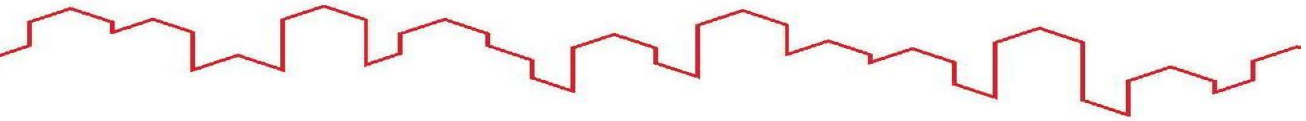

Department of Economics

The Impact of Business Improvement Districts on Crime

Giulia Faggio[1]
City, University of London

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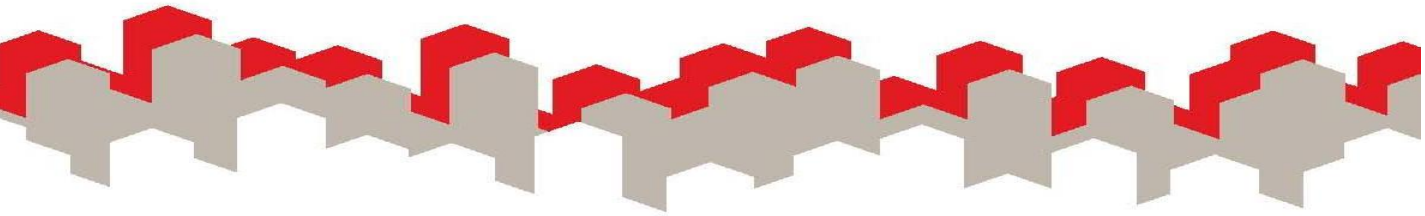

[1] Corresponding author: Department of Economics, City, University of London, Northampton Square, London EC1V 0HB, UK. E-mail: giulia.faggio@city.ac.uk

The Impact of Business Improvement Districts on Crime

Giulia Faggio
Department of Economics, City, University of London

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Abstract

This study evaluates the impact of Business Improvement Districts (BIDs) on crime using a novel data set on the total number of BIDs established in England and Wales between 2012-2017. Results indicate that BID areas are, on average, affected by higher levels of crime than other commercial areas, but they experience a drop of 10-11 crimes per quarter following BID formation. The reduction in crime is stronger for shoplifting, anti-social behaviour and public order-related crimes. Effects depends on the intensity of the approach adopted as well as on the amount of resources devoted to crime prevention. The study also provides evidence of diversion effects. As crime declines in BID areas, criminal activity diverts in neighboring commercial areas. Diversion effects are smaller than deterrence effects so that aggregated crime declines.

Keywords: urban regeneration policy; local government policy; crime

JEL codes: R28, R58, K42, H70

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Contact information: Giulia Faggio, Department of Economics, City, University of London, Northampton Square, London EC1V 0HB, United Kingdom; e-mail: *giulia.faggio@city.ac.uk*

1 Introduction

The paper evaluates the impact of Business Improvement Districts (BIDs) on crime using a novel data set on the total number of BIDs (127) established in England and Wales between 2012-2017, and street-level monthly observations on reported crime published by the Single Online Home National Digital Team in the UK.

A BID is a defined geographical area where business rate payers and/or property owners agree to pay an additional levy into a fund for a fixed period (usually five years). The local administration collects the levy, which is ring-fenced and returned to the BID. Specific agreed initiatives are then delivered to improve the area for businesses, including crime reduction, street cleaning, air quality and event marketing.

The BID model was introduced in Canada and in the US in the 1970s and quickly spread to many cities around the world (Hoyt and Gopal-Agge, 2007; Ward, 2007). In the UK, the first seven BIDs were formed in 2005 under a pilot scheme sponsored by the then Labour government.[1] As of 31st December 2018, there were 303 operational BIDs in the UK managing a total budget of £106 million (Grail et al., 2020). Despite their growing importance in terms of numbers and resources, there is scarce evidence of the impact that UK BIDs have on their locales and whether they are effective at achieving their objectives.[2] There is, instead, some evidence for the US. US BIDs are credited with decreasing crime (see, e.g., Hoyt, 2005; Cook and MacDonald, 2011), increasing property values (Ellen et al., 2007) and providing a potential solution to the collective action problem (Brooks, 2008; Brooks and Strange, 2011).

The focus of this study on crime is motivated by, at least, three factors: first, the rise in crime numbers, especially violent crime, over the last decade. The number of overall crimes in England and Wales has been steadily climbing from a low of just over 4 million recorded in 2013/14, reaching 6.08 million in 2019/20. Regarding violent crime, figures have shown a sharp increase, rising from 634,600 offences in 2013/14 to almost 1.77 million in 2019/20, for England and Wales. The latest estimate shows a further rise in violent crime to 2.02 million in 2021/22. (Office for National Statistics, 2021).

Second, police budget cuts implemented in the aftermath of the 2008 recession. Between 2009/10 and 2013/14 the amount of public money spent on police services fell from £19.3 billion a year to just £16.4 billion, due to the austerity policies followed by the UK government at the time. Police service expenditure remained below £17 billion a year until spending resumed in

[1] See Ward and Cook (2017) for a critical analysis of the introduction and evolution of BIDs in the UK; and Cotterill et al. (2019) and Grail et al. (2020) for an in-depth review of the development of UK BIDs from 2005 to 2018.

[2] Hirao (2021) examines the impact on house prices of eight BIDs located within the London Borough of Westminster.

2017/18, with the most recent figure of £21.5 billion in 2020/21 (HM Treasury, 2021). Such severe cuts led to reduction in personnel. After reaching a high of 172,000 officers in 2010, the number of police officers in the UK fell to just 150,000 officers by 2017. Although that trend has reversed since, there are still approximately 12,000 fewer police officers in 2021 than there were eleven years earlier (Allen and Harding, 2021).

Third, the substantial amount of resources that BIDs devote to safety and security. In fact, it is often the case that keeping the BID area safe is among the top priorities – or even the top priority – in a BID agenda. Focusing on the group of BIDs analyzed in this paper, the budget share devoted to safety is, on average, 23 percent, reflecting BID security spending of about £100,000 a year. In the 1990s, Los Angeles BIDs spent a third of their budget on safety or about $200,000 a year (see Brooks, 2008; Cook and MacDonald, 2011).

To the best of my knowledge, this is the first paper that examines the impact of BID adoption on reported crime using comprehensive information on BID areas within two countries of the UK. Previous studies on the subject have focused on BIDs areas located within a US city, using either Philadelphia or Los Angeles as a test bed (see, e.g., Hoyt, 2005; Calanog, 2006; Brooks, 2008; Cook and MacDonald, 2011). In addition, this is the first paper to differentiate BIDs according to the intensity of their approach to fighting crime and their membership into the National Association of Business Crime Partnerships (NABCP).[3] Previous studies examining the impact of BIDs on crime have largely considered BIDs as an homogeneous group.

In the analysis that follows, I apply a difference-in-differences estimation strategy with varying treatment. I compare crime before and after BID adoption with the time of adoption varying by BID. The treated group consists of all BIDs established in England and Wales between January 2012 and December 2017 (labelled contemporaneous BIDs). About the control group, I experiment with two options: (a) using later BID areas, i.e., areas that were not organized as BIDs during the sample period, but they would be established as BIDs in 2018 and 2019; (b) using all town centers and commercial/retail areas located in England and Wales that were not organized as BIDs during 2012-2017.

Results indicate that BID areas are, on average, affected by higher levels of crime than either commercial areas or later BIDs, but they experience a drop in the total number of crimes following BID formation. I find that BID adoption is, on average, associated with crime declines of about 10-11 episodes per quarter. The reduction in crime is stronger for shoplifting, anti-social behaviour and public order-related crimes, with declines of 5.7, 5.6 and 1.6 episodes a quarter, respectively. Conversely, robbery seems to be positively associated with BID formation.

[3]BIDs participating in local crime prevention schemes with the police and local councils are often organized as a Business Crime Reduction Partnership (BCRP). BCRPs operate under the umbrella of the NABCP, a lobbying organisation. For further details, see Section 4.

There are about 0.8 more robberies a quarter in a treated area than a control area following BID adoption. This finding might be explained by the increased attractiveness of a BID area. In fact, if a retail area improves in terms of customer safety, cleanness of public places, event marketing, etc., it will become an attractive place not only for customers but also criminals.

The analysis provides two novel results: first, the study documents that the impact of BID adoption on crime depends on the intensity of the approach that BIDs choose to fighting crime. I find that BIDs with active and very active approaches are more successful at reducing crime than BIDs using passive measures. Following BID formation, active and very active BIDs experience a drop of 14-18 crime episodes a quarter relative to non-BID areas whereas passive BIDs experience no change in crime. Second, results indicate that NABCP membership is effective at helping its members to combat crime as long as members adopt an active or very active stance. The few BCRPs that adopt a passive approach experience increasing (rather than decreasing) crime after BID formation.

This study also provides fresh evidence of diversion effects. Results suggest that BID security presence not only deters criminal activity in BID areas, but it also discourages criminals to operate in commercial areas adjacent to BIDs (0-1km distance from a BID boundary) while diverting criminal activity to areas located a little farther (1-2km distance). In other words, there are crime deterrence and crime diversion effects following BID adoption. Deterrence effects are, however, larger than diversion effects so that aggregated crime decreases.

Furthermore, consistent with the work by Brooks (2008) and Cook and MacDonald (2011) on Los Angeles BIDs, the study finds that average BID costs of crime reduction are low. I find that BIDs that spend more on security are, on average, better equipped to combat crime than BIDs that invest less. I then derive a per-unit crime cost of about £1,143-£1,341 of BID safety expenditure, which implies that BIDs in England and Wales can reduce crime very cheaply.

