EVALUATION OF SMALL BOX DISCOUNT RETAILERS AND NEGATIVE OUTCOMES IN UNINCORORATED DEKALB COUNTY

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Executive Summary

DeKalb County passed a moratorium on the granting of new business licenses to small box discount retailers (henceforth referred to as SBDRs) in January 2020. In part, this moratorium was put in place because of concerns about how SBDRs may be negatively influencing public safety, food availability, and property values in unincorporated DeKalb County. Such moratoriums are not unique to DeKalb County, and other jurisdictions have placed restrictions on the opening of SBDRs and also on other aspects of the stores, such as architectural standards and requiring a set amount of square footage to fresh food. This report investigates whether SBDRs in DeKalb County are linked to (1) crime; (2) food availability and pricing; (3) safety and security features of SBDRs; and (4) property values. To do so, we used both qualitative and quantitative data. We collected qualitative data on the inside and outside safety and security features of SBDRs as well as food availability and pricing and compared them to other types of stores. We also gathered quantitative data from DeKalb County agencies, the U.S. Census Bureau, and American Community Survey to explore how the presence, growth, and clustering of SBDRs and other stores are related to the outcomes noted above. For all our analyses, the impacts of SBDRs are compared to similar retail formats such as grocery stores, pharmacies, and convenience stores.

Our review of the existing literature and legal landscape revealed that, as of May 2020, 26 local jurisdictions had undertaken efforts to enact zoning legislation aimed at restricting the licensure and operational aspects of SBDRs. These restrictions are commonly motivated by a desire to diversify retail choices, improve community health, achieve desirable economic impacts, and reduce crime and safety issues. Zoning restrictions have included overlays to exclude SBDRs from part or all of a jurisdiction, proximity limits, imposition of special land use permitting, architectural design mandates, and requiring that fresh food alternatives be sold on site. Previous research has linked SBDRs to negative outcomes such as food insecurity, food quality, and crime.

Our site visits revealed that SBDRs have average lower prices on some, but not all, of the staple household hard goods and food items for which we recorded data. SBDRs were outperformed by large grocery stores in terms of average pricing for staple household hard goods and food items. SBDRs are less likely to have fresh produce, fresh dairy, fresh meat, or frozen meat when compared to other stores. SBDRs are more likely to have some fresh food types when compared to local grocery stores, pharmacies, and convenience stores. In addition, our qualitative analyses demonstrate the SBDRs are less likely to have in place of several safety and security features linked to crime prevention than other comparison store types.

We generated a series of heat maps to allow for the visual assessment of the simple (1-to-1) relationship between the number of SBDRs and the number of all crimes, violent crimes, property crimes, and public order crimes in a census tract. We also generated maps to capture the relationship between SBDRs and various food availability measures as well as residential property values. Both the visual data contained in the maps and follow up statistical analysis reveal a simple, bivariate (1-to-1) relationship between SBDRs and negative social outcomes.

We also conducted multivariate analyses to isolate the effect that SBDRs have on various outcome measures when controlling for the simultaneous influence of other relevant factors such as poverty, percent black, population, and presence of similar retail stores in a census tract. When doing so, we found that the relationship between the number of SBDRs and the counts of all crime types was sizable but not statistically significant. The clustering of more than one SBDR in a census block group was also

found to be unrelated statistically with the number of total crimes, violent crimes, property crimes, and public order crimes when controlling for other relevant factors and the number of other store types. When examining whether the increase in the number SBDRs over time influences crime counts, we also found that having an increase in the number of SBDRs in census tracts from 2015 to 2016 produced sizable increases (e.g., ~150%-225%) to the number of total crimes, violent crimes, property crimes, and public order crimes from 2018 to 2019. However, likely due to the small number of stores in these subsamples (e.g., few census tracts had 2 or more SBDRs), the findings were not deemed statistically significant.

Finally, statistical models also demonstrate that the number of SBDRs is not statistically related to the social vulnerability index (SVI) of a census tract. The SVI is a measure that reflects the overall vulnerability of a census tract on four dimensions: socioeconomic status, household composition and disability, minority status and language, and housing type and transportation. The SVI can be used to estimate the amount of needed supplies like food, water, medicine, and bedding present in the tract, and is used as a proxy for food availability. Similar to the findings on crime, when examining the simple (1-to-1) relationship between the number of SBDRs and property values, there is a statistically significant and strong negative association between the number of SBDRs and median residential parcel value for some years as well as median home value for 2016. When incorporating other variables into the multivariate models, these effects are modest in size and not statistically significant.

Our specific findings are:

1. **A smaller percentage of SBDRs had fresh produce, fresh dairy, fresh meat, or frozen meat available compared to other types of stores.** When investigating specific store types, SBDRs in general less frequently have specific fresh/frozen food available when compared to large national grocery and local grocery stores. They are, however, more likely to have some specific fresh food types available when compared to pharmacies and convenience stores.
2. Average prices on some staple food and hard good items was lower in SBDRs compared to other store types. **In total, SBDRs appear to provide cost savings on some staple items when compared to local grocery stores, pharmacies, and convenience stores, but do not compare as favorably to large grocery stores on price.**
3. **SBDRs generally compare unfavorably to grocery stores, convenience stores, and retail pharmacies on environmental features commonly associated with crime.** SBDRs were more frequently found to have signs of disorder outside (compared to large and local grocery stores) and more than one cashier working (compared to convenience stores) and less frequently found to have an upscale outside appearance (compared to large grocery stores and pharmacies), clear sightlines (compared to large grocery stores, pharmacies, and convenience stores), to be clean inside (compared to all other store types), have more than one cashier working (compared to large grocery stores).
4. **Considerable levels of crime occur at or within 100 feet of SBDR addresses and the vast majority of those reports involve property offenses.** Of those, almost 80% were larcenies.
5. **At the simple 1-on-1 (bivariate) level, the number of SBDRs is significantly, positively, moderately correlated with the number of total crimes, the number of violent crimes, the number of property crimes, and the number of public order crimes in a census tract in the following year.** These correlations are stronger that those between the number of other store types and the number of crimes.

6. **When including other retailers, poverty, percent black, and population into multivariate analyses, the effects between the number of SBDRs and the number of each crime type remain large but are not statistically significant, which may be due to small sample sizes.**
7. **The presence of SBRDs and convenience stores appear to have the greatest independent impact on crime outcomes in a census tract.**
8. **Analysis of the clustering of SBDRs within a census block group reveal that having more than one SBDR in a census block is associated with an 225.4% increase in the number of property crimes.** When examining additional store types for clustering in the same model, the relationship between having more than one SBDR in a census block and property crime is rendered non-significant. The co-occurrence of SBDRs and convenience stores appear to be particularly relevant in this regard.
9. **Overall, year-to-year increases in the number of SBDRs located in census tract did not consistently yield a statistically significant increase the in the subsequent number of total crimes, violent crimes, property crimes, or public order crimes.** It should be noted, however, in some models, the p values for violent and property crime approached statistical significance and the size of the effects was large. **For violent crime, the expected number of violent crimes increased by 148.2% and by 177.6% for property crime in census tracts that had an increased number of SBDRs between 2015 and 2017.** The co-occurrence of SBDRs and convenience stores appear to be particularly relevant in this regard.
10. **SBDRs tend to be located in or adjacent to food deserts more so than retail pharmacies.**
11. **The number of SBDRs is not significantly correlated with food availability, as measured by the Social Vulnerability Index score of a census tract**, neither were the number of grocery stores, pharmacies, or convenience stores.
12. **There exists evidence to suggest that the presence of retail establishments is related to the median home values within a census block. These effects vary across time, with some retail types showing positive effects (e.g., grocery stores) and others showing negative effects (e.g., convenience stores and SBDRs).** The median home value in 2019 was not significantly correlated with the number of SBDRs in a census block in 2018. The number of SBDRs in 2015 was associated with a decrease in the median home value in 2016. The number of other stores types are more consistently related to median home values. Each additional grocery store in a census block group was associated with an increase of .15 in the median home value in 2019, and of .14 in 2018 and 2016. The number of convenience stores was significantly related to a decrease in median home value. Each additional convenience store in the census block group was associated with a decrease in the median home value of .21 in 2019 and 2018, .18 in 2017, and .16 in 2016.

Our main conclusions are:

1. With increasing frequency, local jurisdictions across the country have enacted zoning and licensure restrictions on SBDRs. These restrictions aim to limit the number, proximity, and business operations of SBDRs to achieve improved safety, community health, and economic development outcomes. The intent and restrictions being considered by DeKalb County are in line with current zoning practices.

2. Based on our qualitative analyses, SBDRs and convenience stores are more similar in food availability and pricing. In addition, SBDRs are less likely to have safety and security features in line with the principles of crime prevention through environmental design (e.g., being well lit, having security cameras, limiting signs of disorder, having an upscale appearance, having burglar bars, and having clear sightlines into the store) as compared to large grocery stores and pharmacies. In this way, SBDRs are similar to convenience stores and different from grocery stores.
3. Numerous studies have shown correlations between the presence of certain types of retailers and levels of crime in the adjacent areas. Our quantitative findings demonstrate that SBDRs are similar to convenience stores in their negative relationship to crime. The number and concentration of SBRDs and convenience stores are positively correlated and both have negative impacts on crime counts. Thus, the presence of these establishments may both be related to negative outcomes and treating them similarly may be justified. The same patterns are not exhibited with respect to grocery stores and pharmacies.
4. Overall, our findings suggest that some types of retail land establishments correlate with negative social outcomes (e.g., crime, fresh food availability, property values) while others do not. SBDRs, like convenience stores, may have a greater impact on the health, safety, and welfare of the community than other types of businesses such as grocery stores and pharmacies. These findings suggest that it would be reasonable to subject SBDRs and convenience stores to similar zoning ordinances as a means of reducing negative social outcomes in the adjacent areas.

Introduction

Background on Small Box Discount Retailers (SBDRs)

Generally, SBDRs focus on low-income consumers with the goal of offering products at low prices (Shrestha, 2016). SBDRs[1] specialize in providing fast-moving consumer goods – daily necessities at a value price (Shrestha, 2016). One way in which they achieve this objective is by selling goods that are packaged in smaller sizes than found in other outlets (Shrestha, 2016). They also offer private-label store brands and provide everyday low prices rather than spend large sums of money on advertising rotating deals (Shrestha, 2016). Although the major SBDR chains – Dollar Tree, Family Dollar (now Dollar Tree owned), and Dollar General have been in operation since the 1950s, the past few decades have seen an increasing growth in sales (Shrestha, 2016). SBDRs generally open in areas that are underserved by supermarkets or other large-scale retail stores. Given their relatively small size, they are able to open where large stores cannot. This small size allows for them to operate in areas convenient to their target customers – elderly people and those on a fixed income (Shrestha, 2016). This combination means that many SBDRs are located in impoverished areas (mostly rural and urban locales) with high proportions of minority community members. SBDRs also tend to rely on a lean staffing model to control operational costs. This is associated with less order, cleanliness, and control both inside and outside of the store locations (MacGillis, 2020).

SBDRs have expanded at a rapid pace, with almost 30,000 in existence in February 2019 (Donahu & Bonestroo, 2019). Chain SBDRs have been operational in DeKalb County since the mid-1990s. As of 2017, there were 1,467 SBDRs in Georgia, placing Georgia in the top 11 states for the number of chain SBDRs per person (Donahu & Bonestroo, 2019). Roughly five years ago, Dollar Tree purchased Family Dollar, although Family Dollar still has branded stores. Dollar Tree is focused on "event-based" shopping while Family Dollar is a need-based neighborhood discount store focused on household essentials (K. Zanni, personal communication, February 2, 2020). Dollar General stands on two pillars of convenience and value to serve everyday needs. Dollar General has recently introduced its DG+ brand that has a greater number of coolers for fresh foods, alcoholic beverages, and a greater array of fresh produce (S. Brophy, personal communication, February 24, 2020). Further, Dollar General is planning to or has retrofitted a portion of its stores to expand fresh food offerings (S. Brophy, personal communication, February 24, 2020).

Together, the major dollar store brands currently operate 43 stores in unincorporated DeKalb County. At present, all of these stores operate as Dollar General, Dollar Tree, or Family Dollar. Internal research of the Dollar Tree brands indicates that their stores contributed almost $6.8 million in real estate and sales taxes to DeKalb County (unincorporated and incorporated) in 2019 (Committed to DeKalb County, 2020). They also report providing $9.5 million in annual wages and bonuses in DeKalb County. Reflective of their mission and goals of offering event-based or need-based household essentials, data show that only 1.5% of food sales in DeKalb County are spent in Family Dollar, and in Urban Atlanta more broadly about $2 million dollars are spent on food and beverage at SBDRs compared to about $54 million at food stores (Urban Atlanta Food Sales, 2020). Other internal reporting based on an online survey of 1,431 adults shows that overall satisfaction is quite high among Dollar Tree and Family Dollar customers, with 87% of customers reporting overall customer satisfaction at Dollar Tree and 78% of customers reporting overall customer satisfaction at Family Dollar (DeKalb County

[1] We use the terms that are used in the research we cite. For example, Shrestha (2016) explicitly discusses SBDRs.

Loves Our Stores, 2020). Other highlights indicate that 77% of customers feel that SBDRs fill a need in their community; 60% agree that without SBDRs, their community would have fewer places to shop and they would have to travel further for things they need, and 61% agree that the only people who would benefit from blocking SBDRs in DeKalb County are the competing stores that charge higher prices (DeKalb County Loves Our Stores, 2020).

Literature on SBDRs and Social and Health Outcomes

With the proliferation of SBDRs across the U.S., researchers have begun to examine the potential consequences of their opening in communities. Most of this research has focused on the potential influence SBDRs have on obesity, food availability, food quality, and crime. Other research has considered the marketing of and services that SBDRs provide.

Obesity

Food deserts are defined by the USDA as low-income census tracts with at least 500 persons and/or at least 33% of the population who live more than one mile from a supermarket or large grocery store (or 10 miles in rural census tracts) (Ploeg, Nulph, & Williams, 2011). Some research has shown a link between food deserts and dietary outcomes; however, research has yet to demonstrate a link between supermarket proximity and obesity (Shannon, 2015). Morland and Evenson (2008) found that the presence of convenience stores with gas stations was significantly associated with increased prevalence of obesity. Specifically, for every additional convenience store with a gas station, the prevalence rate of obesity was multiplied by 31%. There is a correlation between dollar stores and obesity, but it is possible that this link is not causal in nature and rather reflecting of existing food preferences (Drichoutis, Nayga, Rouse, & Thomsen, 2015). Research specifically examining dollar stores and childhood obesity did not find a link between the presence of dollar stores close to a child's residence and body mass index (Drichoutis et al., 2015).

Food Availability, Insecurity, and Quality

Food availability has repeatedly been linked to poor diets and negative health outcomes. In a summary of 54 studies in the U.S. between 1985 and 2008, Larson and colleagues (2009) summarized that neighborhood residents who have limited access to convenience stores have healthier diets and lower rates of obesity. One of the criticisms of dollar stores is that they are found in "food deserts" and could undermine national grocery chains opening in those areas (Donahue & Mitchell, 2018). It has been speculated that chain dollar store companies may see areas lacking in grocery stores as ripe for revenue because of a lack of competition (Donahue & Mitchell, 2018). Others note that the infusion of dollar stores is a challenge to local, smaller grocery and retail stores (Donahue & Mitchell, 2018). Another consideration of dollar stores is the array of foods that are offered. As noted, one strategy that dollar stores use is to provide consumer goods in non-standard size packaging to keep costs low. Further, dollar stores have been criticized for only offering a limited range of fresh food, with most not offering fresh produce or meat (Donahue & Mitchell, 2018). Instead, the food offerings more commonly include processed food (Donahue & Mitchell, 2018).

Food insecurity is a term used to describe a lack of consistent access to healthy foods needed to maintain a healthy and active life (USDA, 2019). Research suggests that nearly 10% (37 million) of Americans suffer from food insecurity, including an estimated 11 million children. Food insecurity has been correlated with low-income areas, a lack of affordable housing, social isolation, poor access to healthcare, and other common social determinants of health (Coleman-Jensen, Rabbitt, Gregory, &

Singh, 2019). Research on the types of foods available at dollar stores support this concern in that a limited offering of healthy foods is available. In an inventory of dollar stores in Arkansas, it was reported that there was a very limited offering of healthier foods such as lower-sodium products and limited offerings of fresh fruits and vegetables (as cited in Drichoutis et al., 2015). Similar food inventory analyses have been conducted in other cities. Research in Minneapolis and St. Paul, Minnesota reported that no dollar stores carried fresh fruit or vegetables, only one-third sold frozen fruit, 44.4% sold frozen vegetables, and 55.6% sold 100% fruit juice. The availability of wholegrain-rich products at dollar stores ranged from 33.3% to 77.8% of dollar stores. Finally, two-thirds sold low-fat milk (Caspi, Pelletier, Harnack, Erickson, & Laska, 2015). The authors of this study concluded that "dollar stores stocked a narrower range of healthy options, but more consistently had certain items, such as canned fruits and vegetables and wholegrain-rich cereal, compared with other stores" (Caspi et al., 2015, p. 543).[2] Dollar store purchases have also been evaluated in terms of nutritional quality. In a study of 661 customers at 105 different food retailers, the researchers found that dollar store shoppers were more likely to be non-Hispanic Black and to have a high school education or less as compared to shoppers at corner stores, gas-marts, or pharmacies (Caspi, Lenk, Pelletier, Barnes, Harnack, Erickson, & Laska, 2016). Customers commonly cited (39%) the good prices when asked about the most important reason for shopping at the store, which was higher than the percentage indicating this reason for the other stores. Although the number of items and amount spent was not statistically different for shoppers at the different stores, dollar store shoppers purchased a median of 1,266 calories, which was more than double the median calorie purchases for the shopper at the other store types. A greater percentage of shoppers purchases sweet baked goods at dollar stores relative to shoppers at corner or gas-marts, and a greater percentage of dollar store shoppers (58%) purchased sugar-sweetened beverages, than corner store, gas-mart, or pharmacy shoppers. The researchers also found that dollar store shoppers were more likely to purchase candy – in fact, they were more than three times as likely to purchase candy than corner store shoppers (Caspi et al., 2016).

Crime

Numerous studies have shown correlations between the presence of certain types of retailers and levels of crime in the adjacent areas (Berke et al., 2010; Bernasco & Block, 2011; Dabney Teasdale, & Clubb, 2017; Gruenewald et al., 2006; Kubrin et al., 2011). The link between the presence of SBDRs and crime has not specifically been empirically examined beyond descriptive pieces. For example, a recent publication in Propublica cited a website, the Gun Violence Archive, to note that at least 200 violent incidents involving guns have occurred at Family Dollar or Dollar General stores since 2017 (MacGillis, 2020). This story provides descriptive information about the number of certain types of crimes at SBDRs but does not establish that SBDRs have more (or less) crime than other stores. The presence of other retail food locations has been investigated. In their study linking the built environment to fear of crime and crime rates, Schweitzer, Kim, and Mackin (1999) found that presence of a nearby grocery or convenience store was associated with an increase in the crime rate. Further, they reported that fear of crime is positively associated with the presence of a nearby grocery or convenience store. Bernasco and Block (2011) also show that the presence of grocery stores increases crime. Specifically, they found that grocery stores in a block increased robbery – adding a grocery store to the block increased the expected number of robberies by 34%. Research conducted on businesses and crime in unincorporated DeKalb county also found a positive association between gas stations and

[2] "Other stores" included corner or small grocery stores, and gas marts.

convenience stores in census tracts. When accounting for race, population, and poverty, each additional gas station or convenience store at the end of 2012 was associated with an increase in violent crime of 13.2% (Dabney et al., 2017). On whole, the extant literature suggests that the presence and proliferation of certain types of retailers, either on their own or in co-occurrence with other types of retailers, serves as a crime generator for the surrounding areas.

Land Values

The relationship between land values and SBDRs has not been examined in the empirical literature. Other research, however, has identified a relationship between big-box retailers and home property values, such that proximity to these stored is associated with a decrease in home property values (Johnson, Lybecker, Gurley, Stiller-Shulman, & Fischer, 2009) and the number of stores nearby, the distance to nearest store, and the arrival of new stores negatively influences property resale values (Johnson & Acri, 2010).

Zoning Restrictions Against Small Box Retailers

A number of local jurisdictions have enacted zoning legislation aimed at restricting the licensure and operational aspects of SBDRs. The Laurie M. Tisch Center for Food, Education & Policy at Columbia University maintains a database of these legislative actions. These data are arrayed in Table 1. As of May 2020, a total of 26 jurisdictions had undertaken efforts to restrict what are commonly referred to as "small box retailers." Policy makers have assigned an upper area limit of 10,000-16,000 square feet on this category of retailer. Definitions also commonly refer to the sale of a wide assortment of hard and soft household goods, including food and beverages and the designation as SNAP retailers. It is noted that the consumer goods are generally offered as a discounted price, generally not exceeding $10.

