

Do Business Improvement District Organizations Make a Difference?

Crime In and Around Commercial Areas in Philadelphia

Lorlene M. Hoyt

Imagine you are a tourist shopping for souvenirs in a city like New York, Los Angeles, or Philadelphia. When you arrive at the first commercial area, you see vibrant banners lining the street; you notice that buildings and street furniture are clean and well maintained. Suddenly, you discover an outdoor festival where a team of people in colorful uniforms are sweeping litter from the sidewalk and police are redirecting traffic. You feel safe and decide to spend your time and money here. Later in the day, you make your way to another commercial area. There you see graffiti on building facades, bottles and newspapers overflowing from trash receptacles, and vacant storefronts with broken windows. There are fewer shoppers on the street and vacant lots where weeds grow to resemble trees. You feel uneasy here and leave without hesitation.

Although considered prosperous in the earlier part of the twentieth century, many urban commercial areas in the United States began a spiral of economic and physical decline in the 1950s as manufacturing jobs and middle-class families moved to the suburbs (Loukaitou-Sideris 2000). The story of the tourist, albeit embellished, is useful because it describes the activities that business improvement districts (BIDs) provide in an effort to reduce fear and crime and underscores the relationship between crime and economic development in urban commercial areas.

Around the globe, business owners, property owners, local merchant associations, elected officials, and municipal planners view the BID as a useful mechanism for raising the requisite funds to improve the pedestrian experience and compete more effectively with suburban shopping malls (Levy 2001; Houston 2003). BIDs—like suburban shopping malls where tenants are required to pay a monthly common-area fee and adhere to the security, maintenance, and appearance standards outlined in their lease—collect mandatory assessments from property owners to develop programs that convey a message of “clean and safe” to visitors. Through this centralized system of management, both BID managers and shopping mall operators exert considerable control over their customers’ experience. While customers do not pay a user fee or pass through a gate, BID organizations are territorial in nature and provide services within clearly delineated boundaries. In contrast, commercial areas without BID organizations rely on municipal government and voluntary membership organizations like

Abstract

The business improvement district (BID) is an international, yet controversial, model for urban revitalization. This article contributes to the BID debate by identifying the theories that underpin the model, developing a conceptual framework that examines the linkages between crime theories and BID services, and—through the use of spatial and statistical methods of analysis—measuring the impact of BID organizations on criminal activity in and around commercial areas. Results show that lower property crime rates differentiate commercial areas with BID organizations from those without BIDs and that the lower rates are not matched by higher crime in surrounding blocks.

Keywords: *business improvement districts; crime theory; spatial statistics*

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merchant associations for the provision of sanitation, security, and other services.

A close examination of the BID is pertinent to planning because it is a popular and international model for urban revitalization. For more than three decades, the BID concept has spread from Canada to the United States, New Zealand, South Africa, the United Kingdom, and Serbia (Hoyt 2005). Cities like New York and Vancouver are home to more than forty BID organizations and large BIDs like Philadelphia's Center City District (CCD) have substantial annual operating budgets.¹ The proliferation of BID organizations within cities and around the globe notwithstanding, a burgeoning mass of critics who question BIDs on legal and ethical grounds exists. Specifically, skeptics suggest that BIDs are a threat to democratic accountability, create wealth-based inequities in the delivery of services, and negatively impact adjacent residential neighborhoods (Pack 1992; Briffault 1999; Garodnick 2000; Hochleitner 2003; Hoyt 2004; Loukaitou-Sideris, Blumenberg, and Ehrenfeucht 2004). In contrast, there are dozens of membership organizations, practitioners, and scholars who work to perpetuate the prevailing conviction that "BIDs work" (Mitchell 2001; Levy 2001; Birch 2002; Houston 2003; Symes and Steel 2003).

It is important to note that BIDs are significant and, to some degree, permanent institutions. For example, Philadelphia's BIDs spent approximately \$20.4 million to provide supplemental public services in 2002. This means that, on average, each BID dedicated more than \$23,000 to each block over a period of one year. In addition to financial resources, BIDs have staying power. Most of Philadelphia's BIDs have five-year term limits, all of the BIDs that have requested reauthorization were approved, and none has dissolved. Moreover, three of the eleven organizations have twenty-year term limits. Therefore, it is important to test whether BID activities actually impact the way criminals behave. Are BID members getting a bang for their buck? Do BIDs make a difference? If so, do they threaten the viability of adjacent communities displacing crime outside their borders?

Save a few case studies describing how BIDs operate, empirical research on the impact of BIDs is virtually absent from the literature (Levy 2001; Mitchell 2001; Symes and Steel 2003). While it is beyond the scope of this study to directly address the aforementioned controversies regarding accountability and inequity, it makes a significant contribution to the BID debate by identifying the theories that underpin the BID model, developing a conceptual framework that examines the linkages between crime theories and BID services, and—through the use of spatial and statistical methods of analysis—measuring the impact of BID organizations on criminal activity in and around commercial areas.

► Research Questions

This work informs planning literature and practice in four distinct ways. First, it identifies a set of urban theories that underpin the BID model, beginning with those that speak to the relationship between urban space and human behavior. Following a brief introduction to the study context, this article reviews theories ranging from *Gemeinschaft-Gesellschaft* (Tonnies 1877/1957) to "anomie" (Wirth 1938), suggesting that these older theories laid the groundwork for their modern counterparts. To demonstrate why it is widely believed that BIDs mitigate criminal activity, the conceptual framework also examines the relationship between contemporary crime theories like "broken windows" (Wilson and Kelling 1982) and the types of services BIDs typically provide. Third, because city merchants believe that crime—both real and perceived—as well as signs of physical decay impede their ability to attract customers (Thomas and Bromley 2000; Loukaitou-Sideris 2000) and most BIDs in large American cities provide supplemental security and sanitation services (Mitchell 1999) to mitigate disorder, this study systematically compares urban commercial areas that have BID organizations to those without BIDs. Using linear discriminant analysis, this article answers the question, Do BID organizations make a difference? Specifically, is there a quantifiable difference between commercial areas with BID organizations and those without BIDs? If so, which measures of criminal activity explain the difference? Last, this study answers an important policy question: if BID organizations are effective in deterring criminal activity, do BID services push crime into adjacent neighborhoods? Using linear discriminant analysis, this study determines whether residential neighborhoods which abut urban commercial areas with BID organizations differ from those without BIDs. Said another way, is there a considerable difference between criminal activity in the blocks surrounding commercial areas with BID organizations and the blocks around commercial areas without BID organizations? If so, which types of crime are responsible for explaining the difference?

