Advertisers Capture: Evidence from Hong Kong

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Abstract

This paper shows that non-coercive political pressure on the media can be substantial. Using daily advertising data between 2010 and 2014, this paper documents that advertisers in Hong Kong engage in politically-induced advertising boycott on a newspaper that adopts a political stance which is against the mainland Chinese government policy. To establish causality, I exploit difference in firms' characteristics and exogenous variation of the occurrence of political events and their intensity to examine to what degree political salience affects firms' decisions to place ads in a pro-Democracy (as opposed to pro-Beijing) newspaper, particularly so among Beijing-friendly firms. I estimate that the pro-Democracy newspaper suffered from an ad revenue loss equivalent to 21.9% of its total advertising revenue in 2014 due to political reasons.

JEL Code: D22, F50, P16

1 Introduction

Freedom of press is a right protected by law in many countries. Nevertheless, non-coercive political pressure on the media is prevalent in the world. In the 2016 annual report on Freedom of Press issued by Freedom House[1], democratic countries such as Malaysia and Mexico[2] were classified as "not free", and many others such as India, Japan and South Korea have "partly free" media. How does the government influence media reporting outside of formal legislation? This paper sheds light on this question by showing that censorship often works through incentives

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[1]The methodology comprises of questions that could be divided into three broad categories: the legal environment, the political environment, and the economic environment.

[2]The constitutions of both countries establish freedom of expression.

rather than coercion.

The 2011 earthquake and nuclear disaster in Japan and its subsequent media coverage is a telling example of the mechanisms illustrated in the paper. According to the Freedom House 2014 annual report, the Tokyo Electric Power Company (TEPCO), which ran the Fukushima nuclear power plant, spent around 24.4 billion yen ($238 million) on advertising in a year. The company has also maintained strong ties with the Japanese government. These have been suggested as a factor to media's conservative coverage of TEPCO's handling of the nuclear crisis: news report on largely followed official government statements (Imtihani and Yanai, 2013), with few journalists questioning TEPCO until two weeks later after the leak. Even before the incident, the Japanese government has been criticized for exerting discreet political pressure on the media[3]. This event highlights the political function of advertisers and shows the intrigue ties between advertiser, government and the media.

This paper establishes causality of newspapers' political stance on advertising choice. By studying the print newspaper advertisement market in Hong Kong, it shows that advertisers engage in politically-induced advertising boycott on a media that adopts a political stance which is against the government policy. Model of media political economy have attempted to explain why profit-maximizing advertisers might have a preference for biased information providers by incorporating how reporting affects readers response to ads (Ellman and Germano, 2009), but has fallen short in addressing the impact of state-business relations on media bias. As in the motivating example in Japan, businesses in many countries enjoy close ties with top officers (Faccio, 2006), and this tie is likely to lead firms to act as an extension of state.

I quantify the size of advertising revenue impact on the pro-Democracy newspaper due to political influence[4] by exploring two mechanisms, illustrated in a simple model, that explain firms' decision to engage in advertising boycott. The first is identified by time series variation. I show that an increase in firms' political salience can lead to more aversion from advertising on media that is against government policy. The second is identified by cross-sectional variation in firms' characteristics. I show that firms that are politically connected with the mainland Chinese government and firms with headquarter located in mainland China are more likely to engage in advertising boycott.

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[3]http://www.economist.com/news/asia/21651295-japans-media-are-quailing-under-government-pressure-speak-no-ev

[4]Work on the effect of advertising revenue on media's independence include Petrova (2011), Qin et al (2014), Reuter and Zitzewitz (2006) and Reuter (2009)

The identification strategy of the time series analysis relies on a behavioral insight that consumers' attention tend to be drawn to an attribute that stands out among products (Schkade and Kahneman 1998; Koszegi and Szedil, 2013; Bordalo et al, 2013, 2015). The attribute is newspaper slant in our context. We exploit unexpected outbreak of political events and the variation in the intensity of these events over the sample period to obtain exogenous variation in newspaper slant. The main intuition is that news reports almost always demonstrate a stronger interpretative narrative that is consistent with the newspapers' underlying political ideology when covering political events. In other words, when covering political events, ideological slant implied in the news articles appearing on newspapers representing opposite political stance should diverge, but relatively indistinguishable on non-political news such as traffic accidents. This divergence creates greater awareness among advertisers on newspaper's slant and more aversion from advertising in a pro-Democracy newspaper. To operationalize this intuition, I use Gentzkow and Shapiro's (2010) method to measure polarization of the front-page news report on the two major newspapers sitting on opposite ends of the political spectrum[5]. We find evidence that firms exhibit more aversion from advertising on the pro-Democracy newspaper in periods that register large slant gap.

Advertising choice of politically connected, as well as that of mainland Chinese companies, is another focus of this paper. Following the literature on political connection (Faccio 2006, Khwaja and Milan 2005), we consider a firm as connected if at least one of its board members is a member of the political organs within the mainland government. These companies are usually highly profitable. Many of them are beneficiaries of the political and economic status-quo[6]. In our sample period, Mainland Chinese companies are increasingly visible in the local Hong Kong economy as economic integration between mainland and Hong Kong deepens. Together, advertising spending by politically connected firms and mainland Chinese firms represent a large and growing fraction of the overall advertising revenue in the market. We find that both connected and mainland Chinese companies are more likely to avoid advertising on the pro-Democracy newspaper relative to the neutral firms.

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[5]Eisensee and Strömberg (2007) adopted a similar identification strategy. They show that U.S. relief depends on whether the disaster occurs at the same time as other newsworthy events, such as the Olympic Games, which are unrelated to need for relief.

[6] Fernandez and Rodrik (1991) consider a model that explains aversion from political reform. In the model, firms expect uncertainty over individual outcome. While firms might believe that democracy can bring net gain to the economy, uncertainty over individual gain/loss can lead firms to prefer the status-quo.

The institutional framework of Hong Kong presents several attractive features for the study. First, press freedom is protected by law. This means that the government cannot directly interfere with newspaper reporting and different voices are allowed. If freedom of press is not a legal right, newspapers can be easily regulated by the government and all newspapers will share government's political stance. Second, the political spectrum in Hong Kong spans from pro-Democracy to pro-Beijing. This allows us to follow the methodology of Gentzkow-Shaprio (2010) to quantify polarization[7]. Third, several incidents that are highly political in nature - including the Umbrella Movement - erupted in our sample period. This provides sources of variation in newspaper slant.

I focus on the print version of the 2 paid-for newspapers with the largest readership in Hong Kong: Apple Daily and Oriental Daily. As shown in table 1, readership of each of the top 2 newspapers is about 4-5 times higher than the third most popular newspaper - Ming Pao. Together, readers of the two newspapers occupy approximately 75% of the total readership (including online readership). Apple Daily is the widely-recognized pro-Democracy paper whereas Oriental is pro-Beijing. The owner of Apple Daily, Jimmy Lai, is known to be a fiercely anti-Communist tycoon and frequently attacked by pro-Beijing critics. In contrary, owner of the Oriental Daily, Ma Ching Kwan, was appointed to be the member of the 10th and 11th session of PCC, an important political organ of the central PRC government (more in section 3).