There exist several themes across the legislative efforts. Common concerns appear to have motivated the action, with 92% citing a desire to diversify retail choices, 77% citing a community health focus, 42% raising concerns about economic impacts, and 23% noting possible crime and safety issues associated with small box retailers. Nearly half of the actions saw a licensure moratorium introduced to allow time for the systematic study of the purported concerns that came before the legislative body. Themes are also evident in terms of the enacted licensure restrictions. In eight of the 26 jurisdictions (31%), area overlays resulted in small box retailers being excluded from part or all of the jurisdiction in question. Another 25% of the ordinances mandated a special land use permitting process for small box retailers. Design limits such as parking lot restrictions, shelving height mandates, and mandates on fresh food alternatives (e.g., 15% of shelf space dedicated to fresh fruits, vegetables, meat, dairy) are observable in this regard. Yet another commonality was density restrictions precluding small box retailers from being located in close proximity to one another. These mandated buffers range from 2,500 feet to five miles.

The passage of small box retailer restrictions is temporally and geographically concentrated. The first ordinance (Grand Marais, MN) was passed in 2016 and 22 of the 26 actions were adopted in 2019 or 2020. Geographically, the laws are disproportionately located in midwestern (N=7), southwestern (N=5) and southeastern (N=12) states. Through May of 2020, there have been 8 zoning actions passed in the metro-Atlanta area (unincorporated DeKalb County, Atlanta, Clarkston, East Point, Henry County, Morrow, Stockbridge, and Stonecrest).

Table 1. Local Policies Limiting Small Box Retailers Nationwide, May 2020*										
Jurisdiction	Passage Date	Moratorium	Density Limits	Design Limits	Special Permit	Overlay	Health Focus	Crime Focus	Economic Focus	Retail Diversity Focus
Akron, OH	9/2019		X - 2.5k ft.		X		X	X		X
Atlanta, GA	11/2019		X – 1 mi.		X		X			X
Baytown, Tx	5/2020					X	X		X	X
Benzonia, MI	1/2020	X		X					X	X
Birmingham, AL	7/2019		X – 1 mi.			X	X			X
Broadview Heights, OH	11/2019	X					X	X		X
Clarkston, GA	5/2020	X			X		X			X
Cleveland, OH	4/2019	X					X	X		X
DeKalb County, GA	1/2020	X					X	X	X	
East Point, GA	2/2020	X					X		X	X
Fort Worth, TX	12/2019		X – 2 mi.		X		X			X
Grand Marais, MN	5/2016	X		X					X	X
Harwick, MA	12/2019	X		X		X				X
Henry County, GA	5/2020		X – 5 mi.				X		X	X
Mauldin, SC	1/2020	X					X			X
Melvindale, MI	11/2019		X – 2.5k ft.		X		X		X	X
Mendocino County, CA	8/2017			X	X	X				X
Mesquite, Tx	7/2018		X – 5k ft.		X		X			X
Morrow, GA	9/2019	X								
New Orleans, LA	10/2019		X – 2 mi.		X		X		X	X
Oklahoma City, OK	5/2019	X	X – 1 mi.			X	X	X		X
Palm City, FL	1/2020	X					X		X	X
Stockbridge, GA	7/2019		X – 1 mi.						X	X
Stonecrest, GA	11/2019					X	X	X		X
Tulsa, OK	4/2018		X – 1 mi.			X	X			X
Wyandotte County, KS	2/2019		X – 10k ft.		X	X	X		X	X

* Data compiled by the Laurie M. Tisch Center for Food, Education & Policy at Columbia University

The Current Study

Study Setting

In January of 2020, the DeKalb County Commission passed a moratorium on the establishment or expansion of SBDRs. Per the moratorium, "small box discount store means a retail store that is 16,000 square feet or less in size, which offers for sale a variety of convenience shopping goods and continuously offers the majority of the items in their inventory for sale at a price lower than traditional retail stores. SBDRs do not include stores that contain a pharmacy, sell gasoline or diesel fuel, or primarily sell specialty food items (i.e. meats, seafood, cheese, or oils and vinegars)." The moratorium called for the commissioning of a study of the effects of SBDRs on the health, safety, and welfare of the county's residents and businesses. We were commissioned by the DeKalb County Planning and Sustainability and Law Departments to conduct an independent analysis of the impact that the presence and proliferation of SBDRs has on the surrounding areas. The analysis was concentrated on the current unincorporated areas of the county which is comprised of 121 full census tracts and 294 block groups.[3] According to data provided by the Office of Planning and Sustainability, unincorporated DeKalb County spans 155.41 square miles and has a total population of the area of 415,464. The population is 71% Black with an average age of 36.7 years. There are 157,841 total housing units in unincorporated DeKalb County, of which 57% are homes and 43% rental properties. The majority of housing stock was built during the last three decades of the twentieth century. The modal household is comprised of 2 people. The area is home to an educated populous, with 2/3 reporting at least some college experience and 2/3 occupying white-collar jobs. The median household income is $58,967, with 16% of the households reporting income levels below the poverty level and 18% being food stamp recipients. The unemployment rate at the end of 2019 was 6.5%. The workforce of unincorporated DeKalb is fueled by 10,545 businesses that employ 107,929 employees.

We received annual business license data for 2015-2019 from the Department of Planning and Sustainability. These data document 33,173 businesses licensed in unincorporated DeKalb County over that time period, with the number and listing of active businesses fluctuating significantly from year to year. We meticulously hand cleaned this file using Google Maps, case-by-case consultation with the Business License Division, and information exchange with representatives of the Dollar General and Dollar Tree corporations. Several waves of incorporation occurred in DeKalb County during the study period. We tracked the date of such changes and adjusted the database accordingly from year to year, only including a retailer as being in unincorporated DeKalb county if it was zoned as such for the entire year. We also personally visited many of the locations to confirm their operational status. Google searches were also conducted to make phone contact and/or confirm operational status of licensed retailers. The resulting inventory of SBRDs (and comparison retail categories) is precise and reflective of the operational businesses under study.

During the study period, a total of 75 different retailers fitting the definition of a small box discount retailer were licensed for operation in the area comprising unincorporated DeKalb County. While considerable change occurred with respect to the entities that operated the store locations (i.e., regional chains and independent operators were replaced by national corporations), the total number of

[3] The average census block covers .044 square miles of land area while the average block group covers .51 square miles and average census tract covers 1.73 square miles. On average, there are 39 blocks in a block group. The population for a census block group ranges from 600 to 3,000. The population range for census tracts is 1,590-16,588.

licensed SBDRs remained relatively stable, fluctuating from a low of 39 in 2017 to highs of 45 in 2015 and 2018. **By the end of 2019, there were 43 SBDRs located in 29 different census tracts comprising unincorporated DeKalb County. Most census tracts only had one SBDR (24 census tracts), eight tracts had two, and one tract had three.** Three primary factors account for the changes in the SBDR licensed to operate in unincorporated DeKalb County during the study period 2015-2019. First, the incorporation of the cities of Tucker (November of 2015) and Stonecrest (November 2016) annexed significant land area and the corresponding businesses located therein. Second, the corporate merger of Family Dollar and Dollar Tree led to the mandated divesting of Family Dollar locations (6 in unincorporated DeKalb County). Third, the emergence of national dollar store chains (i.e., Dollar General, Dollar Tree, and Family Dollar) has led to increases in the number of store locations under these monikers and a crowding out of regional chains and independent operators. For example, Dollar General, Dollar Tree, and Family Dollar have seen their number of store locations double in the past ten years.[4] Despite the retail consequences of the global pandemic, Dollar General recently announced plans to open an additional 1,000 locations nationwide and remodel another 2,500.[5]

The premise underlying the moratorium ordinance enacted for unincorporated DeKalb County in January of 2020 is that SBDRs may have a greater impact on the health, safety, and welfare of the community than other types of businesses. We attempted to assess this premise by conducting parallel analyses on businesses that are similarly situated to SBDRs within the larger retail industry (i.e., overlapping product offerings, marketing plans, or store designs). In particular, we identified grocery stores, retail pharmacies, and convenience stores for this counterfactual analysis. Grocery stores are often at the center of the debate over the proliferation of SBDRs. Both types of retailers sell a wide array of consumer hard goods and consumables. While SBDRs offer a wider array of hard goods, grocery stores generally stock a more expansive list of brand name consumables and healthy food sources (e.g., fresh fruits, vegetables, meats, and dairy). Both types of retailers use stand-alone and strip mall locations, although grocery store chains require greater staffing and bigger land parcels due to their much larger size. While local grocers and some boutique national chains (e.g., Aldi and Whole Foods) are known to use staffing models and facilities that approximate those of SBDRs (i.e., 10,000-15,000 square feet), national chains such as Kroger and Publix routinely open stores that exceed 40,000 square feet of space. Big box warehouse clubs (e.g., Costco and Sam's Club) generally occupy about 150,000 square feet buildings while discount supercenters (e.g., Walmart and Target) can approach 200,000 square feet and deploy many more employees on a given shift. The current analysis excludes warehouse clubs and supercenters from consideration and focuses on local and national chain grocers (e.g., Publix, Kroger, Aldi, Whole Foods, Ingles, Food Depot) and indoor farmer's markets (e.g., Sprouts or local variations). Of the food-oriented retailers, these types of outlets most closely approximate SBDRs in terms of their staffing models, marketing plan, product selection, and attractiveness to a wide array of consumers. Conversely, big box retailers use dramatically different marketing, architectural, and staffing models than do SBDRs or grocery stores. They are small villages in their own right and do not make for a fair comparison.

We chose national retail pharmacies (e.g., Walgreens and CVS) as a second comparison group of stores in our counterfactual analysis. These retailers closely approximate SBDRs in terms of their land

[4] See Statistica for a full breakdown of the market: https://www.statista.com/topics/1343/dollar-stores-in-the-us/
[5] A recent article in Supermarket Times details the planned expansion by the Dollar General and Dollar Tree corporations: https://www.supermarketnews.com/retail-financial/dollar-general-dollar-tree-stay-expansion-track

footprint. This is best evidenced by the trend for national SBDR chains to purchase and retrofit Rite Aid locations when that retail pharmacy chain went out of business in 2015. Aside from the addition of a wider selection of over-the-counter pharmaceuticals and full-service prescription pharmacy services, these chain retailers pursue similar staffing models and offer comparable consumables and hard goods as are common to SBDRs.

Convenience stores are presented as a third comparison group in our counterfactual analysis. These retailers occupy smaller spaces compared to SBDRs. Large national chains such as RaceTrac and QT can approach 5,000 square feet of interior area but most of the brands that are widely recognized in unincorporated DeKalb County (e.g., BP, Shell, Chevron) do not exceed 2,000 square feet. Most convenience stores double as gas stations. They tend to rely on leaner staffing models (i.e., 1-2 employees on duty at a time) and concentrate on smaller package sizes and product offerings. That said, they are abundant in unincorporated DeKalb County and, like SBDRs, often serve as a primary retail outlet in low income areas. DeKalb County subject convenience stores to a host of zoning restrictions as part of a special land use permitting process. Clearly, convenience stores represent the most tenuous comparison group in this study. While they compare favorably to SBDRs in their staffing models, the size of the store, inventory (much more limited food and hard good offerings), prevalence, and marketing model do not track well to SBDRs.

The small box discount retailer moratorium raises concerns regarding their impact on community health, safety, and economic outcomes. We selected the above mentioned retailers because they afford the best available correlational comparison for these general outcomes. According to data provided by the Department of Planning and Sustainability, there were 163 convenience stores, 44 national grocery stores, and 36 retail pharmacies licensed to operate in unincorporated DeKalb County between the start of 2015 and end of 2019. This sort of representation provides robust comparison groups upon which to base our counterfactual analysis.

Negative Social Outcomes

Based upon the existing literature and available data, a series of operational measures of community health, safety, and economic outcomes were identified. The safety outcome was measured using levels of reported crime. Research suggests that crime levels are correlated with the presence of specific types of retailers in the area (Dabney, et al., 2017; Schweitzer et al. 1999; Bernasco & Block, 2011). The DeKalb County Police Department provided address-level data on all Part I[6] and Part II[7] crimes reported to them 2015-2019. In line with common convention, we aggregated these incidents to reflect total crime levels, as well as counts of crimes against persons, property, and public order. Violent or Person offenses include murder/non-negligent manslaughter, rape, simple or aggravated assault, robbery, sex crimes, kidnapping, and terroristic threat/intimidation. Property crimes include arson, burglary, counterfeiting, damage to property, embezzlement, entering auto, extortion, forgery, fraud, larceny-theft, receiving/possessing stolen property, and vehicle theft. Public order offenses include criminal trespass, cruelty offenses, curfew violations, disorderly conduct, drug violations, driving

[6] According to FBI designations, Part I crimes include murder/non-negligent manslaughter, forcible rape, aggravated assault, robbery, burglary, larceny-theft, motor vehicle theft, and arson.

[7] Part II crimes include simple assault, entering autos, forgery, counterfeiting, fraud, embezzlement, receiving/possessing stolen property, vandalism, kidnapping, weapons violations, prostitution, sex crimes, crimes against family/child, drug offenses, liquor offenses, disturbing the peace, nuisance, disorderly conduct, gambling, DUI, vagrancy, curfew/loitering offenses, runaways, and “other” non-traffic offenses.

under the influence, family offenses, flight, loitering, obstruction, neglect, nuisance, prostitution, weapons violations, and a host of other non-traffic offenses. Total crime includes all of the above. We focus our analysis on reported crime data at the census tract or census block level during a given time period and consider how it relates to the presence of SBDRs and other types of retailers at earlier time periods (e.g., overlay 2019 crime data onto 2018 business license data).

We focused on two measures of availability of food: food deserts and food insecurity. The term "food desert" is used to describe low-income census tracts where a significant number (at least 500 people) or share (at least 33 percent) of the population lives greater than 1.0 mile from the nearest supermarket, supercenter, or large grocery store for an urban area (USDA, 2019). Such restricted access to healthy foods is said to compromise community health. Moreover, research suggests that SBDRs are often located in "food deserts" (Donahue & Mitchell, 2018). We plot the location of SBDRs relative to census tracts that the USDA identified as food deserts in 2017. Given that retail pharmacies stock many of the same food items as SBDRs and also represent the most robust food source option in impoverished urban areas, we provide a comparison analysis of the location of these retailers relative to food desert census tracts. The food desert concept is a blunt measure of food access in that it presumes that the presence of a grocery store is the only way to provide healthy food sources to a community. As such, the concept of food insecurity has emerged as a more meaningful concept in the conversation about food access. Unfortunately, researchers have confronted difficulty in identifying direct measures of this concept using available data sources and have instead turned to proxy or approximating measures as a compromise solution. The CDC's Social Vulnerability Index (SVI) uses 15 U.S. census variables at the tract level to represent the resilience of communities when confronted by external stresses on human health, including social and environmental inequalities and deprivation. For the SVI, four key dimensions are assessed: socioeconomic status, household composition and disability, minority status and language, and housing type and transportation. The SVI can be used to estimate the amount of needed supplies like food, water, medicine, and bedding present in the tract.[8] Food researchers commonly use the SVI as a proxy measure of food insecurity (Alwang, Siegel, & Jorgensen, 2001; Bohle, Downing, & Watts, 1994; Frozi, et al., 2015; Hinkel, 2011). We explore the relationship between the presence of specific retailer types (i.e., SBDRs, convenience stores, grocery stores, and retail pharmacies) and food insecurity using CDC data from 2016 on the Social Vulnerability Index.

Finally, we accessed the tax digest for DeKalb County to assess the relationship between the presence of certain types of retailers (i.e., SBDRs, convenience stores, grocery stores, and retail pharmacies) and land use and residential home values in the surrounding unincorporated area. We examine the median land use value in a census tract and the residential property value in a census block group relative to the presence of SBDRs and other store types. This allows for meaningful yet focused insights on the impact that these businesses have on the property values of adjacent areas. A total of 121 census tracts and 294 block groups comprised unincorporated DeKalb County in 2019. According to the DeKalb County Tax Assessor's Office, the fair market median value of the residential property values in these block groups ranged from $19,000 to $1,325,000. That year, 38 different block groups contained at least one residential property as well as one or more small box discount store. There were a total of 43 SBDRs located in these block groups. The recorded 2019 median value of a residential property located on these block groups ranged from $74,300 to $384,000. For comparison purposes, we also analyzed 2019 residential property values for block groups containing at least one parcel of

[8] See the CDC website for details on this measure: https://svi.cdc.gov/factsheet.html.

residential property along with a convenience store (81), grocery store (4), or retail pharmacy (18). The median fair market value assigned to residential properties located in the corresponding block groups ranged from $42,200 to $407,700 for those with a convenience store and residential property, from $104,400 to $424,150 for those with a grocery store and residential property, and from $103,900 to $660,600 to those with a retail pharmacy and residential property.

Analysis Plan

Upon collecting and cleaning the licensure, crime, food desert, Social Vulnerability Index, and property value data detailed above, the next step was to conduct a series of empirical exercises on these data. There were both qualitative and quantitative dimensions to the analysis. **The qualitative efforts centered around site visits to a selection of SBDRs and comparison stores (i.e. convenience stores, small local grocery stores, large chain grocery stores, and retail pharmacies) to assess the availability and pricing of commonly purchased household goods as well as the presence of safety and security features.** The 2019 store locations for each category of retailer were listed according to the location in the 5 commission districts of unincorporated DeKalb County. Random samples were drawn for each district. We visited a total of 19 SBDRs (6 Dollar General, 6 Dollar Tree, and 7 Family Dollar), 6 local grocery stores, 11 chain grocery stores, 8 convenience stores, and 13 retail pharmacies. Site visits to SBDRs and grocery stores were conducted in February of 2020 but were discontinued due to the COVID-19 pandemic. Site visits to convenience stores and retail pharmacies were conducted in August of 2020. A sample of return visits were conducted for SBDRs and grocery store locations in August to determine if the pandemic effected product pricing.

As noted, one strategy that SBDRs use is to provide consumer goods in non-standard size packaging to keep costs low. To examine the availability of commonly purchased foods, we coded each store for its offerings of fresh produce, fresh dairy, fresh meat, fresh lunchmeat, bread, and frozen meat. For each food category, we noted if the food category was available at all, if it had a limited selection comparable to a convenience or mom-and-pop grocery, or if it had a wide variety of foods in the category. We examined price by locating commonly purchases household goods (Tide detergent, Glad trash bags, gallon of milk, two-liter Coca-Cola, and Honey Nut Cheerios cereal) recording the costs of those items, accounting for packaging size. For instance, we recorded the price of Tide detergent per ounce and Coke per liter. Finally, we recorded several outside and inside safety and security features for their presence at each store. Outside characteristics included: being well lit, having security cameras, having signs of disorder, having an upscale appearance, being a standalone store, having burglar bars, and having clear sightlines into the store. Inside characteristics included: being clean, having security cameras, having more than one cashier working, having a merchandise safety system, and having high shelving. Decades of social scientific research conducted under the heading of Crime Prevention Through Environmental Design (CPTED) and Defensible Space have shown these environmental characteristics to be correlated with levels of crime (Atlas, 2008; Jeffrey, 1971; Newman, 1966,1981).

The quantitative dimension of our analysis is organized into several phases. **First, we used the data from the DeKalb County Police Department to identify all criminal incidents occurring at or within 100 feet of 64 SBDRs while they were operational for the 2015-2019 time period.** [9] A 100 foot buffer is the smallest one available within the DKPD database. It allows us to capture crimes occurring in

[9] While there were 75 SBDRs licensed in unincorporated DeKalb County 2015-2019, they were located at 64 different addresses due to changes in ownership or name.

the exact address location as well as in the surrounding parking area common to strip centers and small shopping centers. These data are presented by offense category (person, property, public order crime) and according to the most frequent offense types (e.g., assault, larceny, assault, criminal trespass). Address-level crime data are the most conservative estimate of crime attributable to SBDRs. Police officers often record the location offenses using street intersections (e.g., Main Street and Elm Street) or generic block numbers (e.g., 100 block of Main Street) as a signifier. These instances are omitted from an address-level analysis such as ours. Many retail stores are located in shopping centers or malls. It varies whether a single or multiple addresses are assigned to such collectives. This can result in overestimation or underestimation of crimes occurring at a specific address.

Next, we use GIS software to provide a series of visual representations of the relationship that exists between the presence of specific business types and negative social outcomes. Sample maps are presented in the body of the report with a full listing provided in the appendices. A "heat map" design is used to overlay the presence of retail locations on levels of crime, food deserts, food insecurity, and residential housing values in unincorporated DeKalb County during a specific time period. The locations of SBDRs are mapped separately from the locations of convenience stores, grocery stores, and retail pharmacies. These maps provide a simple picture of how the presence of different retailer types correspond to the negative social outcomes under study.

