Using Location Quotients To Test for Negative Secondary Effects of Sexually Oriented Businesses

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Abstract

A frequent complaint made by community residents is that sexually oriented businesses (SOBs; that is, strip clubs, adult book stores, and XXX theaters) produce negative secondary effects in the form of additional crime and disorder. Local governments respond by writing often strict ordinances that regulate the location and practices associated with these businesses, but that may threaten the balance between the adult businesses' First Amendment freedom of expression with the municipalities' exercise of power in safeguarding the public's health and welfare. To defend these regulatory attempts, courts, including the U.S. Supreme Court, require municipalities to justify their ordinances by presenting empirical evidence that SOBs do, in fact, produce additional crime and disorder. This article explains the spatial analysis technique of buffered location quotients, a method suitable for measuring whether and to what degree the presence of SOBs in a community are associated with increased rates of crime and disorder.

Introduction

Community residents often complain that sexually oriented businesses (SOBs; that is, strip clubs, adult book stores, and XXX theaters) reduce neighborhood safety and quality of life. Local government authorities respond to these complaints by writing ordinances that regulate the location and business practices associated with these businesses, thus seeking to reduce the negative secondary effects of ambient noise, disorder, and especially crime these businesses are reported as causing and spreading into the surrounding neighborhoods. Courts, including the U.S. Supreme Court, have taken a critical look at these regulations ensuring that the laws meet constitutional scrutiny

and balance the businesses' First Amendment freedom of expression with the municipalities' exercise of power in safeguarding the public's health and welfare (Nolon and Salkin, 2006). To defend regulatory attempts, courts require municipalities to justify their ordinances by presenting empirical evidence that SOBs do in fact produce negative secondary effects (Linz et al., 2004; Nolon and Salkin, 2006). This article explains the spatial analysis technique of buffered location quotients (LQs), a method suitable for measuring whether and to what degree the presence of SOBs in a community are associated with increased rates of crime and disorder. It uses data and mirrors methods from an SOB study recently completed in Jefferson County (Louisville), Kentucky (hereafter, Louisville Metro) (McCord and Tewksbury, 2013).[1]

Location Quotients

The LQ is a statistical method used extensively in regional studies since the 1940s (Miller, Gibson, and Wright, 1991). It is a ratio value that compares the characteristics of a subarea under study with the characteristics of the larger, surrounding region or city and is calculated as

$$LQ = \frac{c_i/a_i}{c_R/a_R},$$ (1)

where

LQ = location quotient;

C_i = total number of crimes in study area i

(where i is a subarea of the larger region R);

a_i = the area of study area i;

C_R = total number of crimes in the larger region R;

a_R = the area of the larger region R.

LQs have been adopted by SOB researchers to test for the clustering of crime surrounding adult businesses as an indication of negative secondary effects. The process uses a Geographic Information System (GIS) to draw buffers of some meaningful radius around the SOBs. Crime density in the set of buffers is then compared with the crime density of the entire city via LQ values. LQs are simple ratio values, thus an LQ of 3.00 would indicate the crime density around the SOBs is 3 times that of the city or region, and an LQ of 0.75 would indicate a density 25 percent less than the city average. Because municipalities often contain land area where crime is less likely to occur (airport runways, rivers, and undevelopable land), a conservative approach is to consider only LQ values greater than 2.00 as significant evidence of secondary effects (Rengert, Ratcliffe, and Chakravorty, 2005).

The determination of the width of buffers used in SOB analysis is based on the goals of the research. Buffers that measure 500 and 1,000 feet are common, because they are based on the restrictive distances for SOBs to other land uses (residential areas, schools, and so on) as found in many local

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[1] Access to other research and legal documents on the secondary effects of SOBs is available at secondaryeffectsresearch.com, a website sponsored by a group of university-affiliated research scientists.

ordinances. Other researchers have used a series of smaller concentric buffers (50 to 250 feet) around SOBs to show the reduction in crime density as distance increases from the business sites, thus indicating that it is the SOB itself and not some other characteristic of the neighborhood that is causing the increase in crime (McCleary, 2007). This method is also useful for showing the approximate distance from the SOBs at which secondary effects affect the surrounding neighborhood.