Our thesis is most comparable to Di Tella and Franceschelli (2009), which documents government's intention to capture the media[8]. They find that a one standard-deviation increase in government advertisement in Argentina is associated with a reduction in corruption coverage by almost half of a front page per month. While their focus is on government ads, we examine ad patterns by all advertisers. This paper is also closely related to DellaVigna et al (2015) in estimating the effect of changes in political environment on advertising behavior. This paper differs in an important dimension that we emphasize the effect of news content on advertisers'

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[7]Alternatively, Qin et al (2014) used principal component analysis to quantify media bias. They consider 9 content categories: mention of political leaders, citation of Xinhua, controversial issues intensively covered by oppositional overseas Chinese media, corruption, disasters, accidents, sports, crimes, and entertainment. They collapse these 9 dimensions of content differentiation into a single dimension. Groseclose and Milyo (2005) count the times that a particular media outlet cites various think tanks and policy groups, and then compare this with the times that members of Congress cite the same groups

[8] McMillan and Zoido (2004) provided the most direct evidence of government capture. They show the monetary transfer from the Peruvian government to the media companies during Fujimoto's presidency

choices rather than the media ownership[9]. The content is arguably a more important channel because of its direct tie to the freedom of press. While existing literature has emphasized that a large advertising market can promote media independence (Petrova, 2011; Gehlbach and Sonin, 2011), this paper suggests that this view warrants caution because the advertisers can be captured by government also through economic incentives.

This work also contributes to the literature on the relevance of firms' political connections (Faccio, 2006; Khwaja and Mian, 2005; Knight, 2007; Cingano and Pinotti, 2013; Coulomb and Sangnier, 2012; Luechinger and Moser, 2012). While much of the emphasis of this strand of literature emphasizes the benefit of political connections, this paper extends this literature by showing that politically connected firms are likely to inherit government's political preference and act as extension of the state. Finally, the suggested mechanism is broadly related to the literature of salience in consumers' choice (Schkade and Kahneman 1998; Koszegi and Szedil, 2013; Bordalo et al, 2013, 2015). A number of empirical studies have documented the importance of salience and limited attention in a variety of economic contexts, and attention is drawn to the attribute that stands out from that of the rest of the choices[10]. This paper provides new empirical evidence to this literature by considering a novel context, namely political salience increases with news polarization.

2   Suggestive Evidence

There has long been speculation that Apple Daily suffers from advertising boycott. In fact, from an interview as early as 2007, Jimmy Lai said,

> There's a very well organised boycott here. We have almost no real estate advertisement because real estate companies are mostly big companies with business in China. We have 30-35% less ads than we should have. And now the boycott has become very permanent and very organised.

[11]. The quote motivates our analysis on how firms' characteristics affect their advertising decision, with a specific emphasis on the real estate industry.

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[9]Work on the effects of news contents includes Stromberg (2004); Gentzkow and Shapiro, 2004; Gentzkow , 2006; DellaVigna and Kaplan, 2007; Gerber,Karlan, and Bergan, 2009; Knight and Chiang, 2011; Enikolopov et al, 2011; Snyder and Stromberg, 2010

[10]See DellaVigna(2009) for a detailed review.

[11]https://www.theguardian.com/media/2007/may/14/mondaymediasection8

Another way to assess whether Apple Daily has suffered financially relative to Oriental Daily is to study the stock price of the corporations. Figure 4 shows the stock prices of the two corporations that own Apple Daily (Next Digital) and Oriental Daily (Oriental Press), as well as the Heng Sang Index over the sample period. Stock price of Next Digital registers much larger volatility in this period. While both corporations under-performed relative to the market average, Next Digital's decline was much more apparent after the 1st quarter of 2011. Next Digital continued to under-perform relative to Oriental in most of 2013 and 2014.

We also present the revenue composition between subscription and advertising for Apple Daily in table 2, which is printed in Apple Daily's annual investor report. The advertising revenue in 2014 reduced to approximately 1/2 of that in 2010 whereas subscription revenue in 2014 was 68% of that in 2010. Fraction of advertising revenue to total revenue fell significantly between 2013 and 2014 from 0.621 to 0.566. These aggregate time trends, though short, suggest that the reasons to fall in demand for Apple's advertising space might not be fully accountable by economic factors.

3 Institutional Context

When the sovereignty of Hong Kong was returned to China in 1997, part of the agreement between the British and the Chinese was that the rights of the Hong Kong residents -including freedom of speech, freedom of the press, and freedom of assembly- were to be carried over and protected by the Basic Law. This means that neither the Hong Kong nor the PRC government can directly interfere with newspapers' reporting. However, there were signs that suggest press freedom in Hong Kong had suffered from increasing pressure. The most telling example is the physical attack on a journalist of the liberal media in 2014[12], which highlighted the safety concern for liberal journalist. Local journalists saw the attack as effort of the PRC government in seeking to rein in Hong Kong's vibrant and still free press while the pro-Beijing camp dismissed any link between the attack and press freedom. Another example is the repeated effort by the exclusive free TV channel in Hong Kong (TVB) to downgrade politically sensitive material in news air time[13]. According to the annual report by Reporters Without Borders, Hong Kong's decline in the press freedom index [14] ranking is drastic despite no change in law; the city was

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[12]Kevin Lau, the editor of Ming Pao, was physically stabbed and suffered from serious injuries

[13]The news department of TVB downgraded coverage of the 20th anniversary of the 4 June Incident.

[14]The index ranks the performance of 180 countries according to a range of criteria that include media pluralism and independence, respect for the safety and freedom of journalists, and the legislative, institutional and infrastructural environment in which the media operate.

ranked 18 in 2002, 58 in 2013, 61 in 2014 and 70 in 2015.

In parallel to an increasing pressure on media, researchers have noted that politics had become gradually polarized over the same period (Cheng, 2014). One piece of evidence is the increasing occurrence of filibusters in the Legislative Council. Our sample period is also marked by increasing occurrences of political events such as large-scale protests. Several important examples follow. In the second half of 2012, the leading political controversy was the government-backed Moral and National Education (MNE). Opponents believed that the goal of MNE was to brainwash the students to love China and launched large-scale protests with more than 100,000 protesters. In the last quarter of 2013, HKTV, a TV company started by a self-made billionaire with no political connection, was denied a TV license while other two politically connected companies were granted. The decision spurred suspicion that HKTV was denied for political considerations and tens of thousands protested on the street. In the second quarter of 2014, Beijing released the "White Papers". It was seen as a reneger on Beijing's pledges for a democratic, autonomous Hong Kong under Beijing's rule in 1997. In the last quarter of 2014, Umbrella Movement took place and marked the new height of confrontation.

3.1 Business and Politics

The business sector has been the chief ally of the mainland government in fending off the demands for progressive democratization well before the handover in 1997. During the Basic Law drafting period from 1985 to 1990, local powerful capitalists such as Li Ka-Shing, formed the biggest group among the 23 Hong Kong members in the Basic Law Drafting Committee. The resultant Basic Law guaranteed business representation in the Legislative Council by allocating half of the seats to "Functional Constituency" - seats allocated to professional interest group with very narrow electoral base. The chief executive of Hong Kong is to be elected by an election committee, of which the composition is weighted in favor of the business committee (Ma, 2007). Similarly, Cheung and Wong (2004) showed that business and professionals made up a large percentage of the major advisory committees in Hong Kong[15]. Most of the business and professional elite in these advisory committees had their seats in the united front[16] organizations appointed by Beijing. Government information showed that about half of the 800 members

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[15] A review by the Legislative Council in 1997 identified more than 300 advisory committees, including statutory advisory boards and committees (65), non- statutory boards and committees (116), non-advisory statutory bodies (73), statutory charitable bodies (4), and statutory bodies dealing with appeals (45)

[16] The united front tactic is a PRC initiative in bringing different individuals and groups together to unite support for the authority.

of the Executive Council in 2000–05 were members or chairmen of advisory committees (Ma, 2007). The heavy business representation in the government binds government's interest with the business interest, and secures support of business to government policies.

