

Electoral Impacts of a Failed Uprising: Evidence from Hong Kong's Umbrella Movement

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Abstract

Do anti-regime protests in electoral autocracies benefit the opposition by shifting the political preference of bystanders? We seek an answer to this question by examining the electoral impact of Hong Kong's Umbrella Movement. Analyzing election outcomes at the polling-station level shortly after the movement, we find that protest exposure, as measured by spatial proximity to protest sites, is positively correlated with the decline of electoral support for the opposition. Individual-level surveys indicate that the adverse influences of protest exposure manifest themselves in elevating bystanders' sense of economic insecurity, even though the movement causes no persistent income loss, while enhancing political efficacy.

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1 Introduction

Most anti-regime protests in non-democracies fail to topple the incumbent government. Do they at least undermine the regime’s social support base by shifting the political preference of the citizens? In particular, are opposition parties able to gain more votes in post-protests elections? This is an important question, because scholars of comparative authoritarianism often treat revolutions and authoritarian elections as two separate events. If anti-regime protests do help the opposition accumulate electoral strength, we have reason to believe that “democratization by elections” can be made possible by the “revolutionary bandwagon” (Kuran 1991).

Recent empirical studies show that protests — including social movements in democracies and anti-regime ones in non-democracies — may benefit candidates who are aligned with the protest’s ideology (Madestam et al. 2013; Mazumder 2018), especially when state repression occurs and provokes backlash mobilization (Aytaç, Schiumerini, and Stokes 2017; Lohmann 1994; Sullivan and Davenport 2017). After being exposed to these protests, citizens may not only change their political views (Tertychnaya and Lankina 2020), but also develop a higher level of political efficacy (Wallace, Zepeda-Millán, and Jones-Correa 2014).

However, the opposite effect has also been documented when tensions in the protest escalate (Wasow 2020). Blatant disruptive actions, including occupation of public space, road blocking, arson, and attacks on government properties, likely evoke a high level of anxiety and bias toward the status quo among ordinary citizens (Schwartz 2016; Stenner 2005). Although these actions are widely adopted, they are more common in anti-regime protests under non-democracies, where protests are usually prohibited. To make their voices heard, protesters often need to break existing rules and act out of societal expectations, causing significant deviations from the everyday life. It thus provides authoritarian incumbents, many of whom achieve a high approval rating because of their ability to deliver stellar economic performance (Guriev and Treisman 2020), an effective rhetorical basis to counter the popular appeal of anti-regime protests. Voters influenced by the rhetoric may end up blaming the opposition for destabilizing the status quo and threatening the society’s economic prospects, thereby punishing it in the voting booth.

We use Hong Kong’s Umbrella Movement as a case for testing these two competing hypotheses. The Umbrella Movement, which emerged in Hong Kong in 2014, was a large anti-regime protest, involving the occupation of various areas by pro-democracy protesters for 79 days. It failed because the protesters eventually chose to disband themselves without achieving any concessions from the government. Using the outcomes of the subsequent legislative election, we detect a remarkable, negative impact of protest exposure, measured by spatial proximity to protest sites, on the opposition’s support rate. Our difference-in-differences (DID) estimation finds that one standard deviation decrease in the distance between a constituency and the protest sites would make the decline in the vote share of the opposition candidates 3-6% larger. Turnout rate follows a similar pattern, although the magnitude of the effect is somewhat smaller.

Our results are robust against various proximity measures (driving time v. straight line), types of constituencies (territory-wide v. regional proportional representation), and clustered standard errors (constituencies v. geographical districts). In addition, we weight observations in our sample with their covariate balancing propensity score (Fong, Hazlett, and Imai 2018) to remove the impact of observable constituency characteristics. Our main results hold in the balanced sample created by weighting. We also replace the conventional dichotomous classification of political camps with a constituency-level ideology measure calculated from the ideal points of all Hong Kong legislature candidates in the 5th and 6th Legislative Councils (2012-2016 and 2016-2020). Using this indicator, we find that protest proximity is significantly positively correlated with the rise of anti-opposition sentiment.

A placebo test and a sensitivity analysis are conducted to verify the validity of a key identification assumption, commonly known as parallel trends. In the placebo test, we apply the same DID analysis to the two elections before the emergence of the Umbrella Movement. Consistent with our expectations, spatial proximity in these “placebo” elections loses its prediction power for change in opposition vote share. On the other hand, the results of the sensitivity analysis suggest that our estimates will still be significant even in the presence of influential time-varying unobservables.

To explore the mechanisms that drive the election results, we analyze the Asian

Barometer Survey to gauge changes in public opinions in the wake of the protest. Our DID estimate indicates that citizens living in districts near the protest sites experienced a higher increase in the anxiety over the city’s economic prospects, while the change in their reported income did not vary with proximity. In addition, consistent with the findings of studies based on the experience of democracies, we detect a significant increase in the average level of political efficacy after the movement, although the increase does not seem to depend on the proximity to the protest sites. Finally, using another individual-level survey, the Hong Kong Election Study (HKES), we find that economic insecurity is a crucial determinant of respondents’ choice between the regime and the opposition in the 2016 election. We further demonstrate that the negative impacts of the protest are concentrated in citizens with lower income, while young people who are politically active are more likely to convert to the opposition after the protest.

In addition to engaging the debate about the relationship between social movement and elections, our research also speaks to the broad literature in political science on revolutions and political transitions. Classic works in this field emphasize either the importance of structural factors (Moore 1966; Skocpol 1979) or actions taken by the state (Aytaç, Schiumerini, and Stokes 2017; Chang 2008) and by the elite (Albertus and Menaldo 2018; Przeworski 1991). Recent works accord more attention to an agency-based perspective, focusing on the interaction between anti-regime protests and bystanders (Tertychnaya 2020; Tertychnaya and Lankina 2020). Our study sheds new light on this line of research by highlighting a specific causal mechanism – namely, economic anxiety brought by protest exposure – that affects popular support for anti-regime protests.

The rest of the article is organized as follows. In the next section, we demonstrate our theoretical framework. In Section 3, we discuss background information about Hong Kong’s political institutions and the Umbrella Movement, and then present our research design and hypotheses. Section 4 and 5 present the data and methods. Section 6 shows our constituency-level results and robustness checks. We investigate the causal mechanisms of the protest’s impact at individual level in Section 7 and Section 8, and conclude in the last section.

2 Theoretical Framework

Historically, not many anti-regime protests achieve their ultimate goal of overthrowing the incumbent government (Chenoweth and Stephan 2011). It is important to note, however, that successful revolutions seldom involve a single uprising. For this reason, an anti-regime protest that fails to topple the regime may still leave impacts on society, if not also sow the seeds of subsequent victory. Studies show that protests in general may produce various outcomes, including arousing the public's interest in politics (Zhang 2016) and redistributing *de jure* power (Dower et al. 2018). Nevertheless, their electoral impacts remain poorly understood. Our key concern in this article is how anti-regime protests affect the political attitudes of ordinary citizens as manifested in voting behavior, especially under “competitive authoritarianism” (Levitsky and Way 2010) where the voting booth is a major battlefield between the regime and the opposition.

On the one hand, anti-regime protests likely enhance citizens' interest in political participation by boosting their sense of political efficacy. Studies find that protests in democracies have a positive impact on the sense of political efficacy of those exposed to them (Enos, Kaufman, and Sands 2018; Wallace, Zepeda-Millán, and Jones-Correa 2014). Beckwith (2016) argues that even a failed social movement has similar effects, thus creating favorable conditions for subsequent mobilization. We have reason to believe that this effect is even larger in autocracies, because authoritarian governments often outlaw anti-regime information, organizations, and activities. They may even resort to blatant electoral fraud to signal their invincibility and irreplaceability (Magaloni 2006; Simpser 2013). Citizens who live in this repressive political environment may not be able to conceive of overthrowing the authoritarian edifice. Exposure to an anti-regime protest, especially when turnout is large, helps unlock ordinary citizens' imagination by disrupting the seemingly infallible political order. As Kuran (1991) points out, the rise of even a small set of individuals suffices to create a “revolutionary bandwagon” and to significantly strengthen the opposition. It is possible that an enhanced sense of political efficacy helps coalesce a “negative coalition” against the authoritarian incumbent (Beissinger 2013).¹ As more people rally against the authoritarian incumbent, the likeli-

¹Although the concept of “negative coalition” is concerned with revolutions, it nevertheless has substantial political

hood of “democratization by elections” will become higher (Lindberg 2009). Even in the absence of power alternation, an empowered opposition will still significantly constrain the authoritarian incumbents.