The final step in our quantitative analysis plan involved estimating a series of multivariate statistical models that allows us to capture the effect that specific retail types (i.e., SBDRs, convenience stores, grocery stores, and retail pharmacies) have on crime, food insecurity, or parcel values and residential property values while holding constant other relevant predictor variables. These models provide a more complete, time ordered, and substantively meaningful approximation of the effect of dollar store presence and proliferation. That said, due to the small sample sizes that we are faced with, statistical significance is less meaningful in some of our models; thus, we often report the raw magnitude of the effect sizes.

Qualitative Results

Inventory of SBDRs: Product Availability, Product Cost, and Safety and Security Features

In Table 2, the qualitative assessment of food availability results is presented for all of the SBDRs visited and compared to other stores that were visited (i.e., large grocery, small grocery, pharmacies, and convenience stores combined). Stores were coded as not having the type of food available, having it available at a limited selection, or having it available at an expanded selection/similar to a grocery store. To evaluate the percentage of SBDRs having different food types available compared to other stores, chi-square tests of independence were conducted. This statistical approach allows one to isolate where differences exist across various 1-on-1 relationships between study variables. Significant differences in percentages across categories were evaluated. The presence of an asterisk (*) indicates that a statistically significant relationship was observed. A significantly greater percentage of comparison stores had fresh produce, fresh meat, fresh lunchmeat, frozen meat, and bread available with an expanded selection or selection similar to a large grocery store. A significantly greater percentage of SBDRs did not have fresh produce, fresh dairy, fresh meat, or frozen meat available. A significantly greater percentage of SBDRs had fresh lunchmeat and bread available at all compared to other stores.

Table 2. Food Availability Comparison of SBDRs to Other Stores

	SBDRs (n=19) % (N)	Other Stores (n=36) % (N)
Fresh Produce		
Not Available*	94.7 (18)	52.8 (19)
Limited Selection	5.3 (1)	5.6 (2)
Expanded Selection/Similar to Grocery*	-	41.7 (15)
Fresh Dairy		
Not Available*	-	22.2 (8)
Limited Selection*	94.7 (18)	19.4 (7)
Expanded Selection/Similar to Grocery	5.3 (1)	58.4 (21)
Fresh Meat		
Not Available*	94.7 (18)	52.8 (19)
Limited Selection*	5.3 (1)	2.8 (1)
Expanded Selection/Similar to Grocery*	-	44.4 (16)
Fresh Lunchmeat		
Not Available*	5.3 (1)	47.2 (17)
Limited Selection*	94.7 (18)	8.3 (3)
Expanded Selection/Similar to Grocery*	-	44.5 (16)
Frozen Meat [t]		
Not Available*	50.0 (7)	11.4 (4)
Limited Selection*	50.0 (7)	-
Expanded Selection/Similar to Grocery*	-	88.6 (31)
Bread		
Not Available	10.5 (2)	27.8 (10)
Limited Selection*	89.5 (17)	27.8 (1)
Expanded Selection/Similar to Grocery*	-	44.5 (16)

[t]Frozen meat only coded for 14 stores

*p<.05 columns statistically different

Table 3. Food Availability Comparison of SBDRs to Other Stores

	SBDR (n=19) % (N)	Large Grocery (n=11) % (N)	Local Grocery (n=6) % (N)	Pharmacy (n=13) % (N)	Convenience Store (n=6)[10] % (N)
Fresh Produce					
Not Available	94.7 (18)	-	-	100.0 (13)	100.0 (6)
Limited Selection	5.3 (1)	-	33.3 (2)	-	-
Expanded Selection/Similar to Grocery	-	100.00* (11)	66.7* (4)	-	-
Fresh Dairy					
Not Available*	-	-	16.7* (1)*	23.1* (3)	66.7* (4)
Limited Selection	94.7 (18)	-	16.7 (1)	30.8* (4)	33.3* (2)
Expanded Selection/Similar to Grocery	5.3 (1)	100.00* (11)	66.7* (4)	26.2* (6)	-
Fresh Meat					
Not Available	94.7 (18)	-		100.0 (13)	100.0 (6)
Limited Selection	5.3 (1)	-	16.7 (1)	-	-
Expanded Selection/Similar to Grocery	-	100.00* (11)	83.3* (5)	-	-
Fresh Lunchmeat					
Not Available	5.3 (1)	-	-	92.3* (12)	83.3* (5)
Limited Selection	94.7 (18)	-	16.7* (1)	7.7* (1)	16.7* (1)
Expanded Selection/Similar to Grocery*	-	100.00* (11)	83.4* (5)	-	
Frozen Meat [t]					
Not Available	50.0 (7)		20.0 (1)	100.0* (5)	100.0 (6)
Limited Selection	50.0 (7)	-	-	-	-
Expanded Selection/Similar to Grocery	-	100.00* (11)	80.0* (4)	-	
Bread					
Not Available	10.5 (2)		-	30.8 (4)	100.0* (6)
Limited Selection	89.5 (17)		33.3* (2)	61.5 (8)	-
Expanded Selection/Similar to Grocery*	-	100.00* (11)	66.7* (4)	7.7 (1)	-

*p<.05 different from SBDRs

[10] Food availability data were not coded for one convenience store.

When comparing SBDRs to other store types separately, different findings emerged. As can be seen in Table 3, all large grocery stores had the investigated food categories available the most expansively and, when compared to SBDRs, the percentage difference was significant**.** A significantly greater percentage of local grocery stores had the investigated food categories available as an expanded selection or similar to large grocery stores when compared to SBDRs. A significantly greater percentage of SBDRs had fresh lunchmeat available as a limited selection as compared to retail pharmacies, and a significantly greater percentage of SBDRs had frozen meat available as compared to pharmacies. A significantly greater percentage of pharmacies had fresh dairy available with an expanded selection or similar to grocery stores than SBDRs. A significantly greater percentage of SBDRs had fresh dairy and fresh lunchmeat available as a limited selection as compared to convenience stores. A significantly greater percentage of SBDRs had bread available compared to retail pharmacies. Not surprisingly, convenience stores underperformed in terms of availability and pricing compared to all other categories.

The data in Tables 2 and 3 above suggest that some meaningful differences are observable when comparing the food availability of SBDRs to a combination of other food and hard goods retailers (i.e., SBDRs to an aggregate of grocery, pharmacy, and convenience outlets). Meaningful differences are observable when the comparisons are done from one retail sector to another (e.g., SBDRs to grocery stores or SBDRs to pharmacies).

In addition to food availability, the qualitative assessment also included price comparison of selected, commonly purchases household goods. In doing so, prices were evaluated, and independent samples t-tests were performed to evaluate potential statistically significant differences in average values. Table 4 displays the results of this assessment where the bolded text in the cells at the bottom of the table indicate statistically significant differences in pricing. **A number of per unit pricing differences were observed when SBDRs were compared to large grocery stores, local grocery stores, convenience stores, and retail pharmacies.** The average price per ounce for a gallon of milk was significantly higher in SBDRs when compared to large grocery stores. The average price for a Glad Trash bag was lower in SBDRs compared to pharmacies. The average price for Honey Nut Cheerios was significantly lower in SBDRs compared to local grocery stores. The average price per ounce for Tide laundry detergent was significantly lower than the average price found in pharmacies. The average price for a glad trash bag was also significantly lower in SBDRs when compared to pharmacies. The average price for a two-liter of Coca-Cola was significantly lower in SBDRs compared to the price in convenience stores.

Because of the possible influence that the Covid-19 pandemic is having on prices, we returned to six SBDRs (varied across store chains and commission districts) and also visited five large grocery stores, five local grocery stores, and 12 pharmacies in August to check prices. The data in Table 5 show that differences exist in the pricing levels across the store types. Again, bold text in the cells at the bottom of the table indicate statistically significant differences. Some changes were observed in the pricing comparisons conducted after the onset of the COVID-19 pandemic. The average price per ounce for Tide was significantly higher in large grocery stores than in SBDRs, while the average price per Glad Trash bag and the average price per ounce for a two-liter of Coca-Cola was significantly higher in SBDRs compared to large grocery stores. The average price for Honey Nut Cheerios remained lower in SBDRs compared to local grocery stores as did the average price per ounce for Tide laundry detergent. The average price per two-liter of Coca-Cola was not statistically different across SBDRs and convenience stores in this analysis.

Table 4. Food Price per Unit Comparison of SBDRs to Other Stores

	SBDR (n=19)	Large Grocery (n=11)	Local Grocery (n=6)	Pharmacy (n=13)	Convenience Store (n=7)
	Mean (s)	Mean (s)	Mean (s)	Mean (s)	Mean (s)
Tide (ounce)	.12 (.01)	.25 (.37)	.17 (.04)	.15 (.02)	
Glad Trash Bags (bag)	.20 (.03)	.17 (.06)	.27 (.09)	.28 (.05)	.15
Gallon Milk (gallon)	3.99 (.76)	3.04 (62)	3.63 (.49)	4.19 (.90)	4.36 (.55)
2 Liter Coca-Cola (2 Liter)	.92 (.06)	.81 (.17)	.97 (.23)	1.14 (.23)	1.20 (.22)
Honey Nut Cheerios (ounce)	.28 (.02)	.29 (.07)	.35 (.03)	.36 (.10)	-
t Tide (sig.)		1.137 (.285)	2.659 (.072)	**4.34 (.000)**	-
t Glad (sig.)		-1.580 (.142)	1.734 (.154)	**5.06 (.000)**	-1.952 (.067)
t Gallon (sig.)		**-3.274 (.004)**	-.966 (.349)	.603 (.553)	.786 (.446)
t Coke (sig.)		-2.043 (.067)	.470 (.662)	3.273 (.220)	**3.262 (.016)**
t Honey (sig.)		.168 (.870)	**5.187 (.000)**	2.751 (.077)	-

Table 5. Food Price per Unit Comparison of SBDRs to Other Stores Updated – only Post Covid

	SBDR (n=6)	Large Grocery (n=5)	Local Grocery (n=5)	Pharmacy (n=12)	Convenience Store (n=6)
	Mean (s)	Mean (s)	Mean (s)	Mean (s)	Mean (s)
Tide (ounce)	.12 (.02)	.14 (.02)	.17 (.04)	.15 (.02)	-
Glad Trash Bags (bag)	.24 (.03)	.17 (.04)	.24 (.05)	.28 (.05)	-
Gallon Milk (gallon)	3.40 (1.37)	2.93 (.82)	3.54 (.52)	4.19 (.90)	4.04 (.07)
2 Liter Coca-Cola (2 Liter)	.99 (.05)	.75 (.19)	.94 (.26)	1.14 (.23)	1.19 (.24)
Honey Nut Cheerios (ounce)	.30 (.02)	.26 (.05)	.35 (.03)	.36 (.10)	-
t Tide (sig.)		**2.312 (.046)**	2.703 (.051)	**3.120 (.007)**	-
t Glad (sig.)		**-3.068 (.013)**	.018 (.986)	1.995 (.077)	-
t Gallon (sig.)		-.707 (.496)	.203 (.844)	1.497 (.154)	-.634 (.550)
t Coke (sig.)		**-2.733 (.046)**	-.438 (.673)	1.590 (.131)	-1.988 (.099)
t Honey (sig.)		-1.305 (.247)	**2.856 (.021)**	1.612 (.127)	-

The final part of our qualitative analysis involved assessing SBDRs and other stores for safety and security features that have been connected to crime prevention (Cozens, Saville & Hillier, 2005; Lawrence, 2004). To do so, selected outside and inside characteristics of stores were evaluated for their

presence (present or not). The percentage of SBDRs possessing each characteristic was compared to the percentage of other stores possessing each characteristic using chi-square tests of independence. When cell sizes were below 5, Fisher's Exact test was used to evaluate significance (indicated using asterisks). N**otable differences were observed in the physical and security features of SBDRs compared to other types of retailers. Prior research (Atlas, 2008) demonstrates that each of these environmental factors is predictive of crime.** As displayed in Table 6, a significantly greater percentage of SBDRs had signs of disorder outside compared to large grocery stores. A significantly greater percentage of large grocery stores and pharmacies had an upscale outside appearance as compared to SBDRs. A significantly greater percentage of convenience stores were standalone stores compared to SBDRs. A significantly greater percentage of large grocery stores, pharmacies, and convenience stores had clear sightlines into the store from outside. Inside characteristics were also evaluated. A significantly greater percentage of large grocery stores, local grocery stores, pharmacies, and convenience stores were clean inside as compared to SBDRs. A significantly greater percentage of large grocery stores had more than one cashier working during the visit than SBDRs, but a significantly greater percentage of SBDRs had more than one cashier working compared to convenience stores. A significantly greater percentage of SBDRs had a merchandise security system and high shelving compared to convenience stores. SBDRs more frequently had cameras and high shelving than local grocery stores (p=.05).

Table 6. Safety and Security Features of SBDRs

	SBDR	Large Grocery	Local Grocery	Pharmacy	Convenience Stores
	% (n)	% (n)	% (n)	% (n)	% (n)
Outside Characteristics					
Well Lit	100.0 (19)	100.0 (11)	100.0 (6)	100.0 (13)	100.0 (7)
Camera	68.4 (13)	81.8 (11)	66.7 (4)	61.5 (8)	100.0 (7)
Signs of Disorder	52.6 (10)	0.0 (0)**	0.0 (0)	23.1 (3)	42.9 (3)
Upscale Appearance	26.3 (5)	63.6 (7)*	0.0 (0)	61.5 (8)*	14.3 (1)
Standalone Store	31.6 (6)	18.2 (2)	33.3 (2)	61.5 (8)	100.0 (7)**
Burglar Bars	31.6 (19)	0.0 (0)	33.3 (2)	30.8 (4)	14.3 (1)
Clear Sightlines	42.1 (8)	100.0 (11)**	83.3 (5)	92.3 (12)**	100.0 (7)*
Inside Characteristics					
Clean	15.8 (3)	100.0 (11)***	66.7 (4)*	61.5 (8)*	71.4 (5)*
Cameras	100.0 (19)	100.0 (11)	66.7 (4)^{t}	100.0 (13)	100.0 (6)
>1 Cashier	57.9 (11)	100.0 (11)*	83.3 (5)	84.6 (11)	0.0 (0)*
Merchandise Safety System	63.2 (12)	45.5 (5)	16.7 (1)	92.3 (12)	0.0 (0)*
High Shelving	100.0 (19)	100.0 (11)	66.7 (4)^{t}	92.3 (12)	0.0 (0)***

*p<.05, **p<.01, ***p<.001, ^{t}p=.05

Quantitative Results

Crime Analysis

We focus our analysis on reported crime data at the census tract level during the 2017-2019 time period. These data are compared to the presence of licensed retailers during 2016-2017. During 2017-2019, the 121 census tracts comprising unincorporated DeKalb County experienced between 0 and

2,682 overall reported crimes, with an average 608 per tract. Counts of reported violent crime varied from 0 to 606 incidents per tract with an average of 126. Property crime levels varied from 0 to 1448, with an average of 337 per tract. Public order offending ranged from 0 to 796 crimes per tract, with an average of 146. During 2016-2017, there were 43 SBDRs, 123 convenience stores, 35 grocery stores, and 28 retail pharmacies licensed in the area comprising unincorporated DeKalb County for the preceding two years, 2016-2017.

The two maps below provide visual representations of the simple, bivariate (1-on-1) relationship between the location of specific types of retailers and overall levels of crime. Research on the relationship between crime and land use suggests that it takes some time for new land uses to impact the social dynamics (e.g., crime) of the surrounding community, as such we plot those businesses that were open for the two-year period 2016 and/or 2017 against crime data for the period 2017-2019. Note that the maps below focus on overall levels of crime but Appendix A provides maps for violent, property, and public order crimes as well, broken out for all of the categories of businesses detailed in the text of the report. In the first map below (Figure 1), black dots represent the location of the 43 SBDRs that were confirmed open for 2016 and/or 2017. Referring to the background shading of the map, red depicts those areas with the highest levels of reported 2017-2019 overall crime, yellow illustrates moderate levels of crime, while green and blue shading indicates lower crime areas. Note that no stores or crime concentrations are plotted for the incorporated areas of the county. **The visual data show that SBDRs, especially those in close proximity to one another, tend to be concentrated in moderate to high crime laden areas of the county.**

The next map (Figure 2) plots the comparison stores (convenience stores, grocery stores, and retail pharmacies) that were open 2016 and/or 2017 against the aggregate level of violent crime for the period 2017-2019. Royal blue dots represent 121 convenience stores, green dots 35 grocery stores, and red dots 28 retail pharmacies. The crime shading and boundaries conventions mirror that of the map above. **These data show that the location of convenience stores, especially when clustered together along main thoroughfares, are associated with moderate to high levels of crime. Grocery stores and retail pharmacies show a weaker association to elevated crime levels.** Referring to Appendix A, note that these relationships hold stable in the heat maps plotting violent, property, and public order crime.

Figure 1.

All Crimes Heat Map (2017-2019) and SBDR

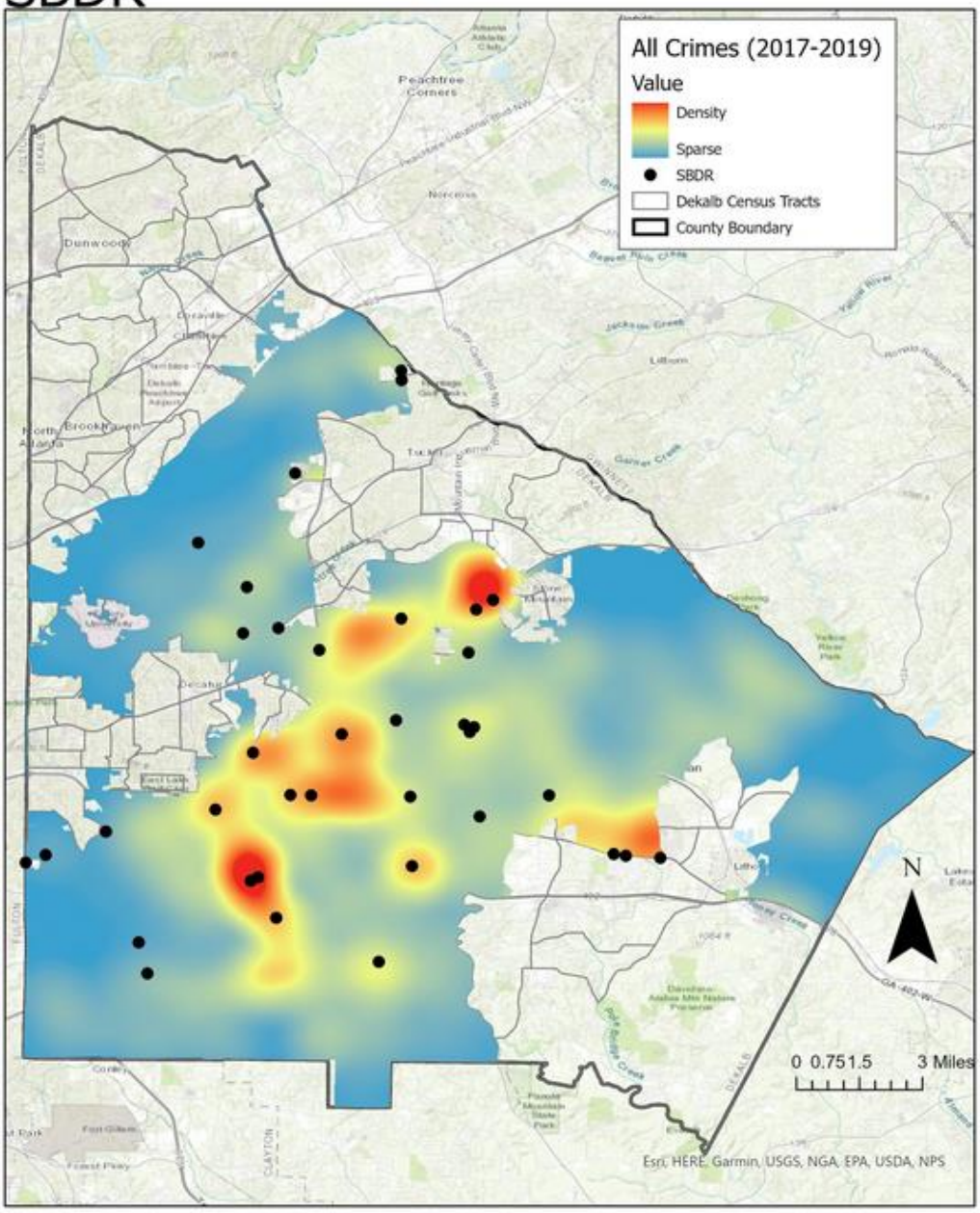
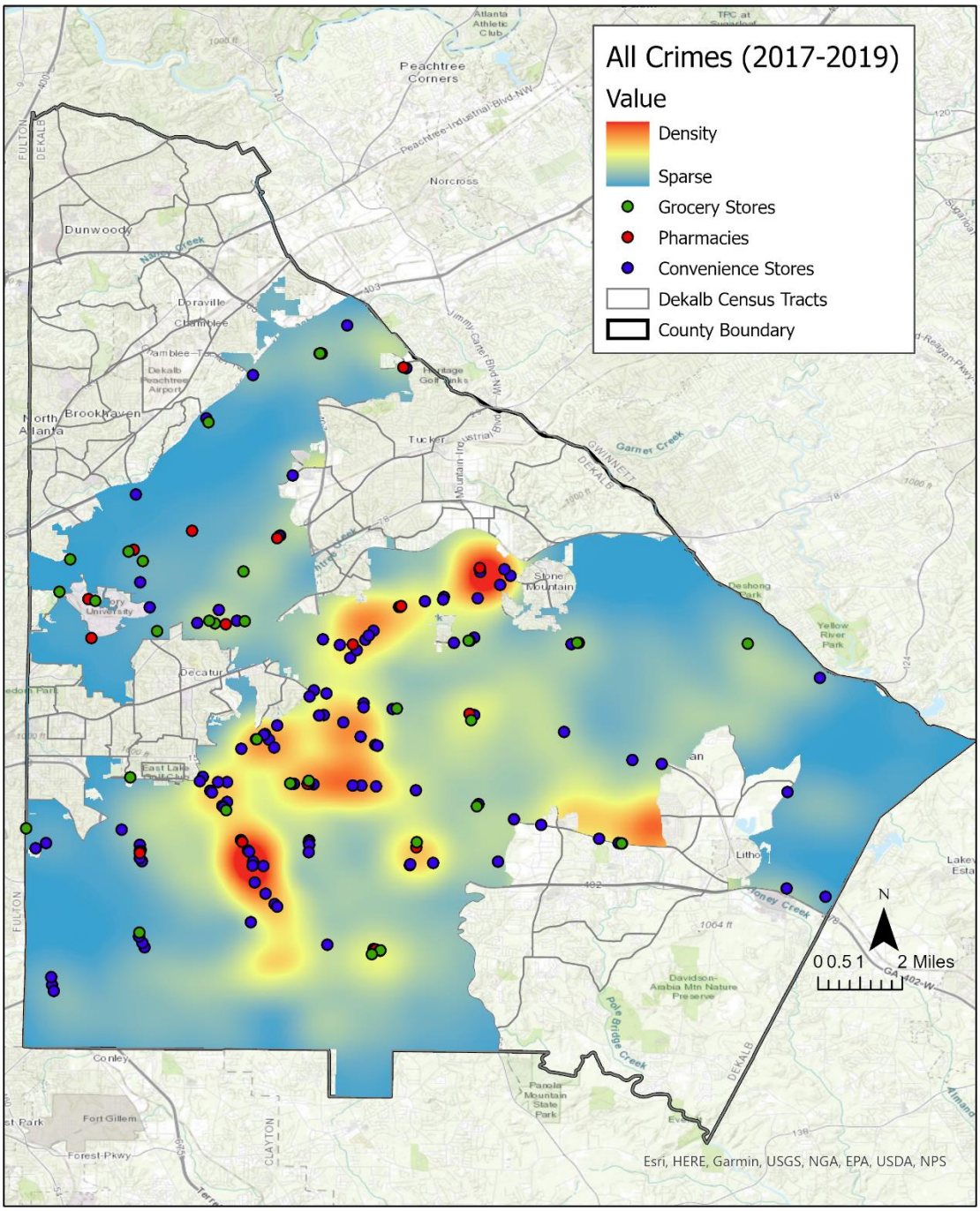


