

# In sight, in mind: Spatial proximity to protest sites and changes in peoples' political attitudes

Duoduo Xu  | Jiao Guo

Department of Sociology, The University of Hong Kong, Hong Kong, China

## Correspondence

Duoduo Xu, Department of Sociology, The University of Hong Kong, Hong Kong, China.  
Email: [ddxu@hku.hk](mailto:ddxu@hku.hk)

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## Abstract

Occupying public spaces can be an effective tactic for conveying a semantic message of protest and gaining wider support; however, it may also severely disrupt the everyday lives of non-participants and causes a backfire. Therefore, it remains unclear whether and how the occupy movements have shifted political attitudes among the general public. Bringing a social-spatial perspective to the case of the Occupy Central Movement (OCM) in Hong Kong, this study investigates how the attitudinal impact of occupation has varied according to people's spatial proximity to the protest sites. Using two waves of individual-level panel data collected right before and after the OCM and detailed geo-information on the respondents' home addresses and the occupied areas, we apply a difference-in-differences (DIDs) design to identify the causal link between space and attitudes. In addition, propensity score matching (PSM) methods are used to ensure the comparability of nearby and faraway residents. The results show that after the OCM, residents living near the occupied areas not only maintained their support for the pro-democracy camp but also became more liberal as compared to faraway residents. This phenomenon can be explained by the "on-site" effect, which suggests that the direct exposure to protestors' solidarity

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and the repressive actions of authorities arouse bystanders' sympathy for the protestors and support for their political cause. Such influence appears to be long-lasting and can be evidenced by the local election results after the protest.

#### KEYWORDS

Hong Kong, Occupy Central Movement, political attitudes, protest, spatial proximity

## 1 | INTRODUCTION

With socioeconomic inequalities rising around the globe, we have entered an age of protest (Samuel et al., 2020). Between 2006 and 2020, the number of protests worldwide was more than triple that of the prior 15 years (Isabel et al., 2022). Occupation, as a nonviolent tactic used by protestors, was popularized in the early 2010s through a series of highly influential social movements, including the Occupy Wall Street (OWS), the Arab Uprisings, and the Spanish Indignados (Matthews, 2018). By occupying public and often symbolic streets or buildings, protestors express their dissatisfaction with the status quo and advocate their own political causes. Ideally, the purpose of a protest, whichever an occupy movement or any other tactics, is to publicise the protestors' demands, prompt "the third party" who would not have been interested in the issue to enter the bargaining arena, and consequently gain legitimacy for their demands through public support (Lipsky, 1968). Indeed, there is mounting evidence that the protest strategy can attract public attention and spark widespread discussion about the protestors' claims (Madestam et al., 2013; Wasow, 2020). For example, Calhoun (2013) pointed out that the most important impact of OWS was that it changed people's thoughts about social and political issues.

In the recent decade, scholars have increasingly analysed social media as an underlying mechanism that influenced attitudinal consequences of occupy movements (Juris, 2012; Lee et al., 2015; Suh et al., 2017; Vasi & Suh, 2016), while the spatial dimensions at the core of such movements are often neglected. On the one hand, the physical gathering and ritual actions of a group of (mostly young) protestors concentrated in a public area create a carnival-like atmosphere, conveying a sense of solidarity and triggering supportive reactions of bystanders (Traïni, 2009; Wouters, 2019). Especially when repression by the authorities is perceived as illegitimate, the use of governmental force can easily trigger public grievances and evoke citizens' sympathy towards the protestors (Barkan, 1984; Cai, 2016; Hess & Martin, 2006; Koopmans, 1997). On the other hand, occupation inevitably disrupts the public space, which may delegitimize the action itself and even provoke opposition, particularly when the protest severely hampers social functioning and affects people's livelihoods over a prolonged period, such as by paralysing traffic, hindering daily commuting, and affecting the retail industry (Ketchley & El-Rayyes, 2021; Wallace et al., 2014).

Our study aims to fill this research void by analysing the case of the Occupy Central Movement (hereafter OCM, also known as the Umbrella Movement) in Hong Kong. In 2014, this 79-day movement witnessed thousands of pro-democracy protestors occupying the political and economic centre of the city. It not only brought profound changes to Hong Kong's political landscape but also laid a foundation of public support for later campaigns, including the larger-scale Anti-Extradition Movement in 2019 (Ho, 2020). At the beginning of the protest, the repressive strategies of the authorities, particularly the use of tear gas by the police to try to disperse the protestors, enraged citizens and even mobilised greater participation and support for the movement (Cai, 2016; Cheng & Chan, 2017). Yet as the occupation continued, the severe disruption of local residents' social and economic lives triggered grievances and weakened the legitimacy of the movement (Cai, 2016). As a movement receiving mixed reviews, the OCM provides researchers a valuable opportunity to investigate how the spatial proximity to protest influences people's political attitudes.

The data used in this study are taken from two waves of the Hong Kong Panel Study of Social Dynamics (HKPSSD). The same group of individuals were interviewed in September 2014 (right before the OCM took place) and then followed up with in mid-2015 (six months after the movement ended), making it possible to capture individual changes in political attitudes before and after the protest. Importantly, the HKPSSD data contain detailed geo-information on the respondents' home addresses, permitting us to identify their spatial proximity to the occupied area. By comparing the political attitudes of nearby and faraway residents both before and after the OCM, we are able to apply the difference-in-differences (DIDs) approach to investigate the attitudinal consequences of proximity to protest sites. Notably, as occupied areas are also city centres with higher housing prices, it is likely that nearby residents tend to have higher socioeconomic status than faraway residents. Thus, the observed changes in their attitudes may simply reflect the changing view of the middle-class rather than as a result of spatial proximity. To address this concern, we adopt propensity score matching (PSM) methods to make the two groups of people intrinsically comparable before conducting DIDs estimation.

The study is organised as follows. Firstly, we review previous research related to the social-spatial dimension of protest movements and identify the research void. Secondly, we propose our hypotheses based on the background of the OCM. Thirdly, we introduce the data, measurement, and method, which is followed by the empirical results. Finally, we highlight the theoretical and practical implications of our study and discuss its limitations.

## 2 | THE SOCIAL-SPATIAL DIMENSION OF PROTEST MOVEMENTS

The mobilisation of bystanders is a determinant of successful protests (Snow & Benford, 1992). Many social scientists have analysed protests as phenomena that generate public political support, yet the empirical findings of previous studies are quite mixed. For example, focussing on the context of the United States civil rights protests in the 1960s, Andrews et al. (2016) found that white Southerners became more supportive of anti-segregation protests if they lived in counties where the sit-in movements occurred. By contrast, Ketchley and El-Rayyes (2021) observed an opposite pattern during Egypt's democratic transition, in which sustained protests swayed public opinion against democracy. In addition, scholars have investigated various mechanisms through which protest movements can shift people's political attitudes, including the scale (Wallace et al., 2014) and the intensity of protests (Branton et al., 2015), as well as the local political context (Andrews et al., 2016). In the recent decade, an emerging strand of literature has argued that exposure to protests matters in protest mobilisation. Among them, most studies emphasised the role of social media in protest information diffusion and offline gathering mobilisation (Lee & Chan, 2018; Juris, 2012; Suh et al., 2017; Vasi & Suh, 2016). However, the spatial factors that were deeply embedded in those occupy movements have been largely neglected.