Anti-regime protests may also shift people’s political preference closer to the opposition by exposing them to its cause of democracy. In autocracies, the opposition often faces a great number of hurdles to make its voice heard in society (Lohmann 1994). Anti-regime protests, successful or not, provide an opportunity for the opposition to promote the values of democracy.² Previous studies show that social movements in democracies can indeed alter the views of bystanding citizens (Madestam et al. 2013; Mazumder 2018; Wasow 2020). We expect that the political-education effect of anti-regime protests in autocracies would be similar to or greater than that of garden-variety protests in democracies, as it is generally difficult for citizens in autocracies to gain access to alternative information.

On the other hand, anti-regime protests may have adverse impacts on public support for the opposition. Tertychnaya (2020) suggests that when political change is unlikely, citizens may find political participation futile, weakening their sense of political efficacy. As such, they may lose incentive to vote in an election. We argue that a more straightforward causal mechanism exists. Anti-regime protests seek a fundamental political change, and hence are usually prohibited by law. To achieve this goal, members of the opposition are willing to challenge the regime by using disruptive or even violent strategies. They may initiate labor strikes, school boycotts, vandalism, and occupy protests in public areas. Meanwhile, the incumbent is similarly determined to defend the exclusionary political order. It may retaliate by imposing curfews, shutting down public transport and online communication,³ and restricting the freedoms of individual citizens. In sum, either side is willing to pay a hefty price to achieve its goal. Clashes between the protesters and the law enforcement may further foment unrest such as police brutality, riots, and

implications in contemporary autocracies, where multi-party, somewhat competitive elections are held on a regular basis (Levitsky and Way 2010).

²Of course, for those who are averse to the values of democracy, they may support the authoritarian incumbent more strongly after learning the opposition’s political position. Here we simply argue that all else held constant, it is better for the opposition to have more opportunities to promote its cause than less. We acknowledge that the electoral appeal of the opposition can be influenced by their political position, which varies across country contexts.

³For instance, the Chinese authorities banned access to Instagram from mainland China shortly after the emergence of the Umbrella Movement in Hong Kong (Hobbs and Roberts 2018).

looting.⁴ In fact, studies find that exposure to violent protests has lasting impacts, either reducing support for the cause of the protesters (Sears and McConahay 1973; O. Wasow 2016) or increasing animosity toward the protesting group (Beber, Roessler, and Scacco 2014).

It is worth emphasizing that even in the absence of observed violence, an anti-regime protest may still provoke anxiety among ordinary citizens, thereby reducing their support for the opposition that initiated the disruption. As Guriev and Treisman (2019) point out, the political legitimacy of contemporary autocracies depends crucially on economic performance, rather than ideological appeal. The precondition of economic development is political stability. Not surprisingly, during economic downturns, authoritarian governments often attribute the cause to foreign interventions (Rozenas and Stukal 2019). We argue that authoritarian incumbents can utilize the same playbook against anti-regime protesters. As long as the protesters take disruptive actions, government-controlled media can label them as a threat against a status quo that features economic development. Political psychologists have long posited that insecurity (Fromm 1941) and external threats (Adorno et al. 2019; Feldman and Stenner 1997; Rickert 1998; Stenner 2005) are major factors contributing to the development or activation of the authoritarian personality. Consequently, those who have experienced these threats become more resistant to change and exhibit more longing for the status quo. As Jost and Napier (2011) succinctly put it, “preserving the status quo allows one to maintain what is familiar and known while rejecting the risky, uncertain prospect of social change; traditionalism and hierarchy generally provide reassurance and structure” (p. 92). For this reason, when an anti-regime protest breaks out, however peaceful it is, it may still trigger worries about political turmoil (e.g., political violence and conflicts) and economic instability (e.g., deterioration of job prospect and business environment). If the authoritarian incumbent and citizens have a common stake in preserving the status quo, any force that threatens socioeconomic stability may end up helping the former rally electoral support.⁵

In summary, there is a theoretical reason to believe that anti-regime protests in

⁴Many medical studies have shown that exposure to various kinds of social unrest such as terrorism is linked to the development of anxiety (For example, Schuster et al. 2001; Silver et al. 2002).

⁵Authoritarian governments are keenly aware of citizens' aversion to socioeconomic instability. It is fairly common to see the ruling party of these regimes portray itself in state propaganda as a force for stability (Pearlman 2013).

autocracies would increase the opposition’s public support, although some extant studies suggest otherwise. It is therefore *ex ante* unclear the extent to which an anti-regime protest would benefit or undermine the electoral performance of the opposition. We seek an answer to this question by taking advantage of the heterogeneity of protest exposure afforded by the difference in spatial proximity of one’s residence to the locations of anti-regime protests. As Latané (1981) points out, the salience of most social events is associated with one’s physical proximity to them. This observation is supported by studies related to social movements (Madestam et al. 2013), campaigns (Atkinson et al. 2014), and terrorist attacks (Loewenstein et al. 2001). In our case, the spatial proximity of one’s residence to an anti-regime protest would increase one’s exposure to it, including protest messages and the chaos caused by protesters’ actions.

3 The Umbrella Movement in Hong Kong

3.1 Background

Hong Kong, as one of the “Special Administrative Regions” of China, is a highly developed cosmopolitan city, with a GDP per capita in 2014 of US\$40,247. Under the principle of “one country, two systems,” Hong Kong people for a long period of time enjoyed a high degree of autonomy, including freedom of speech and an independent judiciary. They had the right to elect 40 out of 70 seats of the city’s legislature in relatively fair elections, opposition parties were allowed to compete in these elections.

Despite “one country, two systems,” Beijing has a decisive influence over the selection of Hong Kong’s chief executive – the head of the city – and 30 indirectly elected legislative seats. For this reason, many view Hong Kong as yet another electoral autocracy (Wong 2015). According to the Basic Law, the city’s mini-constitution, universal suffrage will eventually be implemented as the method of electing the chief executive, although the time frame is not clearly specified.

Since the sovereignty transfer in 1997, pro-democracy activists and politicians alike have continued to urge Beijing to honor its promise. To their dismay, the Chinese National People’s Congress (NPC) announced in 2014 that universal suffrage can only be

implemented on the condition that candidate nomination is effectively controlled by Beijing. This decision led many Hong Kong citizens to believe that Beijing had shut the door on democratization. Benny Tai, a local law professor, called for an extensive occupy movement in protest of the NPC decision. Many pro-democracy groups and individuals supported the idea. Student activists initiated a territory-wide school boycott. Pro-democracy academics followed by organizing teach-outs near government headquarters, where the student protests took place. Pro-democracy trade unions and opposition parties gradually joined the fray. The occupy protesters were dispersed by heavily armed police, which ended up provoking more people to take to the streets. The memory of the Tiananmen Square Incident still resonated powerfully with many Hong Kong citizens. Yet, in defiance of the looming threat of brutal crackdowns, unarmed civilians blocked major downtown areas, ushering in the Umbrella Movement, which lasted 79 days. Although anti-regime demonstrations were routinely held in the city, the Umbrella Movement was the first illegal democracy protest that openly challenged the authority of both the Hong Kong and Beijing governments.