Figure 2.

All Crimes Heat Map (aggregated 2017-2019) and Other Stores



In addition to generating heat maps, we also examined crimes reported to DeKalb Police within 100 feet from SBDR addresses between 2015 and 2019 (N=65). Table 7 displays these results. **Police responded to 2,602 reported crimes at SBDR locations during the period 2015-2019. Of those, over half (53%) were property offenses, about one third were public order offenses (36%), and 11% were violent offenses.** Of the property offenses, 80% were larceny offenses and 7% were burglaries. Vandalism was the most commonly occurring public order offense. Almost half (49%) of all violent offenses were simple assaults, and 35% were robberies.

Table 7. Crimes Occurring Within 100 Feet of SBDR Addresses

	N	%
All Crime	**2,602**	**100.0**
Violent Total	**298**	**11.45**
Aggravated Assault	19	6.38
Simple Assault	145	48.66
Robbery	105	35.23
Property Total	**1,380**	**53.04**
Burglary	100	7.25
Larceny	1,102	79.86
Public Order Total	**924**	**35.51**
Drug Violation	56	6.06
Trespassing	54	5.84
Vandalism	98	10.61

To evaluate the relationship between the number of SBDRs, grocery stores, pharmacies, and convenience stores and the number of crimes (total, violent, property, and public order) in a census tract, we first examine the bivariate relationships (comparing the relationship between two variables) between the number of each type of store and the number of each type of crime. We perform these analyses using store data from one year and crime data from the following year (i.e., 2018 store data to 2019 crime data). We do this for annual data between 2015 and 2019. We also present the bivariate relationships between all other variables. The results for 2018 to 2019 are presented in Table 8. **This bivariate analysis suggests that SBDRs exhibit a stronger relationship with crime levels than some other types of retailers. As can be seen, when examining the simple (1 to 1) relationship, the number of SBDRs is significantly and positively correlated with the number of total crimes, the number of violent crimes, the number of property crimes, and the number of public order crimes**. These positive correlations show that as the number of SBDRs increases, the number of crimes increases the following year. The correlations are moderately strong, ranging from .53 to .57. In terms of comparison, the number of grocery stores is only significantly correlated with the number of property crimes, and correlation is weak (.20). The number of retail pharmacies is not significantly correlated with any of the crime count variables. Like SBDRs, the number of convenience stores is significantly and positively correlated with the number of total crimes, the number of violent crimes, the number of property crimes, and the number of public order crimes. These correlations are moderately strong, ranging from .67 to .71. The correlation matrices for other crime count years and number of store types are presented in Appendix B.

Table 8. Bivariate Correlations Between Crime Counts, Store Counts, and Control Variables

	All Crime 2019	Violent Crime 2019	Property Crime 2019	Public Order Crime 2019	SBDR 2018	Grocery 2018	Pharmacy 2018	Convenience 2018	Poverty	Percent Black	Population
All Crime 2019	1.00										
Violent Crime 2019	.98*	1.00									
Property Crime 2019	.99*	.94*	1.00								
Public Order Crime 2019	.98	.97*	.92*	1.00							
SBDR 2018	.56*	.53*	.54*	.57*	1.00						
Grocery 2018	.17	.11	.20*	.13	.24*	1.00					
Pharmacy 2018	.11	.08	.14	.06	-.22*	-.01	1.00				
Convenience 2018	.70*	.67*	.67*	.71*	.55*	.20*	.17	1.00			
Poverty	.13	.68*	.08	.20*	.06	-.03	-.01	.16	1.00		
Percent Black	.67*	.68*	.65*	.66*	.31*	-.03	.04	.44*	.24*	1.00	
Population	.26*	.25*	.27*	.22*	.15	.10	.09	.09	-.10	.23*	1.00

*p<.05, pairwise correlations

We also estimated multivariate models (negative binomial regression models) to examine the relationship between the number of SBDRs, the number of grocery stores, the number of pharmacies, and the number of convenience stores in a census tract and the number of total crimes, the number of violent crimes, the number of property crimes, and the number of public order crimes in a census tract, holding constant the population size (number of people in the census tract), race (% black) and poverty (percentage below the poverty line) based on the 2010 decennial census and the 2014 American Community Survey. The analysis captures changes over time, as we modelled the outcomes year to year. Specifically, we evaluated models examining counts of stores in 2018 and crime counts in 2019, counts of stores in 2017 and crime counts in 2018, counts of stores in 2016 and crime counts in 2017, and counts of stores in 2015 and crime counts in 2016 to evaluate how the number of stores is related to crime in the following year.

Table 9 presents the results examining crime counts in 2019 when evaluating the relationship between the number of SBDRs in 2018 in a census tract and crime. This first model does not include other store types but does include poverty, percent black, and population of the census tract. In examining the table, the cells represent the coefficients (B) for each variable and the CI is the confidence interval for the coefficient. The B represents the expected factor increase or decrease in the counts of crime for a one-unit change in the variable (e.g., for a 1 unit increase in the count of SBDRs). Confidence Intervals that include 0 show that the B coefficient (the effect) is not statistically significant. They also show the range that the true value of the coefficient is likely to be. You can add and subtract from the coefficient to get an interval within which the true coefficient is likely to fall 95% of the time. For variables that have significant coefficients, we present % change, which indicates the expected % change in the expected count of crime. **As shown, the number of SBDRs in 2018 is associated with an increase**

in the number of total crimes, the number of violent crimes, the number of property crimes, and the number of public order crimes in 2019 when accounting for poverty, percent black, and population in a census tract. **These models indicate that for every additional dollar store in a census tract, the expected number of total crimes increases by 83%, violent crimes by 84%, property crimes by 84%, and public order crimes by 79%.**

Table 9.Negative Binomial Regression Predicting 2019 Crime, SBDR

	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
Only SBDR				
SBDR Store 2018	.60 * (.14-1.06) **82.5**	.61** (.24-.98) **83.8**	.61** (.17-1.06) **84.2**	.58** (.20-.96) **78.9**
Poverty	.00 (-.02-.03)	.01 (-.01-.03)	-.00 (-.03-.02)	.01 (-.01-.03)
Percent Black	.02*** (.02-.03) 2.5	.03*** (.02-.04) 3.0	.02*** (.01-.03) 2.2	.03*** (.02-.03) 2.7
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)

*p<.05, **p<.01, ***p,.001, [t]only reported for significant coefficients

We performed a supplementary analysis that examines the relationship between crime counts in 2019 and the number of convenience stores in a census tract. In this analysis, we did not include the other store types, but did include measures of poverty, percent black, and population of the census tract. This analysis was conducted for several reasons. First, as shown in Table 8, the number of convenience stores and the number of SBDRs in a census tract are significantly, positively correlated. This relationship is moderately strong. **As the number of SBDRs increases in a census tract, so too does the number of convenience stores. Thus, we wanted to isolate the relationship of convenience stores to counts of crime since it appears that SBDRs and convenience stores are commonly found in census tracts.** Second, the relationship shown in Table 8 between the number of convenience stores and number of crimes indicates that a significant, strong, and positive relationship exists between the two. Third, convenience store locations are regulated in unincorporated DeKalb through the Special Land Use Permit (SLUP-6) process. This process resulted from a similar empirical study examining six different types of retailers (auto body shops, liquor stores, convenience stores, fast food restaurants, check cashing stores, and pawn shops). That study showed significant relationships between crime and the presence, clustering, and growth of these retail types. Thus, if SBDRs are similarly related to crime as convenience stores, it may be reasonable to treat SBDRs in a similar fashion. As shown in Appendix C, the number of convenience stores in 2018 is associated with an increase in the expected number of total crime, violent crime, property crime, and public order crime counts in 2019. The percent expected change in crime counts ranges from 40.4% to 43.6%. Thus, our findings demonstrate that the number of SBDRs and convenience stores both are associated with increases in crime counts.

Table 10 presents the results examining crime counts in 2019 but includes measures of the number of SBDRs, the number of grocery stores, the number of pharmacies, and the number of public

order crimes. It also includes measures of poverty, percent black, and population of census tract. This model is informed by research that connects crime levels to diverse commercial land usage. **As can be seen, when evaluating the different store types simultaneously, there is not a statistically significant relationship between the number of SBDRs in 2018 and total crime, violent crime, property crime, or public order crime in 2019.** However, there is statistically significant relationship between the number of grocery stores and the number of convenience stores and the number of property crimes, and the number of convenience stores and the number of public order crimes. For each additional grocery store in a census tract, the expected number of property crimes increases by 51%, while for each additional convenience store in a census tract, the expected number of property crimes increases by 26% and the expected number of public order crimes increases by 28%. **The simple relationship found between the number of SBDRS and crime counts becomes non-significant when accounting for other variables at the multivariate level.**

Table 10. Negative Binomial Regression Predicting 2019 Crime

	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
All Stores				
SBDR 2018	.31 (-.17-.80)	.35 (-.04-.74)	.30 (-.16-.76)	.32 (-.08-.72)
Grocery Store 2018	.39 (-.03-.81)	.32 (-.03-.67)	.41* (.02-.80) 50.8	.33 (-.03-.69)
Pharmacy 2018	.42 (-.29-1.14)	.26 (-.32-.83)	.52 (-.16-1.19)	.24 (-.36-.84)
Convenience Store 2018	.23 (-.01-.47)	.22* (.03-.41) 24.9	.23* (.00-.45) 25.6	.25* (.05-.44) 27.8
Poverty	.00 (-.02-.02)	.01 (-.01-.02)	-.00 (-.02-.02)	.01 (-.01-.02)
Percent Black	.03*** (.02-.03) 2.6	.03*** (.02-.04) 3.0	.02*** (.02-.03) 2.4	.03*** (.02-.03) 2.7
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)

*p<.05, **p<.01, ***p,.001, [t]only reported for significant coefficients

Tables 11 through 13 present the results examining crime counts in 2018, 2017, and 2016 while controlling for the presence of other retailers, poverty, race, and population. The results are relatively consistent over time, such that the number of SBDRs is related at the bivariate level to the number of crimes in a census tract (tables in Appendix D), but that when accounting for the number of other types of stores and our control variables, the relationship becomes non-significant. This suggests that increases in retail land use in general, not one particular type of retailer type, produce increases in all crime levels when controlling for other relevant socio-economic factors. There are a few exceptions. For the 2018 crime count models (Table 11), the number of SBDRs was significantly related to the number of violent crimes even when holding constant the number of other stores as well as the other control

variables. For each additional SBDR in a census tract in 2017, the expected number of violent crimes increased by 71%. In this same year, the number of convenience stores was found to increase the expected counts of property and public order crimes by 25% and 31% respectively. For the 2017 (Table 12) and 2016 (Table 13) crime count models, the only store variable found to be related to the number of crimes was the number of convenience stores. For this year, the number of convenience stores was related to an increase in the number of total crimes, violent crimes, property crimes, and public order crimes. **In total, we find mixed and time varying results regarding the relationship between crime and the number of SBDRs located in the surrounding area. The number of SBDRS is related to the expected number of violent crime counts in 2018, but the number of SBDRS is not significantly related in other years to crime counts. The number of convenience stores is related to an increase in the expected crime counts (of at least one type) in every year.**

Table 11.Negative Binomial Regression Predicting 2018 Crime, SBDR

	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
All Stores				
SBDR 2017	.50 (-.07-1.06)	.53* (.05-1.01) 70.7	.50 (-.04-1.04)	.40 (-.05-.86)
Grocery Store 2018	.31 (-.09-.72)	.31 (-.04-.67)	.32 (-.06-.70)	.28 (-.05-.60)
Pharmacy 2018	.34 (-.34-1.02)	.21 (-.35-.78)	.39 (-.26-1.04)	.24 (-.30-.78)
Convenience Store 2018	.22 (-.01-.45)	.15 (-.04-.35)	.22[#] (-.00-.45) 25.0	.27** (.09-.46) 31.3
Poverty	.00 (-.02-.02)	.01 (-.01-.03)	-.01 (-.03-.02)	.01 (-.01-.03)
Percent Black	.03*** (.02-.03) 2.6	.03*** (.02-.04) 3.1	.02*** (.02-.03) 2.4	.03*** (.02-.04) 2.9
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)

*p<.05, **p<.01, ***p,.001, [#]p=.05, [t]only reported for significant coefficients

Table 12. Negative Binomial Regression Predicting 2017 Crime, SBDR

	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
All Stores				
SBDR 2016	.20 (-.32-.72)	.12 (-.28-.52)	.22 (-.29-.73)	.18 (-.26-.61)
Grocery Store 2016	.36 (-.04-.75)	.35 (.04-.65)	.37 (-.01-.75)	.28 (-.05-.62)
Pharmacy 2016	.41 (-.25-1.37)	.31 (-.19-.80)	.42 (-.23-1.07)	.36 (-.18-.90)
Convenience Store 2016	.27* (.03-.51) 30.7	.29** (.10-.47) 33.3	.25* (.01-.48) 28.2	.32** (.11-.52) 37.6
Poverty	-.00 (-.02-.02)	.00 (-.02-.02)	-.01 (-.03-.01)	.00 (-.01-.02)
Percent Black	.03*** (.02-.03) 2.7	.03*** (.03-.04) 3.5	.02*** (.02-.03) 2.4	.03*** (.02-.04) 2.9
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (.00-.00)

*p<.05, **p<.01, ***p,.001, #p=.05, [t]only reported for significant coefficients

Table 13. Negative Binomial Regression Predicting 2016 Crime, SBDR

	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
All Stores				
SBDR 2015	.25 (-.30-.79)	.14 (-.30-.58)	.27 (-.25-.79)	.23 (-.22-.70)
Grocery Store 2015	.36 (-.06-.79)	.33 (-.03-.68)	.40 (-.00-.80)	.25 (-.12-.61)
Pharmacy 2015	.43 (-.25-1.11)	.27 (-.26-.81)	.50 (-.15-1.15)	.22 (-.32-.77)
Convenience Store 2015	.31* (.06-.56) 36.5	.34** (.13-.54) 40.1	.30* (.06-.53) 34.3	.35** (.15-.55) 41.8
Poverty	-.00 (-.02-.02)	.01 (-.01-.03)	-.01 (-.03-.01)	.00 (-.01-.02)
Percent Black	.03*** (.02-.03) 2.6	.03*** (.03-.04) 3.2	.02*** (.02-.03) 2.5	.03*** (.02-.03) 2.6
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (.00-.00)

*p<.05, **p<.01, ***p,.001, #p=.05, [t]only reported for significant coefficients

Another way to examine the relationship between the number of SBDRs and crime is by examining how the clustering of SBDRs (e.g., having more than one in a relatively small area) is related to crime in a geographical area. This purported clustering effect has led zoning authorities in several jurisdictions to restrict the number of stores located in close proximity to one another (see Table 1). For this analysis, we examined census block groups and identified each block group as having either no or a single SBDR or having two or more SBDRs. We also identified if each block group had no or a single grocery store, pharmacy, and convenience store or two or more. We then examined through negative binomial regression the presence of more than one store type (2019) and its potential relationship to the number of crimes in 2019. First, we explored the relationship between the clustering of SBDRs on the number of total crimes, violent crimes, property crimes, and public order crimes in block groups accounting for median household income and population of the block group. Data for median household income and population of the census block group were taken from the American Community Survey (2018). These results are presented in Table 14. In these models we control for the population and the median household income of the block group and not race or poverty since those variables are only available at the census tract level. **These data suggest that having at least two SBDRs in a census block group was associated with a 225.4% increase in the expected number of property crimes.**

Table 14. Negative Binomial Regression Predicting 2019 Crime, More than 1 Store Block Group

	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
SBDR (2+)	1.06 (-.16-2.28)	1.10 (-.04-2.24)	1.18* (.07-2.29) 225.4	.96 (-.19-2.12)
Median HH Income	-.00*** (-.00-.00) .00	-.00*** (-.00--.00) 0.0	-.00*** (-.00--.00) .00	-.00*** (-.00--.00) .00
Population	.00*** (-.00-.00) .00	.00*** (.00-.00) .00	.00*** (.00-.00) .00	.00*** (.00-.00) .00

*p<.05, **p<.01, ***p,.001

Next, we examined the relationship between the clustering of SBDRs as well as the clustering of grocery stores and convenience stores[11] on the number of total crimes, violent crimes, property crimes, and public order crimes in block groups accounting for median household income and population of the block group (Table 15). **When accounting for the clustering of different store types, the relationship between two or more SBDRs on the number of each type of crime remains in a positive direction but weakens and is not significant.** Having more than one convenience store in a census block group, however, was related to a statistically significant increase in the count of total crime, violent crime, property crime, and public order crime. More than one convenience store in a block group is associated with a 125.3% greater expected count of total crime, 104.6% greater expected count of violent crime, 133.5% greater expected count of property crime, and 129.5% greater count of public order crimes.

[11] We could not include clustering of pharmacies because no census block group had more than one pharmacy.