The remainder of the paper is organized as follows: Section 2 reviews the literature focusing on the US experience. Section 3 introduces the statistical model. Section 4 describes the data and presents summary statistics of the main variables of interest. Section 5 presents the results of the empirical exercise. Section 6 replicates the main analysis using data at the postcode level. Section 7 tests the presence of crime diversion effects. Section 8 concludes.

2 Literature Review

The BID model has attracted interest from a variety of disciplines, including criminology, economics, law, sociology and urban planning. Focusing largely on the economics literature, the role of BIDs have been analyzed in different contexts: as a form of private government whose activities may complement or substitute the work of state agencies in the provision of local public

goods (see Helsley and Strange, 1998; Helsley and Strange, 2000); as a possible solution to the collective action problem (see Brooks, 2008; Brooks and Strange, 2011; Cook and MacDonald, 2011); as a gated community whose formation may affect the geographic distribution of crime (see Helsley and Strange, 1999); as a welcome addition to the central work of the police in crime prevention and order maintenance within local areas (see Hoyt, 2005; Cook and MacDonald, 2011; Shearing and Johnston, 2013; D'Souza, 2020).

Previous studies have also pointed out that BIDs may fail to generate Pareto improvements (see Helsley and Strange, 1998; Brooks and Strange, 2011); that the benefits of collective action due to BID formation are demonstrably uneven (Brooks and Strange, 2011); that they encourage the increased use of police arrest powers in their districts (Harcourt, 2005) and may criminalize low-level disorder (D'Souza, 2020); that BIDs may displace disorder and crime to adjacent areas (see Helsley and Strange, 1999; Harcourt, 2005).

This paper contributes to two strands of literature. It adds to a growing literature that tries to quantify the impact of BIDs on crime.[4] It also contributes to the debate about the role of private action in the analysis of crime and crime control policy. In the criminal justice policy literature, recent work (see, e.g., Cook and MacDonald, 2011 and D'Souza, 2020) has emphasized how BIDs can provide an effective form of private action for public safety and how BIDs can co-produce crime control by hiring private security and working closely with the police.

The brief literature review that follows is not exhaustive but focuses on one theoretical and a few empirical studies investigating the potential BID effects on crime. Helsley and Strange (1999) provide the theoretical underpinning of crime deterrence and crime diversion effects that I explore further in this paper. By modelling gated communities in a geographic model of crime, they argue that an increase in gating in one community (e.g., BID formation with security personnel) will *i*) decrease crime in that community (deterrence), *ii*) increases crime in other communities (diversion) and *iii*) decreases aggregate crime. In other words, diversion effects are expected to be lower than deterrence effects so that overall crime declines.

From an empirical point-of-view, Hoyt (2005) and Calanog (2006) analyze the BID impact on crime using the city of Philadelphia as a case study. Hoyt (2005) applies geographical clustering to 1999-2002 crime incidence data from the Philadelphia Police Department and finds that property crime, and especially theft, is lower in commercial areas organized as BIDs relative to non-BID areas. She does not find, however, that BID services push crime into adjacent residential neighborhoods. Using multiple sources of crime data from the Philadelphia Police Department and focusing on a slightly longer time period (1997-2002), Calanog (2006) also finds that BIDs

[4]There is also a small literature that analyzes the consequences of BIDs on commercial and residential property values (see, e.g., Ellen et al., 2007; Brooks and Strange, 2011; Hirao, 2021) and two studies that examine the determinants of BIDs (Brooks, 2007; Meltzer, 2012).

have an effect on property crime, particularly auto theft, theft and robbery, although he finds no evidence of crime deterrence on serious crime like murder, rape and aggravated assault. Differently from Hoyt (2005), he finds some evidence of crime displacement for incidences of burglary, theft and auto theft in places that are two to three blocks away from the nearest BID.

Brooks (2008) is among the first to take identification issues seriously and verify the robustness of her estimates by constructing alternative control groups of non-BID areas. Using crime incidence data from the Los Angeles Police Department covering the period 1990-2002, she finds that BID adoption has a crime deterrent effect, ranging between 36 and 57 fewer incidences of crime per neighborhood a year or about 6-10 percent reduction in crime. She finds a larger impact for serious (both violent and non violent) crime, specifically robbery, burglary, and auto burglary and theft. Although Brooks (2008) does not directly explore crime displacement, her comparison between BID areas and their neighbors indicates that BIDs are associated with fewer incidences of crime per year relative to adjacent areas.

Cook and MacDonald (2011) extend Brooks (2008)'s analysis and investigate BID adoption on crime using both crime and arrest data from the Los Angeles Police Department covering the years 1994-2005. Overall, they find a substantial effect of BIDs on crimes and arrests. BID adoption is associated with about 28 fewer crimes per neighborhood a year which reflects an 11 percent decline. The largest marginal shift in crime occurs for robberies, followed by burglary and auto theft. BID advent is also associated with an average BID neighborhood reduction of 9.62 arrest incidents, reflecting a 32 percent decline. Regarding displacement, Cook and McDonald (2010) find that rather than displacing crime to neighboring areas, BIDs actually reduce crime in those areas by a modest amount or have no effect.

Using also the city of Los Angeles as a test-bed, MacDonald et al. (2009) investigate the impact of BID adoption on violent crime. Applying a Bayesian hierarchical model and exploiting the time variation in BID adoption between 1996-2003, they find a significant effect of BIDs on reducing the rate of robberies as well as robberies & homicides. They find, however, no significant effect on other types of violent crime, property crime or a measure of overall crime. MacDonald et al. (2013) go a step further and test whether BIDs do in fact provide safety benefits to residents. Using primary data on households with at least a youth, they find that BIDs are not associated with a decrease in violent crime among youths living near BIDs compared to youths living in other neighborhoods, when neighborhoods are matched on key socioeconomic characteristics that are known to predict violent crime.

3 Estimation Strategy

The empirical analysis consists of a difference-in-differences estimation strategy with varying treatment. I compare crime before and after BID adoption with the time of adoption varying by BID. The treated group consists of all BIDs established between January 2012 and December 2017 (labelled contemporaneous BIDs). In some specifications, I use the subgroup of contemporaneous BIDs that have indicated safety as a priority or the subgroup of contemporaneous BIDs that are organized as Business Crime Reduction Partnerships (BCRPs). I also distinguish treated BIDs according to the intensity of their approach to fighting crime (i.e., passive, active and very active). Furthermore, I experiment with two control groups: (i) using all town centers and commercial/retail areas located in England and Wales that were not organized as BIDs during 2012-2017; (ii) using later BID areas, i.e., areas that were not organized as BIDs during the sample period, but they would be established as BIDs in 2018 and 2019.

The main estimation equation can be expressed as:

$$\begin{aligned} Y_{i,t} = \alpha + \beta_1 \, Treated_i + \beta_2 \, Treated_i * Post_{i,t} + \gamma_t + \\ + \beta_3 \, crime_{2011,i} + \sum_t \delta_t \left(crime_{2011,i} * \gamma_t \right) + p_j + p_j * \gamma_t + \epsilon_{i,t} \end{aligned} \tag{1}$$

where observations are at a given area (i) and year-quarter (t) level. $Y_{i,t}$ refers to the total number of crimes (both in aggregate and by crime type) reported in area i in year-quarter t. The dummy variable $Treated_i$ is equal to 1 for contemporaneous BIDs (or any subgroup) and equal to zero for the control group, thereby estimating the average level of crime over the sample period distinguishing between treated and untreated areas. The dummy variable $Post_{i,t}$ is zero for quarters preceding BID formation and turns to 1 when a BID is formed. $Post_{i,t}$ is always zero for areas in the control group whereas it turns to 1 in the year-quarter when a contemporaneous BID starts operating.[5] Instead of using the day following the announcement of a successful BID ballot, I have chosen the first day of business as the day a BID starts operating. I then covert this date to its corresponding year-quarter and use the information to construct $Post_{i,t}$ for the treated group. The main parameter of interest in equation 1 is β_2. If BID formation is associated with crime decline, β_2 will be negative.

Equation 1 also includes year-quarter fixed effects (γ_t), 2011 area-level crime ($crime_{2011,i}$) and area linear trends measured by the interaction between 2011 area-level crime and year-quarter fixed effects ($crime_{2011,i} * \gamma_t$). When I conduct the analysis at the postcode level, the

[5] For any year-quarter t, the control group consists of units never treated and units not yet treated. Therefore, my estimation avoids the problem of "forbidden comparisons" between treated units and units that have been treated in earlier quarters (early-treated units). The problem of forbidden comparisons and its impact on difference-in-differences estimates with varying timing has been extensively discussed in Goodman-Bacon (2021), de Chaisemartin and D'Haultfoeuille (2020) and Callaway and Sant'Anna (2021). The approach used in this paper is close to Callaway and Sant'Anna (2021)'s suggested solution.

variable $crime_{2011,i}$ will refer to 2011 postcode-level crime and postcode trends are measured by the interaction between 2011 postcode-level crime and year-quarter fixed effects. My preferred specification includes police force area controls (p_j) and police force area trends, the latter defined as the interaction between police force area dummies and year-quarter fixed effects ($p_j * \gamma_t$).[6] $\epsilon_{i,t}$ is the error term.

It is important to emphasize that the data that I analyze here are quarterly crime counts aggregated up to the BID or commercial area level. When analyzing Los Angeles BIDs in the 1990s, Brooks (2008) points out that crime in BID areas would ideally be expressed as number of crime episodes reported per customer visit since daytime consumers represent the 'risk set' or the population at risk of being victimized in a BID area. Nevertheless, she quickly adds that, unfortunately, customer footfall data are not available at the small level of geography that she requires (i.e., Los Angeles Police reporting districts). Such data are also unavailable at the UK BID area level. Both Brooks (2008) and Grogger (2002) warn against the use of residential population data, as an alternative to customer visits, for a number of reasons: (1) BIDs are essentially commercial/retail areas with limited residential population; (2) the population at risk of the types of crime BIDs address is poorly approximately by the residential population; (3) residential population data at such a small level of geography are also unavailable.[7] Taking all these elements in consideration, I use crime counts.