► Study Context

The city of Philadelphia is an ideal context for addressing these research questions because Pennsylvania's enabling legislation is one of the oldest and most innovative examples of BID law. Moreover, there are forty-two large commercial areas throughout the city, and eleven of them are currently managed by BID organizations that provide a range of services aimed at decreasing criminal activities. Finally, Philadelphia is home to the CCD, a BID organization with international acclaim that is

regularly studied and imitated by business leaders and elected officials around the globe.

The genesis of BIDs in the Commonwealth of Pennsylvania was in 1935 when the state passed general enabling legislation allowing the formation of municipal authorities. With the power to engage in commercial, revenue-producing endeavors, the legislation limited the use of special assessments to authorities created for the purpose of sewer construction (Bollens 1961). A superseding law, the Pennsylvania Municipality Authorities Act (PMAA) of 1945, was amended by the legislature in 1980 providing for the creation of autonomous financing authorities for administrative services and public improvements—or BIDs. Like BID-enabling legislation in other states and provinces, Pennsylvania's law is general and subject to interpretation, yet it does grant these legally independent entities some specific powers. First, the governing body of a municipal corporation has the power to designate a BID, and this legally independent entity can collect assessments and provide administrative services. Furthermore, Pennsylvania's BIDs have the right to conduct economic development activities. They include the right to hold property, acquire and operate projects, borrow money, enter into contracts, perform transactions with other governmental agencies, and exercise eminent domain.

A study conducted in 1996 by the Philadelphia City Planning Commission (PCPC), titled *Philadelphia Shops Update*, documents the basic characteristics and conditions of significant shopping and service concentrations throughout Philadelphia. This report shows that there are a total of forty-two large commercial areas—areas that contain at least one hundred contiguous business establishments—throughout the city. As mentioned earlier, the business and property owners for eleven of the forty-two large commercial areas have established BID organizations. As shown in Table 1 and Figure 1, the remaining thirty-one commercial areas, which collectively constitute 212 city blocks, depend largely on basic municipal services to keep the area clean and safe. Philadelphia's BIDs, as shown in Table 2 and Figure 1, have a collective jurisdiction of approximately 872 blocks.

Bound by the Delaware and Schuylkill Rivers on the east and the west, Center City is the largest commercial area in Philadelphia. It is a pedestrian-oriented and historic area consisting of business firms, governmental offices, hospitals, hotels, residential units, restaurants, theaters, museums, pharmacies, and retail and specialty shops. Today, the CCD is one of the world's oldest, largest, and most prominent BIDs. Interested in making Philadelphia's central business district more competitive, the Central Philadelphia Development Corporation (CPDC), a not-for-profit membership organization supported by Philadelphia's business leaders, invited the president of the

Denver Partnership to speak on the subject of BIDs in 1985. While in the midst of a national economic recession, and at a time when the city was virtually insolvent, Philadelphia's business leaders utilizing the CPDC presented this new and innovative concept to property owners, community groups, and public officials. By 1988, then Police Commissioner Kevin Tucker, an active proponent of community policing, was very receptive to the BID concept and later testified in favor of the legislation. However, during the public comment period, sixteen property owners filed objections. Because they represented only 12 percent of the property owners and 12 percent of the total taxable assessed value of the proposed BID, the process moved forward. In 1990, Mayor Goode signed the bill into law and the city's first BID began operations in March 1991.

► Conceptual Framework

In this article, I construct a conceptual framework to support two hypotheses: commercial areas with BID organizations are more effective in deterring criminal activity than those without BIDs, and BID services push crime into adjacent residential neighborhoods. To assemble this framework, I identify and succinctly trace a set of classical urban theories that explain the relationship between urban life, urban space, and human behavior; discuss the relationship between classical and contemporary theories on crime; and critically assess the scholarly literature linking social disorganization, crime, and crime in urban commercial areas. Drawing on this work, I then argue that BIDs services should deter crime. Last, I confront the increasingly controversial debate on whether BID services in effect push crime into adjacent residential neighborhoods.

Classical urban theories developed in the nineteenth century in response to the Industrial Revolution focus on the shift from rural to urban living. Such theories hold that while there are advantages to urban living, there are also many disadvantages. On the positive side, it allows for exposure to a diversity of cultures and a wide variety of consumer choices for housing, education, and entertainment. Furthermore, most downtown areas contain outdoor public spaces where residents engage in recreation and interact spontaneously with strangers. However, scholars such as Tonnies, Durkheim, and Wirth emphasize the disadvantages of urban living, contending that it prevents a common morality, weakens social bonds among people, and isolates individuals from society (Tonnies 1957/1877; Durkheim 1893/1947; and Wirth 1938). For example, theorist Ferdinand Tonnies describes the rural-urban shift by contrasting two distinct forms of social organization, *Gemeinschaft-Gesellschaft*, or community and society. Through the use of this typology, he argues that the binds that hold rural

societies together were radically different, and more desirable, than their urban counterparts (Tonnie 1957/1877). Sociologist Emile Durkheim broadens the argument by identifying changes in social bonds among people as the central difference between rural and urban life. Durkheim believes that an industrialized society negatively affects human behavior because it encourages social differentiation that ultimately disrupts the social solidarity. In short, urbanization produced new environments, new types of people, and new ways of life (Durkheim 1893/1947).

Later, Robert Park (1916) in the Department of Sociology in the University of Chicago focuses on the behavior of several subcultures including juvenile gangs, hobos, and prostitutes. Heavily influenced by Park's work, Louis Wirth (1938) built on earlier works in his groundbreaking essay, "Urbanism as a Way of Life," which profiles explanatory principles for the social and psychological consequences of urban living. According to Wirth, city dwellers react to their large, dense, and varied environments by altering their personality. Rather than experiencing the sense of belonging to a group, they experience superficial and transitory contacts. While the urban experience begins with a sense of individual freedom, it later progresses to a state of "anomie" that is characterized by a feeling of isolation and indifference.