Spatial proximity matters for two reasons. First, being physically close to a protest site suggests direct exposure to emotion and information, leading to a more pro-movement attitude. Scholars have long noticed the importance of emotion in protest mobilisation (Jasper, 2011; Mizen, 2015) and that the impact of this generative emotion is contingent on spatial proximity (Andrews et al., 2016). Traïni (2009) pointed out that "sensitizing apparatuses" in protest activities, such as physical props and ritual actions, can convey a sense of solidarity, arouse public emotion, and even attract more recruits. Similarly, Wouters (2019) proved the casual link between protester's behaviours and public support using two video vignette experiments: worthiness (the absence of disruptiveness) and unity of participants could increase bystanders' identification with the protestors and consequently make the protest have more persuasive power. Furthermore, violent repression of a peaceful protest may provoke public resentment and escalate the protest, especially if the situation is effectively communicated to the receptive audience (Barkan, 1984; Hess & Martin, 2006; Koopmans, 1997). Among the handful of empirical studies that have directly examined the role of emotion in protest, Andrews et al. (2016) found that, in the context of the United States civil rights protests, white people who lived in counties where the sit-in movements occurred exhibited greater sympathy and tolerance for minorities, arguably because they had witnessed the discipline and sacrifices of the student protestors. Some studies

have suggested that access to information is another channel through which spatial proximity may affect people's perceptions of political issues (Gartner et al., 1997; Gartner & Segura, 2000). For example, through diffusing knowledge of the threat of the policy and the anti-immigrant atmosphere within the local area (single counties in rural areas or multiple counties in densely populated areas), the 2006 Immigrant Rallies protests in the United States successfully swayed Latinos' support for less restrictive immigration policy (Branton et al., 2015).

Second, spatial proximity to a protest site implies possible inconvenience and even economic loss caused by the resulting disruption, leading to a more anti-movement attitude. Large-scale protest movements often bring certain social and economic costs to the community. Inevitably, they disrupt people's daily lives, particularly for nearby residents. Some scholars have argued that this forces people who are ignorant of politics to think about the issue the protestors are opposing (Couldry, 2013), but this can backfire if citizens perceive that the threat and inconvenience caused by the protestors are the more serious issues. For example, Xu (2013) found that media coverage of OWS tended to stress the obstruction of transportation and annoyance to people in the neighbourhood. Empirical studies have also found that spatial contiguity to influential (large and long-lasting) protests can lower public support for the protestors' demands. Specifically, Wallace et al. (2014) showed that large-scale protests with over 10,000 participants during the United States civil rights movement generated feelings of political alienation among citizens within a 100-mile radius. Likewise, during the Egyptian democratic transition, Ketchley and El-Rayyes (2021) found that the sustained street protests resulted in inconvenience and economic loss, consequently lowering local residents' support for democracy within the census district.

Space is more important for occupy movements than for any other protest tactic, as the nature of occupation is to draw public attention through spatial disruption. Using encampments in unauthorized places, such movements occupy streets or buildings with significant symbolic and commercial meaning and high population density to challenge authorities, monopolies, or capitalism (Pickerill & Krinsky, 2012). The OWS movement, which took place in New York City's Zuccotti Park on September 17, 2011, was an influential case that received widespread attention. Hundreds of people gathered, camped, and slept in Zuccotti Park to protest the economic inequality and manipulation of the financial apparatus in contemporary society. The actual occupation during the OWS lasted no more than a month, but it had an enduring effect on people's thoughts. The brilliant slogan "we are the 99%" made a deep impression, focussing millions of people's minds and perspectives on important social and political issues (Calhoun, 2013). Yet unfortunately, empirical evidence of the attitudinal consequences of the occupy movements on individuals remains relatively scarce, and little attention has been paid to the social-spatial dimension of these occupations. A notable exception is Wang and Wong (2021). Using two rounds of constituency-level election data in 2012 and 2016, they found that protest exposure (as measured by distance from an electoral district to the occupation sites) was positively correlated with a decline in electoral support for the opposition, possibly because the nearby residents felt a sense of economic insecurity. Nevertheless, focussing only on voters may prevent us from accurately assessing the changes in political attitudes among the general public, as voters represent a self-selected sample of the population, and the turnout rates vary substantially in different elections. Our study attempts to fill the research gap by utilizing individual-level panel data from city-wide representative household surveys conducted immediately before and after the 2014 Occupy movement in Hong Kong.

### 3 | RESEARCH BACKGROUND AND HYPOTHESES

Hong Kong has become known as a "city of protest" (Dapiran, 2017). After the handover of Hong Kong's sovereignty to China in 1997, there have been continual street protests focussed on democracy and political rights, such as the annual demonstrations on July 1 and the anti-national education protest in 2010. These protests have given citizens the experience of participating in collective action and persuaded some that protests are a useful tool in the fight for democracy (Cai, 2016). Based on the attitudes towards democratisation and the Beijing government, there has been a marked cleavage between parties in Hong Kong since the 1980s: the pro-establishment

camp accepted the degree of autonomy by the Beijing government, whereas the pro-democracy camp demanded more rapid democratisation and a higher degree of autonomy (Kuan & Lau, 2002; Li, 2018). However, such party divergences were not mirrored in party identification among Hong Kong citizens before the OCM in 2014 (Zhang & Gu, 2022), partly because they had little faith that the parties could bring about policy changes within the executive-dominated political system (Kuan & Lau, 2002; Ma, 2014). During the period from 2010 to 2015, yearly repeated opinion surveys showed that more than one half respondents did not support any party in Hong Kong (Ma, 2018, p. 144).

Against this background, a pro-democratic law professor named Benny Tai Yiu-ting proposed the "Occupy Central with Peace and Love" on a local newspaper, in early 2013. He suggested that occupying Central illegally but peacefully for an extended period was a strategy with "greater lethality" to pressurize the Beijing government and fight for universal suffrage in the 2017 election of the chief executive in Hong Kong (Tai, 2013). With a long period of preparation, including three rounds of deliberation, the 6.22 Civil Referendum and the 1 July March, the opposition had effectively diffused their political ideas and publicised their political demands before the actual occupation (Lee & Ting, 2015; Yang, 2020). The occupation finally was triggered by the central governmental announcement on August 31, 2014 that does not allow citizens to nominate the chief executive candidates. On the night of 26 September, thousands of frustrated students rushed into and occupied the streets of Admiralty near the government headquarters. In the following days, the occupation sites were expanded to include Causeway Bay a prosperous business centre and Mong Kok, a retail centre and a densely populated residential area.

In the initial stage of the movement, the protestors gained widespread public support as the government was delegitimized by its repressive strategy. On the night of 28 September, the police fired 87 rounds of tear gas to try to drive unarmed protestors away, which was considered to be excessive force, shocking citizens and mobilising additional protestors who had not intended to participate in the movement (Cai, 2016; E. W. Cheng & Chan, 2017). Meanwhile, the protestors continually diffused the information on the movement meaning and their actions also demonstrated a feeling of solidarity, consequently gaining public recognition and resonance (Wong & Liu, 2018). Particularly, the iconic slogans and symbols, such as umbrellas used to protect protestors from the tear gas and yellow ribbons, became widely recognised by general public. Besides, occupiers created a carnival-like atmosphere at the occupation sites, disseminating their political demands through optimistic songs and chants. The mobilising effect seemed to be stronger among the citizens near the sites, as Cai (2016) observed that nearby residents sometimes came to express their support during evenings and weekends. This implies that being on site directly exposed them to the scenes of governmental repression as well as the carnival-like atmosphere created by protestors, possibly helping to generate public sympathy for the protestors and resentment towards the authorities. On this basis, we propose our research hypothesis:

**H 1** *Compared to faraway residents, after the OCM, citizens who resided near the occupation sites tended to change their political attitudes in favour of the protestors' causes.*

On the other hand, as the occupation continued, the resulting social and economic disruptions led to opposition voices and even anti-movement protests. The nearby arterial roads were closed because of the unauthorized occupation, severely hampering the ability of citizens to commute (Legislative Council, 2014). For example, on September 30, 270 bus routes were affected, with 77 suspended and 193 diverted, accounting for about half of all bus routes in Hong Kong. Moreover, the OCM also influenced many industries such as retail, tourism, catering, and transportation (Legislative Council, 2014). Small and medium-sized retailers in Mong Kok, Causeway Bay, and Tsim Sha Tsui saw dramatic declines in sales, reaching as much as 80% during the National Day holidays. Accordingly, surveys showed that the proportion of citizens supporting the OCM decreased from 37.8% in October to 33.9% in December.<sup>1</sup> Also, 37 cases of anti-OCM activity were reported during the 79-day occupation including protests, rallies and drive-slow protests (Yuen & Cheng, 2017). Therefore, it is possible that the citizens, especially those nearby who were mostly affected, tolerated the disruption at first but became disenchanted as the occupation continued. Hence, we propose a competing hypothesis:

**H2** *Compared to faraway residents, after the OCM, citizens who resided near the occupation sites tended to change their political attitudes in opposition to the protestors' causes.*

However, some may argue that with the development of communication technology such as the Internet, geographic location may no longer matter. Particularly, it has been widely recognised that the social media played an important role in the OCM mobilisation (Lee et al., 2015; Lee & Ting, 2015; Tang, 2015). It is possible that the diffusion of information online can overcome the spatial restriction, resulting in a similar attitudinal effect of protest action regardless of where people live or work. Thereby, we also propose another competing hypothesis:

**H3** *The effects of the OCM on the political attitudes of non-participants were unaffected by their spatial proximity to the occupation sites.*

We will also pay special attention to the potential heterogeneous treatment effect of protest exposure given some noticeable differences across the three occupation sites. For instance, while the Admiralty and Causeway Bay occupations clearly reflected an elite and middle-class composition, the occupation of Mongkok drew a more diverse grassroots group of protestors that included students, marginalised youth, housewives and ordinary workers (Yuen, 2018). Armed with facemasks, goggles, umbrellas and metal barriers, these protestors more aggressively confronted the police (Cai, 2016, p. 108; Yuen, 2018). They also more actively interacted with the local community by explaining their motivations to nearby residents and conveying their political ideas through community visits (Yuen, 2018). It is thus worthwhile to conduct a sub-sample analysis to distinguish the occupations that took place at different sites.

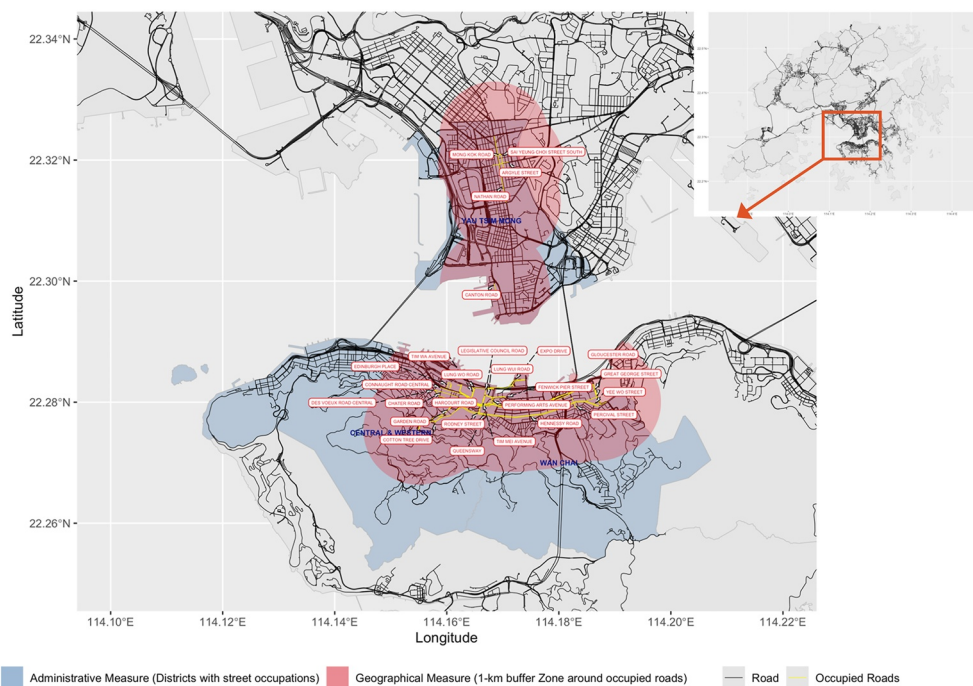
## 4 | DATA, MEASUREMENT AND METHOD

### 4.1 | Data

This study utilizes two waves of individual-level panel data from the HKPSSD. This city-wide representative household panel survey in Hong Kong collects household- and individual-levels data covering social, economic, and behavioural information (Wu, 2016). Using computer-assisted personal interviews (CAPIs), this survey has been administered to the same households and all eligible individuals within the sampled households every two years since 2011, with a representative refreshment sample added in 2014 to deal with panel attrition. Our study uses the refreshment sample collected from July to September 2014, right before the OCM took place, and its follow-up data collected from July to December 2015, half a year after the OCM ended. The individual-level retention rate across these two waves was 72.02%. Together with detailed address information on all sampled households, the HKPSSD dataset provides an ideal setting for investigating the causal effects of spatial proximity to occupation sites on the changes in individuals' political attitudes. Only individuals who were successfully interviewed in both waves are included in the analysis, so our dataset is a balanced panel data ( $N = 1411$  individuals). Besides, as we are mainly interested in the attitudinal changes among bystanders, protestors or participants of the movement are excluded here ( $N = 1346$  individuals). After deleting 19 individuals with missing values on selected variables, we are left with 1327 unique individuals and 2654 person-year observations for analysis.

### 4.2 | Measurement

Adhering to the practice established in related studies (Andrews et al., 2016; Branton et al., 2015; Ketchley & El-Rayyes, 2021), we adopt a dichotomous variable to measure individuals' spatial proximity to the nearest protest site, with one indicating nearby residents (i.e., the treatment group) and 0 indicating faraway residents (i.e., the control group). Although our geo-spatial data allow us to calculate the precise distance between an individual's home



**FIGURE 1** Occupied Roads and Directly Affected Areas during the Occupy Central Movement. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/1468-4446.12988)]

and the occupation sites, we believe that such a continuous measure is inappropriate in this context. For instance, there was no intrinsic difference between those who lived 10 km away and those who lived 100 km away in terms of the likelihood of direct exposure to the protest. As a robustness check, we use both administrative and geographical definitions for the measurement. The administrative measure defines the treatment group as those who lived within the three districts where the street occupations occurred: Yau Tsim Mong (with 343,000 residents living in a 6.99-square-kilometre area), Central and Western (with 243,000 residents living in a 12.55-square-kilometre area), or Wan Chai (with 180,000 residents living in a 10.51-square-kilometre area). The geographical measure utilizes the information on road closures due to the occupation, which was posted on the Transportation Department website during the protest. According to the geographical measure, the treatment group is defined as those who lived within the one-km buffer zone around the occupied roads. Compared to measures used in previous studies, which are relatively large geographic scales such as a county (Andrews et al., 2016; Branton et al., 2015) or 100-mile radius (Wallace et al., 2014), the two spatial measures we use here are much more fine-grained, which allows us to more precisely estimate the effect of personally witnessing and experiencing a social protest. In addition, the two measures can be supplementary for each other. As shown in Figure 1, there is a large proportion of overlapping areas for these two measures, but they are not entirely consistent. For example, citizens living in the western area of Central and Western belonged to the treatment group following the criteria of administrative measure, but they were far away from the occupation sites geographically.