The last element to clarify is the chosen period of analysis. Monthly observations on reported crime are publicly available from December 2010 to December 2017. Because of a new crime classification introduced in 2011, consistent data on crime types are available from January 2012 onward. Total reported crimes in 2011 are still used to control for the initial level of crime within an area, but they are not part of the main period of analysis.

There is an additional factor to take into consideration. London hosted the 2012 Summer Olympics. Such event required increased security in the capital. According to the 2012 post-Games review by the National Audit Office (National Audit Office, 2012), a total of £969 million was spent on security: about half (£455 million) on policing the Games and the other half (£514 million) on providing security at the venues. The Metropolitan Police in London initially committed to deploy 12,000 police officers a day, with up to 20 percent of them coming from outside

[6]There are 43 territorial police forces in England and Wales, but only 37 included in my BID area-crime data set. Given the limited number of contemporaneous BIDs (127) scattered across 36 police area jurisdictions, the final model specification only includes the four largest police forces, namely the Metropolitan Police Service, West Midlands Police, Greater Manchester Police, West Yorkshire Police, with the remaining 33 forces used as benchmark.

[7]UK 2011 Census data could be conceivably used to retrieve residential population, but their use would require substantial imputation and extrapolation. The Census smallest geography is the 2011 Output Area (OA). Any OA combination is unlikely to be coterminous with a BID area. Thus, population counts for BID areas would have to be imputed using fairly arbitrary procedures. Moreover, census data are available for 2011 only. Population data for other years would have to be extrapolated.

London. As the Games approached, it became apparent that the estimated requirement for security guards at the venues increased from 10,000 guards to over 20,000. Therefore, additional armed forces and police had to step in to cover the shortfall. Because of the disruption in police services that the Games created both inside and outside London, I decided to exclude the first two quarters of 2012 from the analysis and focus on the period 2012Q3 to 2017Q4.

4 Data

4.1 Data sources and summary statistics

I use six data sources: (1) street-level crime data publicly available for England and Wales.[8] These are monthly observations on reported crime broken down by crime type and police force jurisdiction covering the period December 2010 - December 2017. Each offence is anonymously identified by geographic coordinates (latitude and longitude)[9]; (2) the ONS National Postcode Directory (May 2017) facilitating the link between each reported crime and its nearest Royal Mail postcode; (3) area shapefiles of all town centers and commercial/retail areas in Great Britain for the year 2017. These data are publicly available on the Consumer Data Research Centre website[10] (see Pavlis et al., 2018 for a detailed description of the methodology used to create the data); (4) area shapefiles of 127 contemporaneous BIDs (those established between January 2012 and December 2017) and related information on their business plans, ballot dates, ballot results and starting dates; (5) area shapefiles of 38 later BIDs (those established between January 2018 and December 2019) and related information on their ballot results and starting dates; (6) area shapefiles of 71 early BIDs (those established between March 2005 and December 2011) and related information on their ballot results and starting dates.

Data sources listed as (1)-(3) refers to data that are publicly available; those listed as (4)-(6) are the result of an extensive data collection and preparation exercise. To this end, I first collected information on all BIDs established between January 2005 and December 2019 (236 BIDs) and split them into three groups, namely early, contemporaneous and later BIDs.[11]

[8] Data are published on https://data.police.uk by the Single Online Home National Digital Team and provided by the 43 territorial police forces in England and Wales, the British Transport Police, the Police Service of Northern Ireland and the Ministry of Justice. In this paper, I focus on England and Wales.

[9] The latitude and longitude coordinates of crime incidents published on data.police.uk represent the approximate location of a crime, not the exact place where it happened. When crime data are uploaded by police forces, the exact location of each crime is compared against a master list of anonymous map points to find the nearest. The coordinates of the actual crime are then replaced with the coordinates of the map point. See https://data.police.uk for more details.

[10] Data are available at the following link: https://data.cdrc.ac.uk/dataset/historic-retail-center-boundaries

[11] In the UK, there are different BID types depending on the dominant land-use within their geographic area. I focus on BIDs classified as town center (which comprises about 80 percent of UK BIDs), commercial, leisure and retail BIDs. These categories tend to be located in town/city centers. Industrial BIDs, which represents the second largest category (10.3 percent of UK BIDs), are excluded from the analysis (see Grail et al., 2020 for further details on the BID classification adopted in the UK).

Second, I relied on the information provided by BID Business Plan documents and retrieved BID area maps. I then drew shapefiles of each BID area using ArcGIS. Third, I identified the date and the result of the initial BID ballot, which is decisive for BID formation. I also identified the date on which each BID started operating. Fourth, I linked crime data to BID areas by converting the geographic coordinates of street-level crime data from the World Geodetic System (WGS84) into the British National Grid (BNG) and, then, associating each crime observation to its closest BNG postcode. Following this procedure, I could locate crime observations within or outside BID boundaries with accuracy.

Table 1 shows some descriptive statistics. The size of an average contemporaneous BID is 0.96 km^2, but the median is half the size, at 0.47 km^2. The same is true for the comparison group of later BIDs. The size of the average later BID is 0.82 km^2 with a median of 0.53 km^2. The group of town centers and commercial areas located in England and Wales (labelled Commercial Areas) reports an average size 10 times smaller (0.09 km^2) than that of contemporaneous BIDs and an even smaller median of 0.07 km^2.

In terms of postcodes, the 127 contemporaneous BIDs cover an area of 55,313 postcodes with the average number of postcodes per BID equal to 436 (median 350). The 38 later BIDs occupy an area of 19,076 postcodes and report a number of postcodes per area very similar to that of contemporaneous BIDs (mean 502; median 352). On the contrary, the group of commercial areas reports a much smaller average number of postcodes per area equal to 71 with a median of 23. As expected, the area covered by town centers and commercial areas located in England and Wales is larger and includes 191,904 postcodes. It is worth noting that postcodes are very fine geographical areas in the UK, usually accurate up to the level of a front door in a particular street.[12]

Relevant for the analysis that follows, Table 1 also reports the average number of crimes per quarter distinguishing between area type (contemporaneous BIDs, later BIDs and commercial areas); the geographic unit of analysis (area and postcode); and pre- and post-BID creation time (the initial year, 2011, and the sample period, 2012-2017). On average, there were 472.5 crimes reported per quarter in 2011 across contemporaneous BID areas. The same estimate dropped to 431.8 during the period 2012-2017, thus implying a reduction of 8.6 percent in crime. Looking at the comparison group of later BIDs, the average number of crimes per quarter was 450.5 in 2011; it fell to 408.4 during the period 2012-2017, reflecting a drop of 9.3 percent. Regarding the group of Commercial Areas, the average number of crimes per quarter declined by 2.2 percent from

[12] A UK postcode usually corresponds to a very limited number of addresses or a single large delivery point. While it might not always be a geographically accurate description of where a property is located, it is generally a good approximation. For instance, a building which contains several flats or businesses, but only one external door will only have the external door listed as a delivery point.

64.9 in 2011 to 63.5 in 2012-2017. When considering these figures at the level of the postcode, Table 1 also reports a reduction of about 8.7 percent in crime across contemporaneous BID areas between pre- and post-BID years. Similarly, for later BID areas, the reduction in crime is of 9.2 percent. Conversely, for commercial areas, the decline is smaller at 1.5 percent.

Table 2 focuses on contemporaneous BIDs only. It shows the amount of resources BIDs devoted to security services during the period 2012-2017. Information was retrieved from business plan documents that each BID was legally obliged to prepare in advance of the first ballot vote. Each document presents a 5-year business plan outlining what the BID priorities are and describing how resources will be allocated among the identified priorities. Obviously, BID advocates use these documents as a marketing tool to persuade merchants to vote favourably at the ballot. Thus, these documents greatly vary in terms of layout and amount of details provided. Out of the 127 plans that were collected, 111 (87.4 percent) indicate that 'keeping the BID area safe' is one of the main BID priorities; 108 (about 85 percent) report positive spending on security services; and about half of them (47.2 percent) state that they have also organized themselves as a Business Crime Reduction Partnership (BCRP). BCRPs are local schemes that aim to establish tighter links between businesses, the police and local councils in order to work together to reduce crime within their area. BCRPs work under the umbrella of the National Association of Business Crime Partnerships (NABCP), a lobbying organization which offers members information on recent legislation, advice on best practices, document templates and accreditation, but it does not seem to offer direct financial support.[13]

Table 2 compares expenditures figures for contemporaneous BIDs (column 1) and for the BID subgroup that has indicated safety as a priority (column 2). The total annual budget is higher for the latter than for the former group. On average, the group of BIDs with safety as a priority have a total annual budget of about £400,000 whereas the group of all BIDs have a total budget of about £374,000. Unsurprisingly, the group in Column 2 spends more on security services (mean: about £96,000; median: £60,000) than the group in Column 1 (mean: about £84,000; median: £51,000). In percentage terms, Column 2 reports a budget share spent on security measures of 22.4 percent which is almost 3 percentage points higher than the share reported in Column 1 (19.5 percent).

4.2 Taxonomy listing different approaches to fighting crime

After collecting information from business plan documents about the measures utilized by each BID to reduce crime, I built a taxonomy distinguishing between a passive, active and very active approach. A passive approach simply involves joining existing initiatives to help crime preven-

[13] For more information, visit https://www.nabcp.com/

tion (like Pubwatch or Shopwatch) or lobbying local government for additional resources to be devoted to the area. A direct approach involves the use of one or more of the following measures: information sharing with police forces and participation in crime forums; child safety schemes; participation in safety and coordination hubs; funding training for staff to act as first respondents; closed-circuit television (CCTV) schemes; enhanced digital radio links; area dedicated staff with tasks ranging from assisting tourists to patrolling streets. Depending on the task allocation, these dedicated staff (often in coloured uniforms) have been called street ambassadors, rangers, wardens, angels or patrols. A very active approach requires more direct measures such as employing taxi marshals; investing in number plate recognition, face recognition, head cameras and other types of security software; hiring a dedicated police community support officer (PCSO), a regular police officer for a given set of hours or a BID crime reduction coordinator (often with previous police experience); launching own crime reduction initiatives, hotlines and hubs. Obviously, a BID can simultaneously apply passive, active and very active strategies or any combination of the three. For simplicity in the analysis that follows, I define a BID having a passive approach to fighting crime if it only employs passive measures. I define a BID having an active approach if it employs, at least, one active measure (with or without passive measures), but it does not use any of the very active strategies. I define a BID having a very active approach if it uses, at least, one very active measure.