To further develop the classical crime theories introduced by Park (1916) and Wirth (1938), Clifford Shaw and Henry McKay (1942) hypothesized that some neighborhoods are unable to effectively control crime due to the presence of certain neighborhood factors. This seminal work led to what is now known as the social disorganization tradition, a school of thought aimed at explaining the spatial variation in crime rates in urban areas. Within this tradition, empirical findings consistently support the theory that as social disorganization increases, crime increases. That is, spatial variations in urban crime rates can be explained by differences in the capacity for control across areas. While measures vary, researchers working within this theoretical domain concern themselves with identifying the ecological variables that are associated with crime. An evaluation of ecological studies reveals that the most common variables include measures of population, income, age, and racial composition (Roncek 1981; Greenberg and Rohe 1984; Byrne 1986; Sampson 1986, 1987; Roncek and Pravatiner 1989; Sampson and Groves 1989; Swartz 2000). Moreover, such empirical research often relies heavily on the use of census tracts (White 1932; Block 1979), block groups, and blocks (Roncek 1981; Roncek and Pravatiner 1989; Gottfredson, McNeil, and Gottfredson 1991; Roncek and Maier 1991; Perkins et al. 1993; Loukaitou-Sideris, Liggett, and Iseki 2001) as the spatial unit for data aggregation.

Table 1.
Large commercial areas in Philadelphia without business improvement district (BID) organizations.

<i>Key</i>	<i>Name of the Commercial Area</i>
1	South 9th Street (The Italian Market)
2	South 7th Street
3	East Passyunk Avenue
4	Point Breeze Avenue
5	Woodland Avenue
6	Lancaster Avenue and 40th Street
7	North 52nd Street
8	West Girard Avenue
9	Girard Avenue and Marshall Street
10	Broad Street and Cecil B. Moore Avenue
11	Ridge Avenue and Cecil B. Moore Avenue
12	Broad Street and Susquehanna Avenue
13	Hope Street and North 22nd Street
14	Broad Street, Germantown Avenue, and Erie Avenue
15	Germantown Avenue and Lehigh Avenue
16	Front Street and Kensington Avenue
17	Kensington Avenue and Allegheny Avenue
18	Aramingo Avenue
19	East Girard Avenue
20	Ridge Avenue and Roxborough Avenue
21	Chestnut Hill
22	Broad Street and Lindley Avenue
23	Lindley Avenue and 5th Street
24	Olney Avenue and 5th Street
25	Broad Street and Olney Avenue
26	Frankford Avenue and lower Mayfair Street
27	Castor Avenue and Magee Avenue
28	Rising Sun Avenue and Lawndale Street
29	Five Points
30	Frankford Avenue and Mayfair Street
31	Lehigh Avenue and 5th Street

Source: Philadelphia City Planning Commission (1996).

For the past six decades, the extension of social disorganization theory through the emergence of related theories such as "defensible space" (Newman 1972), "routine activities" (Felson and Cohen 1980), and "broken windows" (Wilson and Kelling 1982) has affected the way that scholars and practitioners think about the physical design and day-to-day management of urban spaces. For example, those who subscribe to "defensible space" theory believe that a properly designed environment can increase social interaction and social cohesion among residents. and in turn, these relationships will increase informal surveillance mechanisms and reduce crime (Jacobs 1961; Newman 1972; Sampson 1983; Greenberg and Rohe 1984; Taylor, Gotterredson, and Brower 1984; Rosenbaum 1988; Perkins et al. 1993). According to "broken windows" theory, criminals will seek out an area where signs of neglect are prevalent and pedestrians appear unattached and

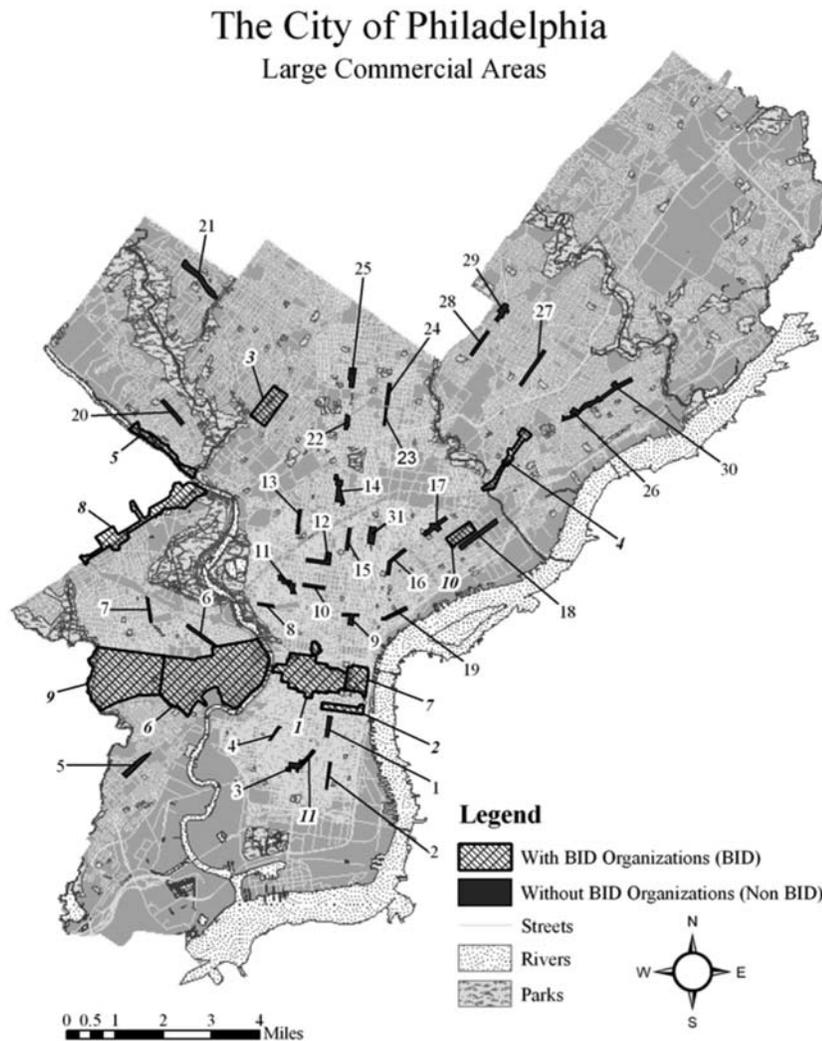


Figure 1. City of Philadelphia—Large commercial areas.
Note: BID = business improvement district.

fearful. Within this framework, vacant buildings, trash-filled alleys and streets, and broken windows are evidence of social disorder and diminishing social control (Skogan 1999). While “broken windows” theory contends that signs of neglect and decay invite crime, it claims that the presence of the police through increased visibility enhances informal social control, lessens fear, and deters crime (Trojanowicz 1982; Wilson and Kelling 1982; Kelling 1985; Greene and Taylor 1988; Mastrofski 1988). Similarly, with “routine activities” theory, the presence of informal, yet capable, guardians contributes to the collective supervision of public spaces and pressures offenders to evaluate potential victims more carefully (Cohen and Felson 1979); “routine activities” theory suggests that direct criminal acts require the absence of guardians (Brantingham and Brantingham 1984; Felson and Cohen 1980).