The outcome variables are individuals' political attitudes, which are indicated by political spectrum and political stance. The political spectrum is measured by self-reported conservatism or liberalism, ranging from 1 (very conservative) to 7 (very liberal). The political stance is measured by self-reported support for political parties with two opposite stands, ranging from 1 (support for the pro-establishment camp) to 7 (support for the pan-democracy camp). While the former serves as a "predisposition" that can be largely devoid of changes if confronting little challenge (Chen & Goren, 2016; Sears & Funk, 1999), the latter is more sensitive to ongoing political realities (Franklin, 1984; Niemi & Jennings, 1991).

Besides, a series of variables are used to estimate the propensity score of being treated, specifically, the probability of living near the occupation sites. At the individual level, we consider sex (male = 1), age, immigrant status (mainland immigrants = 1), educational attainment (primary school or below = 1, lower secondary = 2, upper secondary = 3, tertiary = 4), economic status (student = 1, inactive due to retirement, pregnancy, and other reasons = 2, unemployed = 3, manager/professional/associate professional = 4, clerical/service & sales staff = 5, skilled/unskilled worker = 6, unclarified jobs = 7), housing type (public = 1), and logged monthly household income per capita (Hong Kong dollars, HKD). At the neighbourhood level, we account for District Council Constituency Area<sup>2</sup> socioeconomic status (DCCA SES), an index constructed with the information on the percentages of individuals aged 15 or above with a college-level of education or above, individuals working as managers or professionals, households with an income over 30,000 HKD, and public housing at the DCCA level. The index was scaled to have a range from 0 to 100, with higher values indicating better neighbourhoods (See Wu, 2016 for details).

### 4.3 | Method

We adopt a difference-in-differences (DIDs) approach to assess the impacts of the spatial proximity to the occupation sites through comparing changes in political attitudes between nearby residents and faraway residents before and after the OCM. Any difference between the prior and post differences between the two groups would reveal the varying effects of the protest on our outcome variables. A basic model of DIDs can be specified as follows:

$$Y_i = \beta_0 + \beta_1 \text{Nearby}_i + \beta_2 \text{Post\_OCM}_i + \beta_3 \text{Nearby}_i * \text{Post\_OCM}_i + \varepsilon_i$$

where  $Y_i$  is either the political spectrum or political stance of an individual  $i$ ; *Nearby* is a dummy variable which captures the spatial proximity to occupation sites and thus  $\beta_1$  reflects the differences between the treatment (i.e., nearby residents) and control (i.e., faraway residents) groups; *Post\_OCM* is a dummy variable indicating time period after the OCM and thus  $\beta_2$  suggests the aggregate factors that would cause changes in  $Y$  even in the absence of spatial exposure to occupation sites. The coefficient of our interest is  $\beta_3$ , which indicates the impact of the OCM on the treatment group relative to the control group.

DIDs estimation typically requires a parallel trend assumption, which suggests that had the treatment (i.e., OCM) not occurred, the changes in the outcome variables for both treatment (i.e., nearby residents) and control groups (i.e., faraway residents) would have been the same (Angrist & Pischke, 2008).<sup>3</sup> However, some systematic differences between the two groups in terms of their individual characteristics may violate this assumption and subsequently lead to potential bias in estimation. For instance, the proportion of private housing in the three districts that occupy movements happened was more than 90%, considerably higher than the average level of Hong Kong (53.0%) (Census and Statistics Department, 2017; Jin et al., 2022), indicating relatively higher socioeconomic status of nearby residents than faraway residents. If the trends in attitude change were systematically different for high-SES and low-SES populations (e.g., the middle-class became relatively more supportive of the pro-democracy camp after the protest), then the observed changes in political attitudes between the treatment and control groups might result from changing views of different socioeconomic groups rather than direct exposure to the occupation.

To alleviate this concern, we utilize the PSM approach to make the nearby and faraway residents intrinsically comparable before conducting DIDs estimation (Rosenbaum & Rubin, 1983). We first use a probit model to calculate the propensity score that reflects the probability of living near the occupation sites conditional on a vector of the control variables. Here observations who do not satisfy the common support condition are excluded, because they cannot find a comparable case in the counterpart group and might cause extrapolation when interpreting results. Then, kernel matching is conducted to match observations from the treatment and control groups based on the estimated propensity scores. Through constructing a kernel-weighted index over multiple individuals in the control group for each individual in the treatment group, the kernel matching can retain all of the samples in the two groups (Heckman et al., 1997; Heckman, Ichimura, Smith, et al., 1998; Heckman, Ichimura, & Todd, 1998). To ensure that our results are not sensitive to the choice of the matching



algorithm, we used a variety of matching methods as robustness checks, including one-to-one nearest neighbour matching with a calliper, paired optimal matching, full optimal matching, and covariate balance propensity score, respectively.

By comparing the pre-post changes in political attitudes between the matched nearby and faraway residents, the PSM-DIDs approach can provide an unbiased estimation of the attitudinal consequences of being spatially close to the occupy movement.

## 5 | EMPIRICAL RESULTS

### 5.1 | Descriptive statistics

Table 1 compares the political attitudes and sociodemographic characteristics of residents near to and far from the occupation sites. The administrative and geographical measures yield qualitative similar results. Therefore, if the findings of a variable are consistent across two measures, only administrative measure is mentioned here to avoid repetition.

Before the OCM occurred, Hong Kong people in general were slightly more in favour of liberalism and the pro-democracy camp. This is not so surprising, considering that three rounds of deliberation mobilised public support for the pro-democracy camp and governmental reactions in June and August 2014 had already aroused public dissatisfaction about the authorities, which laid a good foundation for the subsequent occupation (Yang, 2020). More importantly, nearby and faraway residents showed no statistically significant differences both in terms of their political spectrum and political stance, yet soon after the OCM, these two groups of individuals showed a clear divergence in these political attitudes. Specifically, nearby residents became more liberal (from 4.16-point to 4.64-point) after the OCM, and their support for the pro-democracy camp remained constant (around 4.3-point). By contrast, faraway residents' slight inclination to liberalism was almost unchanged (from 4.11-point to 4.16-point), and their support for the pro-democracy camp was not able to sustain (from 4.19-point to 3.86-point) after the OCM. These simple comparisons provide a preliminary indication that the occupy movement may have brought different impacts to citizens depending on where they lived or whether they were directly exposed to the protest.

In terms of the individual-level characteristics of nearby and faraway residents, there were no statistically significant differences in sex, age, and educational attainment. For immigrant status, results from the administrative measure show that immigrants from mainland China tended to locate their homes near the occupied areas, while results from the geographical measure do not display such a trend. Moreover, the results from both measures show the two groups differed significantly in economic activity status and housing type. Residents near the occupation sites were more likely to be managers and (associate) professionals as well as clerical, service, and sales staff, while they were less likely to be skilled workers, students, and other economically inactive persons. The proportion of living in public housing was less than 10% for nearby residents, while the number for faraway residents was around 60%, which is almost identical to official statistics. Additionally, the household income per capita of nearby residents was higher than that of faraway ones, although the difference is insignificant with administrative measure. In terms of neighbourhood environment, compared to faraway residents, those nearby tended to live in DCCAs with higher SES scores. These individual- and neighbourhood-level differences confirm that nearby residents in general tended to have higher socioeconomic status than faraway residents, as we mentioned in the Method section. Hence, PSM is necessary to balance the two groups before we conduct DIDs estimation.