Applying this taxonomy to the group of contemporaneous BIDs with safety as a priority (111 BIDs), I find that there are 40 BIDs (36 percent) with a very active approach; 45 BIDs (40.5 percent) with an active approach; and 26 BIDs (23.4 percent) with a passive approach. Among the group of BIDs organized as BCRPs (60 BIDs), 24 BIDs (40 percent), 26 BIDs (43 percent) and 8 BIDs (13 percent) adopted a very active, active and passive approach, respectively.

Columns (3)-(5) of Table 2 show summary statistics for these three groups. BIDs with a very active approach to fighting crime report a higher total annual budget (at about £471,000) than the groups of BIDs using active (about £389,000) and passive measures (about £311,000). In addition, very active BIDs spend on safety slightly more than BIDs with an active approach (about £110,000 vs £100,000) but significantly more than BIDs with a passive approach (about £67,000). In percentage terms, the budget share on safety is the highest for active BIDs (25.1 percent), followed by very active BIDs (22.4 percent), whereas passive BIDs report a smaller average share (17.4 percent). Table 2 clearly indicates that, in terms of spending on safety, active and very active BIDs behave more similarly relative to BIDs with a passive approach. The last column of Table 2 describes the group of BIDs that are also organized as BCRPs and operate under the NABCP membership. As noted before, this group largely (83 percent) consists of BIDs adopting either active or very active security measures. Therefore, it is unsurprising that

BCRPs or NABCP members devote a substantial amount of resources to keeping the BID area safe. Among all columns, Column (6) reports the highest annual average spending on safety (£114,511).

5 Results

5.1 BID adoption on crime: main results

Table 3 presents results at the area and year-quarter level, comparing contemporaneous BIDs and commercial areas. I use a clean group of commercial areas which excludes the 71 BIDs that were formed between 2005-2011 (labelled early BIDs). The rationale for such exclusion is that 'keeping a BID area safe' is among the top priorities of many BIDs (early and contemporaneous) so I do not want my control group to be affected by areas already investing in fighting crime.

Table 3 is organized as follows: Columns (1) includes the Treated variable, $ln(size)$ and year-quarter fixed effects; Column (2) also includes the variable (Treated x Post); Column (3) adds 2011 area-level crime and area trends; and Column (4) further controls for the four largest territorial police forces in the UK and police force trends. The first column of Table 3 shows the results of regressing reported crime on the Treated dummy while controlling for differences in area size. On average, crime is much higher in contemporaneous BIDs than commercial areas. There are about 189 more crime incidences reported per quarter in a BID area than a typical town center or commercial area located in England and Wales over the sample period. This result is consistent with the large differences in crime levels between the two groups reported in Table 1.

By adding the variable (Treated x Post) to our model (see Column 2), I find that BIDs are on average associated with a higher level of crime (208 more crimes than a typical commercial area), but BIDs experience a reduction of about 36 crimes per quarter in the period following BID formation. When 2011 area-level crime and area trends are included in the estimation (see Column 3), the estimated coefficient for the variable Treated drops in size but retains its significance; the coefficient for (Treated x Post) also drops in size and remains statistically significant. The substantial reduction in the size of the coefficients in Column (3) suggests that it is important to control for area differences in initial (2011) crime and area trends related to the initial crime level. Adding police force controls and police force trends (see Column 4) do not change the results: BID areas experience 7 additional incidences of crime per quarter during 2012-2017. Moreover, BID adoption reduces crime by about 9-10 episodes per quarter.[14]

Commercial areas may not provide the most suitable control group to be used in the analysis

[14] I replicate Table 3 including the full set of territorial police forces instead of using the four largest. Results are essentially unchanged and available from the author upon request.

because they are on average much smaller in size and characterised by a significantly lower level of crime than BID areas (see Table 1, Row 2). So, we turn to the group of later BIDs. Later BIDs are areas that were not organized as BIDs during 2012-2017, but they would be in 2018-2019. I expect the groups of contemporaneous and later BIDs to have more similarities between themselves than with the larger group of commercial areas. Table 1 showed that this is, on average, true.

Table 4 presents results comparing contemporaneous BIDs and later BIDs. On average, contemporaneous BIDs report 28.7 more incidences of crime than later BIDs in any year-quarter during 2012-2017 (see Column 1). This estimate indicates a much smaller difference between treated and control groups than the one documented in Table 3. Column (2) shows that there is a substantial reduction in crime following BID creation. The coefficient of the variable (Treated x Post) is of similar magnitude but opposite sign than that of the variable Treated. Following BID adoption, crime reduces by about 57 incidences a quarter. In addition, contemporaneous BIDs report on average 59 additional crimes per quarter. By adding the two estimates, the difference in crime between contemporaneous BIDs and later BIDs considering pre- and post-BID formation drops from 59 to 2 episodes a quarter.

By adding initial crime and area trends, Column (3) confirms the results obtained previously: contemporaneous BIDs are on average associated with higher crime (11.4 more incidences), but they also experience a drop in crime (of 14.6 episodes) after BID implementation. Relative to Column (2), Column (3) reports coefficients that are much reduced in size but retain their statistical significance, suggesting again that controlling for 2011 area-level crime and area trends is crucial for deriving robust estimates. By using the full specification, which further includes the four largest territorial police forces and police force trends, Columns (4) confirms the results obtained so far. BIDs reports higher levels of crime (14.6), but there is evidence of a significant decline in crime following a successful BID ballot. The reduction is of 11 episodes per quarter.

5.2 Intensity of the approach to fighting crime

Section 1 presented a taxonomy classifying BIDs by a passive, active and very active approach to fighting crime. This section explores this taxonomy further and investigates whether the intensity of the approach affects the impact of BID adoption on crime. I expect BIDs with a very active or active approach to be more successful at reducing crime than BIDs with a passive approach. In the analysis that follows, I focus on the groups of contemporaneous BIDs and later BIDs.

Table 5 focuses on contemporaneous BIDs that have indicated 'keeping the BID area safe' as a priority. These 111 BIDs are the treated group in Table 5, Column (1). The corresponding control group (54 BIDs in total) consists of the 38 later BIDs and the 16 contemporaneous

BIDs for which safety is not a priority. Columns (2)-(4) separate the group of BIDs with safety as a priority into three classes: those applying a very active (40 BIDs), active (45 BIDs) and passive (26 BIDs) approach. Results for the three groups are presented in Columns (2), (3) and (4), respectively. It is worth noting that the number of BIDs included in the treated group varies in each column whereas the control group remains the same. A full model specification, corresponding to Column (4) in Table 4, is adopted in Table 5, Columns (1)-(4).

Looking at Table 5, Column (1), BIDs that have indicated safety as a priority experience a higher level of crime than the control group. There are 28.8 additional incidences of crime per quarter in the former group relative to the latter. Moreover, BID formation is associated with a decline of 11.1 crime episodes a quarter. Looking at Columns (2)-(3), BIDs with an active and very active approach behave similarly. Both groups suffer higher levels of crime over the sample period and enjoy a statistically significant reduction in crime post-BID formation. This reduction is of about 14 and 18 incidences a quarter in very active and active BIDs, respectively. The group of BIDs using passive measures is also characterised by higher levels of crime during the sample period. More importantly, for this group, BID formation is not associated with any crime decline. The coefficient of (Passive x Post) is small in size and not statistically significant (coef. 3.49; se 7.61).

Table 6 is organized exactly as Table 5, but it focuses on the sub-group of contemporaneous BIDs that are also organized as BCRPs and are NABCP members (60 in total). The majority of BCRPs adopted either an active (26 BCPRs) or very active (24 BCRPs) strategy, with only 8 BCRPs adopted a passive approach to fighting crime.

Looking at Table 6, Columns (1), BIDs that are also organized as BCRPs are characterised by a higher level of crime (coeff. 32.58; se 6.70) during 2012-2017 and experience a statistically significant reduction in crime after BID formation (coeff. -22.26; se 8.13). Relative to all contemporaneous BIDs and the group of BIDs with safety as a priority, NABCP members seem to achieve a higher reduction in crime in the post-BID period (comparing -11.00, -11.14 and -22.26 in Tables 4, 5 and 6, respectively). Moreover, very active and active BCRPs are characterised by both a higher incidence of crime and a larger crime decline in the post-BID period compared with passive BCRPs, which, instead, report no difference in average crime levels and a positive and statistical significant effect of BID formation on crime. Given the very limited number of passive BCRPs (8), caution is needed when interpreting this set of estimates.

To summarize, this section has shown that BIDs adopting a passive approach at fighting crime behave significantly different than those adopting either an active or a very active approach. BID areas utilizing either direct or very direct measures are more successful at reducing crime following the creation of a BID than areas using passive measures. Moreover, it seems that

NABCP membership is effective at helping its members in their war against crime as long as members adopt an active or very active stance. The few BCRPs that adopted a passive approach saw crime increasing instead of decreasing after BID formation.

5.3 Resources devoted to crime prevention

The results so far use a definition of BIDs that is binary, either possessing a certain characteristic or not. BIDs are, however, highly heterogeneous not only in their approach to combat crime but also in the amount of resources devoted to safety. This section explores the impact of BID security expenditure on crime using two measures: the nominal spending on security measures and the budget share spent on safety. I focus on the group of contemporaneous BIDs that report positive spending on safety (108 BIDs) as the treated group. The control group consists of the 38 later BIDs together with the 19 contemporaneous BIDs with zero safety expenditure. The model specification is very similar to equation 1, but I replace the Treated binary variable with the nominal expenditure on safety (expressed in thousands GBP) or the budget share spent on security.