Few studies empirically examine crime in urban commercial areas. An older study of street crime in Oakland, California, suggests that commercial strips are particularly vulnerable because their linearity decreases the number of people who can occupy and supervise the space (Angel 1968). Other studies emphasize the relationship between pedestrian traffic and criminal activity. While most of these studies show that the presence of more people on the street increases an offender’s risk of detection and is associated with a lower rate of criminal activity (Luedtke and Associates 1970; Ley and Cybriwsky 1974; Pablant and Baxter 1975; Duffala 1976), some indicate that larger volumes of pedestrian traffic are associated with higher crime rates (Dietrick 1977).

Despite the lack of consensus on how pedestrian traffic impacts crime, scholars agree that urban commercial areas

Table 2.
Large commercial areas in Philadelphia with
business improvement district (BID) organizations.

<i>Key</i>	<i>BID Name</i>
1	Center City
2	South Street
3	Germantown
4	Frankford
5	Manayunk
6	University City
7	Old City
8	City Avenue
9	Mercy Health
10	Port Richmond
11	Passyunk

present unique challenges to policing professionals and promote the belief that the presence of police foot patrols effectively reduces crime rates in commercial areas (Trojanowicz 1982; Ona 1999). As previously mentioned, scientific work on the impact of BID organizations is practically nonexistent. A recent study, however, shows that BID security services have a deterrent effect on the way that crimes like theft and burglary cluster within BID boundaries; it did not include violent crimes, like homicide, rape, and aggravated assault because they are of a personal nature and “have more to do with material gain than confrontation” (Hoyt 2004). This article adds to that study by including quality of life crimes such as drug-related crimes and disorderly conduct. These factors are important to consider since BIDs work in tandem with police departments to give more attention to low-level criminality (Briffault 1999, 397).

As alluded to by the story of the tourist, BID organizations aid local economic development in urban commercial areas by providing a variety of services—street sweepers, uniformed safety ambassadors, additional police, and streetscape improvements—to reduce fear and crime. The central focus of this study is to determine whether BID organizations make a difference and whether they push crime beyond their borders. I answer the first question by comparing commercial areas with BID organizations to those without BIDs, giving special attention to measures of criminal activity. The logic behind this approach is quite simple: every BID organization provides a combination of services that should, based on a variety of crime theories, decrease social disorganization and criminal activity. In fact, BID organizations base their operations on these theories by managing programs that make physical improvements to public spaces and enhance surveillance activities.

Philadelphia’s BIDs strive to make physical improvements to public spaces by deploying staff who sweep streets and remove graffiti. For example, in the CCD, staff sweeps every sidewalk in the district at least three times a day. Is it sensible to believe that such services positively influence the pedestrian experience and deter criminal activity? Will pedestrians acknowledge clean streets and building facades and respond by spending more time chatting with colleagues and reading the newspaper outside? Will criminals sense that the space is safe and that people are generally friendly with one another rather than fearful? Will criminals ultimately decide to target another and more vulnerable area? The answer to all four questions is yes, according to “broken windows” theory. In addition to street sweeping and graffiti removal, many BIDs manage streetscape improvement programs to further enhance the pedestrian experience in outdoor public spaces. Moreover, BID capital improvement activities are supported by “broken windows” theory in that well-kept places are less vulnerable to criminal acts. For example, in response to the unsightly image of honor boxes chained to utility poles, the Center City BID recently started a program for installing corrals to organize and manage newspaper honor boxes, as shown in Figure 2.

Other improvements often include new street lighting, benches, trash receptacles, bicycle racks, sidewalks, curbing, street trees, bus shelters, entryways, signage, banners, murals, and pedestrian signage, as shown in Figure 3. For example, the CCD leveraged funds from the sale of tax-exempt bonds and funded a \$26 million capital improvement program that included the installation of more than one thousand pedestrian-scale lights. According to “defensible space” theory, there is a strong relationship between surveyable acts and the physical design of the environment (Newman 1972). In this case, the introduction of additional lighting decreases the likelihood of crime by making public spaces more physically accessible and visible to the public. For example, BID security patrols are more likely to observe and report criminal activity on well-lit street corners.

With respect to formal surveillance, many BIDs deploy uniformed security personnel who assist visitors with directions, help people traverse busy intersections, and report suspected criminal activities to the police. Even on the busiest streets—where pedestrians, bicyclists, and drivers move quickly about—BID security patrols are visible. Wearing a friendly smile and colorful attire, these unarmed civilian foot patrols are deployed to reinforce social control and mitigate criminal activities. In addition, it is not unusual for BIDs to develop formal partnerships with local police departments (Briffault 1999). Three of the eleven BIDs in Philadelphia (the Center City BID, the South Street BID, and the University City BID)

have formal partnerships with the Philadelphia Police Department and provide office space and equipment to support police substations and ministations within the BID, as shown in Figures 4 and 5. Such efforts stem from “routine activities” theory, which purports that motivated offenders choose to commit a crime after assessing the presence of formal guardians. Let me provide two examples of how this theory is put into practice. First, the police deployed by the CCD commonly use tactics to increase their visibility. For example, the CCD captain deploys officers to the more densely populated corridors like Market, Chestnut, and Walnut Streets. He also issues “park and walk” assignments that increase officer visibility by strategically parking police vehicles and deploying foot and bike patrols to a high-crime area. Second, BIDs often coordinate private (BID security) and public (police) street patrols, streamlining security-related communications, improving response time, and saturating the streets with capable guardians as shown in Figure 6.