### 5.2 | Propensity score matching

Table 2 presents the results of the probit model estimating the probability of living near to occupation sites. Overall, citizens' spatial proximity to occupation sites is associated with their socioeconomic status, even when we adopt the geographical measure which emphasises geographical distance more. For example, results from both measures show

TABLE 1 Descriptive statistics for selected variables, by spatial proximity to occupation sites, Hong Kong Panel Study of Social Dynamics (HKPSSD) 2014–2015

		Administrative measure (Districts with street occupation)			Geographical measure (1-km buffer zone around occupied roads)		
		Nearby residents	Faraway residents	Diff. <sup>a</sup>	Nearby residents	Faraway residents	Diff. <sup>a</sup>
<b>Political attitudes</b>							
Political spectrum (1–7) (1: Very conservative; 7: Very liberal)	Pre-OCM	4.157 (0.978)	4.117 (1.199)	0.04	4.099 (0.975)	4.125 (1.199)	-0.026
	Post-OCM	4.642 (1.234)	4.169 (1.053)	0.473***	4.467 (1.212)	4.194 (1.066)	0.273**
	Diff.	0.484***	0.051	0.433**	0.368***	0.069	0.299*
Political stance (1–7) (1: Pro-establishment; 7: Pro-democracy)	Pre-OCM	4.264 (1.093)	4.188 (1.149)	0.076	4.178 (1.068)	4.200 (1.152)	-0.022
	Post-OCM	4.296 (1.503)	3.861 (1.059)	0.434***	4.243 (1.292)	3.871 (1.101)	0.373***
	Diff.	-0.032	-0.327***	0.359**	0.065	-0.329***	0.395**
<b>Individual-level characteristics</b>							
Sex (male = 1)		48.4%	48.0%	-	52.6%	47.5%	-
Age		48.878 (18.077)	49.119 (17.345)	-0.241	48.912 (18.132)	48.868 (16.858)	0.044
Immigrant status (mainland immigrants = 1)		42.1%	30.5%	**	36.2%	31.3%	-
<b>Education attainment</b>							
Primary or below		32.7%	31.7%		30.9%	31.9%	
Lower secondary		17.6%	18.7%	-	21.7%	18.1%	-
Upper secondary		38.4%	35.2%		37.5%	35.3%	
Tertiary		11.3%	14.5%		9.9%	14.6%	
<b>Economic activity status</b>							
Student		3.1%	7.1%		2.6%	7.1%	
Inactive		35.8%	41.9%		34.9%	42.0%	
Unemployed		1.9%	2.1%		2.0%	2.1%	
Manager/(associate) professional		25.8%	14.0%	***	19.1%	14.9%	*
Clerk/service & sales		22.6%	17.4%		23.0%	17.4%	
Skilled/unskilled worker		10.1%	14.9%		17.7%	13.8%	
Unclearified job		0.6%	2.7%		0.7%	2.6%	
Housing type (public = 1)		8.2%	59.1%	***	9.2%	58.6%	***
Logged family monthly income per capita (\$HK)		8.791 (1.557)	8.600 (1.480)	0.192	8.969 (1.121)	8.578 (1.526)	0.392**

TABLE 1 (Continued)

	Administrative measure (Districts with street occupation)			Geographical measure (1-km buffer zone around occupied roads)		
	Nearby residents	Faraway residents	Diff. <sup>a</sup>	Nearby residents	Faraway residents	Diff. <sup>a</sup>
Neighborhood-level characteristics						
DCCA SES	51.722 (16.271)	35.052 (21.781)	16.670***	45.728 (16.474)	35.927 (22.235)	9.801***
Number of Individuals	159	1168	1327	152	1175	1327

Note: - insignificant. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

<sup>a</sup>T-tests are conducted for continuous variables, and chi-squared tests are conducted for categorical variables here. Standard deviation in parentheses.

that the association between being a mainland immigrant and spatial proximity to occupation sites is positive, while education attainments and living in public housing are negatively related to the likelihood of living near occupation sites. Apart from these, results from the administrative measure also shows that the probability of living close to occupation sites is higher for the manager, (associate) professional, or clerk, service, and sales staff than that for skilled/unskilled workers, and the DCCA SES is positively associated with spatial proximity to occupation sites.

Then, we conduct kernel matching based on the propensity score estimated by the probit model. To ensure the quality of matching, we check covariate balance between treatment and control groups by looking at the standardized bias, which is the ratio of the difference in the covariate means between the treatment and control groups to the square root of the average variance of the two groups (Rosenbaum & Rubin, 1985). Figure 2 shows the standardized bias in the covariate means before and after matching. Clearly, the standardized bias in the covariate means is considerably reduced after matching, especially for housing type and DCCA SES index, whose standardized bias decreases from more than 100% to below 20% (see Appendix Table A2). This suggests that the matching procedure has successfully balanced the treatment and control groups on those observed characteristics. The common support condition is imposed here, and most observations are within the common support region (Appendix Figure A1).

### 5.3 | Effects of protest exposure on individuals' political attitudes

Based on the matched sample, we then conduct DID estimation. The results are reported in Table 3. Overall, we find that compared to faraway residents, nearby residents' scores on both the political spectrum and political stance scales became significantly higher after the OCM. Given that high scores indicate a stronger preference for liberalism and a greater inclination towards pro-democracy camp, the results suggest that the people who were directly exposed to the occupy movement became relatively more supportive of protestors' political cause afterwards. The results are largely robust when we use alternative matching algorithms, although the statistical significances vary (see Appendix Table A3). Hence, our Hypothesis one is supported by the empirical finding.

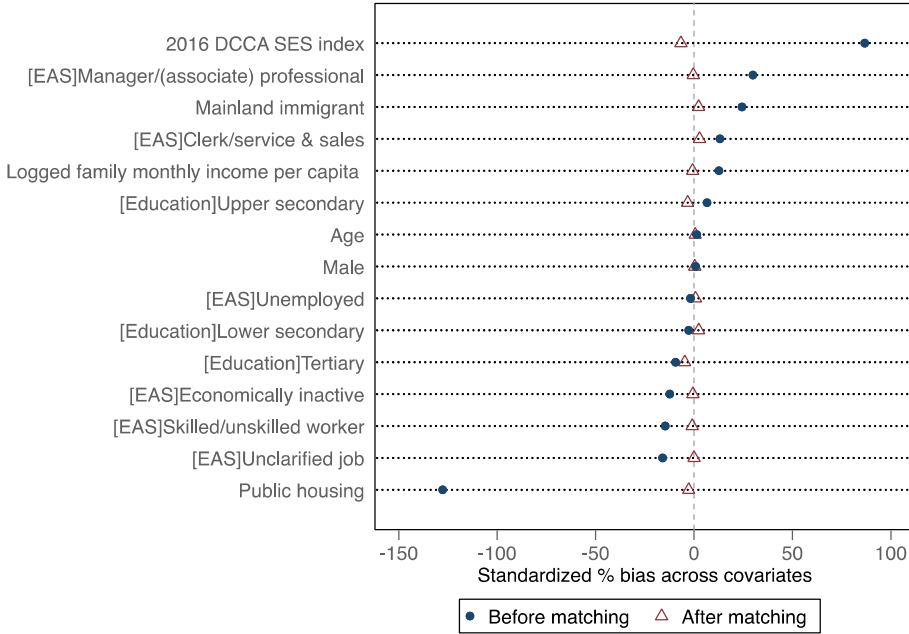
Figure 3 illustrates the findings more intuitively. Here the result from the model with geographical measure is chosen as an illustrative example. For the political spectrum, nearby residents became much more liberal after the OCM, while faraway residents remained nearly neutral (Panel A, Figure 3). Compared to the relatively stable political spectrum, people's political stance is much more sensitive to ongoing political realities. This is especially true in societies like Hong Kong, where the party cleavages are too fragmented to form a stable party identity (Cheng, 2014; Franklin, 1984; Kuan & Lau, 2002; Niemi & Jennings, 1991). Tarrow (1993) famously suggested that public opinion unavoidably rises and falls within the "cycle of collective action". By the time we collected our baseline data (July–September 2014), public support for the pro-democracy camp was already at a relatively high level, and it was not surprising to observe a declining trend of such support in the follow-up survey. In line with our expectation,