Testing for Negative Secondary Effects of SOBs in Louisville Metro, Kentucky

The following case study demonstrates several methods using LQs to test for the presence of negative secondary effects around SOBs in Louisville Metro, Kentucky. The first technique examines the density of crime found in 500- and 1,000-foot buffers surrounding the SOBs and compares it with the crime density of the city overall. The next method compares the crime density in the 500- and 1,000-foot buffers with crime density in similar sized buffers surrounding 400 randomly selected street intersections. Because street intersections tend to be found in the more built-up areas of the city, this approach is more conservative than the first and adds to the robustness of the findings. The final technique examines crime density in a set of six concentric 250-foot buffers extending out from the SOBs to a distance of 1,500 feet.

In 2003, Jefferson County and its largest city, Louisville, merged and formed a single governmental agency, Louisville Metro (2010 population was 740,000). Several small communities within the county opted out of the agreement and continue to provide their own local governmental services, including police services. The Louisville Metro Police Department (LMPD) was formed at the time of the merger and polices approximately 90 percent of the county in both population and area.

In Louisville Metro, 30 SOBs were identified and were confirmed as being in business during the entire study period (October 2009 through September 2010). Of the 30 SOBs, 21 are strip clubs with live entertainment, all of which sell alcoholic beverages. The remaining 9 SOBs are adult book and toy stores, with all but 2 having private video viewing booths or an adult theater.

Crime data for the 1-year period were provided by the LMPD for the area under its jurisdiction. Of the 30 SOBs, 24 are located within the LMPD policing area. The remaining 6 SOBs are located on a 1.5-mile stretch of road in a small opted-out municipality, but directly across the street from the LMPD area of responsibility. Four SOBs are also located on the LMPD side of this stretch of roadway. The small city that opted out of the merger and contained the previously mentioned 6 SOBs was uncooperative with repeated attempts to obtain crime data. Because of the proximity of these 6 SOBs and their likely effect on crime in the LMPD area directly across the street (a distance of approximately 30 feet), they remain in the analysis, but their effect is measured only in truncated buffers that overlay the LMPD area. Exhibit 1 displays the location of the 30 SOBs in Louisville Metro. As is common in other jurisdictions, these businesses tend to cluster spatially.

Crime incidents are separated into the categories of violent crime (homicides, assaults, and robbery), property crime (burglaries, thefts, and vehicle theft), and disorder crime (sale/possession of drugs, prostitution, alcohol violations, criminal mischief, and littering). SOBs and crime incident addresses were geocoded (electronically applied) to the computerized street map. Geocoding hit rates were 100 and 96 percent, respectively.