Column (1) of Table 7 presents estimates for the nominal spending on safety. A coefficient of 1.34 (se 0.16) indicates that a £1000 additional spending on safety is associated with a rise of 1.3 crime episodes a quarter.[15] This would be equivalent to 5.4 crime episodes a year (1.343 x 4 = 5.372) associated with a rise of £4000 (£1000 x 4) in annual spending. Again, this finding confirms that BIDs that spend more on security are also those that experience higher levels of crime. Column (1) also shows that spending on security is associated with crime reduction following BID adoption. A £1000 additional spending on safety reduces crime by 0.88 episodes a quarter after BID formation or, alternatively, £4000 additional spending a year reduces crime by 3.5 (-0.876 x 4 = -3.504) episodes. Along the same lines, a rise of £40,000 (£80,000) in annual safety spending would reduce crime by 35 (70) incidences a year.

Turning to Column (2) of Table 7, I observe that, on average, a 1 percentage point (pp) increase in the budget share spent on safety is associated with about 157 additional crime episodes over the sample period, 2012Q3-2017Q4. This finding confirms that areas affected by higher levels of crime are more likely to devote a larger share of their budget to crime prevention. After BID advent, a 1pp increase in the budget share allocated to safety is associated with a drop of 67 crime incidences (for the average BID with positive spending on safety) over the period following BID formation.

Two things are worth noting in Column (2): i) crime data vary by quarter but the budget share on safety is a proportion that does not vary by quarter, year or considering the 5-year

[15] To derive this estimate, I use the quarterly spending on safety by dividing the annual expenditure by 4.

period of BID existence. In their initial business plans, BIDs typically decide what proportion of their budget to invest in security measures and keep this proportion roughly constant over time; ii) given that crime data are at the quarterly level, Column (2) captures the 1pp change in the safety budget share per quarter. If I were considering a year, I would multiply the 1pp change by 4 (4pp). Further considering a 5-year period, I would multiply the 1pp change by 20 (20pp).

Are Column (2) results consistent with those derived in Column (1)? To verify whether this is the case, it would be useful to consider what the average spending on safety and the total budget expenditure are for the group of treated BIDs (i.e. contemporaneous BIDs that report positive spending on safety). Looking at Table 1, Column (2), the average spending on safety for BIDs that indicate safety as a priority is about £96,000 a year. The corresponding figure for the group of contemporaneous BIDs that report positive spending on safety is slightly higher at £97,791. About the total annual budget, the former group reports an average of about 400,000 (see Table 1, Column 2), the latter shows a slightly higher average at £405,934.

Taking all into consideration, Column (2) results suggest that £4,059 (1 percent of £405,934) is the additional spending needed each quarter to obtain a reduction of 67 crimes over the period following BID formation. This is equivalent to £16,236 (£4059 x 4) a year and £89,298 (£4059 x 22) over the period 2012Q3-2017Q4. In other words, the annual spending (£97,791) on safety needs to almost double (to £187,089 = £97,791 + £89,298) to reduce crime by 67 episodes a year. Similarly, Column (1) results suggest that annual safety spending needs to increase by £80,000 to have a reduction of 70 crimes per year.

Using these figures, I can derive the average BID costs of reducing reported crime by 1 episode. For the average BID with positive spending on security measures, I find that a decline of 1 reported crime is associated with a relatively narrow range of £1,143 to £1,341 of BID safety expenditure.[16] Looking at the experience of Los Angeles BIDs over the 1990s, Brooks (2008) derives per-unit crime costs in the range of $1,053 to $1,235 (about £680-£800 in 1996) of BID security expenditure.[17] Using a slightly different specification and focusing on Los Angeles BIDs over 1995-2005, Cook and MacDonald (2011) estimate average costs of $2,967 (£1,958 in 2000) of BID security spending. My estimates are not very different from those of Brooks (2008) and Cook and MacDonald (2011).

More importantly, BID costs are low. It is relatively inexpensive for BIDs to reduce crime. This finding provides a clear rationale for involving BIDs into a larger order maintenance network supporting and extending the central role of the police.

[16] These figures are computed as 80,000/70 and 89,298/66.6, respectively.

[17] Brooks (2008) also derives per-unit costs in the range of $2,857 to $3,846 of total BID expenditure. By averaging both types of estimates, she concludes that a decline of 1 reported crime is associated with about $2,000-$3,000 of BID expenditure.

5.4 Results by crime category

This section presents results by crime category. I use a crime classification introduced by data.police.uk before June 2013 because it assures consistency during the sample period. It comprises 11 crime categories: anti-social behavior, public order and weapons, criminal damage and arson, drugs, other crime (which includes forgery, perjury and other miscellaneous crime), violent crime (which includes violent crime and sexual offences), burglary, robbery, shoplifting, vehicle crime, and other theft. The last category (other theft) includes three crime sub-classes: 1) theft from the person[18], 2) bicycle theft and 3) theft by an employee, blackmail and making off without payment. The most important of these sub-classes is theft by an employee, blackmail and making off without payment (up to 70 percent) with the two remaining sub-classes, theft from the person and bicycle theft, covering about 15 percent each.

Table 8 shows results by crime type. Each column refers to a different crime category. In deriving the results, I apply a specification similar to equation 1 where the outcome variable is now defined as the number of crimes reported in each category rather than total crime. I compare the 127 contemporaneous BIDs (treated) with the 38 later BIDs (control) similarly to what I did in Table 4, Column (4). Looking at Table 8, evidence suggests that contemporaneous BIDs experience higher levels of crime classified as other theft (Column 11), anti-social behavior (Column 1) and shoplifting (Column 9). Conversely, contemporaneous BIDs report lower levels of violent crime (Column 6) and drug-related crime (Column 4) than the group of later BIDs. In addition, BID adoption has a significant impact in reducing shoplifting (Column 9) anti-social behaviour (Column 1) as well as public-order crimes and those related to the possession of a weapon, such as a firearm or knife (Column 2). At the same time, an area which chooses to become a BID faces a rise in the number of robberies reported (Column 8).

Looking at the results for anti-social behaviour (see Table 8, Column 1), a coefficient of 10.76 (se 2.60) for the variable Treated indicates that contemporaneous BIDs experience, on average, 11 additional episodes of anti-social behaviour per quarter during the sample period relative to the group of later BIDs. Moreover, BID adoption seems to reduce the incidence of anti-social behavior by 5.6 episodes a quarter (coef. -5.62, se 2.60).

Given that BIDs are largely commercial/retail areas and BID security spending aims at making the area safer for tourists and customers, it is unsurprising to find that BID adoption largely reduces crime types that either involve businesses (e.g., shoplifting) or negatively affect customer experience (e.g., anti-social behavior). Moreover, it is reasonable to expect that if a

[18]Theft from the person is described as crime that involves theft directly from the victim (including handbag, wallet, cash, mobile phones) but without the use or threat of physical force. Colloquially, this type of crime is referred to as pick-pocketing.

retail area improves in terms of cleanness of public places, customer safety, event marketing, etc, it becomes an attractive place for both customers and criminals. This might explain the higher number of robberies, which are likely to occur during periods of lower BID security presence (e.g., at night time).[19]

To check the robustness of the results, I replicate Table 8 for each subgroup of contemporaneous BIDs analyzed in previous sub-sections: BIDs indicating safety as a priority, BIDs with a very active/active/passive approach at fighting crime, BIDs that are organized as BCRPs and are NABCP members (see Tables 5 - 6 for details). Each row of Table 9 refers to one of these subgroups; each column refers to a crime type. The figures inside Table 9 refers to the estimated coefficients and standard errors of the variable (Treated x Post) for each subgroup and crime type. A specification that includes the full set of controls is applied.

The first row of Table 9 is added for convenience: it reproduces the results shown in Table 9 for all contemporaneous BIDs. For the subgroup of BIDs indicating safety as priority, the impact of BID adoption on crime type is very similar to that of Row 1: BID creation reduces shoplifting, anti-social behavior and public order-related crimes whereas it has a positive, statistically significant but relatively smaller impact on robbery.

Distinguishing BIDs by the intensity of their approach to fighting crime is important. BIDs that invest in very active security measures are twice as successful at reducing shoplifting (coef. -12.81, se 2.69) as the typical contemporaneous BID (coeff. -5.73, se 1.74) or the average BID with safety as a priority (coeff. -6.05; se 1.87). Moreover, BIDs with a very active approach are the only ones where violent crime significantly declined after BID formation (coef. -4.15, se 1.86). This sub-group also reports a decline in vandalism (criminal damage and arson) as well as vehicle crime. Conversely, it shows an increased incidence of burglary and robbery. As mentioned before, these findings might be linked to the rise of night time crime in areas that have become more attractive.

BIDs with an active approach to fighting crime show a statistically significant decline in anti-social behavior (coef. -9.24, se 4.90), public disorder (coef. -2.24; se 1.06) as well as crime classified as other theft, a category which includes pick-pocketing, bicycle theft and theft by an employee, blackmail and making off without payment (coef. -9.89, se 5.08). Differently from what was found for the previous subgroup, BIDs with an active approach experience a rise of vandalism (criminal damage and arson) as well as vehicle crime following BID formation. What is striking in Table 9 is that the subgroup of BIDs that have adopted a passive approach show no statistically significant decline in any type of crime. On the contrary, they report a rise of violent crime (coef. 7.74, se 2.30) and robbery (coef. 0.96, se 0.42).

[19] Unfortunately, data.police.uk crime data do not report the time at which crime episodes are committed.