Finally, BIDs not only create a unified voice for a particular group of property owners and monitor the level of service to the area, but they also negotiate with politicians and municipalities on behalf of business owners (Loukaitou-Sideris 2000). BID staff simultaneously ensure that the current level of service provided to the area will continue and work to garner additional services. For example, the University City BID director negotiated an arrangement whereby city inspectors train BID security personnel to recognize imminently dangerous structures while on patrol. Security personnel forward reports documenting the location of dilapidated structures to city inspectors who seal and secure the buildings. According to “broken windows” theory, abandoned properties are visual cues of neglect that invite crime; BID managers believe that this strategy effectively deters criminal activity because vacant houses are vulnerable locations with respect to drug use, illegal dumping, and vandalism.

In the end, all of these theories hold that street order is a public good maintained through a set of standard procedures ranging from design to sanitation to the deployment of uniformed personnel. Believing this, business and property owners pay for the management and delivery of such services to improve the pedestrian experience. In this way, they consider the BID an investment mechanism that leads to increased sales and property values. In contrast, public officials and scholars remain skeptical, questioning whether BID activities push crime into adjacent areas (Briffault 1999; Lloyd et al. 2003; Hoyt 2004).

In urban areas, tensions between the merchants and residents are common because each group has different expectations. Merchants, for example, are interested in attracting customers to their restaurants and bars, while residents—both



Figure 2. Center City District newspaper corrals.



Figure 3. University City District pedestrian signage.



Figure 4. Police ministration located in the South Street District.

within and around the district—are easily frustrated by the litter, noise, and other negative externalities that late-night



Figure 5. University City District headquarters.



Figure 6. Center City District security patrol with Philadelphia police patrol.

crowds produce. Residential leaders exacerbate tensions when they allege that BIDs intentionally displace criminal activities beyond jurisdictional boundaries and into adjacent neighborhoods. Despite the recurrence of this contention at public hearings, community meetings, and professional conferences, the literature fails to address the issue of BID spillover directly or methodically. For example, the authors of a recent study conducted in Los Angeles claim that the creation of adjacent BIDs is evidence that crimes are displaced beyond BID boundaries. BIDs share boundaries, they assert, for the purpose of minimizing “boundary effects” (Lloyd et al. 2003).

The second question this study answers is whether BID services, such as additional police and security patrols, push or

“spill” crime into adjacent residential neighborhoods. Criminologists who have identified and empirically tested the impact of crime spillover (Mahay 1977; Hakim et al. 1979; Fabricant 1979; Weinblatt et al. 1983) have found that crimes, especially property crimes, spill over municipal and neighborhood boundaries when policing activities change (Deutsch and Epstein 1998). Likewise, a study examining quality of life crimes (Esbensen 1987) found that as foot patrols increased, crime decreased, but that crime increased in the area immediately surrounding the impact area. These studies, however, examine crime and crime spillover in and across residential areas. By extension, I hypothesize that commercial areas with BID services increase the cooperative control of public spaces and the costs associated with committing criminal acts; therefore, the net payoff in neighborhoods adjacent to BIDs appears higher from the criminal’s perspective. In short, criminals perceive BID interventions and spill over BID boundaries to commit crimes in abutting neighborhoods.

► Research Design

The two remaining objectives of this study are to find whether patterns of demographic and criminal variables differed between (1) commercial areas with BID organizations, BIDs, and commercial areas without BID organizations, Non-BIDs; and (2) BID spillover regions and Non-BID spillover regions. With an interest in distinguishing between two distinct classes (BID and Non-BID) and identifying the variables that best separate the two classes, I rely on a statistical tool called linear discriminant analysis, or LDA (Fisher 1936; Duda and Hart 1972). LDA is useful because it allows one to estimate a weight vector that maximally separates the means of the two classes by modeling the two classes as multivariate Gaussian distributions with the same covariance but different means. There are two distinct advantages to this approach. First, with the LDA methodology, all of the variables are used simultaneously to build the model rather than one at a time as would be the case in a classical regression analysis with the BID designation as the dependent variable. Second, a more accurate model can be built using real valued variables to predict indicator variables compared to the converse—using a binary variable, BID designation, to predict a real valued variable, crime rate.

Using the software package SPSS, the demographic and crime measurements are represented as a vector of independent variables x and the dependent variable is the label of this vector that is a binary variable $\{-1, 1\}$ that corresponds to a class (i.e., BID or Non-BID). LDA outputs a linear model that can be

interpreted as a weight vector w that is used to classify a new vector x according to the following criteria:

$$y = \text{sign} \left[\sum_{j=1}^d w_j x_j \right], \quad (1)$$

where x_j is the j th element of the vector x , y is the predicted label, and w_i is the i th element of the weight vector. In short, this approach computes the weight vector that maximizes between class variation while minimizing within class variation.

► Data

The data consist of vectors x corresponding to independent variables and labels y (dependent variables) that take on one of two dichotomous labelings (i.e., BID or Non-BID; BID spillover region or Non-BID spillover region). This vector consists of nineteen independent variables, which fall into two distinct categories. There are ten variables, computed using data from the 2000 Census, that represent neighborhood characteristics; and nine variables, based on data from the Philadelphia Police Department, that measure criminal activity.

Each sample vector x represents measurements at the block level, which is the unit of analysis for this study. To account for the variability in magnitude between elements, each variable is normalized to a number between 0 and 1 (per variable and over the entire data set). A brief description of the nineteen independent variables used in this study is provided below.

► Independent Variables

Neighborhood Characteristics

1. Population density, or POP_DENS, is a ratio that represents the total number of residents in the block divided by the geographic area of the block;
2. Owner-occupied housing, or OWN_OC, is a ratio that represents the number of residential units which are owner-occupied divided by the total number of residential units in the same block;
3. Vacancies, or VAC, is a ratio that represents the number of residential units that are vacant divided by the total number of residential units in the same block;
4. Black population, or BLACK, is measured by the number of black residents divided by the total number of residents in the same block and is expressed as a ratio;
5. White population, or WHITE, uses the same method described above;

6. Age zero to nine, or AGE0_9, is a ratio expressed by the number of residents between the ages of zero and nine divided by the total number of residents in the same block;
7. Age ten to seventeen, or AGE10_17, uses the same method described above;
8. Age eighteen to twenty-four, or AGE18_24, uses the same method described above;
9. Age twenty-five to forty-four, or AGE25_44, uses the same method described above;
10. Age forty-five to sixty-five, or AGE45_65, uses the same method described above.