The protest was unable to extract any concession from Beijing, partly because the protesters failed to agree on what concession they wanted from the authorities. Many protesters, however, took pride in their involvement in a spontaneous and leaderless movement (Cheng and Chan 2017), although in the eyes of many bystanders, the movement had gradually lapsed into an aimless public nuisance. The number of tourists visiting the city experienced a rapid decline during the protest, while shops near the occupy sites reportedly suffered a significant drop in sales (Hong Kong's Information Services Department 2014). Admittedly, the socioeconomic risks mostly affected those who lived in or near the protest sites most, as they were the eyewitnesses to the inconveniences created right next to their residential buildings. Meanwhile, the government adopted an attrition tactic toward the movement (Yuen and Cheng 2017). It did not escalate the confrontation with the protesters, perhaps for fear that repression would reinforce the protesters' moral high grounds. For weeks, it took no action to clear the protest sites, except that *pro-establishment* politicians and media continued to inveigh against the protesters for disrupting socioeconomic order and people's livelihoods. Public support for the protest

seemed to wane, as even Benny Tai, the initiator of the occupy movement, urged the occupy groups to retreat (Reuters 2014).

Although the Umbrella Movement came to an end in the government's unimpeded site-clearing operation, resistance continued to shimmer in society. Traditionally, opposition parties in Hong Kong are collectively known as the *pan-democrats*. New political groups with an anti-China or localism platform were formed after the movement. Some of these *localist* groups participated in a legislative election that was held about two years later, in hopes of riding on the momentum of the Umbrella Movement and making a last-ditch effort to create a landslide victory for the opposition. However, in the absence of systematic, large-scaled electoral fraud, the opposition captured only one additional popularly elected seat.⁶

3.2 Hypotheses

The Umbrella Movement and the ensuing election provide a rare opportunity to test the competing hypotheses about the electoral impacts of anti-regime protests. Because the protest was an unexpected event between two elections and highly concentrated in geography, it created a quasi-exogenous variation in protest exposure for ordinary citizens. The geographical compactness of the city allows us to measure the public's responses to the movement at a highly disaggregate level, which is afforded by rich election and survey data in Hong Kong. We here posit two competing hypotheses in relation to the potential impacts of protest exposure:

*H1a. In areas near the protest sites, the **decrease** of the opposition's vote share is more pronounced.*

*H1b. In areas near the protest sites, the **increase** of the opposition's vote share is more pronounced.*

In addition to these main hypotheses, we will also explore factors that drive the election results. Based on previous discussion, we will focus on three different mechanisms:

⁶Despite the absence of large-scale electoral fraud in legislative elections, Wong (2017) finds that there is a systematic redistricting bias against the opposition in the election of the District Councils, the lowest elected tier in Hong Kong.

sense of political efficacy, attitude toward democracy (the key movement frame of the Umbrella Movement), and anxiety about the socioeconomic situation.

H2. In areas near the protest sites, citizens have a stronger sense of political efficacy.

H3. In areas near the protest sites, citizens have a more favorable view of democracy.

H4. In areas near the protest sites, citizens are more worried about the socioeconomic situation.

4 Data

4.1 Dependent Variables

We collect data from several sources. The first part of our dataset covers the outcomes of Legislative Council elections at the polling station level in 2008, 2012 and 2016, which are publicly available from the Hong Kong government's election websites. For each election, we are able to obtain information about the lists of candidates, their party and camp, and how many votes they won at each polling station. We aggregate these records to the District Council Constituency (DCC) level — the lowest level for which digital maps and regional statistics are available⁷ — and calculate the vote share of each camp for all DCCs by summing votes of candidates from the same camp and dividing it by the total votes in that constituency.

In 2016, there were 539 polling stations located in 431 DCCs, scattered in the 18 geographical districts of the city⁸. For brevity, we will use the term *constituency* when referring to a DCC and *district* when referring to one of the 18 geographical districts. Some new constituencies emerged in 2016. We ignore them, as they do not permit intertemporal comparison. This leaves us a sample of 401 constituencies for the main analysis,

⁷District Councils are also the lowest elected tier in Hong Kong.

⁸See the appendix for more details on Hong Kong's administrative units

and 399 for the placebo tests.

The vote share of the opposition in each constituency is the dependent variable of interest in our test of Hypotheses 1a and 1b. The opposition force consists of two factions, the *pan-democratic camp* and *localist*. In addition, there are two types of legislative seats in Hong Kong: geographical constituencies and functional constituencies. The former include 35 seats (henceforth “regular seats”) that are elected to represent five Legislative Council constituencies of Hong Kong. As for the latter, five seats (known as the “super seats”) are elected by all eligible voters based on territory-wide proportional representation.

For a more fine-grained measurement of political preference, we construct an indicator of each constituency’s average ideology, based on the vote share and ideal point of elected legislators (see the method section for details). These ideal points are estimated using roll-call voting records of all the legislators from 2012 to 2017. The records are published on the Legislative Council website.

4.2 Independent Variables

To measure proximity to protest sites, we use two quantities: the minimum straight-line distance and driving time to the four occupy sites. We prefer these continuous variables to a dichotomous one (e.g., within or without the five-kilometer range of the occupy sites) as they allow for more flexible estimation. These measures are collected using digital maps of the DCCs and Google Maps API. We choose driving time instead of public transportation time, because the latter is not available for certain locations (e.g., the top of a hill)⁹. The two measures are our variables of interest, and will be denoted as *Straight-line* and *Driving time*, respectively.

We control a variety of demographic variables at the DCC level to reduce potential omitted variable bias. The data of these variables are downloaded from the websites of the 2011 census and 2016 by-census conducted by Hong Kong Census and Statistics Department. The variables collected range from local population structure to socioeconomic characteristics.

⁹Our main findings remain robust if we use public transportation time and drop constituencies with missing values. See the online appendix.

4.3 Individual-level Data

To examine the impacts of the protest at the individual level, we use two independent public opinion surveys. The first is the Asian Barometer Survey (ABS). Similar to barometer surveys in other continents, the ABS is a pooled cross-sectional data project aiming to investigate the political views of Asian citizens. We analyze the Wave 3 and 4 data of the ABS Hong Kong data. These two waves were collected approximately two years before and after the Umbrella Movement. Each wave has around 1,200 respondents. Questions in the ABS include each respondent's district of residence, demographic information, and political attitude in multiple dimensions. Its dynamic structure enables us to infer changes brought by the protest at each district.

The second set of survey data comes from the Hong Kong Election Study (HKES). The survey was implemented by professional survey companies (SSI and YouGov) using Internet surveys. The sample is representative of the Hong Kong population. We focus on the pre- and post-election surveys around the 2016 Legislative Council election. The advantage of the HKES surveys is that they explicitly ask the vote choice of the respondents in the 2012 and 2016 elections. These two questions help us compare the political preference of the same individual before and after the protest as in panel data, and link their vote choice to the perceived economic insecurity. After removing missing values and respondents who did not turn out in either election, we have a sample of about 1,100 Hong Kong voters.

5 Estimation Strategies

We adopt a difference-in-differences (DID) approach to test each of our hypotheses presented in Section 3, which assumes the following model specification:

$$Y_{it} = \mu + \beta \mathbb{1}\{PostUmbrella\} * Distance_i + \gamma \mathbb{1}\{PostUmbrella\} + \alpha_i + \epsilon_{it}, \quad (1)$$

where i and t indicate the unit of analysis and time period (2012 or 2016), respectively; Y_{it} is the outcome variable; $\mathbb{1}\{PostUmbrella\}$ is an indicator that is equal to 1 for observations in 2016 and 0 otherwise; $Distance_i$ is our key explanatory variable, driving

time or straight-line distance from unit i to the occupy sites; α_i is unit fixed effect; and ϵ_{it} is the idiosyncratic random shock. When testing the main hypotheses (H1a and H1b), the unit of analysis is the constituency and the outcome is the vote share of the opposition candidates. For the remaining hypotheses, the unit of analysis is individual and the outcome is the indicator for each of the proposed mechanisms¹⁰. Standard errors are clustered at unit level to account for the temporal correlation of the outcome variable.¹¹

After taking first difference on both sides of (1), we can eliminate all the time-invariant variables and obtain the following equation:

$$\Delta Y_{it} = \gamma + \beta Distance_i + \Delta \epsilon_{it}. \quad (2)$$

From (2), one can see that we are essentially estimating how the change in the outcome variable (ΔY_{it}) varies with a unit's geographical distance to the occupy sites. The approach employed here differs slightly from the conventional DID, as we have no distinct treated and control groups¹². The key identification assumption, “parallel trends,” remains the same, which assumes that had the Umbrella Movement not occurred, the change in the outcome variable of all the units would have been the same in expectation. Although this counterfactual scenario is unobservable, we can still indirectly test the assumption by analyzing election results prior to the Umbrella Movement. If the assumption holds, the estimate of β in this placebo test should be indistinguishable from zero.