Table 15. Negative Binomial Regression Predicting 2019 Crime, More than 1 Store Block Group

	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
SBDR (2+)	.52 (-.74-1.78)	.63 (-.59-1.82)	.71 (-.43-1.85)	.35 (-.84-1.54)
Grocery Store (2+)	.58 (-1.13-2.28)	.34 (-1.27-1.95)	.15 (-1.41-1.71)	.81 (-.81-2.42)
Convenience Store (2+)	.81* (.17-1.45) 125.3	.72* (.11-1.32) 104.6	.85** (.26-1.43) 133.5	.83** (.22-1.44) 129.5
Median HH Income	-.00*** (-.00--.00) -0.0	-.00*** (-.00--.00) -0.0	-.00*** (-.00--.00) -0.0	-.00*** (-.00--.00) -0.0
Population	.00*** (-.00-.00) 0.0	.00*** (.00-.00) 0.1	.00*** (.00-.00) 0.0	.00*** (.00-.00) 0.0

*p<.05, **p<.01; p<.001 [t] only presented for significant coefficients

Finally, we examined how the growth of SBDRs may influence the number of crimes that occur in a census tract. To perform this analysis, we aggregated the number of each type of crime for 2018 and 2019. We created a measure that indicates if the number of store type was higher in 2017 than in 2015, which demonstrates an increasing number of stores in a census block. We then examined through multivariate negative binomial regression the relationship between having a greater number of SBDRs and convenience stores[12] in 2017 than in 2015 is related to the total number of crimes, violent crimes, property crimes, and public order crimes (in 2018 and 2019 combined). We again accounted for poverty, percent black, and population of the census tract in the model. Eight census tracts had a greater number of SBDRs and ten census tracts had a greater number of convenience stores in 2017 than in 2015. The results of this analysis are presented in Table 16. **Census tracts with a greater number of SBDRs or a greater number of convenience stores were not associated with a significant increase in the number of total crimes, violent crimes, property crimes, or public order crimes. It should be noted, however, the p value for SBDR increasing in the model predicting violent crime was .077 and was .078 in the model predicting property crime. For violent crime, the expected number of violent crimes increased by 148.2% and by 177.6% for property crime in census tracts that had an increased number of SBDRs between 2015 and 2017.**

[12] We could not include measures reflecting the increase in grocery stores or pharmacies because no census tract showed an increase across the time period for these types of stores.

Table 16. Negative Binomial Regression Predicting 2018-2019 Aggregate Crime, Increasing Number of Stores 2015-2017

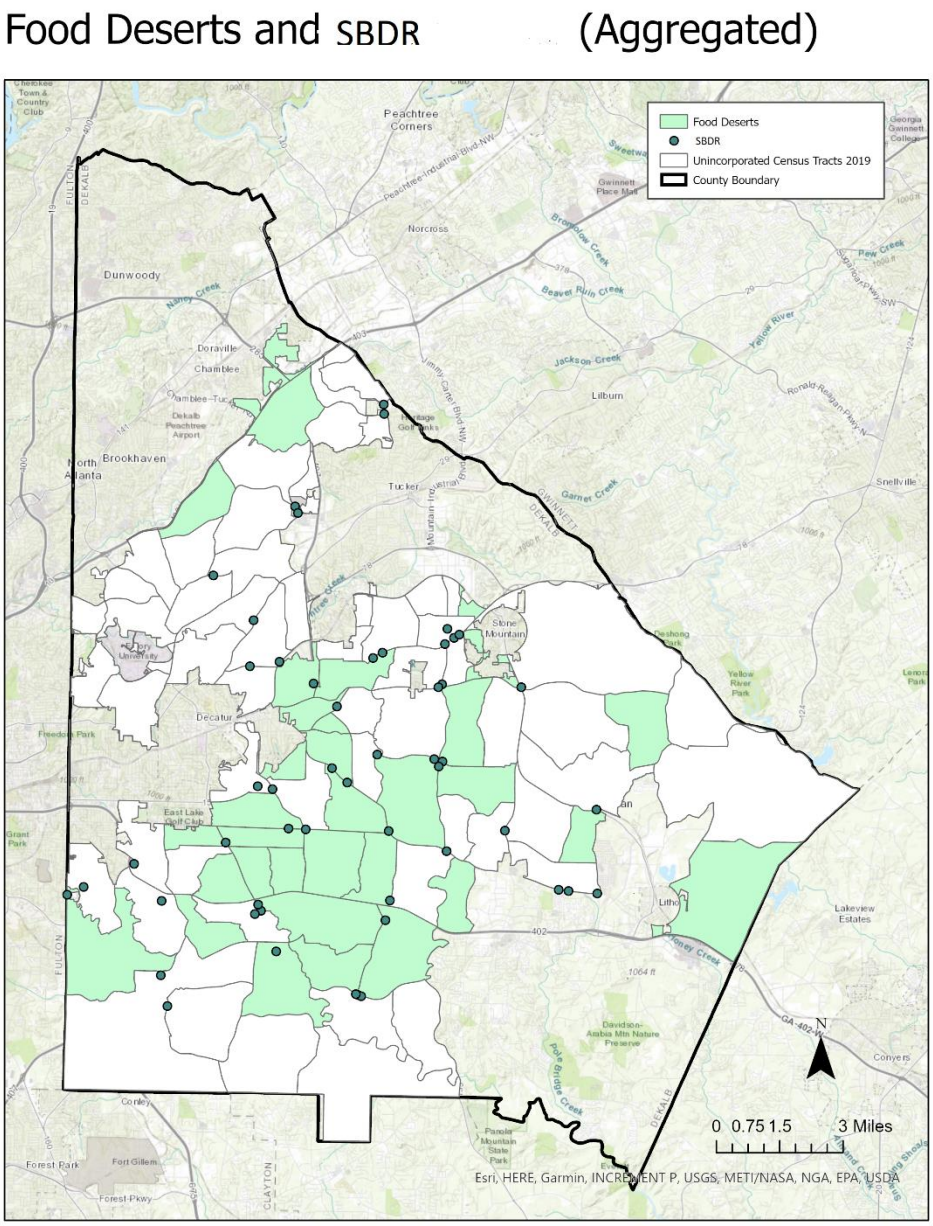
	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
SBDR Increasing	.96 (-.22-2.14)	.91 (-.01-1.92)	1.02 (-.11-2.16)	.82 (-.21-1.85)
Convenience Store Increasing	.34 (-.73-1.40)	.29 (-.62-1.20)	.37 (-.65-1.39)	.28 (-.62-1.20)
Poverty	.00 (-.02-.03)	.01 (-.01-.03)	-.00 (-.03-.02)	.03 (-.01-.04)
Percent Black	.03*** (.02-.04) 2.7	.03*** (.02-.04) 3.2	.02*** (.02-.03) 2.4	.03*** (.02-.04) 3.0
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)

*p<.05, **p<.01; p<.001 [t] only presented for significant coefficients

Food Availability

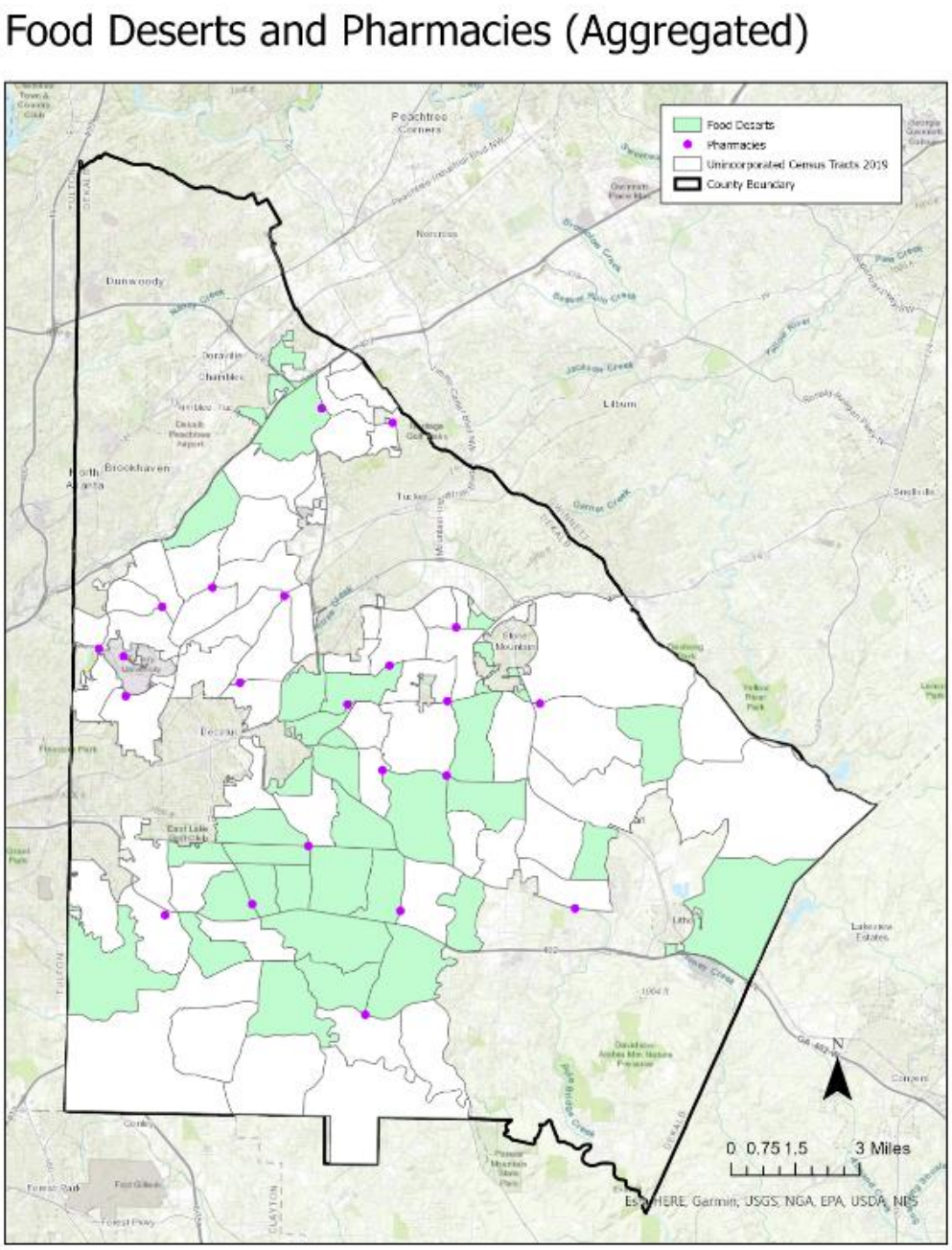
Research suggests that certain types of businesses are associated with food accessibility and poor nutrition among the residents (Caspi, et al., 2015; Drichoutis, et al., 2015). As such, we conducted as series of analyses to explore the relationship between census tract-level food deserts and Social Vulnerability Index (SVI) values and the presence of the following types of retailers: SBDRs, grocery stores, convenience stores, and retail pharmacies. The map below (Figure 3) overlays SBDR locations (dark green dots) onto areas deemed food deserts in 2017. The shaded areas are low-income census tracts with at least 500 persons and/or at least 33% of the population who live more than one mile from a large grocery store (Ploeg, Nulph, & Williams, 2011). **The data show that half of the SBDRs in unincorporated DeKalb County (aggregated for 2017-2019) are located in or adjacent to a food desert and almost every food desert is home to one or more SBDR.**

Figure 3.



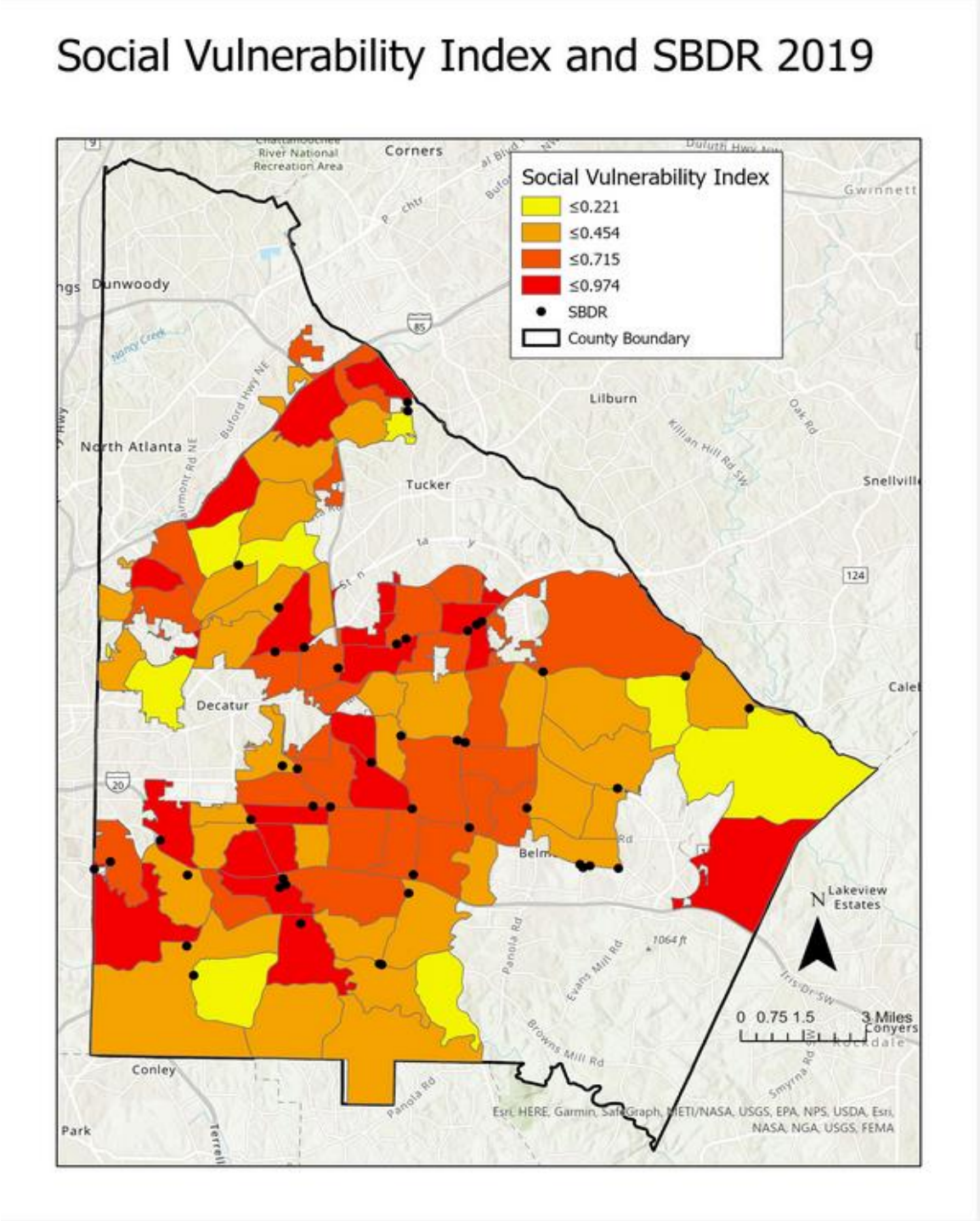
The next map (Figure 4) plots the location of retail pharmacies (pink dots) aggregated for 2017-2019 relative to food desert census tracts (light green shaded areas). **Note that, despite offering a comparable selection of perishable and non-perishable food items, a lower proportion of retail pharmacies are located in census tracts that met the USDA's definition of a food desert in 2017.**

Figure 4.



The map below (Figure 5) plots the location of SBDRs (green dots) relative to the 2016 Social Vulnerability Index scores of each census tract. The SVI is a proxy measure for food insecurity, where the yellow shaded areas represent high food security and the orange areas low levels of food security. **The data show that SBDRs tend to be located in areas that suffer from food insecurity.**

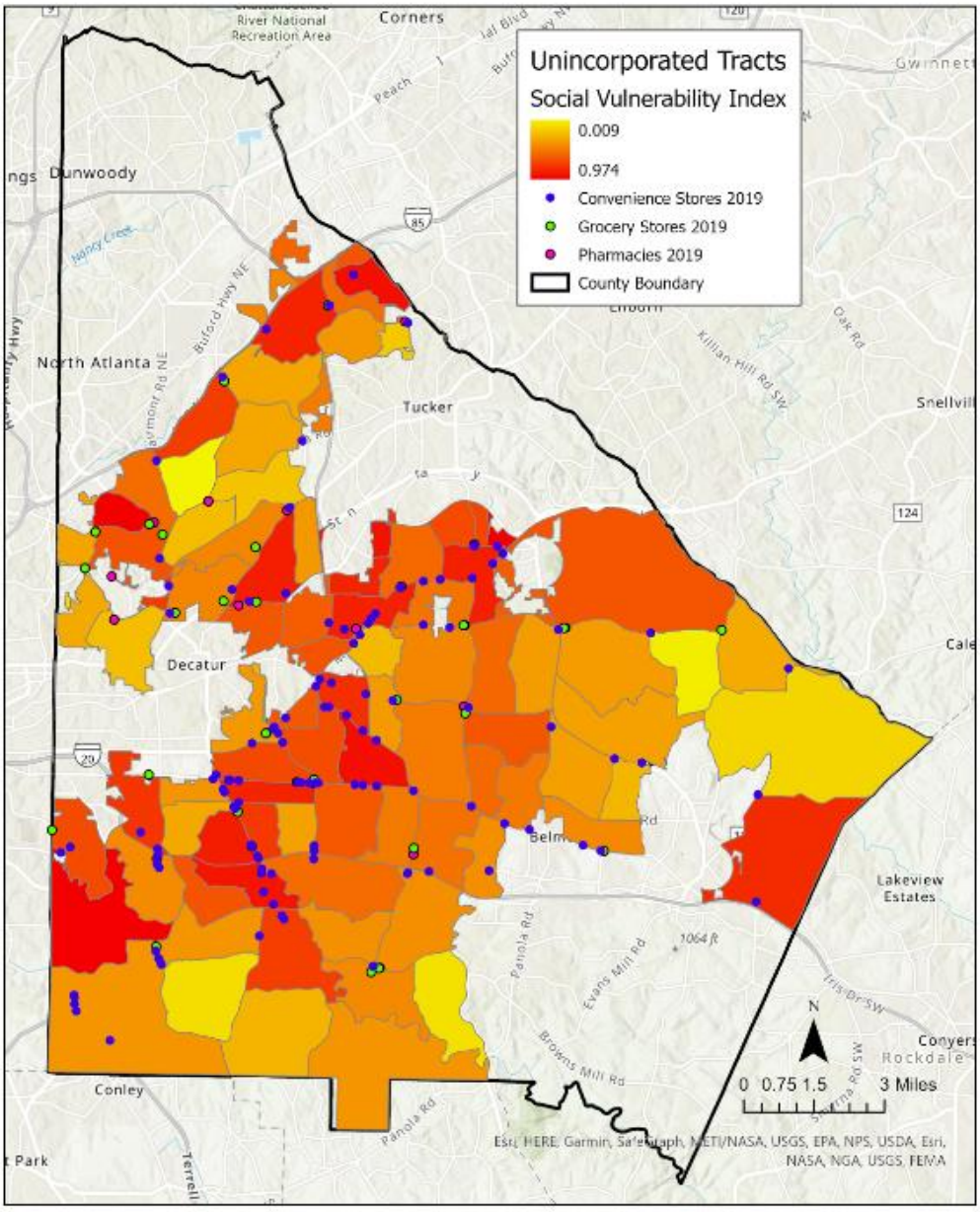
Figure 5



The next map (Figure 6) plots the location of convenience stores (blue dots), grocery stores (green dots), and retail pharmacies (pink dots) relative to social vulnerability scores at the census tract level. **This visual representation suggests that convenience stores and pharmacies tend to be associated with high levels of food insecurity more so than grocery stores.**

Figure 6

Social Vulnerability Index and Other Stores 2019



The next set of analyses involve examining census tracts for the number of SBDRs, grocery stores, pharmacies, and convenience stores and their relationship to the social vulnerability index (SVI) for each census tract. The bivariate analyses evaluate the correlations between the number of each store type and the SVI. Table 17 presents these correlations for the SVI in 2016 and number of store types in 2019 along with our other control variables. **As can be seen, we found little evidence of a statistical correlation between food insecurity and retailer presence, as the number of SBDRs is not significantly correlated with the SVI of a census tract, and neither were the number of grocery stores, pharmacies, or convenience stores.**

Table 17. Bivariate Correlations Between SVI, Number of Stores 2019, and Control Variables

	SVI 2016	SBDR 2019	Grocery 2019	Pharmacy 2019	Convenience 2019	Poverty	Percent Black	Population
SVI 2016	1.00							
SBDR 2019	0.15	1.00						
Grocery 2019	0.00	0.20*	1.00					
Pharmacy 2019	-0.03	0.19*	-0.01	1.00				
Convenience 2019	0.14	0.50*	0.18*	0.17	1.00			
Poverty	0.68*	0.06	-0.03	-0.02	0.14	1.00		
Percent Black	0.12	0.32*	-0.03	0.04	0.41*	0.24*	1.00	
Population	0.12	0.15	0.10	0.09	0.09	-0.10	0.23*	1.00