3.2 Participation in Mainland Politics

Very few selected Hong Kong residents can participate in mainland politics. The two main government bodies that enable limited involvement are the National People Congress ("NPC") and the Chinese People's Political Consultative Conference (PCC, 中國人民政治協商會議). The NPC is the official legislative body of the PRC government consists of about 3000 delegates. Hong Kong NPC delegates are elected by a pre-selected group of members. There are 36 delegates from Hong Kong for each 5-year term. The PCC is a political advisory body in the PRC government. This organization consists of delegates from a range of political parties and organizations, as well as independent members. Unlike the NPC, the PCC does not have actual legislative power. Nevertheless, it is an important political organization with the stated goal to "brings together people and groups from different sectors in the society to a common struggle against anti-communism threat". In essence, it aims to unite individuals with different objectives to secure the continuing ruling of the Chinese Communist Party. Hong Kong delegates of the PCC have varied backgrounds and come from different sectors in the society: high school principal, lawyers, architects, business owners...etc. To become a PCC members, one needs to be "invited" or "recommended" by "related political groups". Neither the selection process of NPC and PCC is open nor transparent to the public.

3.3 Newspaper Market

The print news market in Hong Kong is vibrant. Despite the ubiquity of the Internet and the growing popularity of online news sites, the traditional paid-for newspapers had remained a major source of information for locals in Hong Kong in the sample period. There are 7 major paid-for newspapers to serve the 7 million population in Hong Kong. Aside from Apple Daily and Oriental Daily, Economic Times, Economic Journal, Ming Pao, Sing Tao and the Sun [17] are newspapers that have a non-trivial fraction of readership but their market share is significantly less than that of Apple Daily and Oriental Daily. While Ming Pao moderately leans toward pro-Democracy, others are known to adopt a more pro-Beijing stance. Turning to the readers, unlike the US, subscription of print copies of the newspapers is not common. Most readers purchase a print copy from local news vendor on the street every day. Table 1 shows that a

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[17] the Sun has ceased publication in April, 2006.

non-trivial fraction of readers read more than one newspapers. For example, about 19% of Apple's readers also read Oriental but it is unclear how many of them purchase both. Based on a survey[18], Apple Daily's credibility as a newspaper was ranked 15 out of the 17 newspapers in 2010 and Oriental Daily ranked 9, which suggests that Apple's popularity is not driven by an objective news stance.

Most paid newspapers sold at a cover price of $7HKD (less than $1 USD) in 2014. The price was first raised from $6HKD to $7HKD in 2013 by Apple, Oriental Daily and the Sun, and the decision was soon followed by other newspapers. This suggests that price is not the distinguishing factor that newspapers use to compete for readership. According to Sing Tao Daily's online rate card [19], the newspaper requires at least one week notice in order to cancel a previously ordered advertisement. This means that an advertiser cannot easily cancel a previously ad reservation in response to the news report published on the day before the advertisement. However, an advertiser can respond to the news report today when trying to decide where to put an ad tomorrow. For ads that require longer planning time (for example, a large real estate project, or grocery ads that take more than a week to plan), it is more difficult for advertiser to respond immediately to news report. A key determinant of advertisers' newspaper choice is ad price set by newspapers. Ad price reflects newspapers' perceived effect of political climate on the advertising demand, among other economic factors. In Hong Kong, ad prices are usually set in the beginning of the year and are committed by the newspapers throughout the year.

4 Illustrative Model

This section considers a simple supply and demand model of newspaper advertising to illustrate the effects of political salience and political connection on firms' ad location decision. The demand side depicts firms' choice between the two newspapers:Apple (A) and Oriental(O). The supply side assumes Bertrand-Nash competition in ad prices between the two newspapers. Firms' choice is affected by their salience to newspapers' political stance and their relation to the PRC government.

The economy is populated by a large number of firms normalized to 1. Firms, indexed by i, can be classified as either Beijing-friendly (B) or neutral(N). Let r denote the fraction of firms that are Beijing-friendly, which includes politically connected firms and mainland firms in the

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[18]http://www.com.cuhk.edu.hk/ccpos/en/research/Credibility_Survey%20Results_2010_ENG.pdf

[19]http://std.stheadline.com/daily/upload/singtao.pdf

empirical section[20]. Each firm puts only one ad on the chosen newspaper. We assume that advertising is always more beneficial than not advertising. Firm i receives a random economic benefit e_{ij} for reaching the readers of newspaper j. The economic benefit includes benefit from reaching the target audience as well as the the size of readership. We assume that economic benefit differs across firms because firms can target different population segment. Thus, the quality of the match between firms' target audience and newspapers readers can vary across firms. Furthermore, daily readership varies and is unknown to both firms and the newspapers, and firms may only care about the expected readership of a certain day in the year.

Firms pay the fixed price p_j for putting an advertisement on newspaper j[21]. This price, as described below, is endogenously determined by market conditions and is committed by the newspapers in the beginning of the period. Beijing-friendly firms benefit from the political and economic status-quo and therefore favor Oriental; we model this preference for Oriental by considering a cost v on Beijing-friendly firms when they advertise on Apple. This cost could be interpreted as a signal needed to demonstrate loyalty to Beijing (Spence, 1973). Signaling loyalty can be understood as business's need to invest in *Guanxi* (good relation with government) to ensure economic benefit such as "access to profit-enhancing information and asset" (Wank, 1996).

Della Vigna et al. (2015) showed that advertising on Berlusconi's TV station increased when Berlusconi came to power, and their interpretation was that firms received a political benefit to advertise on Berlusconi's TV station. By similar logic, the Beijing-friendly firms could potentially enjoy a political benefit by advertising on Oriental and the interpretation of v would be quite different. However, there are two reasons we prefer the "political cost" interpretation in this setting. First, the context in Della Vigna et al (2015) has a single beneficiary: Berlusconi's TV station. In our setting, there are several newspapers that adopt a pro-Beijing stance while Apple Daily is the only newspaper that adopts a strong pro-Democracy stance. As a result, political gains are diversified, while political cost is concentrated in one newspaper. Second, none of the pro-Beijing newspapers is actually owned by government officials in Beijing. In other words, advertising on them do not buy advertisers political favors directly.

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[20]The fraction of connected firms is treated as exogenous in the model. In reality, government needs to decide whether the company is "worthwhile" in connecting. There is a potential trade-off in exchanging economic benefit for the firm with loyalty for the government. A direct implication of endogenizing political connection is that government can easily influence firms' behavior and more effectively apply pressure on the media in an economy where few large firms dominate.

[21]I assume that prices are the same for all firms and that there are no quantity discounts.