TABLE 2 Probit models predicting propensity scores for living near to occupation sites, Hong Kong Panel Study of Social Dynamics (HKPSSD) 2014–2015

	Administrative Measure (Districts with street occupation)	Geographical Measure (1-km buffer zone around occupied roads)
Individual-level characteristics		
Male	-0.105 (0.116)	0.010 (0.115)
Age	-0.003 (0.005)	-0.000 (0.005)
Migration status (mainland migrant = 1)	0.511*** (0.126)	0.240+ (0.124)
Education attainment (Ref. primary or below)		
Lower secondary	-0.253 (0.187)	-0.087 (0.177)
Upper secondary	-0.519** (0.186)	-0.314+ (0.178)
Tertiary	-1.057*** (0.246)	-0.713** (0.239)
Economic activity status (Ref. Skilled/unskilled worker)		
Manager/(associate) professional	0.622** (0.212)	-0.059 (0.199)
Clerk/service & sales staff	0.349+ (0.205)	0.003 (0.186)
Unclarified job	-0.633 (0.541)	-0.722 (0.515)
Student	-0.226 (0.331)	-0.571+ (0.325)
Inactive	-0.309 (0.209)	-0.377* (0.191)
Unemployed	0.354 (0.404)	0.021 (0.384)
Housing type (public = 1)	-1.202*** (0.151)	-1.379*** (0.145)
Logged family monthly income per capita (\$HK)	-0.064 (0.040)	0.051 (0.044)
Neighborhood-level characteristics		
DCCA SES index	0.013*** (0.003)	-0.000 (0.003)
Pseudo R-squared	0.24	0.19
Observations	1327	1327

Note: All variables relate to 2014, pre-OCM; Standard errors in parentheses; + $p < 0.1$ , \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

**Panel A. Administrative Measure (Districts with street occupation)**



**Panel B. Geographical Measure (1-km buffer zone around occupied roads)**

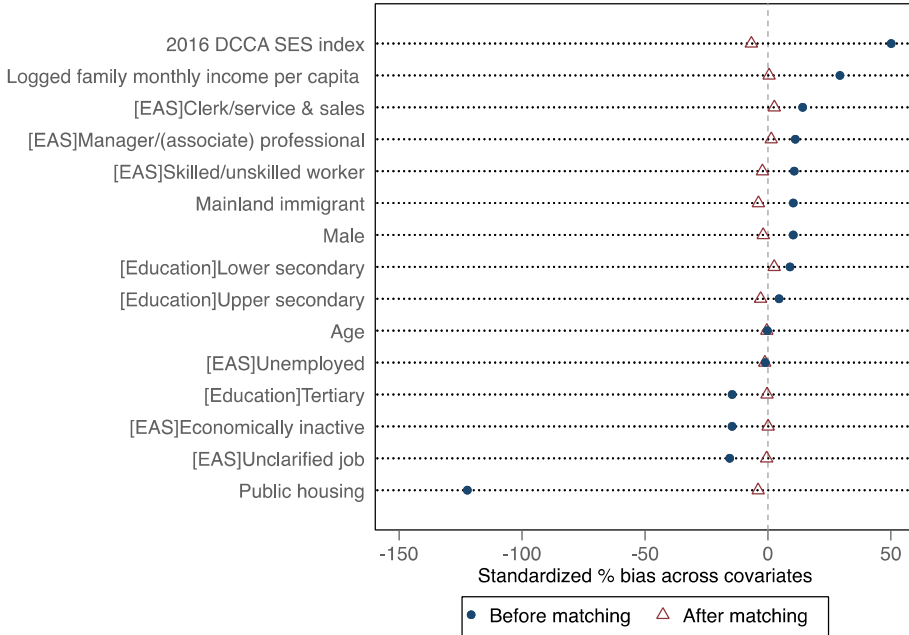


FIGURE 2 Standardized bias in the covariate means before and after kernel matching. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

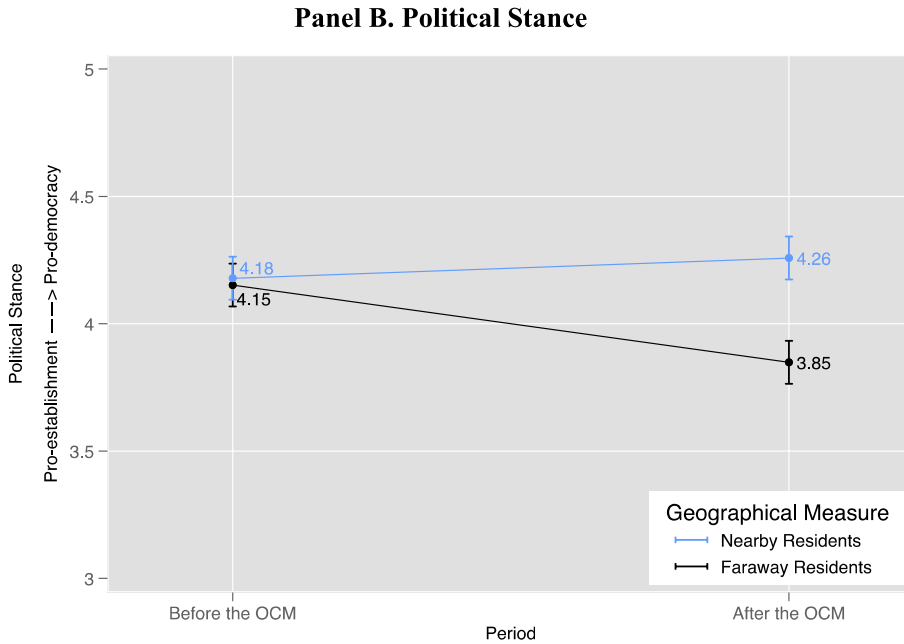
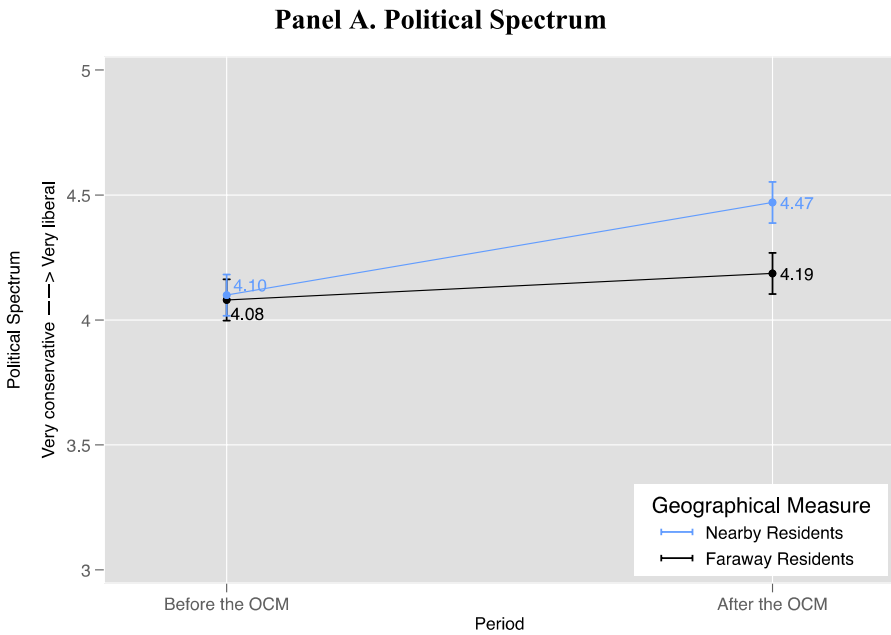
TABLE 3 PSM-DID estimation predicting the effect of spatial proximity to occupation sites on citizens' political attitudes, kernel matching, Hong Kong Panel Study of Social Dynamics (HKPSSD) 2014–2015