*p<.05, pairwise correlations

Multivariate analyses were also performed examining the relationship between the number of SBDRs, the number of grocery stores, the number of pharmacies, and the number of convenience stores and the SVI, while controlling for poverty, race, and population levels. Store data from 2019 was evaluated for its relationship to SVI in 2016. The results of this model are displayed in Table 18. **The number of SBDRs was not statistically significantly related to levels of food insecurity as measured by the SVI. The number of grocery stores, pharmacies, and convenience stores were also shown to not be statistically significantly related to this food security proxy measure.**

Table 18.Ordinary Least Squares Regression Predicting Social Vulnerability Index Score, 2019

	B (s.e.)
SBDR	.12 (.03)
Grocery Store	-.03 (.03)
Pharmacy	-.07 (.05)
Convenience Store	-.01 (.01)
Poverty	.70*** (.00)
Percent Black	-.11 (.00)
Population	.18* (.00)

*p<.05, **p,.01, ***p<.001

Residential Property Values

Research suggests that certain types of businesses are associated with lower property values in the surrounding areas (Dabney et al., 2017; Saphores & Aguilar-Benitez, 2005). We conducted a series of analyses to explore the relationship between census tract-level residential property values and the presence of the following types of retailers: SBDRs, grocery stores, convenience stores, and retail pharmacies. First, we generated a series of maps plotting the presence of these retail types relative to the median parcel value in the surrounding census tract. The 2019 data are presented below in Figure 7. The 2019 locations of SBDRs appear as black dots in the first map below. Light shading (yellow) indicates low property values while orange and red blue depict higher values. **Note that most SBDRs are located in block groups with the lowest 2019 median home values.**

Next, we mapped the location of convenience stores, grocery stores, and retail pharmacies relative to the 2019 median parcel values in the surrounding census tract (Figure 8). **The location of convenience stores (black dots) closely mimics that of SBDRs (i.e., many situated in yellow shaded tracts), but grocery stores (green triangles) and retail pharmacies (blue boxes) are often located in areas with elevated median home values (i.e., sited in orange or red shaded tracts). Note that maps overlaying retail store locations onto all land values are presented in Appendix E. Similar patterns are visible.**

Figure 7

Median Home Values by Unincorporated Census Blocks and SBDR 2019

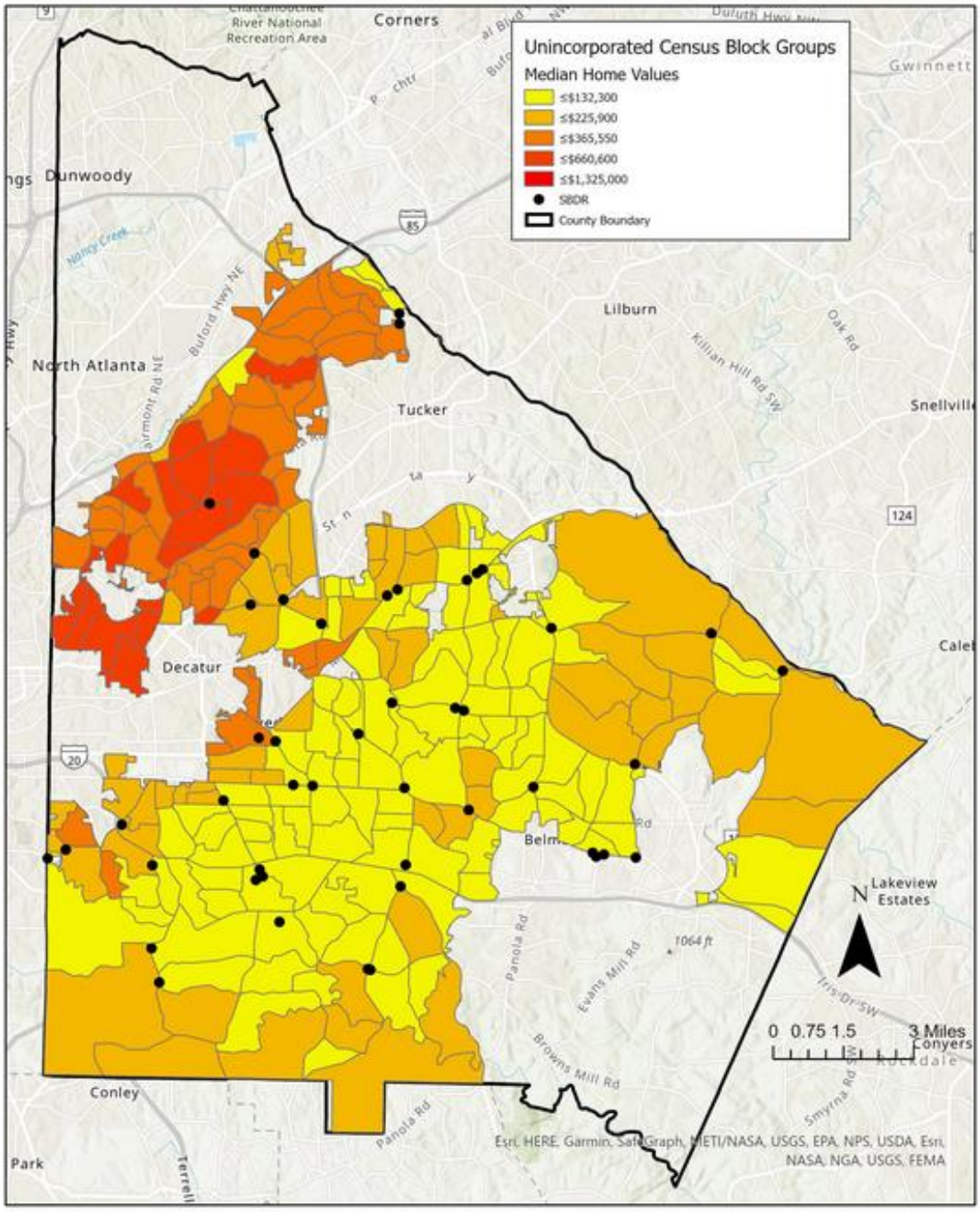
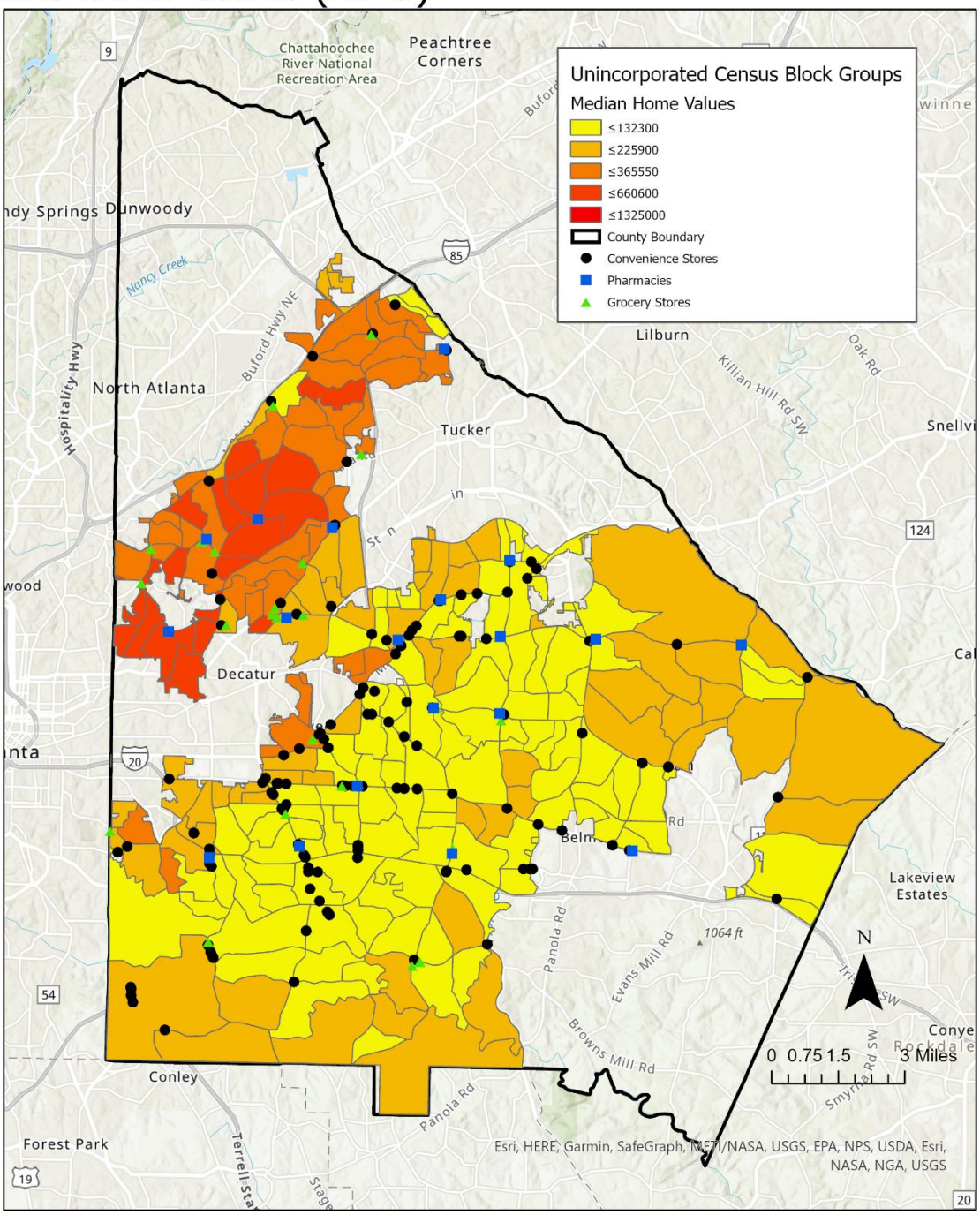


Figure 8

Median Home Values by Unincorporated Census Blocks and Other Stores (2019)



We evaluate the relationship between the number of SBDRs and property values using two different measures for property values. First, we evaluate the relationship between the number of SBDRs and the median parcel value in a census tract. This measure captures all land parcels. Second, we evaluate the relationship between the number of SBDRs and the median residential property value in a census block group. To evaluate the potential relationships between the number of different store types on medial parcel values of a census tract, bivariate correlations between the number of SBDRs, grocery stores, pharmacies, and convenience stores and the median parcel value of census tracts were evaluated. We examine the number of each type of store for 2018 and the correlation between median parcel value in 2019. We took the natural log of the median parcel values because of the skewed nature of the distribution of the variable. We also examine the number of each store type for 2017 and median parcel value in 2018, the number of each store type for 2016 and median parcel value in 2017, and the number of each store type for 2015 and median parcel value for 2016. Table 19 displays the correlations for number of each store type in 2018 and median parcel value 2019 along with the correlations between these variables and our other control variables. **The number of SBDRs is negatively, significantly correlated with the median parcel value in a census tract.** This correlation is moderately weak (-.29). The number of convenience stores and median parcel value was also significantly, negatively correlated with a moderate relationship (-.41). The correlation matrices for other years are shown in Appendix F. Generally, these relationships hold across years.

Table 19. Bivariate Correlations Between Median Parcel Value (log), Store Counts 2019, and Control Variables

	Median Parcel 2019	SBDR 2018	Grocery 2018	Pharmacy 2018	Convenience 2018	Poverty	Percent Black	Population
Median Parcel 2019	1.00							
SBDR 2018	-0.29*	1.00						
Grocery 2018	0.01	0.24*	1.00					
Pharmacy 2018	-0.05	0.22*	-0.01	1.00				
Convenience 2018	-0.41*	0.55*	0.20	0.16	1.00			
Poverty	-0.13	0.06	-0.03	-0.03	0.16	1.00		
Percent Black	-0.84*	0.31*	-0.03	0.02	0.44*	0.24*	1.00	
Population	-0.26*	0.15	0.10	0.09	0.09	-0.10	0.24*	1.00

*p<.05; pairwise correlations

Next, multivariate analyses (ordinary least squares regression models) were conducted to evaluate the effect of the number of each store type on median parcel values (logged) in a census tract. For each analysis, we used the number of each store type from a year predicting values of median parcel values for the following year from 2015-2019. Table 20 shows the results. As indicted, the number of SBDRs was not statistically significantly related to median parcel value in any year. The number of the other store types were also not statistically significantly related to median parcel value. **As with the crime data, the bivariate relationship between the number of SBDRs and median parcel value is rendered non-significant when the number of other store types and other control variables are included in the multivariate analysis.**

Table 20. Ordinary Least Squares Regression Predicting Median Parcel Value (log)

	2019	2018	2017	2016
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
SBDR[t]	-.02 (.06)	.01 (.06)	.00 (.10)	-.03 (.10)
Grocery Store	-.01 (.05)	-.01 (.05)	-.03 (.07)	-.03 (.08)
Pharmacy	-.01 (.09)	.01 (.07)	-.03 (.12)	-.03 (.13)
Convenience Store	-.06 (.03)	-.11 (.03)	-.14 (.04)	-.13 (.05)
Poverty	.03 (.00)	.05 (.00)	.04 (.00)	.05 (.00)
Percent Black	-.80*** (.00)	-.83*** (.00)	-.73*** (.00)	-.73*** (.00)
Population	-.06 (.00)	-.02 (.00)	.03 (.00)	.03 (.00)

*p<.05, **p,.01, ***p<.001

[t]Store counts taken from previous year for each model

We also investigated the relationship between median home values and the number of SBDRs, grocery stores, pharmacies, and convenience stores in census block groups. In doing so, we first examine the bivariate (1-to1) relationship between the number of each type of store, the median home value in the block group, and our control variables (percent homes built before 2000, the percent of renters, and total population in block group). These control variables are all taken from 2018 American Community Survey (ACS) data. Bivariate correlations between median home value and the number of SBDRs, the number of other store types, and the control variables are presented in Table 21 for 2019 median home value and 2018 store data, and 2018 ACS data. **As shown, the median home value (log) in 2019 was not significantly correlated with the number of SBDRs, the number of grocery stores, or the number of pharmacies in a census block in 2018. However, the number of convenience stores in 2018 was negatively and significantly correlated with the median home value (log) in 2019.** Appendix G shows the bivariate correlations between the other years of median home value and store counts from the previous year. Patterns of correlations are similar across years, except for 2015 store counts and 2019 median home value. **In 2015, the number of SBDRs was significantly, negatively correlated with the median home value of a census block.**

Table 21. Bivariate Correlations Median Home Value (log) 2019, Store Counts 2018, and Control Variables in Census Block

	Median Home Value 2019	SBDR 2018	Grocery 2018	Pharmacy 2018	Convenience 2018	Population	Percent Built Before 2000	Percent Rent
Median Home Value 2019	1.00							
SBDR 2018	-0.09	1.00						
Grocery 2018	0.12	0.26*	1.00					
Pharmacy 2018	0.07	0.08	0.02	1.00				
Convenience 2018	-0.27*	0.34*	0.08	0.06	1.00			
Population	-0.04	0.22*	0.06	0.01	0.03	1.00		
Percent Built Before 2000	-0.02	0.17*	-0.01	-0.06	0.00	0.45*	1.00	
Percent Rent	-0.29*	0.07	-0.01	0.01	0.20*	0.07	0.09	1.00

*p<.05, pairwise correlations

Table 22 presents the findings from the multivariate analysis with only the number of SBDRs and the control variables predicting median home values (we first took the natural log of median home value given its skewed distribution).[13] For each model, data for the number of SBDRs was taken from the year prior to the median home value. **As shown, the number of SBDRs (2015) was only associated with a decrease in median home values in 2016. In that year, each additional SBDR was associated with a .15 decrease in the logged median home value in the census block group.**

Table 22. Regression Predicting Median Home Value (log) of Census Block Group, SBDRs

	2019	2018	2017	2016
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
$SBDR^t$	-.05 (.09)	-.05 (.09)	-.04 (.10)	-.15* (.11)
Percent Homes Built Before 2000	.13 (.00)	.13 (.00)	.10 (.00)	.08 (.00)
Percent Rental	-.30*** (.00)	-.30*** (.00)	-.32*** (.00)	-.31*** (.00)
Population	-.10 (.00)	-.10 (.00)	-.06 (.00)	-.02 (.00)

*p<.05, **p,.01, ***p<.001

The next table (Table 23) presents the findings when the number of the other stores types was also included in the model along with control variables. **Even when accounting for the number of other store types, the number of SBDRs is significantly related to a decrease in the median home value in 2015. It was not statistically significant in any other year. For each additional SBDR, the median home**

[13] For 2015, the natural log median home value had a distribution that ranged from 9.24-13.86 (original distribution was 10,300 to 1,044,900)

value (log) declined by .15 in the census block. The number of other stores types was more consistently significantly related to median home value of the census block group. For instance, each additional grocery store in a census block group was associated with an increase of .15 in the median home value (logged) in 2019, and of .14 in 2018 and 2016. The number of convenience stores was significantly related to a decrease in median home value (log). Each additional convenience store in the census block group was associated with a decrease in the median home value (log) of .21 in 2019 and 2018, .18 in 2017, and .16 in 2016. **Collectively, these results suggest that elevated levels of retail land use are related to decreasing property values in general and residential property values in particular.**

Table 23. Regression Predicting Median Home Value (log) Census Block Group, All Stores

	2019	2018	2017	2016
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
SBDR[t]	-.05 (.08)	-.01 (.11)	-.03 (.11)	-.15* (.11)
Grocery Store	.15* (.08)	.14* (.10)	.13 (.10)	.14* (.11)
Pharmacy	.09 (.12)	.08 (.14)	.08 (.14)	.10 (.15)
Convenience Store	-.21** (.04)	-.17* (.05)	-.18* (.05)	-.16* (.06)
Percent Homes Built Before 2000	.13 (.00)	.09 (.00)	.10 (.00)	.07 (.00)
Percent Rental	-.25*** (.00)	-.29*** (.00)	-.29*** (.00)	-.30*** (.00)
Population	-.11* (.00)	-.08 (.00)	-.07 (.00)	-.02 (.00)

*p<.05, **p,.01, ***p<.001

[t]Store counts taken from previous year for each model

The last set of analyses involved examining the clustering of more than one SBDR, grocery store, pharmacy, and convenience store in census block groups and their relationship with median home values (log). These analyses continue to control for percent homes built 2000 or later, percent renters, and population for the census block group. **As displayed in Table 24, having two or more SBDRs in a census block group in one year is not significantly related to median home values in the following year.** We examined other store types and their clustering to see if they were significantly related to median home values. These results are in Table 25. **Having two or more SBDRs remains unrelated to median home value but having more than two convenience stores in a census block is related to a reduction in median home values in the census block in each year.**

Table 24. Ordinary Least Squares Regression Predicting Median Home Value, More than 1 Store Block Group

	2019	2018	2017	2016
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
SBDR (2+)[t]	-.01 (.23)	-.00 (.52)	-.01 (.32)	-.09 (.47)
Percent Homes Built Before 2000	.12 (.00)	.13 (.00)	.09 (.00)	.09 (.00)
Percent Rental	-.30*** (.00)	-.31*** (.00)	-.32*** (.00)	-.31*** (.00)
Population	-.11 (.00)	-.11 (.00)	-.07 (.00)	-.03 (.00)

*p<.05

[t]Store counts taken from previous year for each model

Table 25. Ordinary Least Squares Regression Predicting Median Home Value, More than 1 Store Block Group

	2019	2018	2017	2016
	B (s.e.)	B (s.e.)	B (s.e.)	B (s.e.)
SBDR (2+)[t]	.06 (.25)	.04 (.52)	.03 (.35)	-.05 (.49)
Grocery Store (2+)	.09 (.26)	.11 (.25)	.08 (.32)	.02 (.38)
Convenience Store (2+)	-.23** (.11)	-.20* (.11)	-.15* (.15)	-.15* (.15)
Percent Homes Built Before 2000	.11 (.00)	.12 (.00)	.08 (.00)	.07 (.00)
Percent Rental	-.25*** (.00)	-.26*** (.00)	-.29 (.00)	-.30*** (.00)
Population	-.11 (.00)	-.10 (.00)	-.06 (.00)	-.03 (.00)