As discussed in section 3, firms in Hong Kong - albeit the politically unconnected ones - are generally conservative in their political view. To reflect firms' political conservatism, we assume that firms derive disutility from advertising on Apple Daily, and the level of discontinuity depends on the firms' political salience and newspapers' "political image". Political salience is determined by the news report slant in each newspaper. The "political image" is the newspapers' political stance that is rooted in the public's perception. In other words, firms still have a preference for Oriental Daily even in periods with no political event because Apple is well known for its pro-Democracy stance. Denote the news report slant of newspaper j as θ_j and we assume that the larger the θ the more pro-Democracy the news report slants toward. We represent the "political image" of Apple and Oriental by $\overline{\theta_A}$ and $\overline{\theta_O}$. Since Apple has a pro-Democracy image, $\overline{\theta_A} > \overline{\theta_O}$. Given all of these, the neutral and Beijing-friendly firms' indifference condition between the two newspapers can be described as follows:

$$e_{iA} - p_A - \theta_A - \overline{\theta_A} = e_{iO} - p_O - \theta_O - \overline{\theta_O} \tag{1}$$

$$e_{iA} - p_A - v - \theta_A - \overline{\theta_A} = e_{iO} - p_O - \theta_O - \overline{\theta_O} \tag{2}$$

The first equality implies that even when the news report slant is the same between two newspaper, Oriental will still be more attractive than Apple because of its pro-Beijing image. The second equality implies that it takes a larger economic benefit from advertising on Apple for Beijing-friendly firms to advertise on Apple Daily relative to the neutral firms. In this setup, demand for Oriental will also suffer if their reporting becomes more pro-Democracy. The equalities also imply that the larger the slant gap ($\triangle \theta \equiv \theta_A - \theta_O$), the less attractive is Apple to firms holding other parameters constant. This suggests that while political salience increases with news report's slant, increase in salience alone does not affect newspapers choice if both newspapers slant in the same direction. Increasing contrast in news report slant, however, sway firms away from Apple Daily. That salience increases with contrasts in options has been studied in the literature (Bordalo et al, 2013, 2015; Koszegi and Szedil, 2013).

A remark on the assumption of exogenous newspapers' reporting follows. One might reasonably suspect that the slant of news report is endogenous to expected advertising demand since newspapers can choose to tune up or down the level of slant in their reporting. In particular, given the political environment at the time, a pro-Democracy newspaper might engage in self-censorship and report in milder languages, while the pro-Beijing paper would use more provocative pro-Beijing languages to win ads. While this is entirely plausible, our identification assumption does not require the newspapers to report in ways as if politically-induced

advertising pressure is absent. All that is needed for identification is that newspapers, despite their intent to slant one way or other, to report with more slant in politically turbulent periods that are consistent with their political image to the public. And since the occurrences of these politically polarizing events are exogenous, the slant gap over time is also exogenous. This is a reasonable assumption since newspapers, despite its political ideology, still has to convey informative news of the local happenings to its readers. This means that Oriental Daily cannot always squeeze pro-Beijing sentiment in its news report, and likewise for Apple Daily.

Denote $\triangle e_i \equiv e_{iA} - e_{iO}$. For tractability, we assume $\triangle e$ follows a uniform distribution with support $[-\delta, \delta]$. Given a threshold $\triangle e^*$ of which firms are indifferent between the newspapers, the firm i will place the ad on Apple Daily if $e_{iA} > \triangle e^*$. Below the threshold, the firm will place the an Oriental Daily. Hence the probabilities that the neutral and Beijing-friendly firms will advertise on Oriental are given as

$$S_{NO} \equiv \frac{p_A - p_O + \triangle \theta + \triangle \overline{\theta} + \delta}{2\delta} \tag{3}$$

$$S_{BO} \equiv \frac{p_A - p_O + \nu + \triangle \theta + \triangle \overline{\theta} + \delta}{2\delta} \tag{4}$$

The probabilities that the neutral and Beijing-friendly firms' will advertise on Apple are then simply $S_{NA} \equiv (1 - S_{NO})$ and $S_{BA} \equiv (1 - S_{BO}))$ respectively.

On the supply side, our view is that newspaper advertising space is flexible and can be easily adjusted; there is no capacity constraint such that newspapers can print as many pages as needed[22], and that there is no ad quota to fill so newspapers do not have to fill pages with ads to reach a certain number of pages. I model newspapers price-setting as a simple Bertrand competition where ad prices are set simultaneously by the newspapers and newspapers take into account of the best response strategy of the other paper to maximize expected revenue. We assume that the marginal cost of printing an additional ad is constant and equals to 0. Furthermore, we assume that newspapers have a correct expectation of the political climate over the period. Given these assumptions, Apple and Oriental choose ad price to maximize the following profit functions respectively:

$$\pi_A \equiv p_A \left[r(1 - S_{BO}) + (1 - r)(1 - S_{NO}) \right]$$

$$\pi_O \equiv p_O \left[r(S_{BO}) + (1 - r)(S_{NO}) \right]$$

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[22] In contrary to TV commercials studied in DellaVigna et al (2015), ads spaces on newspapers are much more flexible since editors can simply rearrange news stories to fit however many number of pages needed to fit all advertisements. Note that we have implicitly assumed that readers do not get disutility from ads.

The first order condition with respect to ad price yields the newspapers' best response pricing function. Substituting the pricing function of one newspaper into another yields the closed-form solution for prices. The equilibrium share can be obtained by evaluating equations 3 and 4 at the respective equilibrium ad prices.

$$p_O^* = \delta + \frac{rv + \triangle\theta + \triangle\overline{\theta}}{3}$$

$$p_A^* = \delta - \frac{rv + \triangle\theta + \triangle\overline{\theta}}{3}$$

$$S_O^* = \frac{1}{2} + \frac{rv + \triangle\theta + \triangle\overline{\theta}}{6\delta}$$

$$S_A^* = \frac{1}{2} - \frac{rv + \triangle\theta + \triangle\overline{\theta}}{6\delta}$$

Ad prices are sticky in the short run, and therefore ad share is the main moving variable if other parameters in the model change. Holding ad price constant, the model predicts that an increase in political events occurrences leads to a fall in Apple's ad share. In the medium run, newspapers adjust prices and the model predicts that an expected increase in political events leads to wider price gap. This prediction can be verified in the widening ad price gap in 2013 and 2014. In the empirical section, we will formally test the following predictions:

1. Apple's ad share falls relative to Oriental Daily in politically polarizing periods.

2. Ad price gap increases in politically polarizing periods.

3. Beijing-friendly firms are less likely to advertise on Apple Daily relative to Oriental Daily in all periods.

4. All firms are less likely to advertise on Apple in politically polarizing periods.

This framework can be readily expanded to incorporate endogenous readers' newspaper choice. Readers can become more salient of the newspapers' political stance in turbulent times also. If the underlying population purchases more copies of Apple Daily[23] in turbulent times, the economic benefit of firms advertising on Apple Daily will rise. Our reduced-form estimates will then underestimate the political cost of political salience imposed on all firms. It is also possible that there is increased sorting of readers in turbulent times. Firms may be able to better match readers with its consumers better as a result. We discuss this possible mechanism in section 7 and find no empirical evidence of sorting. We consider this possibility in the appendix.

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[23] Readers tend to buy newspapers when big news happened (Gentzkow et al 2007)). Given that Apple is the only strong pro-Democracy paper, the economic benefit of Apple relative to Oriental should rise in turbulent times.

5 Data

5.1 Advertising

I use a dataset that includes all the ads that have appeared on the newspapers between 2010 and 2014. The dataset is available from a Hong Kong-based private company, Wisers. We exclude tender, announcement, evens promotion and obituary. All ads that were posted or partly sponsored by the newspaper themselves are also discarded. The information for each ad includes the ad headline, date of the ad, the newspaper that the ad appeared, the industry(s) that the ad product(s) belongs to, the company(s) of the product(s), and the section of newspaper that the ad appears.