It is possible that the relationship between ΔY_{it} and $Distance_i$ is driven by confounding covariates that lead to diverging trends of the units. For example, as the Umbrella Movement broke out in the business center of Hong Kong, the opposition's vote share could have dropped more significantly for reasons irrelevant to the protest (e.g., businessmen become more dissatisfied with some policy). To alleviate this concern, we adopt a novel approach proposed by Fong, Hazlett, and Imai (2018), which involves a non-

¹⁰Note that the treatment here is measured at district level, not individual level, due to data limitations. Because the ABS is not a panel, we only control for district rather than individual fixed effects. The regression equation is as follows:

$$Indicator_{idt} = \mu + \beta \mathbb{1}\{PostUmbrella\} * Distance_d + \gamma \mathbb{1}\{PostUmbrella\} + \delta \mathbf{X}_{idt} + \alpha_d + \epsilon_{idt}.$$

See Section A of the online appendix for more details.

¹¹Higher level clusters will be used in the robustness checks.

¹²In other words, we are estimating the slope of a continuous treatment (i.e., a “dose function”), rather than a binary treatment indicator.

parametric algorithm that calculates the covariate balancing propensity score (CBPS) for a continuous explanatory variable. Weighting observations by the score can create a sample that is balanced in these covariates and block the causal path between them and the key predictor $Distance_i$.

We also control for the interaction of the covariates with the period dummy in the regression.¹³ We check the influence of migration by investigating the correlation between the ratio of emigrants and the distance to occupy sites at constituency level. To account for the existence of unobservable confounders, we use a sensitivity test developed by Carnegie, Harada, and Hill (2016), which shows the necessary magnitude of unobservable variables' influence to offset the estimated effect.

Another potential threat against our estimation strategy is that political preference is not a dichotomous variable. As such, the underlying shift in the political preference of Hong Kong citizens may not be accurately captured by the vote share of different camps. To construct a more precise measure, we first estimate the ideal points of all the legislative candidates,¹⁴ and then calculate the average ideology of each constituency by weighting each candidate's ideal score with his or her vote share in this constituency. We replace the vote share of the opposition with this indicator of average ideology as one of the robustness checks.

6 Protest Exposure and Electoral Support for Opposition

6.1 Changes in Opposition Vote Share after the Umbrella Movement

We start by presenting a map of Hong Kong's constituencies to show the difference in vote share for the opposition between the 2012 and 2016 super-seat elections (Figure 1). Darker colors indicate a larger vote share increase. Occupy sites are denoted by white stars on the map. It is noteworthy that the opposition candidates's vote share increase is less pronounced in constituencies near the occupy sites and more so in the city's periphery.

¹³It is equivalent to adding covariates to Equation (2). The covariates are chosen by our expert judgment. To ensure that the variable choices are appropriate, we report in the online appendix the regression result with covariates selected by a machine learning algorithm known as LASSO.

¹⁴The ideal points of elected legislators are estimated based on their roll-call records. The estimation is done via the EM algorithm proposed by Imai, Lo, and Olmsted (2016). The ideal point of a defeated candidate is treated as equal to the average ideological score of elected legislators from the same party.

We can find the same pattern in Figure 2, which displays the bivariate relationships between the change in vote share for the opposition and each constituency's distance to the occupy sites. On the left-hand side of Figure 2, the explanatory variable is the driving time, and on the right-hand side it is the straight-line distance. Graphs in the first and second row are for the super-seat and the regular-seat elections, respectively. One can see that in both elections as the proximity to the protest sites increases, the vote share of opposition candidates drops more dramatically. In the last row of Figure 2, we divide the opposition into the *pan-democratic camp* and the *localist camp*. The pattern seems to be driven mainly by the former rather than the latter.

To verify findings obtained from Figures 1 and 2, we conduct regression analyses based on Equation (1). The results are displayed in Table 1. The first two columns show estimates for the super-seat election, and the next two columns are for the regular-seat election. In all the cases the coefficient of our key predictor, the interaction of the distance to occupy sites and the indicator for the 2016 election, is statistically significant with the expected sign. The estimate suggests that the vote share decline of opposition camp candidates after the protest will be 6% larger in the super-seat election and 3% in the regular-seat election, if the constituency's driving time decreases by one standard deviation (about 10 minutes). Such an effect is highly salient given the fact that the standard deviations for the vote share change of the opposition candidates in the two elections are 10% and 6%, respectively. The result is similar if we use the straight-line distance. Moreover, the estimates also imply that the popularity of the opposition candidates decreased in constituencies close to the occupy sites after the Umbrella Movement ($\hat{\gamma} < 0$), and they performed better in the super-seat election than in the regular-seat election. In the last two columns, we estimate Equation (1) separately for the *pan-democratic camp* and the *localist camp*. The coefficient on the interaction term is significantly positive only in the former case. For the latter, the coefficient is even smaller than zero, although it is not precisely estimated. The result again supports our finding in Figure 2.

We similarly estimate the impact of protest exposure on turnout rate. Results are reported in the online appendix. Contrary to the findings of Tertychnaya (2020), we find no evidence that the failed anti-regime protest discouraged citizens from voting. Indeed,

we find a positive relationship between turnout rate and the opposition's vote share across constituencies. The increase in turnout rate, however, is quite modest; only 0.3 percent when the distance rises by one standard deviation. Given its relatively weak substantive significance, we have reason to believe that the protest tends to change citizens' party preference, rather than their propensity to vote¹⁵.

The election results, therefore, strongly favor Hypothesis 1a over Hypothesis 1b. Exposure to the anti-regime protest, measured by proximity to the protest sites, produces a negative impact on the electoral performance of the opposition parties. It also explains why the opposition won only one extra seat in the 2016 election. In the following section, we will check the robustness of the main findings and examine the potential mechanisms that drive the election results.

6.2 Robustness Checks

In Figure 3, we show how our estimates change after weighting observations with the covariate balancing propensity score (CBPS). Unweighted results are on the left and weighted results are on the right. All the estimates are standardized for the convenience of comparison. Covariates selected to calculate the score include the share of married citizens, the share of college students, the share of medium-income (monthly income higher than 20,000 HK dollars¹⁶) and poor (monthly income lower than 6,000 HK dollars¹⁷) citizens, and the share of trade and financial industry practitioners. We also control for the share of Mandarin speakers.¹⁸ Clearly, weighting significantly reduces the correlation between the key predictor and the covariates. After weighting, most correlation coefficients become insignificant (in black). As may be seen from the first two rows (in red), the coefficients on our variable of interest remain statistically significant even after weighting¹⁹.

If we directly add the interaction of these covariates with the period dummy into the regression, the magnitude of the key coefficient's estimates will drop: more than 13% for

¹⁵This is further confirmed by additional mediation analysis using the method proposed by Imai, Keele, et al. (2011). See the online appendix.

¹⁶About 2,500 US dollars

¹⁷About 764 US dollars

¹⁸Cantonese, rather than Mandarin, is the common dialect in Hong Kong.

¹⁹Results remain largely the same, even if we control for those covariates that are still significant after weighting.

the super-seat election and 47% for the regular-seat election. Yet, the estimates remain significant. For the pattern of migration, we find that neither the level nor the change of emigration ratio is correlated with proximity. Details of these results are reported in the online appendix.