*p<.05

[t]Store counts taken from previous year for each model

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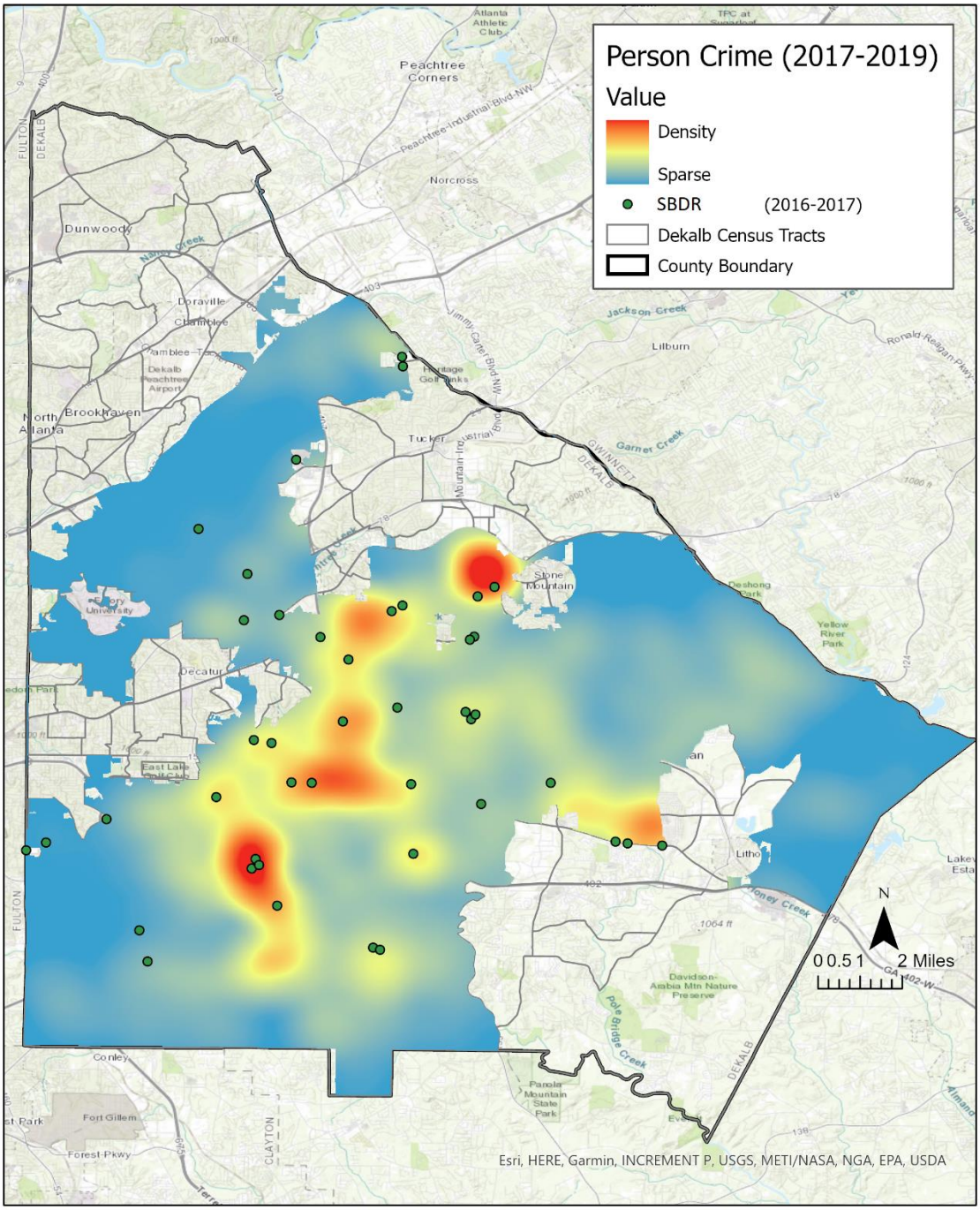
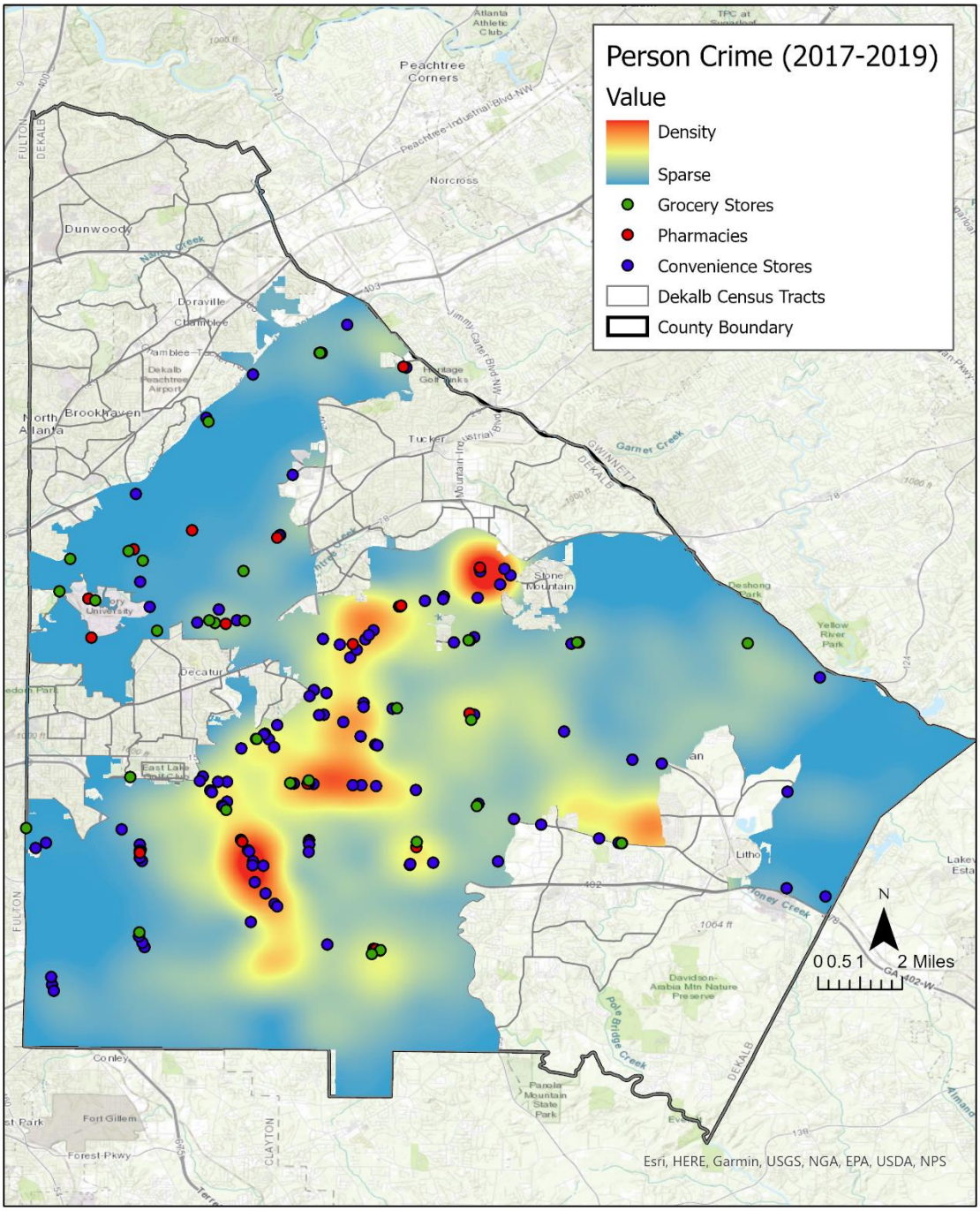
Appendix A – Supplemental Crime Heat Maps

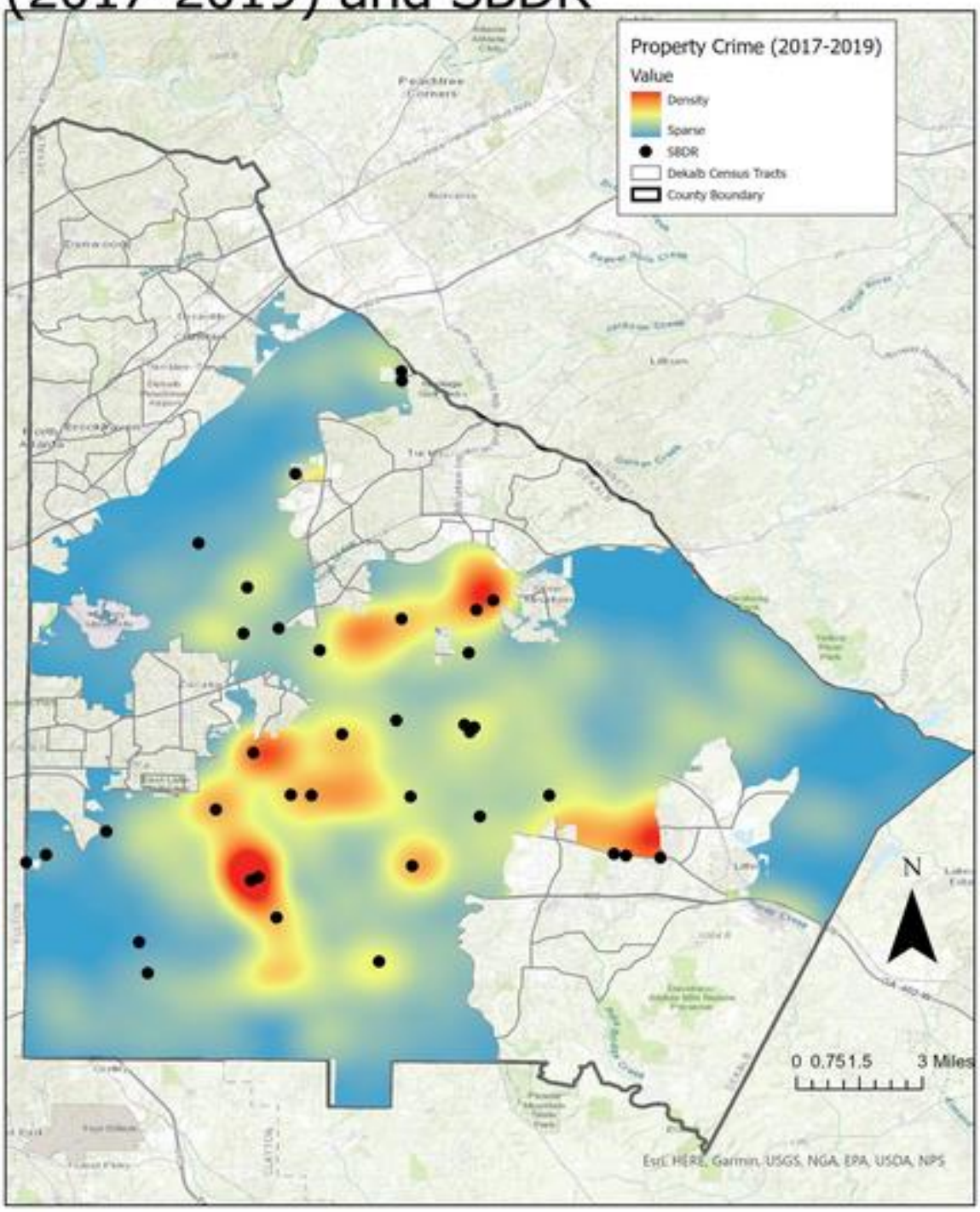
Person Crimes Heat Map (aggregated 2017-2019) and SBDR



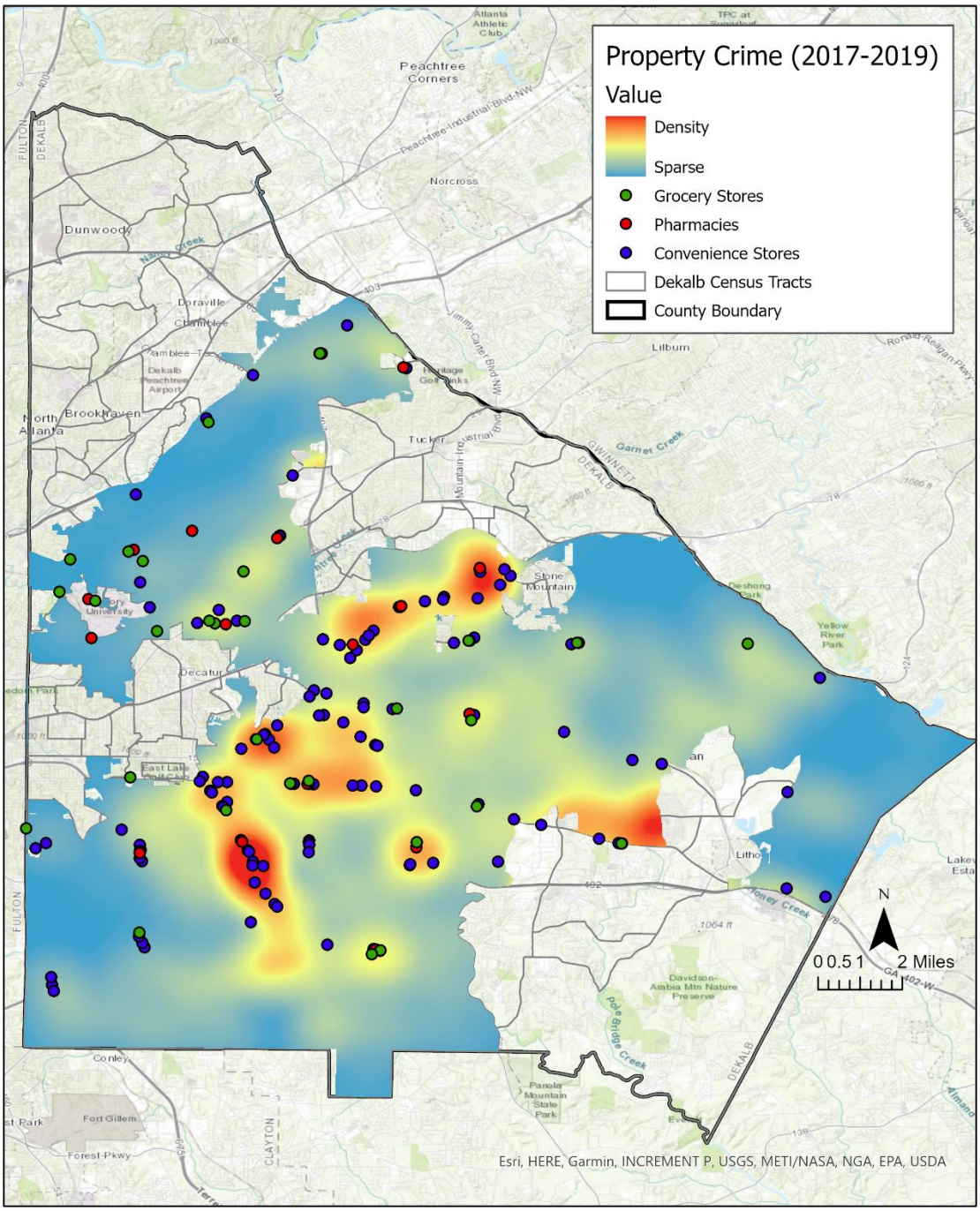
Person Crimes Heat Map (aggregated 2017-2019) and Other Stores



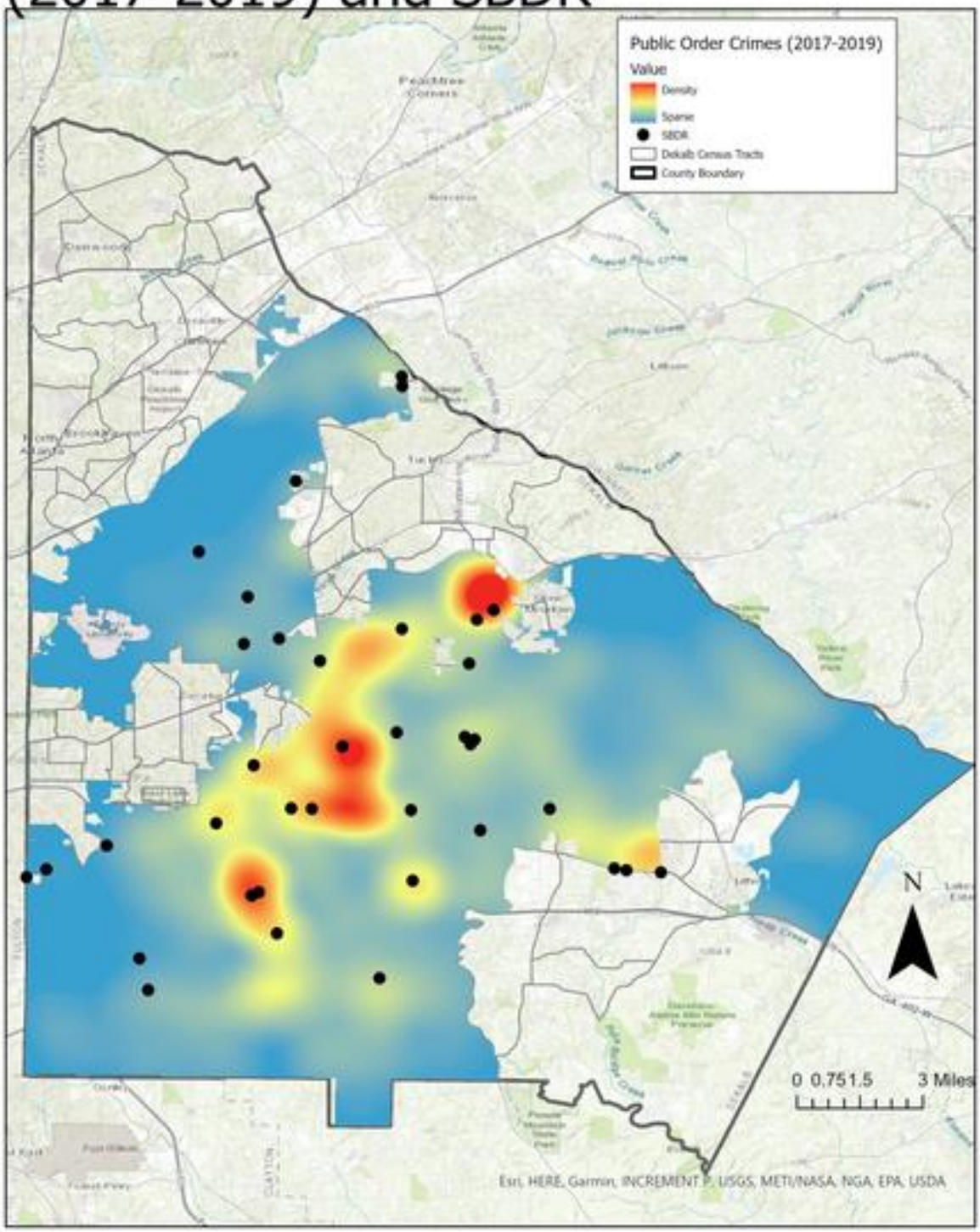
Property Crimes Heat Map (2017-2019) and SBDR



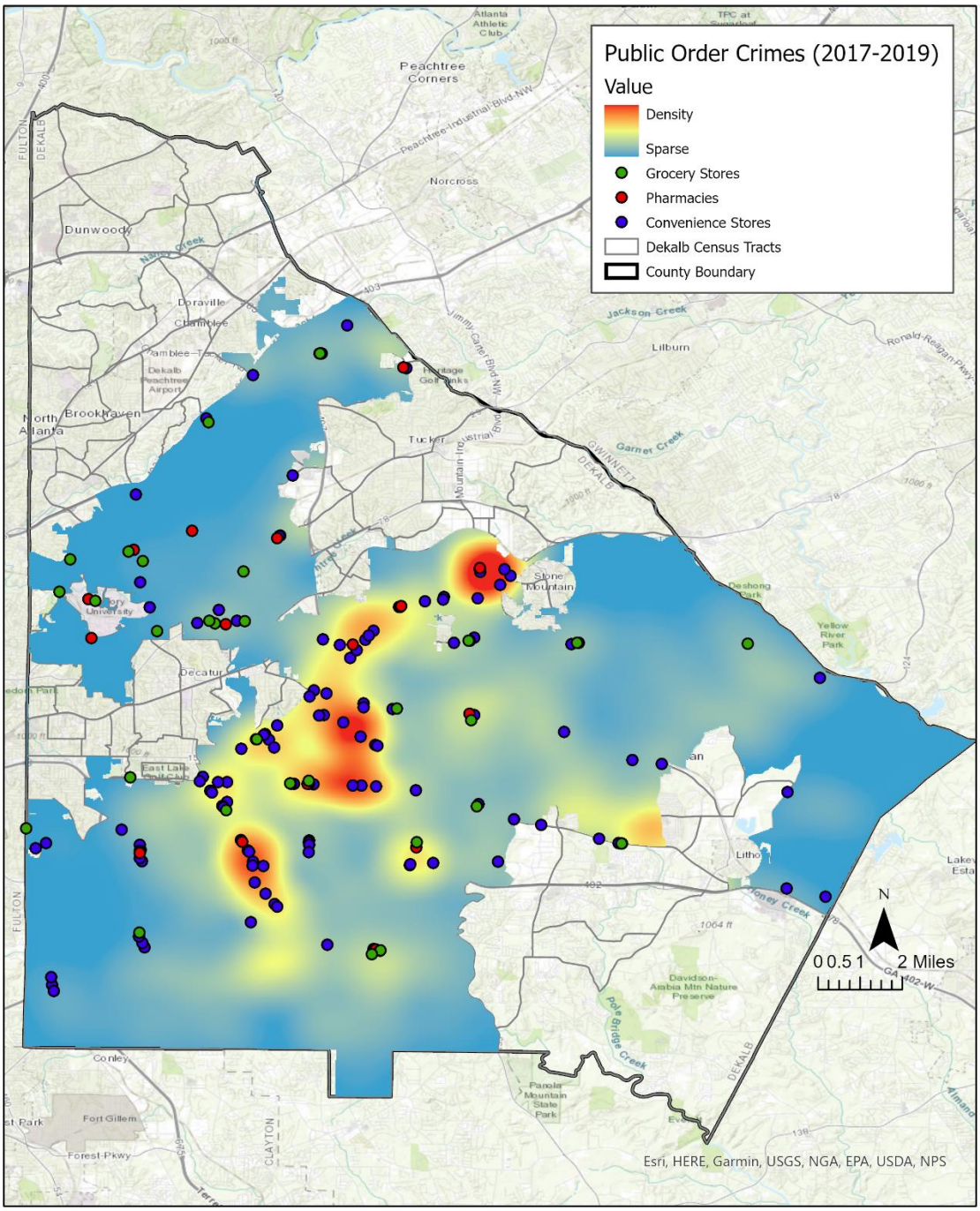
Property Crimes Heat Map (aggregated 2017-2019) and Other Stores