By matching the company name, I merge the ads database with a company information dataset that I constructed. In the company dataset, I classify a company as "Local", "Foreign" or "Mainland" based on the company's location of headquarter [24]. I also classify an organization as "listed on Hong Kong Stock Exchange", "for-profit", "not-for-profit" organizations or government agencies based on other publicly available information. Finally, I look up the mother company of the advertiser if (For example, the fast food chain KFC belongs to the YUM group) they are missing from the Wisers ad dataset [25]. There are 17 possible industries assignment [26], which are provided by Wisers. Ads can have multiple company and industry assignments because more than one company could appear on an ad and each ad product can be classified into multiple industries.

We identify an unique ad by the headline and the date of which the ad appeared. An ad with the same headline could appear on the newspapers on multiple days, but they are considered as different ads in our dataset. Since we do not observe the actual imagery, an ad with the same headline and appeared on two newspapers on the same date but with different size would still be considered as an unique ad appearing on two newspapers. We consider an unique ad assignment as a combination of an unique ad and the company associated with the ad. For example, in a cell phone ad for which both the cell phone carrier company and the manufacturer company are present, the ad will then have two unique ad assignments.

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[24] I manually look up the headquarter location from the companies' website. Companies from Taiwan are classified as "Foreign" whereas Companies from Macau are classified as "Mainland"

[25] In most cases, Wisers lists the owner of the brand and I cross check to make sure the mother company is correct

[26] Automobile, Baby products, Banking, Beauty, Computers, Education, Electronic Appliances, Fashion and Accessories, Food & Beverages, Insurance, Pharmaceutical, Real Estate /property, Restaurants, Retail, Sports, Telecommunication, Travel (airline, hotel).

In summary, there are 116887 unique ads, 13868 unique firms, and 206425 unique ad assignments that appeared on either Apple, Oriental or both. On average, there are 1.77 companies, and 1.23 industries assignment per advertisement. 33209 ads had a HKSE(Hong Kong Stock Exchange)-Listed advertiser assignment. 41055 ads have at least one or more foreign advertisers, but only 4581 ads have at least one or more mainland advertisers. 970 ads are related to the government, and 4636 have at least one or more not-for-profit organizations. Over our sample period, there are 27302, 25926, 22451, 22548 and 18660 ads in each year between 2010-14. Finally, only 4897 unique ads and 9069 ad-company assignments appear on both Apple and Oriental.

5.2 Politically Connected Advertisers

We classify a firm listed on the stock exchange as "connected" to Beijing if at least one of the firm's owner or major shareholders or board members appears on the list of connected individuals. The approach follows the like of Faccio (2006) and Accemoglu et al (2014). We can identify the board members through a list of all board of directors from the Hong Kong Exchange and Clearing Limited (`http://www.hkexnews.hk/reports/dirsearch/dirlist/directorlist_c.htm`). The list of connected individuals consists of all Hong Kong representatives of the NPC and PCC from the 9th to 12th session. The tenure for each member in each session is 5 years, and the 9th congress was in session from 1998 to 2003. Hence, our members list only include members selected after the 1997 turnover. In total, we have 73 non-repeated NPC members. There are 264 non-repeating PCC members. Since there are overlapping members between NPC and PCC, the combined list results in 331 unique individual. The list excludes representatives of other provinces who are Hong Kong residents[27].

For advertisers that are not listed on the stock exchange or are not-for-profit organizations, I cannot formally identify their ownership information. Instead, I gathered the profile of the list of connected individuals from the official website of the respective organizations (NPC and PCC)[28]. The profiles list the occupation and other outside positions of each member. This information is not complete since many individuals have multiple affiliations but the online

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[27]There is no rule that restricts the PCC representatives of a province to be residents of that province. For example, Lawrence Ma(馬恩國) is the representative of Shanxi province in PCC, and Karson Choi (蔡加讚) is the representative of Guangxi province. Both are Hong Kong residents. Most of the representatives of Hong Kong are Hong Kong residents, however.

[28] We retrieve the profile of all connected individuals using a python script to scrape their profile on the official websites of the NPC and PCC. The websites are :

profiles usually only include the primary affiliation. I use this supplementary information to determine whether the respective company/organization is connected or not. Government organizations and educational institutes are discarded. I then check whether the businesses and organizations associated with the profiles appear in the ads dataset [29].

In summary, there are 20370 unique ads that have at least one or more connected advertiser. Table 5 shows the total number of all and connected ad assignments by industry. The "Banking" industry has the most ad assignments at over 35,000, followed by the "Travel", "Retail" and "Restaurants" industries. The percentage of connected ad assignments within each industry varies. The "Telecommunications" industry has the highest percentage of connected ad assignment at about 32%, followed by the "Banking", "Insurance" and "Real Estate" industries. There are many business conglomerate in Hong Kong, and they have a strong presence in almost all of the industries. For example, New World Mobility (telecommunication) and New World Development (real estate) belong to the New World Group and therefore both are classified as politically connected. Similarly, the Cheung Kong Group (owner: Li Ka-Shing) owns Hutchison (telecommunications) and Watsons (A large retail chain in Hong Kong). These companies are all major players in their respective industries. The presence of these business conglomerate means that despite the relatively few number of connected individuals, these connection can have a large effect to newspapers' advertising revenue.

Figure 6 shows the percentage of connected ads assignments by firm characteristics. Foreign companies are responsible for over 50,000 ad assignments (an ad can have more than one foreign company) as opposed to less than 10,000 ad assignments from mainland companies. Less than 10% of the foreign ad assignments are considered as connected. In contrast, the percentage of ad assignment considered as "connected" is over 60% among HKSE-listed ad assignments, which accounts for over 40,000 ad assignments.

Figure 7 plots the percentage of connected ad assignment in each quarter of the sample period by newspaper. In all but one quarter, the percentage of connected to total number of ad assignment is higher at Oriental. The gap appears to be bigger in the first half of our sample

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http://www.npc.gov.cn/npc/gadbzl/xgdbzl_11/node_8514.htm

http://www.cppcc.gov.cn/CMS/icms/project1/cppcc/wylibary/wjWeiYuanList.jsp

[29]Only the main occupation of the members are listed, and many individuals are board members for multiple companies.

period. Furthermore, there appears to be no trend in the average percentage of connected ads over time. Figure 8 plots the percentage of mainland ad assignment by newspaper for each quarter in our sample period. The percentage of mainland ad assignments to total ad assignment at each newspaper is higher at Oriental in all quarters. The gap also appears to diverge in 2014.

5.3 Readers' Demography

Firms might select a newspapers based on the newspapers reader demography. I use the 2014 AC Nielsen's media index to compare the readers demographics between the two newspapers. AC Nielsen surveyed over 6000 individuals of the Hong Kong general population aged 12-64. The samples are weighted to the known population of Hong Kong based on government statistics, making the sample representative to the 7 million residents in Hong Kong. Table 4 shows the basic demographics of the newspapers readers. The average reader of Oriental Daily is slightly older than that of Apple Daily while the average household income is very similar between the two newspapers. Both newspapers have slightly more than 1/3 of their readers living in government housing[30]. Readers of Apple Daily is more educated with the percentage of readers who have completed university or above 5% higher than Oriental readers. While differences in readers' demography between the newspaper exist, it would be difficult for firms do readership profiling to isolate a certain population segment by just choosing one newspaper over another.