Turning to the subgroup of BIDs that are organized as BCRPs and are part of the NABCP, evidence suggests that they are almost three times as likely to experience a decline in shoplifting (coef. -17.07, se 2.98) as the typical contemporaneous BID or the average BID with safety as a priority. In addition, they are successful at reducing public disorder (coef. -5.24, se 1.00), drug-related crime (coef. -1.62, se 0.81) and crime classified as other (coef. -0.62, se 0.34). Similarly to very active BIDs, they experience an increased incidence of burglary (coef. 0.99, se 0.48) after BID adoption.

6 Robustness check

As a further robustness check, I replicate the analysis conducted so far using data at the postcode level. Using a specification similar to equation 1, I define a postcode as treated if it falls within the boundary of a contemporaneous BID area. Similarly, I consider a postcode as untreated if it falls within the boundary of a later BID or a commercial area (see Table 1 for details). In this adjusted specification, postcode trends are defined as the interaction between 2011 postcode-level crime and year-quarter fixed effects.

Overall, I obtain postcode level results that are qualitatively similar to those derived at the BID area level.[20] As before, I conduct two sets of diff-in-diff estimations: 1) comparing contemporaneous BIDs and commercial areas and 2) comparing contemporaneous BIDs and later BIDs. Focusing on the first set of results, I find that there are more crimes reported in an average postcode located within a contemporaneous BID area than in an average postcode within a commercial area. I also find that BID formation reduces the number of crimes reported. Using a full model specification, an average postcode located within a BID area shows 0.082 (se 0.008) more crimes per quarter over the sample period whereas the same postcode reports 0.079 (se 0.010) fewer crimes after BID creation.

Turning to the second set of results, evidence confirms that the average postcode located within a contemporaneous BID area is characterised by higher levels of crime (coef. 0.170, se 0.010) relative to postcodes located within a later BID area. Moreover, postcodes located within a contemporaneous BID area experience a significant drop in crime (coef. -0.068, se 0.011) following BID formation. When considering that a contemporaneous BID area includes on average 436 postcodes (see Table 1), a drop in crime of 0.07 per postcode would imply a reduction of about 30 crimes per quarter for an average BID, which is clearly higher than the estimate (about -11) obtained from Table 4, Column (4). Nevertheless, when we take into account that not all postcodes within a BID area were affected by crime during 2012Q3-2017Q4, but only a proportion of them (on average 123 out of 436), a drop in crime of 0.07 per postcode would imply a reduction

[20] Results are available from the author upon request.

of about 9 (0.07 x 123 = 8.6) crime episodes per quarter, an estimate much more consistent with that reported in Table 4.

7 Further analysis: diversion effects

In their analysis of strategic interactions among gated communities (of which BIDs are an example), Helsley and Strange (1999) highlight the existence of both crime deterrence and crime diversion effects linked to gating. They argue that an increase in gating in one community leads to three important effects: i) it decreases crime in that community (deterrence); ii) it increases crime in all other communities (diversion); iii) it decreases aggregated crime. Relevant to this paper, an increase in gating could be interpreted as a business community organising itself as a BID and choosing safety as one of its priorities. Previous sections have provided evidence of crime deterrence following BID adoption; this section focuses on crime diversion.

To test the presence of diversion effects, this section shifts the focus from BID areas to neighboring commercial areas and tries to quantify empirically the spillover effects from the former to the latter. To start with, I focus on the group of commercial areas and measure the distance of each commercial area to its nearest contemporaneous BID. I expect diversion effects to be stronger for commercial areas within 1 or 2km distance from a BID boundary than for areas at a greater distance. My reasoning is as follows: Criminals, who have previously conducted their activities in a commercial area now organized as a BID, might approach the area and be discouraged by BID security presence. As a consequence, they might decide to divert their focus on commercial areas nearby not yet established as BIDs.

The analysis that follows considers areas within the first 5km of a contemporaneous BID. The treated group consists of areas at 1 and/or 2km from a BID boundary; the control group consists of areas at 3, 4 and 5km. Using a difference-in-differences specification (similar to equation 1), I test whether crime levels are different between the treated and the control groups. I also test whether crime increases (or decreases or does not vary) in treated areas after the creation of a BID nearby. So, one important difference between treated and control areas concerns the variable $Post_{i,t}$. For control areas, $Post_{i,t}$ is always zero. For treated areas, $Post_{i,t}$ varies depending on the year-quarter at which the nearest BID starts operating. In other words, it is zero for all year-quarters preceding the opening of the closest BID; it turns to 1 afterwards.

Table 10 presents the results and is organized as follows: Columns (1)-(3) use commercial areas at 1-2km distance from a BID boundary as the treated group whereas Columns (4)-(5) distinguish between areas at 1km distance (Column 4) and areas at 2km distance (column 5). To provide robust estimates, each column shows results for a slightly different combination of treated and control areas.

Starting from Column (1), which compares commercial areas at 1-2km distance from a BID boundary (treated group) with commercial areas at 3km distance (control group), evidence suggests that treated areas, on average, experience lower levels of crime than the control group. Moreover, treated areas experience a rise in crime following a BID opening nearby. The incidence of crime increases by 1.5 episodes a quarter in areas at 1 or 2km distance from a BID relative to areas at 3km distance. This result suggests that there are negative spillover effects from BID areas to neighboring commercial areas, thus providing evidence of crime diversion.

Columns (2) and (3), which compare commercial areas at 1-2km distance from a BID (treated group) with commercial areas at 3-4km (Column 2) and at 3-5km (Column 3) distance, show results that are similar to those presented in Column (1). Over the sample period, treated areas are characterised by lower levels of crime than control areas. After the formation of a BID nearby, treated areas experience a rise in crime. There are about 1.3 additional crimes reported in areas at 1-2km distance relative to areas at both 3-4km distance (Column 4) and 3-5km distance (Column 5) from a BID boundary.

Turning to Columns (4) and (5), results suggest that diversion effects are largely driven by treated areas located within 1-2km distance from a BID (coef. 1.49, se 0.72 in Column 5). Treated areas located within 0-1km distance are not negatively affected by BID formation (Column 4). In addition, treated areas located within 0-1km distance from a BID boundary are, on average, characterised by a lower level of crime (coef. -3.89, se 0.46) over the sample period than areas within 1-2km distance.

Finding no evidence of diversion effects in commercial areas located in close proximity to a BID (i.e., commercial areas within 0-1km distance from a BID boundary) seems consistent with the idea that BID security presence not only deters criminal activity within BID areas, but it also discourages criminals to operate in commercial areas adjacent to BIDs while diverting criminal activity to areas located a little farther. Looking at the experience of BIDs in the city of Philadelphia, Calanog (2006) also finds that crime is deterred from places that are adjacent to a BID (within 1 block) whereas he finds crime displacement in places that are 2-3 blocks away from the nearest BID boundary. As a possible explanation, he argues that BID employees patrolling service areas on foot are often immediately visible one block away from the border of the nearest BID.[21]

It is worth noting that the diversion effects presented in Table 10 are of a smaller magnitude than the deterrence effects shown in earlier sections of the paper (see, e.g., Table 4). Again,

[21]The work of private organisations like BIDs located in urban areas with a high spatial concentration of retail activity is additional to 'casual surveillance' and 'eyes-on-the-street', which refers to observation, from the street or from adjacent buildings, provided by ordinary people as they go about their daily activities. Rosenthal and Urrego (2021) have recently found that the spatial concentration of retail activity in New York City, which is associated with a strong footfall, often acts as eyes-on-the-street providing an effective deterrent for criminals.

this is consistent with the work by Helsley and Strange (1999), who theoretically derive that deterrence effects are larger than diversion effects so that aggregated crime decreases. I find that this is true in the case of UK BIDs.

8 Conclusions

The paper evaluated the impact of UK BIDs on crime. Specifically, it investigated the impact of BIDs on local crime using street-level crime data publicly available for England and Wales.

To the best of my knowledge, this is the first paper that used comprehensive information on BID areas within two countries of the UK and analyzed the impact of BID adoption on reported crime. Previous studies focused on BIDs areas located within a city, e.g. Los Angeles or Philadelphia in the US. This study focused on the total number of BIDs (127) established in England and Wales between 2012 and 2017. This novel data set was augmented by two auxiliary files: i) the universe of town centers and commercial areas located in England and Wales; ii) the group of BIDs (38) created in England and Wales between 2018 and 2019 (also newly created for this study).

Using a difference-in-differences estimation with varying treatment, the analysis showed that BID adoption is, on average, associated with crime declines of about 10-11 episodes per quarter. Looking at differences by crime type, BID adoption has a substantial impact in reducing shoplifting (5.7 fewer incidences per quarter), anti-social behaviour (5.6 fewer incidences) and public order-related crimes (1.6 fewer crimes). At the same time, BID formation seems to lead to a rise in reported robbery (of less than 1 incidence per quarter).

The paper also showed that the impact of BID adoption on crime depends on the intensity of the approach that BIDs choose to fighting crime as well as on the amount of resources they devote to crime prevention. I found that BIDs with either an active or very active approach are more successful at reducing crime than BIDs using passive measures. In addition, I found that BIDs operating under the NABCP umbrella are more effective in their war against crime as long as they adopt active or very active measures.

When considering the amount of resources devoted to crime prevention, I found that BIDs that spend more on security are better equipped to combat crime than BIDs that invest less. A £4000 additional spending on safety reduces total crime by 3.5 episodes a year. Moreover, I found that BID costs of crime reduction are low. I estimated a per-unit crime cost in the range of about £1100-£1400 of BID safety expenditure.

The findings of this research provided a clear rationale for a greater involvement of a private organization like BIDs into local schemes with the police and local councils working together to guarantee community safety. As emphasized by D'Souza (2020), research has traditionally

prioritised the central role of the police in order maintenance, often overlooking the activities of private organizations. My work provided further support for the inclusion of private organisations in the study of crime suppression and order maintenance and stressed the contribution that private organisations can make into a larger order maintenance network (see, e.g., Shearing and Johnston, 2013; Cook and MacDonald, 2011).