Crime Measures

11. Stolen vehicles, or STOL_VEH, includes stolen passenger vehicles, trucks, buses, motorcycles, snowmobiles, and motor scooters. It is a ratio expressed by the number of stolen vehicle crimes that occurred in the block divided by the total number of stolen vehicles for a given year.
12. Thefts from vehicles, or THEF_VEH, includes theft or attempted theft of car phones, cellular phones, laptop computers, and other accessories; same method as described above.
13. Thefts, or THEFTS, includes pocket-picking, retail theft, bicycle theft, theft from buildings, theft from coin-operated machines, and theft of motor vehicle tags; same method as described above.
14. Burglaries, or BURG, includes forcible entry or entry attempt of private residence, hotel, rooming house, motel, apartment house, drug store, factory, chain store, liquor store, office building, or safe; same method as described above.
15. Robberies, or ROBB, includes forcible thieving from bank, drug store, chain store, liquor store, grocery store or delicatessen, taxi, as well as purse snatchings and hijacking of vehicle; same method as described above.
16. Property crimes, or PROP_ALL, includes all stolen vehicles, thefts from vehicles, thefts, burglaries, and robberies; same method as described above.
17. Drug-related crimes, or DRUG, includes sale of marijuana, synthetic narcotics, nonnarcotic drugs, heroin, cocaine, crack cocaine, and opium-related drugs; same method as described above.
18. Disorderly conduct, or DISORDER, includes obstructing public passageways, public nuisance, and failure to disperse; same method as described above.
19. Quality-of-life crimes, or QOL, includes all drug-related and disorderly conduct crimes; same method as described above.

► Dependent Variables

Using a geographic information system, for each vector x a corresponding label y was assigned that indicated whether the corresponding block was in a BID, Non-BID, BID spillover region, or Non-BID spillover region. To begin, both blocks and

commercial areas (BID and Non-BID) are represented as polygons. As shown in Figure 7, when an entire block or its center falls within the boundaries of a commercial area, the block is categorized as being “in the commercial area.” BID blocks receive a 1, while Non-BID blocks receive a 0. Similarly, each block that intersects with a commercial area (but does not exist “in the commercial area”) is categorized as a block “in the spillover region.” Blocks that intersect with BIDs are coded with a 1, and blocks that intersect with Non-BIDs receive a 0.

For the years 1999, 2000, 2001, and 2002, there were 872 BID vectors, 212 Non-BID vectors, 225 BID spillover vectors, and 513 Non-BID spillover vectors, respectively. Although there were fewer commercial areas with BIDs than commercial areas without BIDs, there were many more BID blocks than Non-BID blocks. Since class imbalances can skew the results of discriminant analysis, I randomly subsampled each year into five data sets. Each subsample contained 212 BID blocks and 212 Non-BID blocks. Conversely, there were fewer blocks in the BID spillover region than in the Non-BID spillover region. Again due to class imbalances, I subsampled each year into five data sets each with 225 BID and 225 Non-BID spillovers. Finally, LDA was run on each subsample for each year.

► Procedures and Results

To determine if there is a measurable difference between commercial areas with BID organizations and those without BIDs, I used LDA to find out whether the BID and Non-BID samples could be accurately classified. As shown in Table 3, on average over the twenty subsamples a classification accuracy of $80.6 \pm 0.38\%$ was achieved. However, the classification accuracy was measured on samples used to construct the model and therefore may not be a measure of how accurately the model will predict a new sample.

The accuracy of the model on new samples was measured using a leave-one-out procedure. The leave-one-out error is computed as follows:

1. Iterate the following over all samples:
 - a. remove the sample from the set;
 - b. build a model using the new set;
 - c. if omitted sample is predicted incorrectly, increment the leave-one-out error.
2. Divide the leave-one-out error by the total number of samples.

As shown in Table 4, on average over the twenty subsamples a classification accuracy of $78.8 \pm 0.57\%$ was achieved. It is important to note that the classification error is close to the leave-one-out error. This suggests that the model is accurate and not overfitting.

With evidence in hand that commercial areas with BID organizations are distinctly different than those without BIDs, I will identify which variables explain the difference. To do so, I examined the stability of the independent variables over the years to determine which were most responsible for the difference between the two classes. The output of the discriminant analysis is two vectors, one for the BID class w_B and one for the Non-BID class w_N and the weight vector in equation (1) is the difference between these two vectors.

$$w = w_B - w_N \text{ or element by element } w_j = w_{B,j} - w_{N,j}$$

The label of a new sample is

$$\text{Bid if } \sum_{j=1}^d x_j (w_{B,j} - w_{N,j}) \geq 0 \text{ and NonBid otherwise}$$

where $w_{B,j}$ and $w_{N,j}$ are the j th elements of the BID and Non-BID class vectors, respectively.

The relative magnitude of the elements in w determines the contribution of the corresponding independent variable to the classification. It is important to note that classification is not affected by scaling the weight vector. Therefore, the weight vector needs to be normalized. I used the following normalization

$$w_j = \frac{w_j}{\sqrt{\sum_{i=1}^d w_i^2}}$$

As shown in Table 5, four factors, namely, property crimes, thefts, stolen vehicles, and thefts from vehicles dominate the classification between BIDs and Non-BIDs and the weights of the factors are very stable.²

Now that I have shown that commercial areas with BID organizations are discernibly different than those without BIDs, I will examine whether there is a difference in the BID and Non-BID spillover regions. In particular, does crime spill into adjacent areas? As shown in Table 6, for all subsamples the two classes (BID spillover and Non-BID spillover) were accurately separated by the linear discriminant with an overall accuracy of $71.8 \pm 1.56\%$.

To measure accuracy on a new sample, I again used a leave-one-out procedure, which resulted in an overall accuracy of $69.3 \pm 1.75\%$, as shown in Table 7. Again, both error rates were similar, indicating that the model is not overfitting. However, the spillover model is not as accurate as the BID versus Non-BID discrimination.