	Political spectrum (1–7) (1: Very conservative; 7: Very liberal)	Political stance (1–7) (1: Pro-establishment; 7: Pro-democracy)
Administrative measure (districts with street occupation)		
Nearby resident	0.039 (0.061)	0.116 (0.066)
Post-OCM	0.041 (0.061)	−0.321*** (0.066)
Nearby resident * Post-OCM	0.440*** (0.087)	0.366*** (0.093)
R-squared	0.04	0.02
Observations	2648	2648
Geographical measure (1-km buffer zone around occupied roads)		
Nearby resident	0.019 (0.060)	0.027 (0.061)
Post-OCM	0.106 (0.060)	−0.303*** (0.061)
Nearby resident * Post-OCM	0.265** (0.084)	0.383*** (0.086)
R-squared	0.02	0.02
Observations	2652	2652

Note: Standard errors in parentheses; \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

we find that for political stance, thanks to the mass mobilisation before the occupation, faraway residents were also as slightly inclined towards the pro-democracy camp as those nearby residents at first, yet their support were short-lived and soon shifted towards pro-establishment camp after the OCM (Panel B, Figure 3). In contrast, nearby residents' support for pro-democracy camp were able to sustain 6 months after the OCM ended (Panel B, Figure 3). Such persistent political support among nearby residents can be attributed to an "on-site" effect, which suggests that the direct exposure to protestors' solidarity and the repressive actions of authorities arouse bystanders' sympathy for the protestors and support for their political cause. Apart from nearby residents, people who worked near the occupation sites possibly experienced such a direct exposure as well, though arguably to a lesser extent. Thus, we further test whether working in those affected districts during the protest also brought similar changes to individuals' political attitudes later on. However, we do not find such an effect among workers (see Appendix Table A4).

To investigate the potential heterogeneity across occupation sites, we further distinguish the occupations that occurred in Hong Kong Island (including Admiralty and Causeway Bay) and Kowloon (Mongkok). The results are presented in Table 4. Interestingly, the occupations that took place in Hong Kong Island had the effect of making nearby residents more liberal but not necessarily more supportive of the pro-democracy camp (Panel A, Table 4), while the occupation that took place in Mongkok swayed nearby residents into both liberalism and the pro-democratic camp (Panel B, Table 4). As such, it may be stated that the Mongkok occupation was relatively more "successful" in changing bystanders' political attitudes. This finding suggests that the so-called "violent contention" that took place in Mongkok was still perceived to be relatively mild and restrained, and did not alienate bystanders as did other protests that involved extreme displays of violence, such as bombings (Huff & Kruszewska, 2016). More importantly, the diversity and unity displayed by the protestors in the Mongkok occupation site, as well as their active interaction and strong connection with the local community (Yuen, 2018), were key to their winning public support despite the spatial disruption they caused.



**FIGURE 3** Estimated Effect of Spatial Proximity to Occupation Sites on Citizens' Political Attitudes, Kernel Matching, Geographical Measure. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

The persistent effects of the OCM on bystanders' political attitudes may even influenced subsequent local elections. As a cross-validation of our empirical results based on survey data, we also conduct auxiliary analysis using three rounds of election data, respectively in 2011 (before the OCM), 2015 (right after the OCM but before the Anti-Extradition Movement), and 2019 (right after the Anti-Extradition Movement). Specifically, for each of these three District Council elections, we collected complete information on each candidate's political camp and their final votes. As shown in Figure 4, the overall vote share for pro-democracy candidates in District Council elections increased after the OCM and,

TABLE 4 The heterogenous effect of spatial proximity to the occupation sites on citizens' political attitudes by occupation sites, Hong Kong Panel Study of Social Dynamics (HKPSSD) 2014–2015

Panel A. Hong Kong Island (Admiralty and Causeway Bay) Occupation Sites		
	Political spectrum (1–7) (1: Very conservative; 7: Very liberal)	Political stance (1–7) (1: Pro-establishment; 7: Pro-democracy)
Administrative measure (districts with street occupation)		
Nearby resident	–0.107 (0.062)	0.024 (0.068)
Post-OCM	–0.089 (0.062)	–0.362*** (0.068)
Nearby resident * Post-OCM	0.648*** (0.088)	0.064 (0.096)
R-squared	0.04	0.02
Observations	2490	2490
Geographical measure (1-km buffer zone around occupied roads)		
Nearby resident	–0.118* (0.059)	–0.158** (0.056)
Post-OCM	0.056 (0.059)	–0.388*** (0.056)
Nearby resident * Post-OCM	0.249** (0.084)	0.112 (0.080)
R-squared	0.01	0.03
Observations	2488	2488
Panel B. Kowloon (Mongkok) Occupation Sites		
	Political spectrum (1–7) (1: Very conservative; 7: Very liberal)	Political stance (1–7) (1: Pro-establishment; 7: Pro-democracy)
Administrative measure (districts with street occupation)		
Nearby resident	0.222*** (0.062)	0.252*** (0.065)
Post-OCM	0.195** (0.062)	–0.154* (0.065)
Nearby resident * Post-OCM	0.219* (0.088)	0.495*** (0.092)
R-squared	0.04	0.06
Observations	2500	2500
Geographical measure (1-km buffer zone around occupied roads)		
Nearby resident	0.151* (0.062)	0.159* (0.066)
Post-OCM	0.186** (0.062)	–0.194** (0.066)
Nearby resident * Post-OCM	0.229** (0.088)	0.535*** (0.093)



TABLE 4 (Continued)

Panel B. Kowloon (Mongkok) Occupation Sites		
	Political spectrum (1–7) (1: Very conservative; 7: Very liberal)	Political stance (1–7) (1: Pro-establishment; 7: Pro-democracy)
R-squared	0.03	0.05
Observations	2514	2514

Note: The sample here includes all respondents except for residents near the Hong Kong Island occupation sites. The data are weighted using kernel matching. Standard errors in parentheses; \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