Exhibit 1

Location of Sexually Oriented Businesses in Louisville Metro*
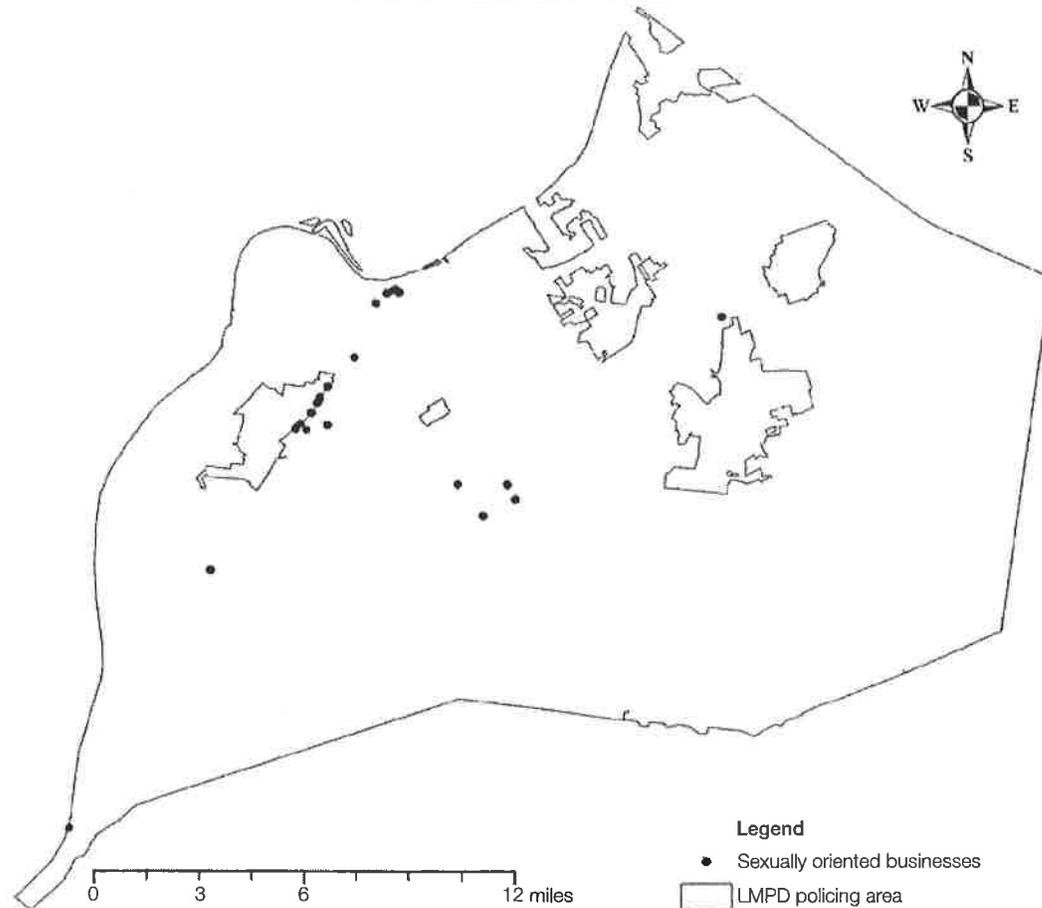
LMPD = Louisville Metro Police Department.
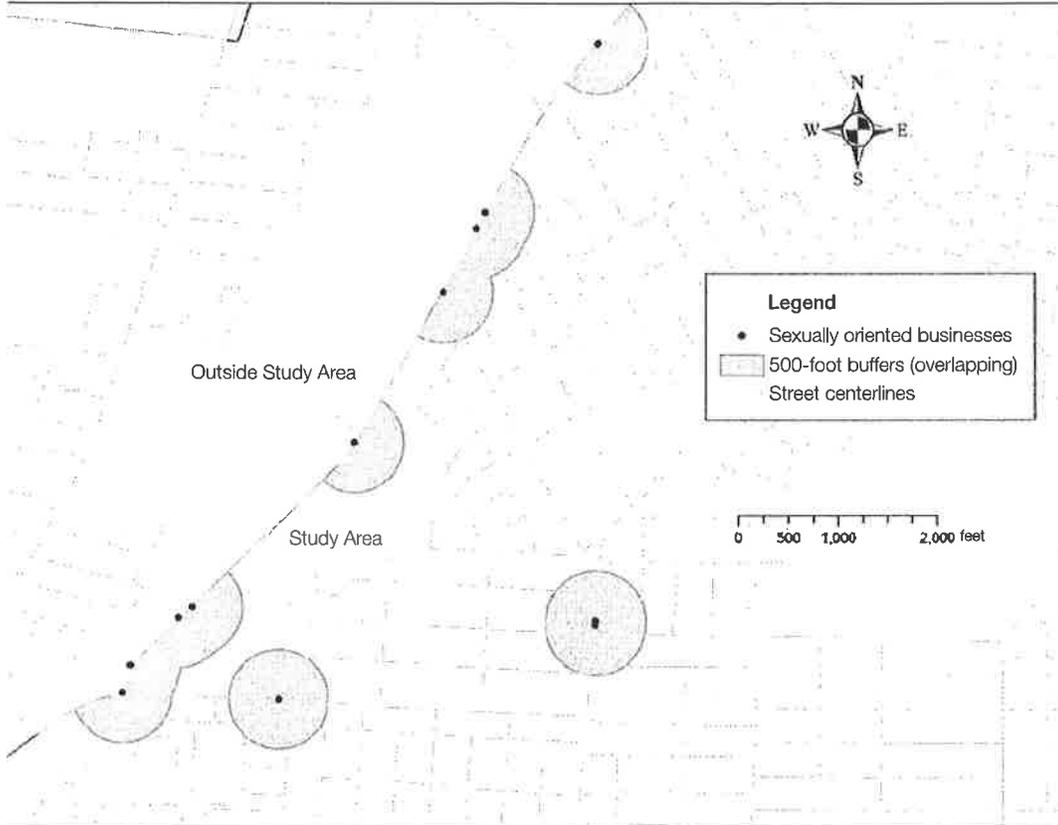** Jefferson County (Louisville), Kentucky.*
Note: "Islands" within the county's boundaries are incorporated cities not part of the LMPD's jurisdiction.