Looking at the functioning of BIDs and their commitment to fighting crime, my research clearly indicated that it would be crucial for BIDs to adopt active or very active crime prevention measures. Simply relying on passive safety measures would not guarantee a decline in local crime.

BIDs are likely to face a number of challenges going forward: the current cost-of-living crisis affecting both households and small businesses' financial conditions, already stretched after two years of Covid-19 pandemic; the changing nature of retailing and the resultant impact on traditional retail centers; the shift from commoditized goods and services to engaging experiences on the high street. UK BIDs have just carved out their own space among government and non-government organizations operating at the local level. The more effective UK BIDs will be in dealing with any of these challenges, the larger their future role will be.

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Table 1: Descriptive statistics

	Number of areas	Size (in square km)	Number of postcodes	Average number of crimes by area 2011	Average number of crimes by area 2012-17	Average number of crimes by postcode 2011	Average number of crimes by postcode 2012-17
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Contemporaneous BIDs	127	0.956	436	472.5	431.8	1.085	.991
		(1.937)	(358)	(493.0)	(453.9)	(7.762)	(5.881)
		[0.473]	[350]				
Later BIDs	38	0.820	502	450.5	408.4	.897	.814
		(1.007)	(394)	(338.3)	(303.6)	(6.463)	(4.603)
		[0.530]	[352]				
Commercial Areas	2,715	0.093	71	64.9	63.5	.912	.898
		(0.088)	(131)	(122.2)	(111.0)	(5.528)	(4.297)
		[0.067]	[23]				

Notes: Values are reported as mean, standard deviation (round parentheses) and median (square parentheses). Area size is measured in terms of square kilometers (column 2) and average number of postcodes per area (column 3). Columns (4)-(7) report the average number of crimes per quarter either by (BID or commercial) area (columns 4 and 5) or by postcode (columns 6 and 7). Commercial Areas include all UK town centers and commercial/retail areas that are not organized as BIDs as of 31st Dec 2017, i.e. excluding areas that overlaps with the 127 contemporaneous BIDs (formed between 2012-2017) and the 71 early BIDs (formed between 2005-2011).
Sources: Street-level crime data, 2011-2017, Data Police UK. Author's calculations for area size and postcode counts.

Table 2: BID expenditures

	Cont. BIDs	Safety as a priority	Very active	Active	Passive	NABCP members
	(1)	(2)	(3)	(4)	(5)	(6)
Number	127	111	40	45	26	60
Total budget	374,027.9	400,023.1	471,410.2	389,357.2	311,402.7	458,852.2
	(325,596.4)	(337,132.9)	(354,210.0)	(350,331.4)	(269,284.8)	(361,104.0)
	[286,747.5]	[300,500.5]	[328,369.0]	[292,000.0]	[232,997.0]	[357,100.0]
Safety budget	83,709.3	95,996.9	109,968.5	99,976.2	67,038.5	114,511.3
	(108,804.0)	(111,362.6)	(129,900.1)	(104,721.3)	(88,115.5)	(119,567.8)
	[51,000]	[60,000]	[70,000]	[65,000]	[30,000]	[79,784]
Budget share on safety	0.1954	0.2239	0.2240	0.2512	0.1744	0.2396
	(0.1359)	(0.1215)	(0.1078)	(0.1148)	(0.1416)	(0.1283)
	[0.21]	[0.23]	[0.21]	[0.24]	[0.15]	[0.23]

Notes: Budget figures are annual and expressed in GBP. Values are reported as mean, standard deviation (round parentheses) and median (square parentheses). All figures are retrieved from the Business Plan documents published by each BID in preparation of the first ballot.
Sources: 127 BID Business Plan documents (see online appendix, Table A.1, for details).

Table 3: BID adoption on crime, area-level analysis, comparing Contemporaneous BIDs and Commercial Areas

	(1)	(2)	(3)	(4)
Treated	188.592***	207.815***	6.779**	6.666**
	(7.616)	(12.623)	(2.704)	(2.698)
$ln(size)$	83.968***	83.956***	5.553***	5.379***
	(0.987)	(0.986)	(0.438)	(0.450)
Treated x Post		-35.900**	-9.776**	-9.583**
		(16.414)	(3.863)	(3.865)
2011-level Crime			0.914***	0.915***
			(0.013)	(0.013)
Constant	296.782***	296.054***	22.743***	32.918***
	(3.796)	(3.758)	(1.607)	(2.946)
n	62,524	62,524	62,524	62,524
Year-quarter FX	Yes	Yes	Yes	Yes
Area trends	No	No	Yes	Yes
Police force area FX	No	No	No	Yes
Police force area x Year-quarter FX	No	No	No	Yes
R^2	0.413	0.413	0.947	0.947
F	327.167	319.332	3635.849	1294.049
p	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses (* 0.1 ** 0.5 *** 0.01 significance levels). All regressions include year-quarter fixed effects and $ln(size)$, where size is measured as area in square kilometers. The variable Treated is 1 for a contemporaneous BID area (i.e., established between Jan-2012 and Dec-2017); 0 for a Commercial Area. In total, there are 127 BIDs and 2,715 Commercial Areas. (Treated x Post) refers to the year-quarter when a BID started operating. Column (3) includes area 2011-level crime and area trends, which are measured by the interaction between area 2011-level crime and year-quarter fixed effects. Column (4) controls for the four largest police force areas in the UK (The Metropolitan Police; West Midlands Police; Greater Manchester Police; and West Yorkshire Police) with the benchmark being all remaining (33) police force areas. Column (4) also controls for police force trends, which are measured by the interaction between police force dummies and year-quarter fixed effects.
Sources: Street-level crime data, 2012-2017, Data Police UK; ONS National Postcode Directory, May 2017; 127 BID Business Plan documents; 2017 historic retail center boundaries, the Consumer Data Research Centre.

Table 4: BID adoption on crime, area-level estimation, comparing Contemporaneous BIDs and Later BIDs

	(1)	(2)	(3)	(4)
Treated	28.697**	59.154***	11.430***	14.583***
	(12.405)	(16.071)	(4.375)	(4.199)
$ln(size)$	212.763***	212.402***	-4.544*	-5.123**
	(10.642)	(10.636)	(2.334)	(2.165)
Treated x Post		-56.977***	-14.631***	-10.996***
		(16.527)	(4.254)	(4.247)
2011-level Crime			0.921***	0.919***
			(0.022)	(0.022)
Constant	550.936***	531.773***	9.093	37.016
	(31.420)	(31.593)	(10.558)	(42.711)
n	3,630	3,630	3,630	3,630
Year-quarter FX	Yes	Yes	Yes	Yes
Area trends	No	No	Yes	Yes
Police force area FX	No	No	No	Yes
Police force area x Year-quarter FX	No	No	No	Yes
R^2	0.182	0.184	0.935	0.938
F	19.284	18.403	373.642	202.290
p	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses (* 0.1 ** 0.5 *** 0.01 significance levels). All regressions include year-quarter fixed effects and $ln(size)$, where size is measured as area in square kilometers. The variable Treated is 1 if a BID was established between Jan-2012 and Dec-2017; 0 if a BID was created between Jan-2018 and Dec-2019. In total, there are 165 BID areas: 127 Contemporaneous BIDs and 38 Later BIDs. (Treated x Post) refers to the year-quarter when a contemporaneous BID started operating. Column (3) includes area 2011-level crime and area trends, which are measured by the interaction between area 2011-level crime and year-quarter fixed effects. Column (4) controls for the four largest police force areas in the UK (The Metropolitan Police; West Midlands Police; Greater Manchester Police; and West Yorkshire Police) with the benchmark being all remaining (33) police force areas. Column (4) also controls for police force trends, which are measured by the interaction between police force dummies and year-quarter fixed effects.
Sources: Street-level crime data, 2012-2017, Data Police UK; ONS National Postcode Directory, May 2017; 127 BID Business Plan documents.

Table 5: BID adoption on crime: BIDs with safety as a priority and a very active/active/passive approach to fighting crime

	(1)	(2)	(3)	(4)
Safety	28.810***			
	(3.873)			
Very Active		34.679***		
		(4.708)		
Active			25.153***	
			(7.145)	
Passive				23.928***
				(5.659)
Safety x Post	-11.139**			
	(4.611)			
Very Active x Post		-14.046**		
		(6.557)		
Active x Post			-17.605**	
			(8.823)	
Passive x Post				3.493
				(7.608)
Constant	-4.130	7.008	-20.205*	7.189
	(11.614)	(17.202)	(11.187)	(16.364)
n	3,630	2,068	2,178	1,760
Treated areas	111	40	45	26
Control areas	54	54	54	54
R^2	0.938	0.945	0.938	0.914
F	182.525	289.848	160.563	255.465
p	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses (* 0.1 ** 0.5 *** 0.01 significance levels). All regressions use a model specification with the full set of controls, similarly to Column (4) in Table 4. The variable Safety is 1 if a contemporaneous BID (which was established between Jan-2012 and Dec-2017) stated that safety was a priority in its business plan; 0 if a contemporaneous BID did not state that safety was a priority or if a BID was created between Jan-2018 and Dec-2019. Likewise, the variables Very Active/Active/Passive are 1 if a contemporaneous BID stated that safety was a priority in its business plan and adopted a very active/active/passive approach to fighting crime. The variables (Safety x Post), (Very Active x Post), (Active x Post) and (Passive x Post) refer to the year-quarter when a BID in the corresponding treated group started operating.
Sources: See Table 4.