Table 2 presents estimates with the alternative dependent variable or standard errors. First, the dependent variable is replaced by the estimated average ideology for each constituency, while the model specification remains the same. Results in the first two columns are consistent with our main finding: constituencies close to the protest sites are more likely to become pro-government, and this is true for both the super-seat and the regular-seat election. In the other four columns of Table 2, we test the robustness of our standard error estimation by clustering at higher level (18 districts). The coefficients of the key predictor are always significant.

It is still possible that our findings are plagued by some unobservable confounders. Placebo and sensitivity tests can help diagnose the extent to which the influence of unobservable confounders undermines the validity of our main findings. In our placebo test, we examine if the spatial proximity effect is unique to the studied period. If we identify a similar spatial proximity effect in elections prior to the Umbrella Movement, this would imply that the spatial proximity effect is unlikely to be due to the anti-regime protest. We compare the election outcomes between the 2008 and 2012 legislative elections. Because the super-seat election did not exist in 2008, we only consider the regular-seat election when examining the vote share change for the opposition. The results are shown in Figure 4.

No matter whether we use the driving time or the straight-line distance as the independent variable, the difference in the opposition's vote share between the two elections is fairly stable over proximity and always fluctuating around zero. This is exactly what we should expect when the parallel trends assumption holds. In fact, we show in the online appendix that before the protest (i.e. in the 2008 and 2012 elections), the correlation between the opposition's vote share increase and the distance is negative. It turns positive only after the protest. Results of the sensitivity test are presented in the online appendix. They suggest that our estimates would not be insignificant unless the unobservables were

as predictive as the most predictive covariate, which is quite unlikely in practice.

7 Mechanisms

In this section, we investigate mechanisms that drive the election results, and offer more in-depth interpretations for the main findings. Our dependent variables in this section are three attitudinal constructs (anxiety about the socioeconomic situation, sense of political efficacy, and attitude toward democracy). We measure them using closely related questions available in the ABS survey. For instance, to gauge anxiety about the socioeconomic situation, we use two questions that ask respondents to report their evaluation of Hong Kong’s economic situation at the present and in the past year. To avoid the problem of multiple inference (Anderson 2008), we standardize all the question answers and apply principal component analysis (PCA) to generate one aggregate variable — PCA score²⁰ — for each construct. These PCA scores capture the main variation in each attitudinal construct, and are used as our dependent variables.²¹

In Tables 3 and 4, we present estimation results for each PCA score. Signs of the scores have been adjusted, so that higher values indicate stronger attitudes. Models in odd columns contain both the interaction term and the period dummy; in even columns they have only the period dummy. In the latter case, the coefficient on *Post Umbrella* reflects the average change in the indicator before and after the protest. In the first two columns of Table 3, we present estimates for the protest’s impact on perceived economic insecurity. It is apparent that in areas near the protest sites the Umbrella Movement significantly raised citizens’ anxiety about the society’s economic situation; this rise in anxiety diminishes with the distance to those sites. The finding supports Hypothesis 4.

A natural follow-up question is: Did the protest result in persistent economic loss in the protest areas? We answer this question using each respondent’s reported income level provided by the ABS. As with other indicators, this variable, which consists of five levels arranged in ascending order, is first normalized before the regression analysis. The result is reported in the last two columns of Table 3. Interestingly, the average income level of

²⁰We take the score of the first component.

²¹In the online appendix, we show results of each question as the dependent variable.

these respondents actually became higher after the protest, and there is no systematic spatial variation.²²

The first two columns of Table 4 show respondents' approval ratings for democracy. Neither the time dummy nor the interaction term has a significant coefficient in column 1. The same is true for the period dummy in column 2. We find no statistical support for Hypothesis 3. The result may suggest that the value of democracy had been well understood by Hong Kong citizens; their attitude was not altered by a single movement. In the third and fourth columns, we report results for the sense of political efficacy. It turns out that the average sense of political efficacy becomes higher after the Umbrella Movement, but the change does not vary significantly by spatial proximity to the protest sites. The result implies that the enhancement of the sense of political efficacy is unlikely to be dependent on physical exposure to the protest; for those who did not experience the protest firsthand, their sense of political efficacy may improve as a result of exposure to it through other channels (e.g., online communications). Together with the findings related to voter turnout, our results on political efficacy suggest that a failed anti-regime protest does not necessarily lead to political alienation or disengagement, as suggested in Tertychnaya (2020).

To summarize, the co-evolution of perceived economic insecurity and the opposition's vote share change implies that the latter is possibly mediated by the former, rather than other variables. The increase in the average sense of political efficacy, on the other hand, explains the rise of average turnout rate and the opposition's vote share in constituencies far away from the protest sites.

8 Heterogeneous Impacts of Protest Exposure

Our main findings on electoral support are based on data available at the polling station level. To ensure that they are not driven by ecological fallacy, we repeat the DID analysis using the vote choice of respondents in the 2012 and 2016 elections reported in the HKES data. We further divide respondents into three categories based on their vote

²²In the online appendix, we provide evidence that the perception of economic insecurity is strengthened by biased news reports

choice:²³ *defectors*, who supported the opposition in 2012 but voted for the incumbent in 2016; *stayers*, who voted for the opposition in both elections; *joiners*, who switched from supporting the incumbent in 2012 to supporting the opposition in 2016.²⁴ We treat *stayers* as the benchmark, testing how *defectors* and *joiners* deviate from the benchmark in various aspects. This analysis is purely exploratory and aims at unveiling determinants of individual heterogeneity in response to the protest.

Table 5 shows results of the individual level DID analysis using HKES data. The dependent variables are whether the respondent voted for the opposition in the 2012 and 2016 elections. Even though the independent variable is now at the district level, and the dependent variables take only three values $\{-1, 0, 1\}$, we can still observe significant estimates, which support the findings at the constituency level: after the protest, many voters switched from the opposition to the *pro-establishment camp* in areas close to the occupy sites. Irrespective of which measure of proximity we use, we find that when the distance increases by one standard deviation, the probability that the respondent switches camps rises by around 2%. The effect's magnitude is comparable to that of previous results. As personal characteristics have been differenced out, the finding is unlikely to be driven by individual-specific confounders.

After dividing respondents in the HKES into three groups based on their vote choice in 2012 and 2016, we find that the relative size of the groups of *defectors*, *joiners*, and *stayers* is about 2: 1: 10. The first fourteen rows of Figure 5 displays the difference between *stayers* and the other two groups — *defectors* and *joiners* — in seven dimensions. Red lines represent *joiners* and blue lines represent *defectors*. From these comparisons, we know that *defectors* live closer to the protest sites, earn less, and are less politically knowledgeable. On the other hand, *joiners* tend to be younger, more likely to be female, and to contact elected politicians, although they also seem to be less politically knowledgeable²⁵. The findings again confirm our claim that proximity matters. They further suggest that the protest's negative impacts are concentrated on those with a lower income level. In the online appendix, we use the ABS data to show that protesters in the Umbrella Movement and *joiners* here are alike in many respects, which implies that the

²³We follow the approach of Hale and Colton (2017).

²⁴Respondents who voted for the incumbent in both 2012 and 2016 are dropped as they are not our main focus.

²⁵Not all the coefficients are precisely estimated due to the small sample size.

opposition succeeded in mobilizing only a narrow segment of the population.

The last two rows of Figure 5 (black lines) display the correlation coefficients of respondents' vote choice in the 2016 election with both perceived economic insecurity and political efficacy.²⁶ Although we possess no information on how the two indicators changed between the two elections, the results show that respondents' tendency to vote for the opposition in 2016 is negatively correlated with the level of perceived economic insecurity, and positively correlated with the level of perceived political efficacy. Both coefficients are significant at 5% level, thus confirming the importance of perceptions of economic insecurity in affecting voting behavior. The results also help explain the previous finding that the *pan-democratic camp*, the moderate wing within the opposition, suffered more than the radical *localists*. The latter possibly attracted citizens who felt more politically efficacious after the protest, while the former bore the costs of disrupting the socioeconomic order.