For the first set of analyses, two sets of buffers were drawn around the SOBs, 500 and 1,000 feet in radius, using the buffer function in the mapping software (ArcGIS 9.3). Overlapping buffers (because of other nearby SOBs) were dissolved into larger buffers to avoid counting the same area and crime incidents more than once. Buffers extending outside the LMPD area were truncated at jurisdictional lines (exhibit 2).

Using GIS software, the total area for each group of buffers (500 and 1,000 feet) and total count of crime incidents falling into the buffers were determined, and the density for each crime category was calculated. Crime density for the larger study area (LMPD jurisdiction) was also calculated for each crime category.

Exhibit 2

Buffers of 500 Feet Surrounding Sexually Oriented Businesses (some truncated at jurisdictional boundaries) in Louisville Metro*

* *Jefferson County (Louisville), Kentucky.*

IBM SPSS statistical software was used to draw a random sample of 400 intersections from the 18,058 intersecting streets in the LMPD area.[2] Buffers that were 500 and 1,000 feet in radius were drawn around each of the intersections, and the density for each crime category was determined, as previously mentioned. Buffers that extended outside the LMPD area were moved to the closest intersection that would allow for the entire buffer to fall within the study area. LQs were determined for all buffers and crime types using the statistical formula mentioned previously (that is, crime density in buffer areas divided by crime density in city).

For the final analysis, a concentric series of six 250-foot buffers were drawn around each of the 30 SOBs. The 250-foot buffer is approximately equal to one-half the average city street length in the study area. The inner buffer extended from 0 to 250 feet, the next 250 to 500 feet, and so on, through to the last one at 1,250 to 1,500 feet out from the SOBs. Again, overlapping buffers

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[2] An online sample size calculator (http://www.surveysystem.com/sscale.htm) determined that a sample size of 376 intersections was necessary for a confidence level of 95 percent at a confidence interval of 5 percent. The sample size was rounded to 400 cases.

(because of other nearby SOBs) were dissolved and buffers extending out of the LMPD area were truncated at jurisdictional boundaries (exhibit 3). A single crime density was determined for each buffer width (0 to 250, 250 to 500, and so on) and LQ values were calculated.

Exhibit 3

Sample of Concentric Series of 250-Foot Buffers Surrounding Sexually Oriented Businesses
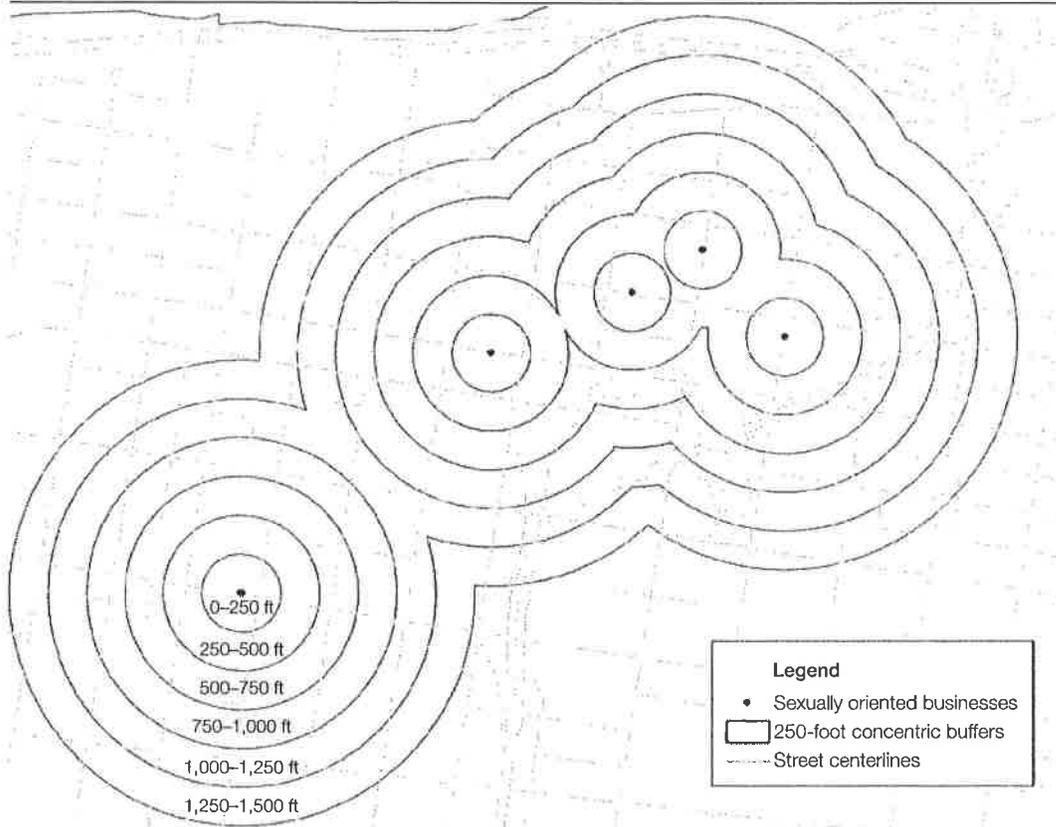
Results

