinity, and to compare the characteristics of residents in neighborhoods with and without stores. Neighborhoods without grocery stores are predominantly low-income and African American, containing approximately 400,000 residents. A concentration of no-grocery-store neighborhoods appears in southern part of the City of Dallas.

These facts are difficult to square with standard economic theory, prompting consideration of alternative hypotheses about the manner in which consumers make food choices, and the ways in which grocery stores choose locations. Given these alternative theoretical perspectives, which match available evidence from interviews and the

reduced-form spatial distribution of stores, it would appear that new policy approaches are required to bring rapid improvements in food security.

Direct recruitment by city leaders of stores into severely under-supplied locations could play a large role because, if successful, they would demonstrate positive, untapped potential for profits, and do so in a highly visible manner. The theory of imitation predicts that such successes would be followed by significant flows into nearby destinations without any further interventions or costs borne by policy makers. Given the importance of healthy diets (e.g., the associated positive externalities and potential cost savings for governments), perhaps a rethinking of the institutional framework that determines food supply in this country should be more prominent among issues analyzed in economics and policy-related sciences.

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Table 1: Average characteristics of residents in no-grocery-store versus three-or-more-grocery-store neighborhoods

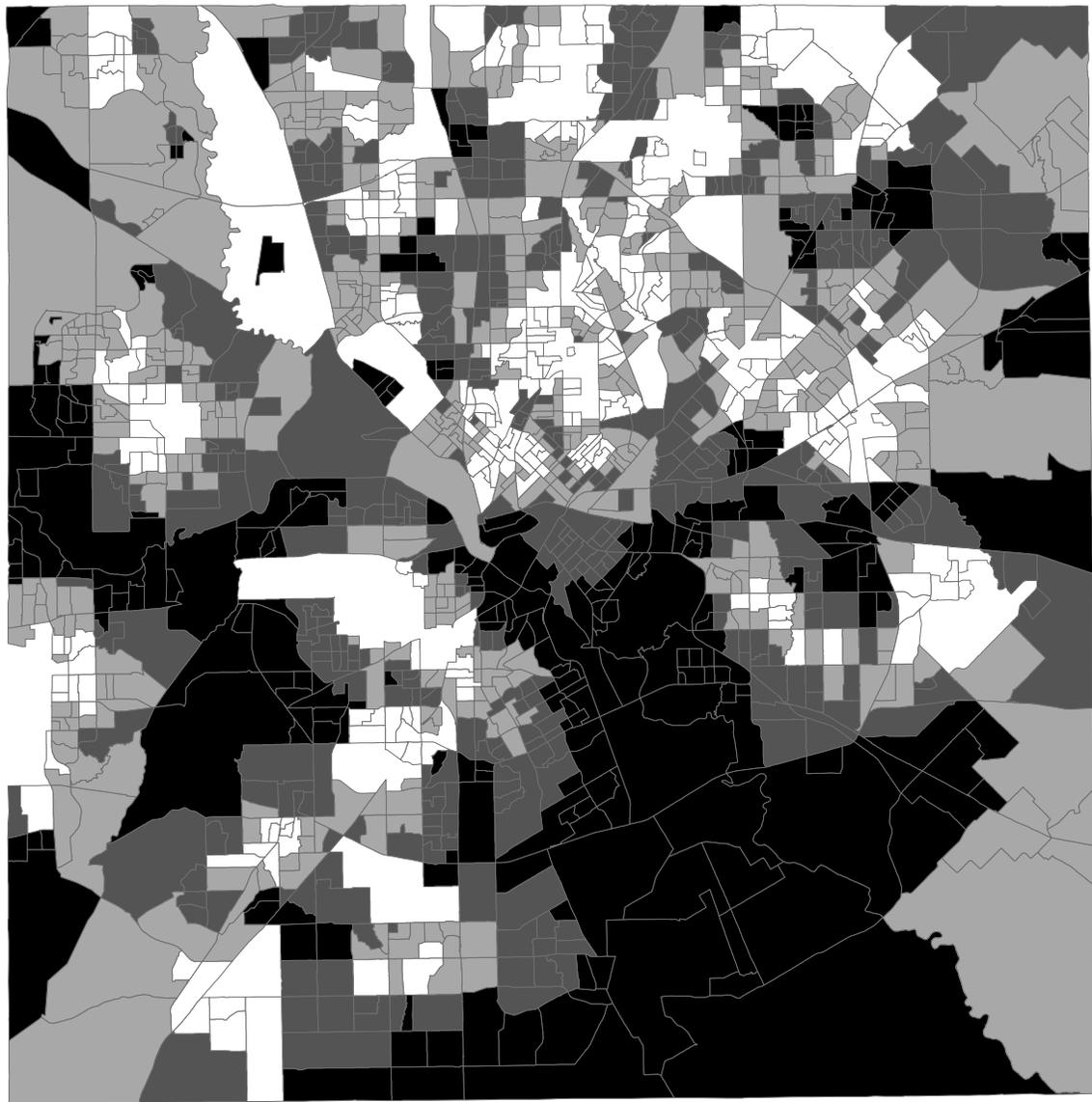| Neigbhorhood* Characteristic	neighborhoods with no grocery stores within one mile	neighborhoods with three or more grocery stores within one mile
Percent White	32	57
Percent African American	35	12
Percent Hispanic	29	25
Median Income	38,869	58,535
Number of HHSC Clients	120	64
Total Number of Neighborhoods	264	427

Sources: Author's calculations based on data from U.S. Census Bureau Population Estimates (www.census.gov/popest/estimates.php), Texas Health & Human Services Commission (www.hhsc.state.tx.us), and Geolytics (www.geolytics.com)

*Note: Neighborhoods are defined as blockgroups as defined by the U.S. Census Bureau. In the 2000 Census, there are 1,681 blockgroups in Dallas County; 264 neighborhoods with zero stores within a mile, 990 with 1 or 2 stores within a mile, and 427 with 3

Table 2: Dallas County zip codes with no mainline grocery stores

City name	Zip code
Irving	75039
Sachse	75048
Grand Prairie	75054
Richardson	75082
Ferris	75125
Hutchins	75141
Wilmer	75172
Sunnyvale	75182
Dallas	75201
Dallas	75202
Dallas	75203
Dallas	75207
Dallas	75209
Dallas	75215
Dallas	75226
Dallas	75233
Dallas	75236
Dallas	75246
Dallas	75247
Dallas	75249
Dallas	75251
Dallas	75253
Dallas	75261

Figure 1.
Number of Chain Grocery Stores Within One Mile:
Dallas County Block Groups

Legend

- 0
- 1
- 2
- 3 or more