Finally, which factors explain the difference between the BID and Non-BID spillover regions? In other words, which independent variables were most responsible for the accuracy of the discrimination? As demonstrated earlier, an output of

Blocks In and Around Commercial Areas

Method for Coding Dependent Variables

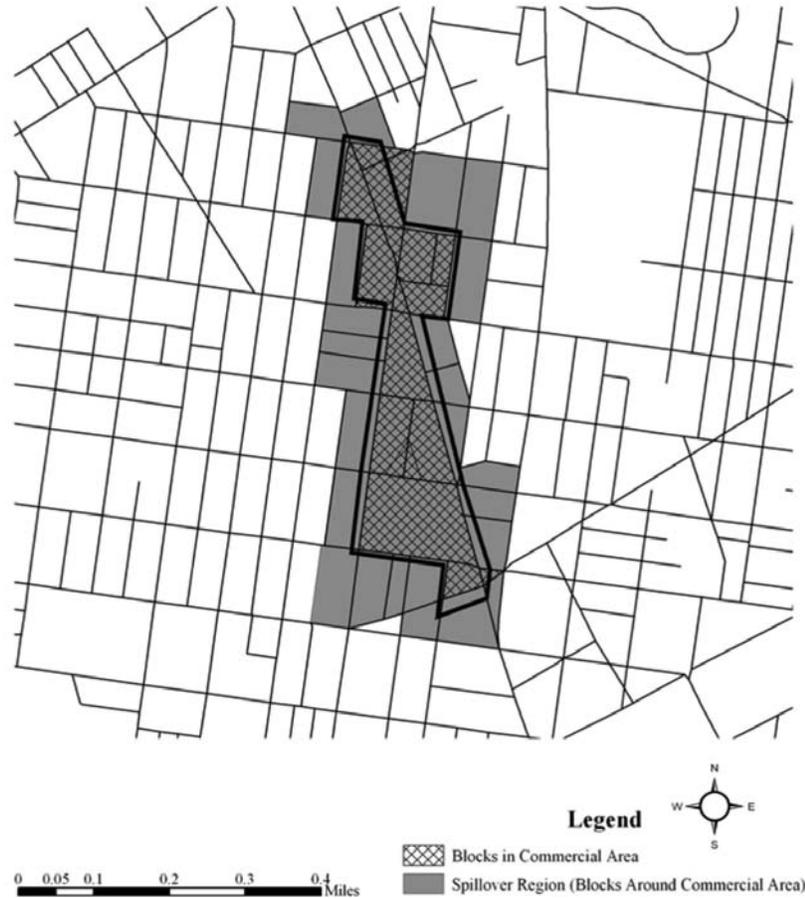


Figure 7. Blocks in and around commercial areas (method for coding dependent variables).

Table 3.
Percentage of original grouped cases correctly classified.

Year	A	B	C	D	E
1999	80.9	80.9	80.9	80.9	80.9
2000	80.0	80.0	80.0	80.0	80.0
2001	80.7	80.7	80.7	80.7	80.7
2002	80.9	80.9	80.9	80.9	80.9

Table 4.
Percentage of cross-validated group cases correctly classified.

Year	A	B	C	D	E
1999	79.5	79.5	79.5	79.5	79.5
2000	78.4	78.4	78.4	78.4	78.4
2001	78.1	78.1	78.1	78.1	78.1
2002	79.1	79.1	79.1	79.1	79.1

the discriminant analysis software is two vectors: one for the BID spillover class w_A and one for the Non-BID spillover class w_S . The label of a new sample is

$$\text{Bid if } \sum_{j=1}^d x_j (w_{B,j} - w_{S,j}) \geq 0 \text{ and spill over otherwise}$$

where $w_{A,i}$ and $w_{S,i}$ are the i th elements of the BID spillover and Non-BID spillover class vectors, respectively. This can be rewritten to match equation (1) where

$$w_j = w_{A,j} - w_{S,j}$$

Also, I normalized this vector using the same procedure as in the BID versus Non-BID case.

Table 5.
Factors (by weight) that dominate
the BID/Non-BID classification.

Year		<i>PROP_ALL</i>	<i>THEFTS</i>	<i>STOL_VEH</i>	<i>THEF_VEH</i>
1999	1	.60	-.65	NA	-.23
	2	.60	-.65	NA	-.23
	3	.60	-.65	NA	-.23
	4	.60	-.65	NA	-.23
	5	.60	-.65	NA	-.23
2000	6	.68	-.64	-.23	NA
	7	.68	-.64	-.23	NA
	8	.68	-.64	-.23	NA
	9	.68	-.64	-.23	NA
	10	.68	-.64	-.23	NA
2001	11	.72	-.67	-.15	NA
	12	.72	-.67	-.15	NA
	13	.72	-.67	-.15	NA
	14	.72	-.67	-.15	NA
	15	.72	-.67	-.15	NA
2002	16	.70	-.66	-.25	NA
	17	.70	-.66	-.25	NA
	18	.70	-.66	-.25	NA
	19	.70	-.66	-.25	NA
	20	.70	-.66	-.25	NA

Note: BID = business improvement district.

Table 6.
Percentage of original
grouped cases correctly classified.

Year	A	B	C	D	E
1999	73.0	73.0	73.0	70.8	70.8
2000	72.3	72.8	72.8	71.6	71.6
2001	73.9	73.9	73.9	70.1	70.1
2002	72.1	71.2	71.2	68.8	68.8

Table 7.
Percentage of cross-validated
group cases correctly classified.

Year	A	B	C	D	E
1999	70.4	70.4	70.4	68.8	68.8
2000	70.1	70.8	70.8	69.0	69.0
2001	71.5	71.5	71.5	66.6	66.6
2002	68.6	69.1	69.1	66.2	66.2

Unlike the BID versus Non-BID discrimination, there were no consistent discriminant factors over the subsamples, as shown in Table 8. This suggests that spillover may not be causal; the model is stable within years but not stable enough to serve as a predictive model.

► **Implications**

Do BID organizations make a difference? In a word, yes. Through an analysis of large commercial areas throughout the city of Philadelphia, this study demonstrates that those which receive supplemental services are markedly different than those which do not. Specifically, the results show that there are two independent variables—property crimes and thefts—that are most responsible for explaining the difference between commercial areas with and without BIDs from 1999 through 2002. Moreover, another variable—stolen vehicles—contributes to the explanation and is stable from 2000 through 2002, while the variable thefts from vehicles proves noteworthy in 1999. What does this tell us about BIDs? Why are they different in these respects?