Exhibit 4 presents the LQ values for each category of crime (violent, property, and disorder) and each set of buffers at 500 and 1,000 feet surrounding the 30 SOBs. As indicated by the LQ values in the upper portion of the table, the density of all three crime categories in the buffers is many times higher than that of the larger study area (Louisville Metro). For example, violent crime is 12.3 times higher in the 500-foot buffers surrounding the SOBs and 8.3 times higher in the 1,000-foot buffers than it is in the overall county density. This pattern of substantially higher crime density in the 500- and 1,000-foot buffers also appears for property and disorder crimes.

The lower portion of exhibit 4 displays the LQ values, comparing the crime density around the SOBs with that of the 400 random intersections. Although this portion of the analysis is far more conservative because the SOB crime density is compared only with the more built-up areas of

the county, the LQ values remain relatively high. As shown, crime densities in the SOB 500-foot buffers are at least 4 times higher than crime densities of the randomly selected intersections for all crime categories, while the densities in the 1,000-foot buffers are about 3 times higher for all crime categories.

Exhibit 5 presents the results of the concentric 250-foot buffer analysis. All crime categories have the highest LQ values in the buffers containing and immediately surrounding the 30 SOBs. LQ values then steadily decrease in the next two buffers out to a distance of 750 feet. Beginning with the 1,000-foot buffers and on out to the last buffers at 1,500 feet, the analysis indicates no discernible pattern.

The results from these analyses suggest that the criminogenic effect of the SOBs is observable out to a distance of at least 750 feet.[3] But more importantly, it is the monotonic decrease in the first three sets of buffers suggesting that the SOBs and not some unmeasured neighborhood characteristic, such as socioeconomic status or the presence of other problematic land uses, are promoting the higher crime levels (Rengert, Ratcliffe, and Chakravorty, 2005).

Exhibit 4

Location Quotient Values of Crime Density in Selected Buffers Surrounding 30 Sexually Oriented Businesses in Louisville Metro*

	Violent Crime	Property Crime	Disorder Crime
LQ values versus Louisville Metro*			
500-foot buffers	12.3	10.1	10.7
1,000-foot buffers	8.3	7.1	7.1
LQ values versus 400 random intersections			
500-foot buffers	4.8	4.2	4.2
1,000-foot buffers	3.3	3.1	2.9

LQ = location quotient.
* Jefferson County (Louisville), Kentucky.
Source: McCord and Tewksbury (2013)

Exhibit 5

Location Quotient Values of Crime Density in Concentric 250-Foot Buffers Surrounding 30 Sexually Oriented Businesses in Louisville Metro*

Buffer	Violent Crime	Property Crime	Disorder Crime
0–250 feet	23.7	18.3	24.4
250–500 feet	8.1	7.1	5.6
500–750 feet	5.2	5.6	4.8
750–1,000 feet	7.8	6.2	6.2
1,000–1,250 feet	5.8	4.4	4.9
1,250–1,500 feet	7.5	5.8	4.8

* Jefferson County (Louisville), Kentucky.
Source: McCord and Tewksbury (2013)

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[3] McCord and Tewksbury (2013) showed secondary effects of the SOBs to be statistically significant in a regression analysis using the 1,000-foot buffers and controlling for important socioeconomic factors.

Conclusion

The research methods used in this study generate strong evidence of the presence of negative secondary effects of crime and disorder around SOBs in Louisville Metro. Courts require municipalities to produce such empirical evidence to justify the stricter regulation local governments place on these often unpopular but constitutionally protected businesses. LQ analysis is a robust method for testing and presenting this evidence and one that is accepted by courts at all levels, including the U.S. Supreme Court.

Author

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Additional Reading

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