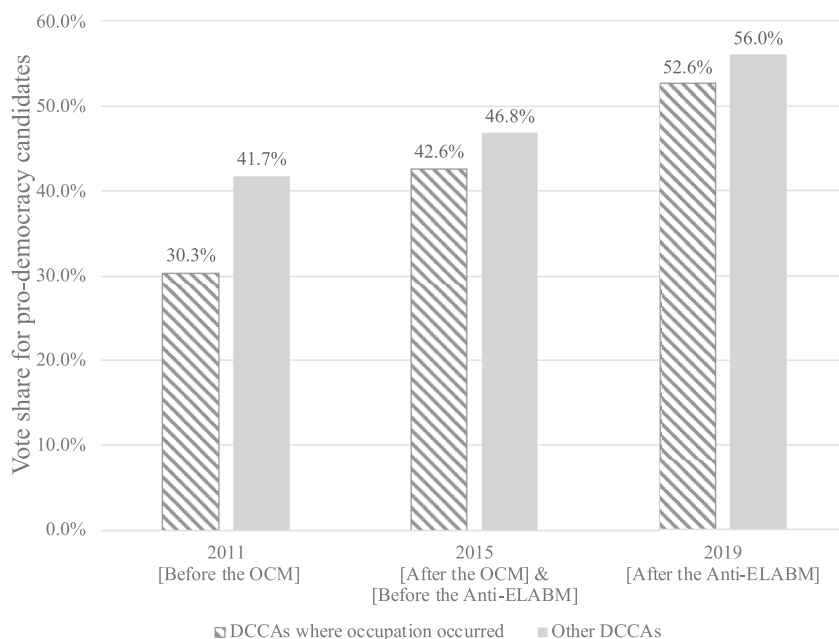


FIGURE 4 Vote shares for pro-democracy candidates in district council elections, from 2011 to 2019. The Occupy Central Movement (OCM) refers to the Occupy Movement in 2014 while the Anti-ELABM refers to Anti-Extradition Law Amendment Bill Movement in 2019. A DCCA is excluded from the sample if (1) the uncontested candidate was automatically elected or (2) all or none of the candidates belonged to the pro-democracy camp

in particular, the increase was much more substantial in DCCAs where occupation occurred (from 30.3% in 2011% to 52.6% in 2019) than in other DCCAs that were not directly affected (from 41.7% in 2011% to 56.0% in 2019).

## 6 | CONCLUSIONS AND DISCUSSION

How protests shift public attitude is a topic that has intrigued many social scientists. However, little attention has been paid to the social-spatial perspective pertaining to many protest movements. Occupation, an increasingly popular protest tactic in the recent decade, highlights the importance of space more than ever, as its nature is to disrupt normal societal function and draw public attention through encampments in unpermitted places (Pickerill & Krinsky, 2012). It is thus theoretically interesting to investigate whether and how the attitudinal consequences of occupy movement varied by individuals' spatial proximity to protest sites.

Taking the Occupy Central Movement in Hong Kong as a case for study and utilizing individual-level panel data collected before and after the movement, our research attempts to fill this research gap. The unique setting provides

a quasi-experiment for us to apply the DID approach in exploring the causal link between space and attitudes, while the selection bias caused by non-random assignment is addressed by the PSM approach. Results from PSM-DID estimation show that, compared to faraway residents, those living proximately to occupation sites tended to change their political attitudes towards protestors' causes. The "on-site" effect of the Mongkok occupation was stronger than the Hong Kong Island occupation. The protestors' diversity, unity, and attachment to the local community in the Mongkok occupation site not only shifted people's relatively stable political spectrum towards liberalism but also helped to sustain their support for the pro-democracy camp even when the movement lost momentum.

The results imply that, during the OCM in Hong Kong, direct exposure to the governmental repression and protestors' solidarity encouraged nearby residents to tolerate the inconvenience brought about by the protests and generate sympathy and support for the protestors. This conclusion is in sharp contrast to those of previous studies that have found that pro-democracy protests negatively affected local residents' or voters' political support (Ketchley & El-Rayyes, 2021; Wang & Wong, 2021). The opposite findings between our study and Ketchley and El-Rayyes's (2021) are probably attributable to contextual differences between Egypt and Hong Kong, including the effectiveness of pre-protest mobilisation, the level of violence employed by protestors/authorities (Simpson et al., 2018), the average education level and postmaterialist values among the public (Duch & Taylor, 1993). Even with the same context, as in our study and Wang and Wong (2021), different methods for measuring protest exposure may have led to inconsistent findings.<sup>4</sup> Compared to the continuous measures of spatial proximity that were used in their study (i.e., straight-line distance and driving time), we believe that a dichotomous measure (i.e., nearby vs. faraway) is more logical, as direct exposure to protests tends to diminish beyond a certain distance rather than progressively decline in a linear fashion.

Our research advances relevant literature from two perspectives. Firstly, by bringing a social-spatial perspective to empirical studies on occupy movement, this study further deepens our understanding on the underlying mechanisms of political mobilisation. While recent literature on social movement tends to focus on the role of media that diffuse information everywhere through words in political mobilisation, our research shows that the spatial dimension still matters, because the direct exposure to movement dynamics generates powerful on-site effects that shift minds of nearby residents. Secondly, by providing evidence on the causal link between proximity to occupation sites and political attitudes, this study contributes to the current debate on whether direct exposure to protest can successfully shift citizens' political attitudes towards protest claims. As shown by our evidence, when a protest is perceived as legitimate, people are willing to tolerate temporary inconvenience caused by the disruptions, suggesting that people's political preferences are not always determined by their self-interests (Green & Cowden, 1992).

More importantly, our research provides practical implications about understanding the profound influence that the OCM brought to Hong Kong people and its political landscape and the reason for broader public support for the pro-democracy camp in recent years. Although the OCM did not receive any desirable response from the government at that moment, it sowed the seeds of the protest demands in people's minds and eventually influenced their voting behaviours, especially for citizens who were directly exposed. Altogether with later campaigns, including the Anti-Extradition Movement in 2019, the OCM has brought a persistent influence on Hong Kong citizens' political attitudes and, subsequently, the political landscape of contemporary Hong Kong.

The present study is also limited in two ways. First, although we addressed the residential selection problem before the OCM, residential mobility during and after the OCM might still bias our results, as the data we used come from a household survey that only tracks respondents based on their home address and could not capture those who relocated. Secondly, a unidimensional measure of political stance (either pro-democracy or pro-establishment) may not be sufficient to reflect people's party preference, since another localism party gained popularity during the movement and became one of three dominant ideologies in Hong Kong (Kwong, 2016).

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the Centre for Applied Social and Economic Research (CASER) at NYU Shanghai upon reasonable request.

## ORCID

Duoduo Xu  <https://orcid.org/0000-0002-1599-2343>

## ENDNOTES

- <sup>1</sup> The survey was conducted by Centre for Communication and Public Opinion Survey, the Chinese University of Hong Kong during the OCM period.
- <sup>2</sup> District Council Constituency Areas (DCCAs) are developed for district administration and election purposes and are comparable in size to census tracts in the United States (Liu et al., 2020; Wang & Lin, 2013). In 2015, Hong Kong was divided into 431 DCCAs under 18 Districts, with populations ranging from 6014–26,271 residents. Given the uneven population distribution across the territory, the intra-DCCA variation in areas was much larger, ranging from 0.058 to 388.916 square kilometres.
- <sup>3</sup> The “parallel trend” assumption is assessed by a placebo test using data from two rounds of HKPSSD survey prior to the OCM. The results demonstrate that there is no significant change in political spectrum between treatment and control group over time before the OCM (see Appendix Table A1).
- <sup>4</sup> Our findings are not directly comparable because they focused exclusively on voters rather than the general population.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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