9 Conclusion

Seldom does a revolutionary movement topple a regime in a single popular uprising. Even a failed anti-regime protest may leave a rich legacy for subsequent resistance movements. In this article, we examine one particular legacy of a failed anti-regime protest: could it at least tip the electoral balance in favor of the opposition? This is a substantively important question, as most authoritarian regimes now hold somewhat competitive elections on a regular basis. The nexus between anti-regime protests and authoritarian elections demands a systematic investigation. In this article, we examine how exposure to a failed anti-regime protest (Hong Kong's Umbrella Movement) shapes citizens' attitudes toward opposition politicians. We measure protest exposure by spatial proximity to protest sites, and find that protest exposure is positively correlated with a more pronounced decline in electoral support for the opposition that organized the anti-regime protest. The cognitive impacts of protest exposure manifest themselves in elevating bystanders' sense of economic insecurity. In addition, their sense of political efficacy improved significantly after the protest, irrespective of spatial proximity

²⁶To make the results coherent we also ignore respondents who always voted for the *pro-establishment* camp.

to protest sites. Perhaps for this reason, another massive wave of anti-regime protests broke out in Hong Kong five years after the Umbrella Movement, even though opposition parties were not able to make much of an inroad into the elected offices; Hong Kong people are ready to change politics by taking to the streets rather than by going to the voting booth.

Our findings have practical implications for anti-regime protests in autocracies. In particular, the opposition elite that organizes anti-regime protests in autocracies should strive to minimize citizens' perceived socioeconomic disruptions from the protest, in order to shore up public support. One way to do this is to reduce the number of protest locations. It is better to organize a large protest in one location, rather than many smaller protests in multiple areas. In addition, the forms and duration of civil resistance also matter. Occupying public areas and obstructing public transport for a lengthy period of time are likely to disrupt the socioeconomic order more than symbolic public acts such as vigils and performing skits and pranks. That said, anti-regime protests may lack a central authority to exercise control over the duration, locations, and formats of the protest. In fact, the opposition in authoritarian regimes is always confronted with a dilemma between expanding its coalition and maintaining unity. A larger coalition poses a greater threat against the regime, but diversity within the coalition may foment dissension, which undermines the cohesiveness of the coalition and the effectiveness of the protest.

From the perspective of authoritarian incumbents, it is certainly in their interest to magnify the socioeconomic impacts of an anti-regime protest, so that they can incite public resentment against it. This tactic is arguably more useful than relying on sheer coercion to deter ordinary citizens from joining in the protest, although studies of regime dynamics accord a lot more attention to the latter tactic. The threat of state repression only increases the cost of protest participation. It does not make the opposition elite less popular. Disapproval of the protest, however, implies citizens' shared stake in the political status quo. How authoritarian governments manipulate the public perception of anti-regime protests warrants more scholarly attention. Of course, economic anxiety is not a feeling unique to citizens living in authoritarian regimes. The extent to which this

factor affects the popular support for protests in democracies, especially violent ones, is worth investigating in future studies.

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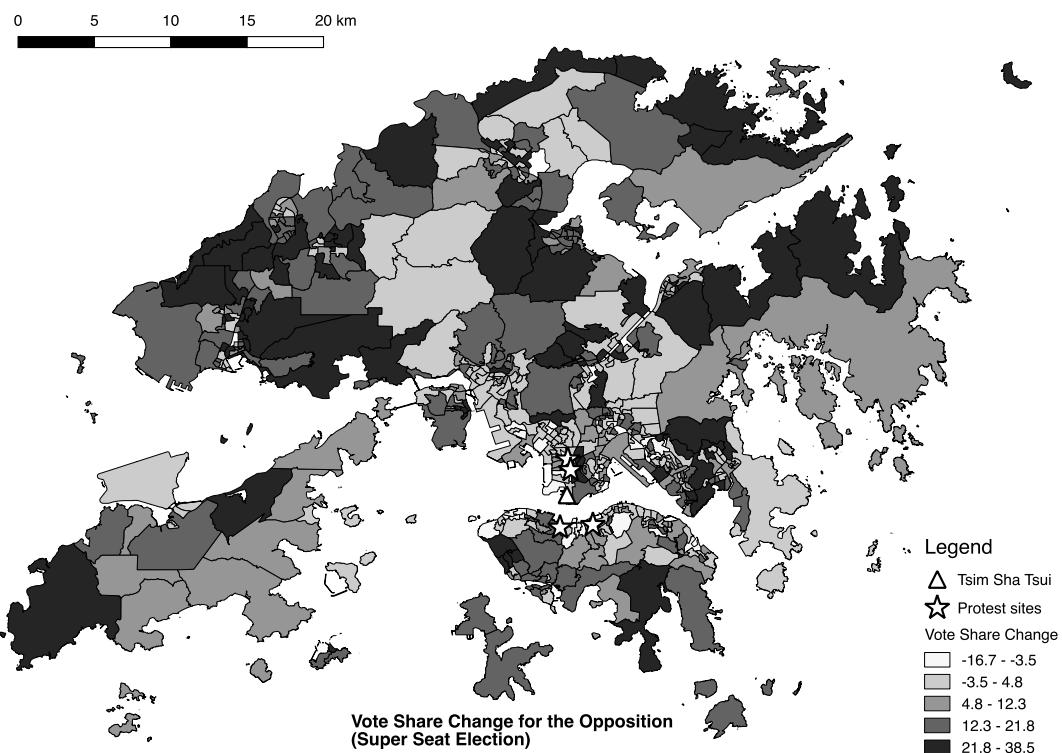
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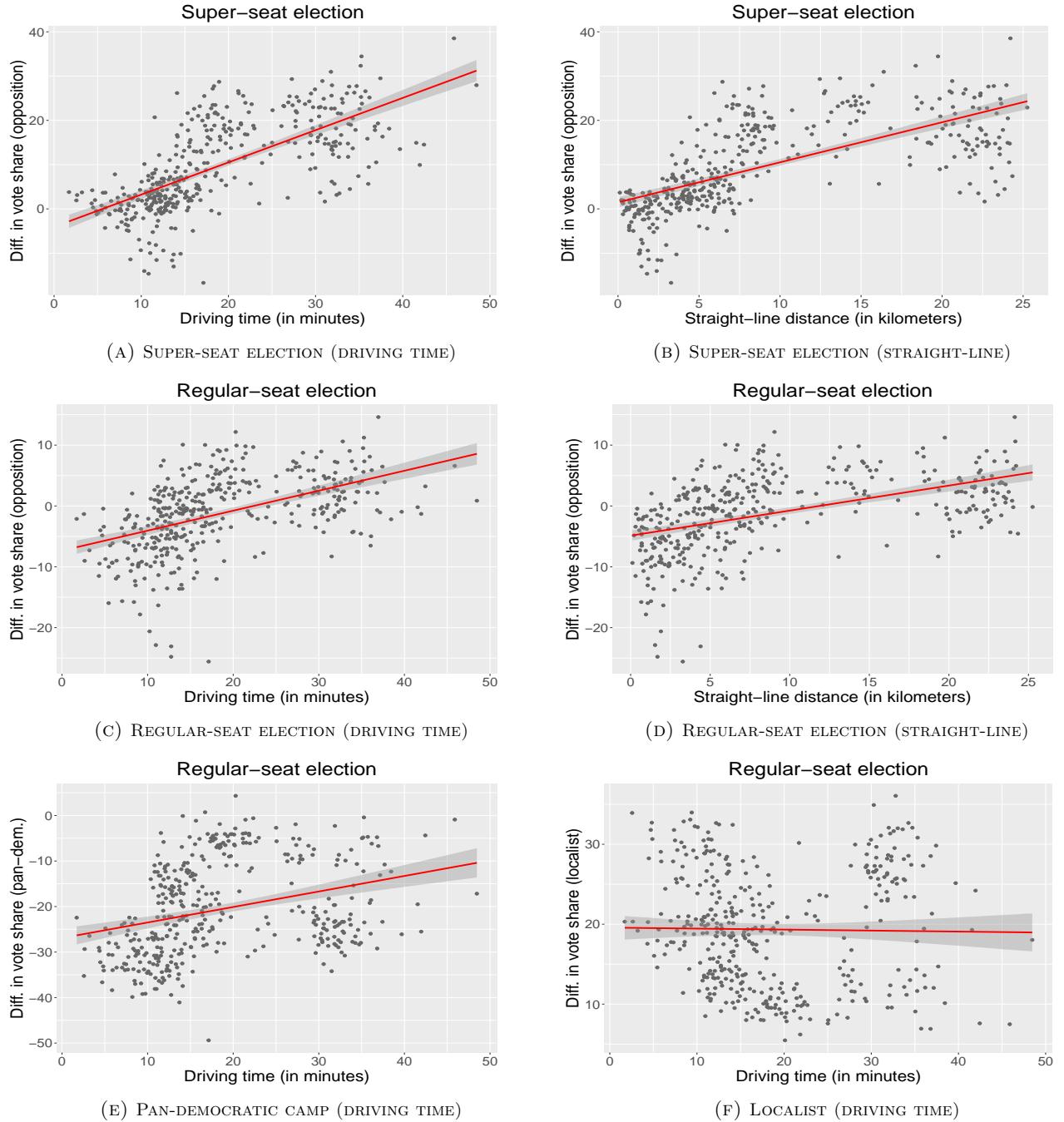
Figures