One possibility is that BID security patrols and police focus more attention on the safety of BID visitors than the interests of the merchants and residents located in the BID. For example, to ensure that customers continue to frequent the area, security patrols turn their attention to the prevention of crimes like pick-pocketing (theft) and smash and grab (theft from vehicle). Although these crimes are nonconfrontational in nature, victims are apt to convey their experience to others. If, for example, the victims are visitors from nearby suburban areas, they are likely to communicate a negative image of the city to a host of potential customers. In this way, these “petty” crimes are devastating because a single incident influences the way that suburban communities perceive urban areas. Correspondingly, it is plausible that BID security and police patrols focus less attention on criminal activities committed by visitors, like customers and tourists. For example, rather than criminalize visitors for less serious crimes like the purchase of recreational drugs or public drunkenness, BID security and police may anticipate and condone these activities, particularly when they take place at BID-sponsored events. Last, BID organizations seem to have little impact on forcible entry or forcible thieving from hotels, drug stores, office buildings, banks, liquor stores, and so on. The explanation for this is unclear, yet it is important to emphasize that crimes like burglary and robbery—unlike thefts—occur indoors and are rarely observable from the street.

Table 8.
Factors (by weight) that dominate the spillover region classification.

<i>Year</i>		<i>PROP_ALL</i>	<i>THEFTS</i>	<i>STO_VEH</i>	<i>DISORDER</i>	<i>QOL</i>	<i>AGE25_44</i>	<i>AGE45_64</i>
1999	1	.42	.81	NA	NA	NA	NA	.21
	2	.74	.51	NA	NA	NA	NA	.20
	3	.74	.51	NA	NA	NA	NA	.20
	4	.33	NA	NA	NA	NA	.37	.38
	5	.33	NA	NA	NA	NA	.37	.38
2000	6	NA	.43	NA	.45	.33	NA	NA
	7	NA	.43	NA	.45	.33	NA	NA
	8	NA	.43	NA	.45	.33	NA	NA
	9	NA	NA	NA	.53	.31	.31	NA
	10	NA	NA	NA	.53	.31	.31	NA
2001	11	.80	.50	.19	NA	NA	NA	NA
	12	.78	.58	.21	NA	NA	NA	NA
	13	.78	.58	.21	NA	NA	NA	NA
	14	.82	.33	.32	NA	NA	NA	NA
	15	.82	.33	.32	NA	NA	NA	NA
2002	16	.42	.63	NA	NA	NA	NA	.27
	17	.42	.63	NA	NA	NA	NA	.27
	18	.41	.61	NA	NA	NA	NA	.27
	19	NA	.49	NA	.30	.30	NA	NA
	20	NA	.49	NA	.30	.30	NA	NA

This study also directly and empirically confronts the question, Do BID services push crime into adjacent neighborhoods? In brief, the results are inconsistent with the basic tenets of “spillover” theory, and I find no evidence to support the “boundary effects” premise. While there is a difference between the blocks surrounding commercial areas with and without BID organizations, this model does not appear highly accurate or stable. For example, from 1999 through 2002, I find that there are at least seven independent variables responsible for explaining the difference between BID and Non-BID spillover regions, and none is stable over the subsamples. These findings are inconsistent with previous studies and seem to contradict the central finding of a lower incidence of crime in BID areas. One interpretation of these results is that while crimes will spill from one residential area to the next when foot patrols are introduced, they do not readily spill from commercial areas to residential areas. Furthermore, it is possible that BID security and police occasionally patrol the blocks just outside the jurisdictional boundaries of the BID and that sporadic patrols would make it difficult for criminals to accurately assess BID boundaries. I may decide to test this challenge in the future by collecting supplemental data via personal interviews with BID security and police.

From a policy position, these findings are advantageous for BID managers with an interest in promoting residential living in and around their districts. For example, families that possess ample wherewithal avoid neighborhoods associated with high

levels of criminal activity, yet these results support the position that “BIDs work.” BID staff, therefore, can more effectively argue the safety and other benefits associated with living in or near a BID-managed commercial area. It is also worth noting that advocates working to form BID organizations may use these findings to ease existing tensions between merchants and residents.

However, it is important to highlight the limitations associated with this work. In this particular study, commercial areas with BID organizations are about ten times larger than those without BIDs. As a result, it is conceivable that differences related to size explain the difference in crime rates. For example, smaller areas may have less pedestrian activity and fewer eyes on the street, creating more opportunity for crime. Or, larger economic centers may possess the political muscle to receive more police and other resources than the smaller commercial areas. Second, there may be potential intervening variables that were not included in the analysis that would explain the difference in criminal activity. For example, confounding variables that I did not examine that would have had effect include special crime prevention programs run by the local government such as the blight removal efforts recently completed under Mayor John Street’s Neighborhood Transformation Initiative. Moreover, other variables such as income, education, employment, or streetscape improvements (e.g., the number of street lights per block), and police presence (e.g., the number of police officers assigned to a commercial area

and the distance from the commercial area to a police station or substation) were not included but would likely add insight to my hypothesis testing.

In closing, this study shows that lower property crime rates not only differentiate but also predict BID areas from Non-BID areas and that the lower crime rates are not matched by higher crime in surrounding blocks. Findings also reinforce the nexus between the physical and social aspects of public space and criminal activity, thus contributing to the planning literature by lending credibility to theories like “defensible space” and “broken windows.” While there are many factors that negatively affect the ability of inner-city commercial areas to successfully contend with suburban competitors—although the results do not indicate which combination of BID services affect crime—this study informs practice by offering a range of crime-prevention strategies for further consideration. In closing, the BID, a self-taxing mechanism that allows business and property owners to offer additional services, is a viable approach that encourages place-based investments, contributes to the quality of life in commercial areas, and facilitates urban revitalization.

► Notes

1. The Center City District’s annual operating budget was approximately \$12.4 million in 2004.

2. I ranked the weights for each of the nineteen factors. Tables 5 and 8 show the three factors with the highest weight for each year. If a factor ranked fourth or lower, it was not applicable, NA.

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