It is possible that the demographic composition changed over time. However, a limitation of the readership dataset is that the date of the interviews are not recorded and therefore, we cannot estimate if and how readership is affected during politically-polarized dates. In addition, we are unable to tell whether readers' demographics change in the sample period since our demographic information is for 2014 only.

6 Measuring Slant Gap

I follow the methodology of Gentzkow and Shapiro (2010) to quantify slant gap between Apple and Oriental in each period. The main idea is to compare the relative frequencies of the "diagnostic" phrases used in the front-page news article with the hard-line pro-Beijing and pro-Democracy rhetoric. These "diagnostic" phrases are politically-charged language that are

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[30]Government housing residents are in general poorer compared to the average population.

indicative of the political stance of the user. For example, one would expect hard-line pro-Beijing rhetoric to use words such as "stability" more heavily and hard-line pro-Democracy rhetoric to use words such as "freedom" and "justice" more often.

I have access to the archives of major newspapers in Hong Kong through Wisers, a private company based in Hong Kong. I use all front-page articles between 2010 and 2014 that appeared on Apple and Oriental. As another input to the slant measure, I use the official commentary of the Wen Wui daily as the reference hard-line Pro-Beijing rhetoric. Wen Wui Daily is a state-owned newspaper. It is controlled by the Liaison Office of the Central Government, and is widely regarded as the mouthpiece of the Communist party. The official commentary was published daily (sometimes multiple commentary are posted in a day) and is publicly available on their website. I wrote a Python script to scrape all commentaries from the newspaper's official website.

I use a column written by 7 famous pro-Democracy politicians/lawyers as the reference of the hard-line pro-Democracy rhetoric, which is also available from Wisers. The name of the column is "Law and Politics" and appeared on Ming Pao daily. The contributors include Margaret Ng, Audrey Eu, Ronny Tong, Alan Leong, Gladys Li, Johannes Chan, Martin Lee, Albert Ho and Benny Tai. Many of them are lawyers and belong to a pro-Democracy party, the Civic Party. This column appears in Ming Pao every day since the end of 2003. In principle, each contributor takes turn to submit an article to the column but some of the authors dropped out and others joined. Benny Tai - the initial advocate of "Occupy Central" movement, which later became the umbrella movement, has contributed to the column since 2011. I excluded all articles written in English.

The processing of Chinese language using text mining technique differs from that of English only slightly. The first step involves removing all numbers, punctuation, and English words from the article. Because the Chinese language does not have white spaces like English, we have to apply an extra procedure to parse the sentences into meaningful phrases(We call bi-gram, tri-gram and quad-gram as phrases made up of 2, 3 and 4 Chinese characters respectively.). This is done by implementing an existing package (rwordseg) in R. We need to supplement the package with a list of words that are specific to Hong Kong because local dialogues or newly created phrases in the news report would not exist in the dictionaries provided in the R package. I went through two procedures to create a list of new words. The first procedure is

manual. I eyeballed all the phrases decomposed by the computer script and manually check whether some phrases should be joined together. For example, many names of the officials were not recognized by the script. so I manually added them to the dictionary. Second, I wrote a program to concatenate one-word phrase into two- or three- word phrases, and rank them by the frequency they appear. We then manually check whether these high-frequency terms represent actual phrases. The high-frequency terms would then be added to the dictionary.

6.1 Selecting Phrases

We focus our attention on the phrases that are most likely to contain ideological valence. To select these phrases, we first let f_{plw} and f_{pll} denote the total number of times phrase p of length l (two, three or four words) is used by Wenwui and LawPolitics(LP), respectively. Let f_{-plw} and f_{-pll} denote the total occurrences of length-l phrases that are not phrase p used by Wenwui and LP, respectively. We compute the Pearson's χ^2 statistic for each phrase (of any length):

$$\chi^2 = \frac{(f_{plw}f_{-pll} - f_{pll}f_{-plw})^2}{(f_{pll} + f_{plw})(f_{pll} + f_{-pll})(f_{plw} + f_{-plw})(f_{-pll} + f_{-plw})} \tag{5}$$

Pearson's χ^2 statistic is a test statistic for the null hypothesis that a phrase is equally likely to appear in the pro-Beijing and pro-Democracy reference. A high Pearson's χ^2 suggests that the phrase is unlikely to be used by both the pro-Beijing and pro-Democracy reference, and would imply high partisanship.

For each period, I rank the phrases by their Pearson's χ^2 and identify 80 phrases (of any combinations of bi-gram, tri-gram and quad-grams[31]) with the highest χ^2 . Table 5 shows the phrases that are more heavily used by Wenwui's commentary and table 6 shows the phrases that are more heavily used by Pro-Democracy commentary in each quarter. The procedure identifies many phrases that confirms the intuition that many of the phrases are chosen strategically for their partisan impact. For example, the economy and foreign relations are emphasized more in the Wenwui commentaries. In 2011, phrases such as "Development", "Economy", "Financial Crisis", and "United States" are among the most pro-Beijing phrases. "Ai Weiwei" (A famous Chinese dissident), "Election", "Democracy" and "Freedom of Press" are among the most pro-Democracy phrases. The emphasis changes over time. In quarter 4 of 2014, Wenwui stressed that the "Occupy Central" movement was unlawful by using phrases such as "Law-Violating Central Occupation" and focusing more on bringing law and order back, as implied by phrases

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[31]Gentzkow and Shapiro (2010) use equal number of bi-grams, trigrams and quad-grams. We deviate from their treatment because this gives us higher predictive power. Specifically, some quad-grams might be more informative than bi-grams in some periods or others. Using only the top 80 chi-square phrases help us capture that.

such as the "police" and "Basic Law". In contrary, the pro-Democracy language includes phrases such as "Civil disobedience" to justify the occupation and emphasize the government's wrong-doing. In the appendix I show the distribution of the number of pro-Beijing and pro-Democracy phrases over the sample period[32].

6.2 Mapping Phrases to Slant

The list of 80 phrases gives us a basis to evaluate the partisanship of the news report in each period. In order to generate a slant measure, we compare the frequencies of these phrases in the reference languages with that in the news report. Specifically, for each quarter index the phrases by $p \in \{1...80\}$ (Ignore phrase length, year for notational convenience.). Let f_{pn} denote the frequency of phrase p on newspaper n. Let $\tilde{f}_{pw} \equiv f_{pw}/\sum_{p=1}^{80} f_{pw}$ denote the relative frequency of phrase p in the Wenwui commentaries in each period. $\tilde{f}_{pl}$, the relative frequency of phrase p, is defined similarly for phrases in the LawPolitics commentaries. We estimate slant in each period for each of the newspapers as follows:

i For each phrase p, we calculate the difference in relative frequencies between LawPolitics and Wenwui: $\Delta \tilde{f}_p \equiv \tilde{f}_{lp} - \tilde{f}_{ww}$.

ii I regress the relative frequencies of the selected phrases in newspaper n on $\Delta \tilde{f}_p$. The slope estimates, which is our slant index, gives:

$$\theta_n = \frac{\sum_{p=1}^{80} \Delta \tilde{f}_p f_{pn}}{\sum_{p=1}^{80} \Delta \tilde{f}_p^{\,2}} \tag{6}$$

This approach is a modified version of Gentzkow and Shapiro (2010)[33]. First, taking the Law-Politics and Wenwui commentaries as the benchmark language, the larger the difference of the relative frequencies Δf of a phrase, the more pro-Democracy it implies. Another way of seeing this is that from equation 6, $\Delta \tilde{f}_p$ does not contribute much to the slant index if it is small. Second, we infer the slant of the news report by asking whether a given newspaper tends to use phrases favored by more Pro-Democracy commentaries. If the phrase is used heavily and has a large $\Delta \tilde{f}_p$, it would contribute to an increase in θ_n.