FIGURE 1. VOTE SHARE CHANGE FOR THE OPPOSITION IN LEGISLATIVE COUNCIL ELECTIONS



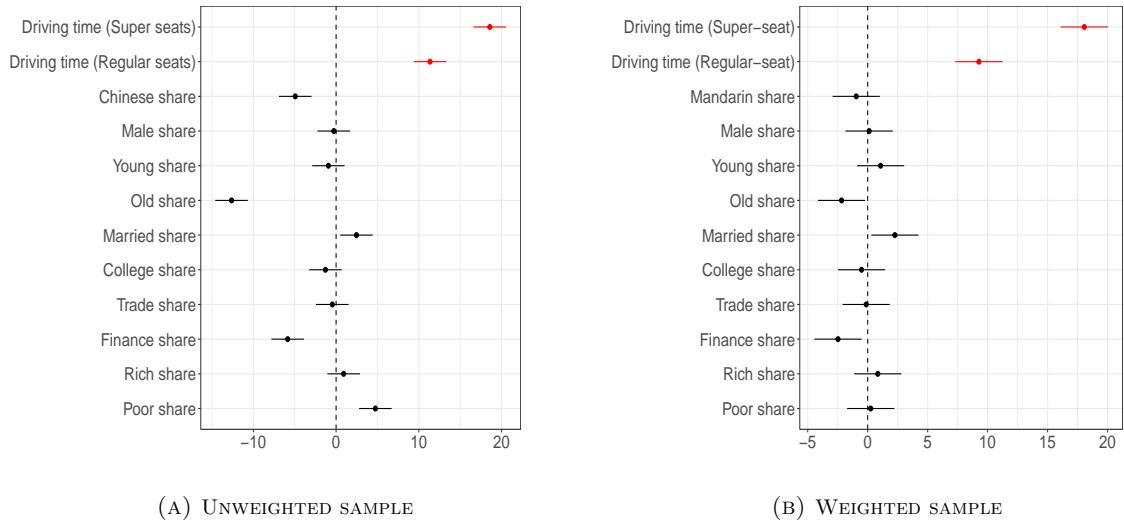
Notes: The map shows the vote share change in each Hong Kong constituency for the opposition between the 2012 and 2016 super-seat election. Darker color indicates a larger vote share surge for the opposition.

FIGURE 2. RELATIONSHIP BETWEEN THE VOTE SHARE CHANGE FOR THE OPPOSITION AND PROXIMITY TO PROTEST SITES



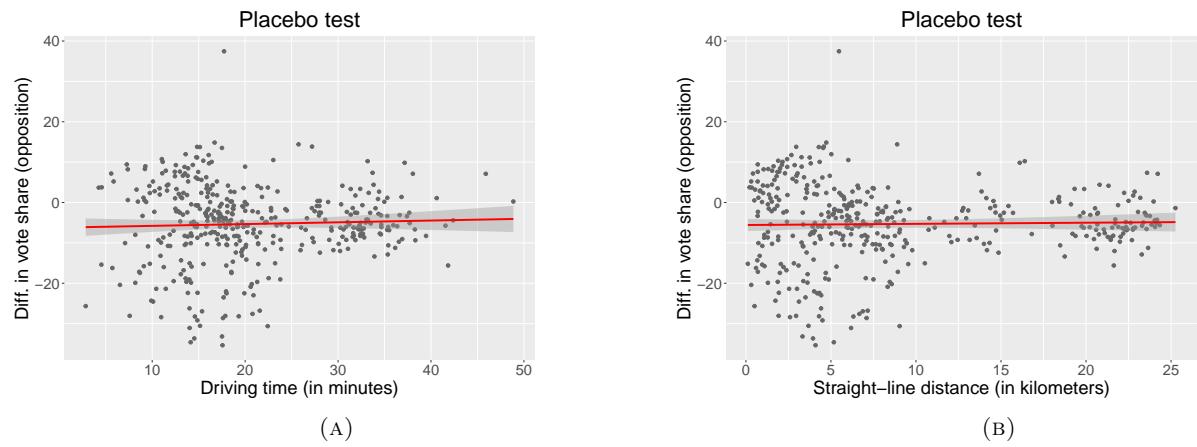
Notes: The figures show how the vote share change for the opposition between the 2012 and 2016 Legislative Council elections varies with the distance to the occupy sites. Each black spot in the graphs represents the vote share change in the corresponding constituency. The red line is the linear fit of the spots, with the grey area indicating its 95% confidence interval. The first two rows are for the super-seat and the regular-seat elections, respectively. The left column uses driving time as the independent variable and the right one uses straight-line distance. The last row plots the respective vote share changes for the *pan-democratic* camp and *localists* between the two regular-seat elections.

FIGURE 3. RESULTS OF CBPS WEIGHTING



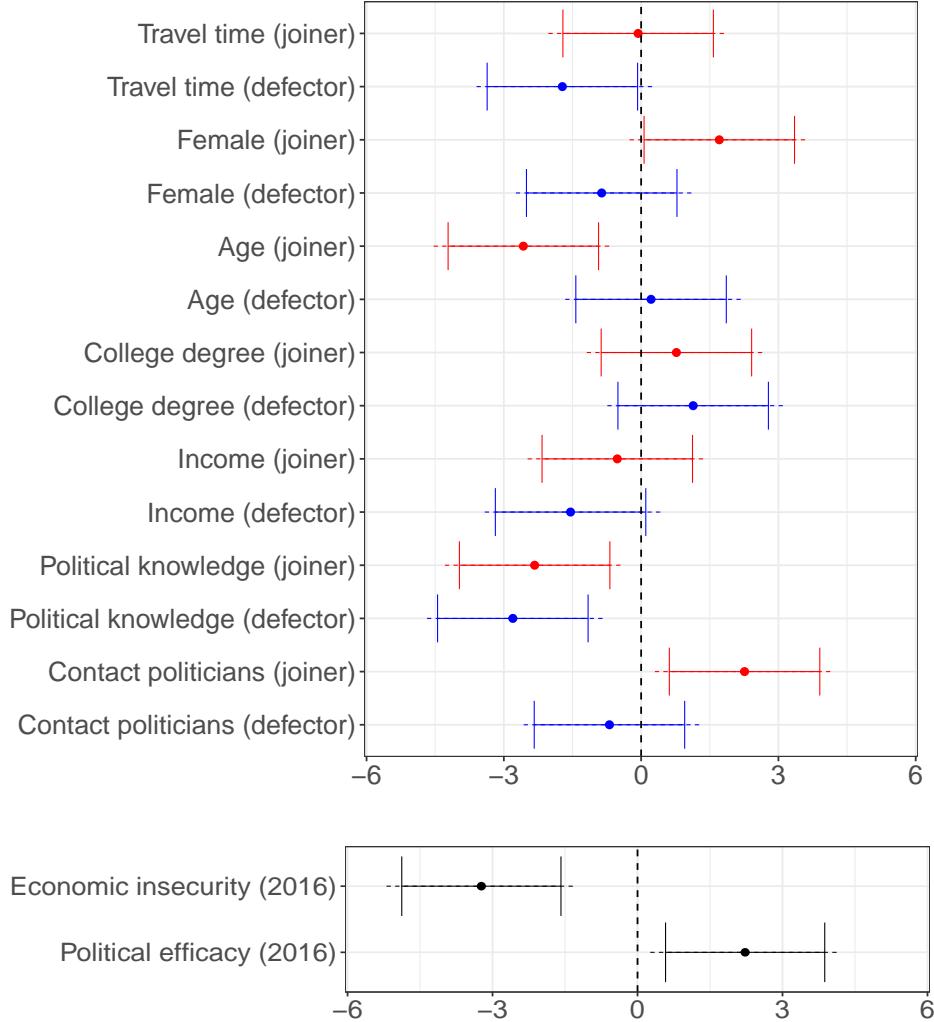
Notes: The figure compares the key independent variable's coefficient (red lines on the top) and its correlation with all the covariates (lines below the red one) in the original unweighted sample (on the left) and in the sample weighted by Covariates Balancing Propensity Score (on the right). The range of each segment represents the estimate's 95% confidence interval.