Table 6: BID adoption on crime: BIDs organized as BCRPs with a very active/active/passive approach to fighting crime

	(1)	(2)	(3)	(4)
NABCP member	32.579***			
	(6.696)			
Very Active		22.359***		
		(7.519)		
Active			47.186***	
			(13.590)	
Passive				4.389
				(13.969)
NABCP member x Post	-22.260***			
	(8.125)			
Very Active x Post		-29.014***		
		(9.837)		
Active x Post			-36.634**	
			(15.369)	
Passive x Post				60.896***
				(19.140)
Constant	6.926	3.300	2.165	2.763
	(11.804)	(13.228)	(10.678)	(12.695)
n	3,630	2,838	2,882	2,486
Treated areas	60	24	26	8
Control areas	105	105	105	105
R^2	0.938	0.952	0.935	0.944
F	183.984	136.108	158.525	180.832
p	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses (* 0.1 ** 0.5 *** 0.01 significance levels). All regressions use a model specification with the full set of controls, similarly to Column (4) in Table 4. The variable 'NABCP member' is 1 if a contemporaneous BID (which was established between Jan-2012 and Dec-2017) stated that it is also a NABCP member; 0 if a contemporaneous BID is not a NABCP member or if a BID was created between Jan-2018 and Dec-2019. Likewise, the variables Very Active/Active/Passive are 1 if a contemporaneous BID stated its NABCP membership and adopted a very active/active/passive approach to fighting crime. The variables (NABCP member x Post), (Very Active x Post), (Active x Post) and (Passive x Post) refer to the year-quarter when a BID in the corresponding treated group started operating. There are two BIDs that are NABCP members but their spending on security measures is zero. For these two BIDs, their approach to fighting crime is not identified.
Sources: See Table 4.

Table 7: BID adoption on crime: using the nominal expenditure devoted to safety and the budget share spent on safety

	(1)	(2)
Safety expenditure	1.343***	
	(0.160)	
Safety budget share		156.939***
		(20.981)
Safety expenditure x Post	-0.876***	
	(0.187)	
Safety budget share x Post		-66.632***
		(24.624)
Constant	15.520	-4.622
	(10.627)	(11.405)
n	3,630	3,630
Treated areas	108	108
Control areas	57	57
R^2	0.939	0.940
F	177.362	185.540
p	0.000	0.000

Notes: Robust standard errors in parentheses (* 0.1 ** 0.5 *** 0.01 significance levels). All regressions use a model specification with the full set of controls, similarly to Column (4) in Table 4. The treated group consists of 108 contemporaneous BIDs that report positive spending on safety; the control group consists of 38 later BIDs and 19 contemporaneous BIDs with zero security spending (57 BIDs). The variable Safety expenditure refers to the BID quarterly spending on safety and is expressed in thousands of GBP. The variable Safety budget share refers to the annual BID budget share spent on safety. Safety expenditure and Safety budget share take a positive value for treated areas; they are equal to zero for control areas. The variables (Safety expenditure x Post) and (Safety budget share x Post) refer to the interactions between Safety expenditure (Column 1) or Safety budget share (Column 2) and the year-quarter when a treated area started operating.
Sources: See Table 3.

Table 8: BID adoption on crime, area-level analysis by crime category

	Anti-social behavior	Public order and weapons	Criminal damage and arson	Drugs	Other crime	Violent crime
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	10.755***	-0.811	-0.229	-1.421***	0.023	-9.105***
	(2.602)	(0.549)	(0.422)	(0.422)	(0.222)	(1.098)
Treated x Post	-5.620**	-1.636***	-0.577	0.663	0.187	-1.328
	(2.600)	(0.572)	(0.403)	(0.484)	(0.186)	(1.049)
Constant	23.452***	1.180	15.450***	4.317**	3.464***	16.606***
	(8.626)	(2.424)	(1.391)	(2.119)	(1.043)	(2.891)
n	3,630	3,630	3,630	3,630	3,630	3,630
R^2	0.814	0.748	0.775	0.502	0.503	0.868
F	40.744	32.813	56.474	19.296	15.643	80.068
p	0.000	0.000	0.000	0.000	0.000	0.000
	Burglary	Robbery	Shoplifting	Vehicle crime	Other theft	
	(7)	(8)	(9)	(10)	(11)	
Treated	0.207	0.099	4.178***	-0.199	11.085***	
	(0.319)	(0.173)	(1.588)	(0.380)	(2.159)	
Treated x Post	0.033	0.846***	-5.729***	-0.040	2.205	
	(0.312)	(0.223)	(1.737)	(0.349)	(2.300)	
Constant	4.212***	-2.618***	-4.510	0.101	-61.353***	
	(1.081)	(0.910)	(5.005)	(1.350)	(10.130)	
n	3,630	3,630	3,630	3,630	3,630	
R^2	0.686	0.496	0.707	0.556	0.785	
F	30.859	13.681	34.628	19.511	41.423	
p	0.000	0.000	0.000	0.000	0.000	

Notes: Robust standard errors in parentheses (* 0.1 ** 0.5 *** 0.01 significance levels). All regressions use a model specification with the full set of controls, similarly to Column (4) in Table 4.
Sources: See Table 4.

Table 9: BID adoption on crime, area-level analysis by crime category

	Anti-social behavior	Public order and weapons	Criminal damage and arson	Drugs	Other crime	Violent crime
	(1)	(2)	(3)	(4)	(5)	(6)
Cont. BIDs	-5.620**	-1.636***	-0.577	0.663	0.187	-1.328
	(2.600)	(0.572)	(0.403)	(0.484)	(0.186)	(1.049)
Safety priority	-4.812*	-1.710***	-0.132	0.239	0.267	-0.678
	(2.802)	(0.622)	(0.423)	(0.519)	(0.205)	(1.119)
Very Active	1.565	-1.461	-1.718***	-1.036	0.187	-4.151**
	(4.647)	(0.957)	(0.626)	(0.684)	(0.257)	(1.861)
Active	-9.244*	-2.238**	2.032***	1.202	0.499	-1.316
	(4.897)	(1.058)	(0.702)	(0.852)	(0.401)	(1.635)
Passive	-1.297	0.250	1.385	-0.220	0.790	7.736***
	(3.880)	(1.005)	(0.879)	(0.919)	(0.575)	(2.302)
NABCP member	2.204	-5.241***	0.747	-1.623**	-0.624*	-2.463
	(4.496)	(1.003)	(0.558)	(0.807)	(0.341)	(1.739)
	Burglary	Robbery	Shoplifting	Vehicle crime	Other theft	
	(7)	(8)	(9)	(10)	(11)	
Cont. BIDs	0.033	0.846***	-5.729***	-0.040	2.205	
	(0.312)	(0.223)	(1.737)	(0.349)	(2.300)	
Safety priority	0.103	0.784***	-6.053***	-0.229	1.081	
	(0.334)	(0.241)	(1.873)	(0.376)	(2.481)	
Very Active	2.167***	0.486*	-12.806***	-1.096*	3.816	
	(0.550)	(0.279)	(2.691)	(0.570)	(3.391)	
Active	-0.110	0.679	-0.456	1.242*	-9.894*	
	(0.469)	(0.498)	(3.392)	(0.651)	(5.075)	
Passive	-0.939	0.959**	-1.490	-0.174	-3.506	
	(0.609)	(0.421)	(2.556)	(0.678)	(2.681)	
NABCP member	0.988**	-0.032	-17.065***	-0.118	0.968	
	(0.483)	(0.374)	(2.980)	(0.558)	(4.301)	

Notes: Robust standard errors in parentheses (* 0.1 ** 0.5 *** 0.01 significance levels). All figures refer to estimated coefficients of the variable (Treated x Post) where Treated consists of the following: 127 Contemporaneous BIDs (Row 1); 111 BIDs with safety as a priority (Row 2); 40 BIDs with safety as a priority and a very active approach to fighting crime (Row 3); 45 BIDs with safety as a priority and an active approach to fighting crime (Row 4); 26 BIDs with safety as a priority and a passive approach to fighting crime (Row 5); 60 BIDs that are also NABCP members. See Tables 5 and 6 for details about treated and control groups. All regressions use a model specification with the full set of controls, similarly to Column (4) in Table 4.
Sources: See Table 4.

Table 10: Diversion effects: the impact of BID adoption on neighboring areas

	1-2km vs 3km	1-2km vs 3-4km	1-2km vs 3-5km	1km vs 3-5km	2km vs 3-5km
	(1)	(2)	(3)	(4)	(5)
Treated	-2.453***	-2.220***	-3.071***	-3.888***	-1.942***
	(0.471)	(0.420)	(0.408)	(0.475)	(0.545)
$ln(size)$	6.629***	6.797***	6.605***	5.506***	7.768***
	(0.384)	(0.347)	(0.328)	(0.362)	(0.358)
Treated x Post	1.554***	1.292***	1.301***	0.587	1.489**
	(0.504)	(0.498)	(0.495)	(0.633)	(0.721)
2011-level Crime	0.995***	0.987***	0.982***	1.008***	0.968***
	(0.040)	(0.032)	(0.030)	(0.038)	(0.027)
Constant	25.723***	26.512***	26.460***	21.226***	31.390***
	(2.463)	(2.071)	(1.930)	(2.222)	(1.995)
n	16,302	20,636	24,178	18,722	18,964
Treated groups	485	485	485	237	248
Control groups	256	453	614	614	614
R^2	0.947	0.939	0.939	0.929	0.943
F	325.977	399.834	429.013	332.601	395.598
p	0.000	0.000	0.000	0.000	0.000

Notes: Robust standard errors in parentheses (* 0.1 ** 0.5 *** 0.01 significance levels). Each column shows results for a different combination and treated and control areas. Columns (1)-(3) compare commercial areas at 1-2km distance from a BID area boundary (treated group) versus commercial areas at 3km distance (control group in Column 1); commercial areas at 3-4km distance (control group in Column 2); commercial areas at 3-5km distance (control group in Column 3). Column (4) compares commercial areas at 1km distance (treated group) versus commercial areas at 3-5km distance (control group). Column (5) compares commercial areas at 2km distance (treated group) versus commercial areas at 3-5km distance (control group). For control areas, (Treated x Post) is always zero. For treated areas, (Treated x Post) varies depending on the year-quarter at which the nearest BID starts operating. All regressions use a model specification with the full set of controls.
Sources: See Table 3.