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[32]There is consistently more pro-Democracy phrases than pro-Beijing phrases. The reason is that the length of the pro-Democracy reference is shorter than that of the pro-Beijing reference, which means that the chi-square of a particular pro-Being phrase will always be lower.

[33]Gentzkow and Shapiro (2010) use speech by all congressmen as references and therefore need to account separately their individual ideological leaning. We have a single reference for each end of the ideology spectrum and therefore, do no have to implement that step.

The word choices of the reference languages changed over time. Certain words were ideologically relevant in some periods but not others. One might also reasonably suspect that the diagnostic phrases became more polarized in politically sensitive periods. We cannot compare the slant of the newspapers across periods directly: our measure does not tell us whether the newspapers harden or soften their political stance over time. Nevertheless, we can still compare how slant gap evolved over the time period. The slant gap is calculated by subtracting the slant of Oriental Daily from the slant of Apple Daily. In politically sensitive periods, newspapers use phrases that are more diagnostic of their political stance. The word choice would then be closer to the respective benchmark, and further away from each other's reporting stance. In the appendix, we consider a measure of polarization of the benchmark language over time.

The evolution of the slant gap between the two newspapers is presented in figure 9. A large difference indicates that the two newspapers is more polarized in their news report slant. In all but one period, the gap is positive, which suggests that Apple Daily is more pro-Democracy than Oriental Daily in general. The periods with large slant gap correspond to periods that intuition would suggest to be politically polarizing. For example, the slant gap increases sharply in 2012 quarter 3, which corresponds to the National and Moral Education controversy. First and second quarter of 2014 also register high slant difference. Quarter 4 of 2014, during which the Umbrella Movement took place, has the highest slant difference in the sample period.

7 Empirical Evidence

The model predicts that Apple's ad share falls in politically turbulent periods. To test this, we regress Apple's ad share relative to Oriental in quarter q of year t on slant gap only. Without any controls, the resulting coefficient on slant gap is statistically significant at 5% level. Adding linear time trend renders the coefficient statistically insignificant but this is expected given the short time series. As shown in figure 7, the percent of connected to total ad assignments is relatively flat throughout the sample period, so it cannot explain the time variation of Apple's ad share. To visualize the result, we show Apple Daily's and Sing Tao's ad share relative to that of Oriental Daily over the sample period. Sing Tao is also known to adopt a pro-Beijing political stance[34] but has a much a smaller readership. By comparing and contrasting Apple and Sing Tao relative to Oriental, we can shed light on the importance of newspapers' political stance on advertising revenue.

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[34]Sing Tao is commonly perceived as having a more pro-Beijing stance than Oriental.

Figure 1 plots the ad share of Apple and Sing Tao relative to the sum of ads on all 3 newspapers (Apple, Oriental and Sing Tao). Figure 2 plots the ad share relative to the sum of ads on either Apple or Sing Tao and Oriental only. The dotted straight line is a fitted line over this period. Figure 1 shows that Apple's ad share fell from about 39% in 2010 quarter 1 to about 33% in 2014 quarter 4 while Sing Tao's ad share stayed flat or increased slightly in the same time period. Likewise, figure 2 shows that Apple's ad share fell from around 50% to 42% while Sing Tao remains at around 33% relative to Oriental. In particular, Apple's ad share declined consistently thoroughly 2014 when the political climate was most polarized.

The next model prediction suggests that ad price between apple and oriental diverges in more polarizing times. The first two columns of table 3 show the ad price of the full-color page in the run-of-paper[35] in the sample period. In 2010, Oriental charged 23% higher than Apple Daily. The price gap shrink to 6% in 2012 but diverged again to 37% in 2014. Despite the increase in price gap in 2014, Apple's relative advertising volume still shrunk considerably. This provides indirect evidence that the expected advertising demand for Apple relative to Oriental fell significantly in 2014.

Decline in Apple's readership could potentially explain Apple's falling ad share. To investigate this channel, I turn to the estimated readership in Apple Daily's annual investor report. Their estimates came from AC Nielsen[36]. Unfortunately, Apple only reports the combined readership of print and online readers but not separately. The numbers are presented in columns 3 and 4 of table 3. In 2010, the total readership was quite close between the two newspapers, but readership of Oriental Daily gradually shrunk from that point on. In contrary, the readership has remained relatively flat for Apple at around 1,500,000 total readers. We have information on print and online readers composition in 2014 only. We noted that in 2014, Apple's readers are much more likely to be online readers: the fraction of total readers who are online readers in Apple and Oriental are 41% and 11% respectively. Hence, it is still possible to conclude that the print version of Apple Daily had become less attractive relative to print version of Oriental

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[35]Newspapers charge different prices for ads at different positions, size and color scheme. We do not observe the actual price charged for each ad.

[36]Oriental Daily reports a different readership estimate from a different market research estimate in their annual investor report. They claim that they have about 4 million readers, while population in Hong Kong is about 7 millions. The number seems dubious and we choose to use the estimate of Apple Daily instead. Another reason we use Apple's estimate is because we have access to AC Nielsen's Media Index 2014 report also, and have verified their 2014 number. Finally, Oriental only reported the estimated readership for their own, but not the other newspapers.

Daily if we assume that Apple's online readership grew very fast in the period[37].

Next, we test the third model prediction that Beijing-friendly advertisers are less likely to advertise on Apple by running a multinomial logistic regression with three choice categories: Apple (A), Oriental (O), and Both Apple and Oriental (AO). Beijing-friendly firms include politically-connected, or mainland firms. We estimate the following model:

$$P(y_{itq} = b) = \beta_0 + \beta_1 c_i + \beta_2 X_i + \delta_{tq} + v_{ib}, \qquad b = \{A, AO, O\} \tag{7}$$

where y_{itq} is the newspaper choice of advertiser i in year t of quarter q. $c_i = 1$ if firm i is classified as Beijing-friendly, X_i is a vector of firm-specific characteristics including the origin (Local, Foreign, Mainland), the industry fixed effects, and whether the firm is a government or not-for-profit organization. Industry fixed effects control for industry-specific tendency to place ads on a certain newspaper. For example, the youth apparel industry might find a pro-democracy paper more attractive because presumably young people are more likely to adopt a pro-democracy stance. $\delta_q t$ are time controls that include dummy for quarters of the year, and linear time trend.

The result is presented in table 7 and is interpreted relative to choosing Oriental alone. The top panel shows the estimation result when only Apple was chosen by the advertiser. The bottom panel shows the estimation result when both Apple and Oriental were chosen. In the first three columns I use the full sample of ad assignments, and in columns 4-6 I only include ads that have at least one HKSE-listed firms[38]. The HKSE-listed firms are larger in size, and many have business exposure to mainland China. In columns 1 and 4, I include industry fixed effects only. In columns 2 and 5, I include both industry fixed effects and time controls. In columns 3 and 6, I also include quarter-specific industry fixed effects.