FIGURE 4. PLACEBO TEST USING ELECTIONS BEFORE THE UMBRELLA MOVEMENT



Notes: The two figures present the relationship between the vote share change of the opposition in the two elections before the Umbrella Movement and the distance to the occupy sites. Each black spot in the graphs represents the vote share change in the corresponding constituency. The red line is the linear fit of the spots, with the grey area indicating its 95% confidence interval. The left graph uses driving time as the independent variable and the right one uses straight-line distance.

FIGURE 5. DIFFERENCES AMONG DEFECTORS, JOINERS AND STAYERS



Notes: The upper part of this figure depicts the difference between defectors and joiners relative to stayers in nine dimensions. Defectors are voters who voted for the opposition in 2012 but voted for the *pro-establishment camp* in 2016 (marked by blue); joiners behaved in the opposite way (marked by red). Each point indicates the average difference between this group and stayers (those who didn't change their vote choice between 2012 and 2016). The lower part displays the correlation coefficients of respondents' tendency to vote for the opposition with their perceived economic insecurity and political efficacy in 2016. The solid line represents the 95% confidence interval of the difference, and the dotted line represents the 90% confidence interval.

Tables

TABLE 1. MAIN RESULTS

	<i>Super-seat</i>	<i>Super-seat</i>	<i>Regular-seat</i>	<i>Regular-seat</i>	<i>Pan-dem.</i>	<i>Localist</i>
Driving time * Post Umbrella	0.728*** (0.055)		0.328*** (0.038)		0.341*** (0.068)	-0.012 (0.059)
Straight-line * Post Umbrella		0.905*** (0.077)		0.411*** (0.048)		
Post Umbrella	-4.058*** (1.034)	1.474* (0.750)	-7.343*** (0.844)	-4.878*** (0.632)	-26.916*** (1.378)	19.572*** (1.124)
Constituency FE	Y	Y	Y	Y	Y	Y
N	802	802	802	802	802	802

Notes: The results are from our difference-in-differences estimation based on Equation (1). Constituency fixed effects are always controlled. In the first two columns the dependent variable is the vote share for the opposition in the super-seat election before and after the Umbrella Movement, and in columns three and four it is the vote share for the opposition in the regular-seat election in the same era. In columns five and six, the dependent variable is the vote share for the *pan-democratic* camp and *localists* in the regular-seat election, respectively. Standard errors are clustered at constituency level. *p<0.05; **p<0.01; ***p<0.001.

TABLE 2. ALTERNATIVE DEPENDENT VARIABLE AND STANDARD ERRORS

	<i>Super-seat</i>		<i>Regular-seat</i>	
	<i>Ideology</i>	<i>Larger cluster</i>	<i>Ideology</i>	<i>Larger cluster</i>
Driving time * Post Umbrella	0.003*** (0.0003)	0.728*** (0.128)	0.0003** (0.0001)	0.328*** (0.079)
Post Umbrella	-0.062*** (0.006)	-4.058 (3.115)	-0.016*** (0.003)	-7.343** (2.259)
Constituency FE	Y	Y	Y	Y
N	802	802	802	802

Notes: In column one and three, the dependent variable is the average ideological score for each constituency in the 2012 and 2016 elections. The scores are the weighted averages of each candidate's ideal point, where the weight is their vote shares in the constituency. In column two and four, the dependent variables are the same as in Table 2, but the standard errors are clustered at the district level (there are in total 18 districts in Hong Kong) level instead of constituency level. Constituency fixed effects are always controlled. *p<0.05; **p<0.01; ***p<0.001.

TABLE 3. MECHANISMS (PERCEIVED ECONOMIC INSECURITY)

<i>With interaction?</i>	<i>Perceived economic insecurity</i>		<i>Real income</i>	
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
Driving time * Post Umbrella	-0.026*** (0.004)		-0.008 (0.009)	
Post Umbrella	0.461*** (0.106)	-0.032 (0.076)	0.587** (0.228)	0.430*** (0.121)
District FE	Y	Y	Y	Y
Individual attributes	Y	Y	Y	Y
N	2,070	2,070	1,857	1,857

Notes: The estimation is based on ABS data, waves 3 and 4. In odd columns, both the interaction of the period dummy and the distance to the occupy sites, and the period dummy are added into the regression. In even columns only the period dummy is included, not the interaction term. Dependent variables in all the columns are principal component analysis scores for the corresponding indicator. In columns one and two, the dependent variable is the PCA score for perceived economic insecurity; in column three and four it is respondents' reported real income level. Standard errors are clustered at district level. District fixed effects and individual attributes are always controlled. *p<0.05; **p<0.01; ***p<0.001.

TABLE 4. MECHANISMS (DEMOCRATIC VALUES AND PERCEIVED POLITICAL EFFICACY)

<i>With interaction?</i>	<i>Appr. of democracy</i>		<i>Political efficacy</i>	
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
Driving time * Post Umbrella	-0.003 (0.013)		0.009 (0.014)	
Post Umbrella	-0.202 (0.354)	-0.250 (0.196)	0.103 (0.258)	0.281** (0.104)
District FE	Y	Y	Y	Y
Individual attributes	Y	Y	Y	Y
N	1,476	1,476	2,035	2,035

Notes: The estimation is based on ABS data, waves 3 and 4. In odd columns, both the interaction of the period dummy and the distance to the occupy sites as well as the period dummy are added into the regression. In even columns, only the period dummy is included, not the interaction term. Dependent variables in all the columns are principal component analysis scores for the corresponding indicator. For the first two and remaining columns, the indicators are the approval of democracy, and perceived political efficacy, respectively. Standard errors are clustered at district level. District fixed effects and individual attributes are always controlled. *p<0.05; **p<0.01; ***p<0.001.

TABLE 5. VOTE CHOICE OF HKES RESPONDENTS

	<i>Vote for the opposition</i>
Driving time * Post Umbrella	0.002* (0.001)
Straight-line * Post Umbrella	0.003* (0.001)
Post Umbrella	-0.121*** (0.028)
Individual FE	Y
N	2174
	2174

Notes: The results are based on HKES data. Estimates are generated using the same difference-in-differences approach. The dependent variable is whether the respondent voted for the opposition in the 2012 and 2016 elections. The independent variables are the same proximity measures (although at district level). Individual fixed effects are always controlled. Standard errors are clustered at district level. †p<0.1; *p<0.05; **p<0.01; ***p<0.001.