Public Order Crimes Heat Map (2017-2019) and SBDR



Public Order Crimes Heat Map (aggregated 2017-2019) and Other Stores



Appendix B. Bivariate Correlation Matrices Crime

Bivariate Correlations Between Crime Counts, Store Counts, and Control Variables 2018											
	Total Crime 2018	Violent Crime 2018	Property Crime 2018	Public Order Crime 2018	SBDR 2017	Grocery 2017	Pharmacy 2017	Convenience 2017	Poverty	Percent Black	Population
Total Crime 2018	1.00										
Violent Crime 2018	0.98*	1.00									
Property Crime 2018	0.99*	0.95*	1.00								
Public Order Crime 2018	0.96*	0.94*	0.91*	1.00							
SBDR 2017	0.58*	0.54*	0.59*	0.55*	1.00						
Grocery 2017	0.17	0.13	0.21*	0.12	0.23*	1.00					
Pharmacy 2017	0.12	0.11	0.14	0.08	0.21*	0.22*	1.00				
Convenience 2017	0.69*	0.62*	0.69*	0.70*	0.50*	0.21*	0.18*	1.00			
Poverty	0.12	0.13	0.08	0.19*	0.07	-0.04	-0.02	0.17	1.00		
Percent Black	0.66*	0.69*	0.64*	0.62*	0.31*	-0.02	0.02	0.43*	0.24*	1.00	
Population	0.27*	0.27*	0.29	0.21*	0.18	0.11	0.10	0.08	-0.10	0.23*	1.00

*p<.05, pairwise correlations

Bivariate Correlations Between Crime Counts, Store Counts, and Control Variables 2017											
	Total Crime 2017	Violent Crime 2017	Property Crime 2017	Society Crime 2017	SBDR 2016	Grocery 2016	Pharmacy 2016	Convenience 2016	Poverty	Percent Black	Population
Total Crime 2017	1.00										
Violent Crime 2017	0.98*	1.00									
Property Crime 2017	0.99*	0.95*	1.00								
Society Crime 2017	0.98*	0.96*	0.94*	1.00							
SBDR 2016	0.49*	0.45*	0.49*	0.50*	1.00						
Grocery 2016	0.20*	0.16	0.22*	0.15	0.31*	1.00					
Pharmacy 2016	0.12	0.10	0.12	0.12	0.22*	0.21	1.00				
Convenience 2016	0.68	0.65*	0.65*	0.71*	0.56*	0.19*	0.19*	1.00			
Poverty	0.09	0.11	0.05	0.16	0.06	-0.02	-0.02	0.15	1.00		
Percent Black	0.67*	0.71*	0.65*	0.65*	0.29*	-0.01	0.02	0.43*	0.24*	1.00	
Population	0.27*	0.26*	0.30*	0.21*	0.10	0.11	0.10	0.09	-0.10	0.23*	1.00

*p<.05, pairwise correlations

Bivariate Correlations Between Crime Counts, Store Counts, and Control Variables 2016											
	Total Crime 2016	Violent Crime 2016	Property Crime 2016	Society Crime 2016	SBDR 2015	Grocery 2015	Pharmacy 2015	Convenience 2015	Poverty	Percent Black	Population
Total Crime 2016	1.00										
Violent Crime 2016	0.98*	1.00									
Property Crime 2016	0.99*	0.95*	1.00								
Society Crime 2016	0.97*	0.97*	0.94*	1.00							
SBDR 2015	0.46*	0.42*	0.46*	0.45*	1.00						
Grocery 2015	0.19*	0.14	0.22*	0.15	0.23*	1.00					
Pharmacy 2015	0.12	0.10	0.13	0.11	0.16	0.21*	1.00				
Convenience 2015	0.69*	0.66*	0.68*	0.71*	0.46*	0.21*	0.24*	1.00			
Poverty	0.11	0.17	0.07	0.18	0.08	-0.02	-0.02	0.11	1.00		
Percent Black	0.65*	0.68*	0.63*	0.64*	0.28*	-0.01	0.02	0.41*	0.24*	1.00	
Population	0.23*	0.20*	0.25*	0.18	0.11	0.11	0.10	0.08	-0.10	0.23*	1.00

*p<.05, pairwise correlations

Appendix C. Multivariate Models of Crime Counts, Convenience Stores, and Control Variables for 2019

Negative Binomial Regression Predicting 2019 Crime, Convenience Stores				
	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
Only Convenience				
Convenience Store 2018	.36** (.13-.58) 43.0	.33*** (.32-1.24) 40.4	.36** (.15-.58) 43.6	.36** (.17-.55) 43.4
Poverty	.00 (-.02-.02)	.01 (-.01-.02)	-.00 (-.03-.02)	.01 (-.01-.03)
Percent Black	.02*** (.01-.03) 2.2	.03*** (.02-.03) 2.7	.02*** (.01-.03) 1.9	.02*** (.02-.03) 2.4
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)

*p<.05, **p<.01, ***p<.001, [t]only reported for significant coefficients

Appendix D. Multivariate Models of Crime Counts, SBDRs, and Control Variables

Negative Binomial Regression Predicting 2018 Crime, SBDR				
	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
Only Dollar				
SBDR 2017	.80** (.26-1.35) 122.9	.78** (.32-1.24) 119.2	.82** (.30-1.34) 127.3	.75** (.29-1.21) 110.8
Poverty	.01 (-.02-.03)	.01 (-.01-.03)	-.02 (-.03-.02)	.01 (-.01-.03)
Percent Black	.03*** (.02-.03) 2.6	.03*** (.02-.04) 3.1	.02*** (.02-.03) 2.3	.03*** (.02-.04) 3.0
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)

*p<.05, **p<.01, ***p,.001, [t]only reported for significant coefficients

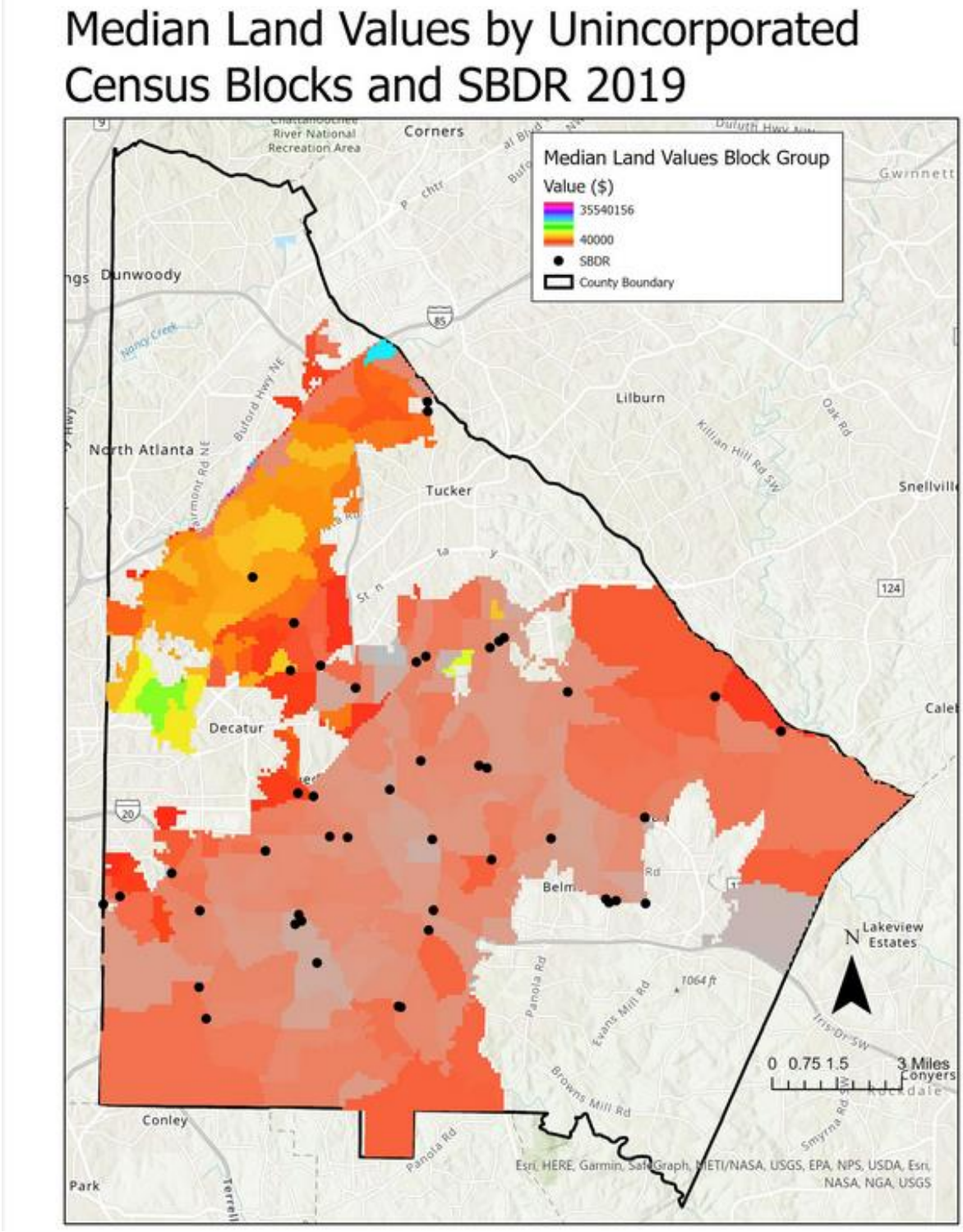
Negative Binomial Regression Predicting 2017 Crime, SBDR				
	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
Only SBDR				
SBDR 2016	.56* (.11-1.05) 77.8	.54** (.17-.90) 71.0	.57* (.11-1.03) 76.9	.61** (.22-1.01) 84.2
Poverty	.00 (-.02-.03)	.00 (-.02-.02)	-.00 (-.03-.02)	.01 (-.01-.03)
Percent Black	.03*** (.02-.04) 2.6	.03*** (.03-.04) 3.5	.02*** (.02-.03) 2.3	.03*** (.02-.04) 3.0
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)

*p<.05, **p<.01, ***p,.001, [t]only reported for significant coefficients

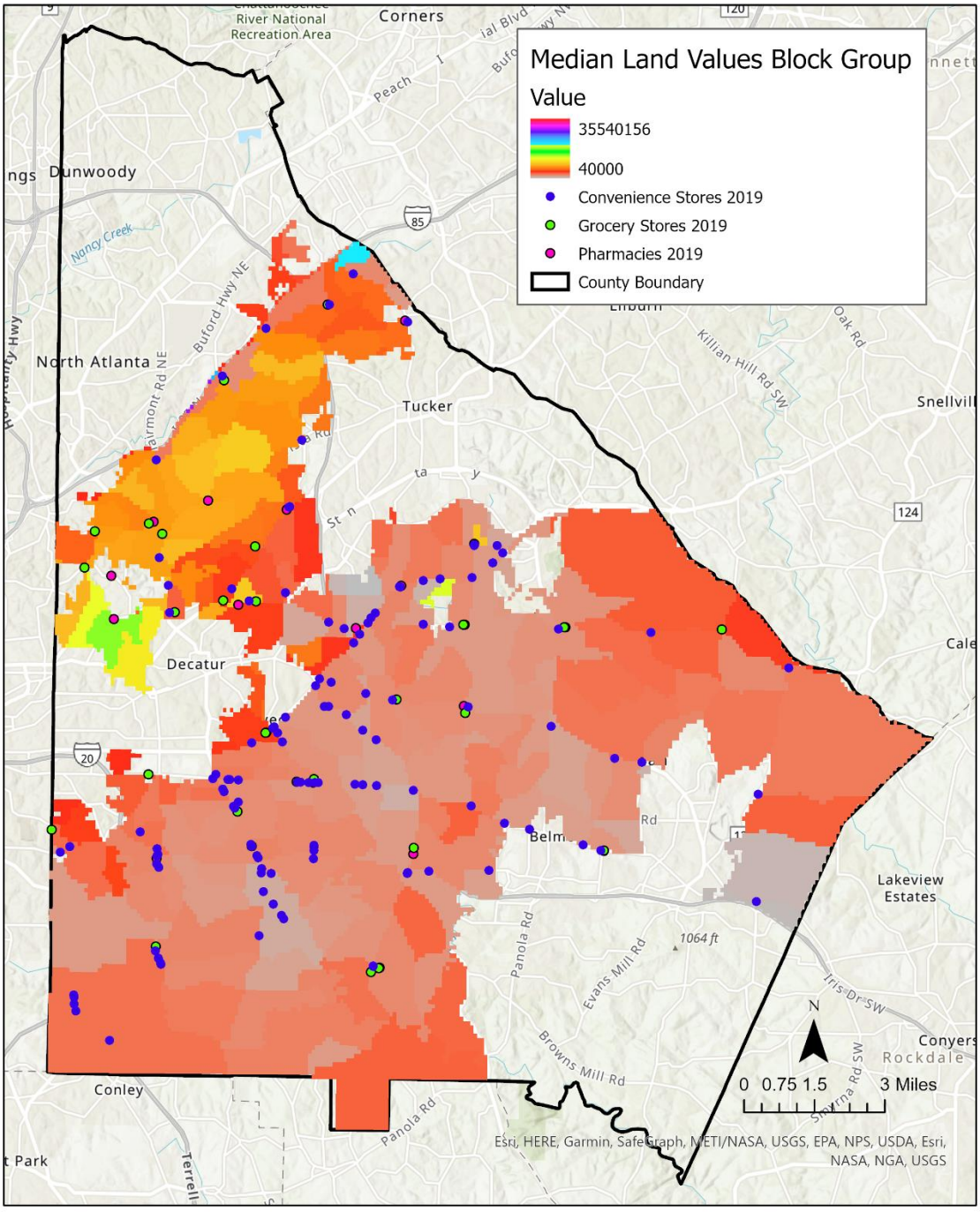
Negative Binomial Regression Predicting 2016 Crime, SBDR				
	Total Crime	Violent Crime	Property Crime	Public Order Crime
	B (CI) % change[t]	B (CI) % change	B (CI) % change	B (CI) % change
Only SBDR				
SBDR 2015	.51 (-.05-1.06)	.42 (-.05-.88)	.53 (-.00-1.07)	.49* (.03-.96) 63.8
Poverty	.00 (-.02-.03)	.02 (-.01-.04)	-.00 (-.03-.03)	.01 (-.01-.03)
Percent Black	.03*** (.02-.03) 2.6	.03*** (.03-.04) 3.3	.02*** (.02-.03) 2.4	.03*** (.02-.03) 2.8
Population	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)	.00 (-.00-.00)

*p<.05, **p<.01, ***p,.001, [t]only reported for significant coefficients

Appendix E. Maps of Retail Store Locations Relative to Median Parcel Values



Median Land Values by Census Block Groups and Other Stores 2019



Appendix F. Bivariate Correlation Matrices Median Parcel Value

Correlations Median Parcel Value (log) 2018								
	Median Parcel 2018	SBDR 2017	Grocery 2017	Pharmacy 2017	Convenience 2017	Poverty	Percent Black	Population
Median Parcel 2018	1.00							
SBDR 2017	-0.29*	1.00						
Grocery 2017	0.00	0.23*	1.00					
Pharmacy 2017	-0.01	0.21*	0.22*	1.00				
Convenience 2017	-0.44*	0.50*	0.21*	0.18*	1.00			
Poverty	-0.14	0.07	-0.04	-0.02	0.17	1.00		
Percent Black	-0.87*	0.31*	-0.02	0.02	0.43*	0.24*	1.00	
Population	-0.23	0.18	0.11	0.10	0.08	-0.10	0.23	1.00

*p<.05, pairwise correlations

Correlations Median Parcel Value (log) 2017								
	Median Parcel 2017	SBDR 2016	Grocery 2016	Pharmacy 2016	Convenience 2016	Poverty	Percent Black	Population
Median Parcel 2017	1.00							
SBDR 2016	-0.27*	1.00						
Grocery 2016	-0.02	0.31*	1.00					
Pharmacy 2016	-0.03	0.22*	0.21*	1.00				
Convenience 2016	-0.13	0.06	-0.02	-0.02	1.00			
Poverty	-0.44*	0.56*	0.19*	0.19*	0.15	1.00		
Percent Black	-0.77	0.29*	-0.01	0.02	0.24*	0.43*	1.00	
Population	-0.15	0.10	0.11	0.10	-0.10	0.09	0.23*	1.00

*p<.05, pairwise correlations

Correlations Median Parcel Value (log) 2016								
	Median Parcel 2016	SBDR 2015	Grocery 2015	Pharmacy 2015	Convenience 2015	Poverty	Percent Black	Population
Median Parcel 2016	1.00							
SBDR 2015	-0.27*	1.00						
Grocery 2015	-0.02	0.23*	1.00					
Pharmacy 2015	-0.04	0.16	0.21*	1.00				
Convenience 2015	-0.42*	0.46*	0.21*	0.24*	1.00			
Poverty	-0.11	0.08	-0.02	-0.02	0.11	1.00		
Percent Black	-0.77*	0.28*	-0.01	0.02	0.41*	0.24*	1.00	
Population	-0.16	0.11	0.11	0.10	0.08	-0.10	0.23	1.00

*p<.05, pairwise correlations

Appendix G. Correlations Between Median Home Value (log) and Store Counts

Correlations Median Home Value (log) 2018								
	Median Home Value 2018	SBDR2017	Grocery 2017	Pharmacy 2017	Convenience 2017	Population	Percent Built Before 2000	Percent Rent
Median Home Value 2018	1.00							
SBDR 2017	-0.08	1.00						
Grocery 2017	0.12	0.24*	1.00					
Pharmacy 2017	0.11	0.09	0.11	1.00				
Convenienc2017	-0.27*	0.29*	0.09	0.02	1.00			
Population	-0.04	0.20*	0.07	0.05	0.04	1.00		
Percent Built Before 2000	-0.02	0.15	0.00	-0.06	0.00	0.45*	1.00	
Percent Rent	-0.29*	0.09	0.01	0.01	0.24*	0.07	0.09	1.00

*p<.05, pairwise correlations

Correlations Median Home Value (log) 2017								
	Median Home Value 2017	SBDR 2016	Grocery 2016	Pharmacy 2016	Convenience 2016	Population	Percent Built Before 2000	Percent Rent
Median Home Value 2017	1.00							
SBDR 2016	-0.06	1.00						
Grocery 2016	0.10	0.30*	1.00					
Pharmacy 2016	0.07	0.07	0.14	1.00				
Convenience 2016	-0.24*	0.35*	0.10	0.02	1.00			
Population	0.01	0.16	0.09	0.06	0.04	1.00		
Percent Built Before 2000	0.07	0.12	0.03	-0.03	0.01	0.45*	1.00	
Percent Rent	-0.32*	0.03	0.03	0.03	0.18*	0.07	0.09	1.00

*p<.05, pairwise correlations

Correlations Median Home Value (log) 2016								
	Median Home Value 2016	SBDR 2015	Grocery 2015	Pharmacy 2015	Convenience 2015	Population	Percent Built Before 2000	Percent Rent
Median Home Value 2016	1.00	-0.14	0.09	0.08	-0.21	0.02	0.06	-0.31
SBDR 2015	-0.14	1.00	0.23	0.13	0.24	0.06	0.06	-0.02
Grocery 2015	0.09	0.23	1.00	0.21	0.15	0.07	0.02	0.06
Pharmacy 2015	0.08	0.13	0.21	1.00	0.19	0.06	-0.01	0.01
Convenience 2015	-0.21	0.24	0.15	0.19	1.00	0.04	-0.04	0.13
Population	0.02	0.06	0.07	0.06	0.04	1.00	0.45	0.07
Percent Built Before 2000	0.06	0.06	0.02	-0.01	-0.04	0.45	1.00	0.09
Percent Rent	-0.31	-0.02	0.06	0.01	0.13	0.07	0.09	1.00

*p<.05, pairwise correlations