The coefficient on "Connect" in the top panel is negative and significant at the 1% level for the all 6 specifications. Adding time controls and industry fixed effect controls in each set of sample does not significantly alter the magnitude of the coefficient. The magnitude of the coefficient of "Connect" in the HKSE-listed firm sample is about half of that in the full sample, suggesting that the avoidance from advertising on Apple is weaker among the HKSE-listed

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[37] Assume that both newspapers start with 0% of online readers in 2010, and the readership rises linearly to 41% and 11% for Oriental. Apple's readership in each year would be: 1566, 1409, 1257, 948, 994. Likewise, Oriental's readership would be 1457, 1361,1285, 1101, 1030. The gap in readership (Apple- Oriental) would be 109, ,48, -28, -153, -36 in each year. The readership time trend has little correlation with the slant difference in this period.

[38] We do not include control on government, and not-for-profit in columns 3 and 4.

firms. On the other hand, listed foreign (mainland) companies are more (less) likely to advertise on Apple than non-listed foreign (mainland) companies. To determine the effect of being connected in the probability scale, we calculate the marginal effects at the median, as shown in parenthesis in the same table. Using the first specification, our result suggests that connected companies are 6.6% and mainland Chinese companies are 18.7% less likely while foreign companies are 2.7% more likely to advertise on Apple alone. This indicates that the aversion to Apple Daily is stronger among mainland companies than connected companies, while foreign companies are more fond of the newspaper. It is possible that foreign companies are not as aware or care about the differences in political stances of the newspapers and simply prefer the newspaper with better cost-effectiveness. Of course, it is also possible that foreign companies prefer newspapers with a pro-Democracy stance. The coefficients are rather stable and robust to different sets of controls for all variables. This is broadly consistent with the model prediction that Beijing-friendly companies are less likely to advertise in a pro-Democracy newspaper. In the appendix table, we also show that Hong Kong government ads do not seem to have a strong preference for Oriental over Apple Daily, as opposed to political ads which seem to exhibit perfect sorting between the two newspapers.

Turning to the bottom panel, the coefficient on "Connect" are negative and significant at the 1% level using the full sample, but are insignificant in the HKSE-listed sample. The coefficient on "Foreign" are positive and significant at 5% but are insignificant in the HKSE-listed sample. The coefficient on "Mainland" is negative and significant at 1% level in all specifications. Putting them together, the result suggests that it is unlikely for connected or mainland companies to advertise on both Oriental and Apple while the opposite holds for foreign companies. The magnitude for all three variables is considerably smaller than that in the top panel. This suggests that firms' characteristics have smaller explanatory power on their decision to advertise in Oriental Daily conditional on them advertising in Apple Daily.

The model only yields prediction on firms' choice of newspapers, but not on ad characteristics. In practice, a firm can choose different ad specifications on different newspapers. For example, it can place a large color ad on newspaper A and a small black/white ad on newspaper B. Hence a firm can discriminate newspaper B through the ad specifications it chooses. Our data does not have information on on the ad characteristics so our result only captures the extensive margin of firm's choice. This concern of intensive margin is more relevant to firms that choose to advertise on both newspapers. If firms only advertise on Apple, even if we

observe the ad characteristics, we would not observe their choice ad characteristics and make relevant comparison. Given that only small amount of ads that appear on both newspapers, we believe that the extensive margin is the more important margin in our context.

Could it be that Apple rejected ads from companies that it dislikes? Many politically-connected, as well as the mainland advertisers are large corporations that have business in multiple sectors and their ads are politically neutral. For Apple Daily to turn away the advertisements from companies that are politically connected, it would mean to turn away otherwise "regular ads" such as ads from grocery stores, cell phone carrier...etc. This translates to a large portion of advertising revenue, which is difficult for Apple to justify as a listed company on the stock exchange.

Next, we test the last model prediction that firms are less likely to advertise on Apple Daily in politically sensitive periods. We consider the following multinomiral logit model:

$$P(y_{itq} = b) = \beta_0 + \beta_1 c_i + \beta_2 \triangle \theta_{tq} + \beta_3 c_i \cdot \triangle \theta_{tq} + \beta_4 X_i + \delta_{tq} + v_{ib}, \qquad b = \{A, AO, O\} \qquad (8)$$

where $\triangle \theta_{tq}$ denotes the slant gap in quarter q of year t, $c_i \cdot \triangle \theta_{tq}$ denotes the interaction between connect/mainland dummy and slant gap. β_2 is expected to be negative: the larger the slant gap, the less likely a firm would advertise on Apple. β_3 measures the possible differential impact of newspapers' slant difference on Beijing-friendly firms[39].

The top panel of table 8 shows the estimation result of equation 8 for which only Apple was chosen, and the bottom panel for which both Apple and Oriental were chosen. In the top panel, the coefficient on θ_{tq} is negative and significant at 1% level for all 3 specifications using the full sample, but the magnitude falls as the specification becomes more stringent. Using the HKSE-listed sample, the significance of coefficient falls to 5% significance as shown in column (4) and (5). However, the magnitude of the effect is stronger compared to that in the full sample. The interaction terms are generally insignificant except for listed-mainland firms. Using the specification in column (1), the coefficient says that one unit increase in slant gap decreases firms' probability of advertising in Apple Daily by 4.2%. To put the number in perspective, the average slant gap in 2014 is 0.45435, which means that firms are 1.9% less likely to advertise in Apple because of the divergence of slant in 2014. This provides evidence that listed mainland firms react more strongly in turbulent times but not the connected firms.

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[39]Our model does not suggest a larger effect on Beijing-friendly firms during turbulent times

Turning to the bottom panel of table 8, the coefficient on $\triangle\theta_{tq}$ is insignificant in the full sample but is negative and 1% significant in the HKSE-listed sample, as shown in column (4)-(6). This echoes with the earlier result that the magnitude of slant gap's effect is stronger among listed companies. The result also indicates that slant gap has strong power in explaining HKSE-listed companies' choice between advertising on both and advertising on Oriental only. This makes sense because HKSE-companies are more profitable than neutral companies in general and can afford to advertise on both newspapers. Overall, the results are broadly consistent with the mechanism that firms avoided advertising on Apple in politically volatile periods.

7.1 Persistence of Slant Gap's Effect

Our time series unit is set to quarter. This means that the observed advertising decision on a given date could happen before a major political event occur, contradicting what our mechanism suggested. In addition, slanted newspaper reporting in volatile periods can have a lasting impact on firms' decision. To addresses these two issues, we investigate whether lagged slant gap could affect firms' newspaper choice in the next period. First we note that the autocorrelation of the slant gap time series is relatively low at 0.13 with a 95% confidence interval between -0.31 and 0.57. This suggests that contemporaneous slant gap is not predictive of lagged slant gap.

We consider two regression specifications. In the first specification, we replace slant gap, and all the interaction terms containing slant gap with the lagged slant gap by one quarter in equation 8. The rationale is that since advertisers could not foresee the occurrences of political events, they could respond only after they observed newspapers slant in the last quarter. This is especially relevant to ads placed in the beginning of the quarter because firms' newspaper choice are presumably driven by reporting in the last quarter. In the second specification, we include both the contemporary and lagged slant gap in the multinomial regression to control for responses :

$$P(y_{itq} = b) = \beta_0 + \beta_1 c_i + \beta_2 \triangle\theta_{tq} + \beta_3 \triangle\theta_{tq-1} + \beta_4 c_i \cdot \triangle\theta_{tq} + \beta_5 c_i \cdot \triangle\theta_{tq-1} + \beta_4 X_i + \delta_{tq} + v_{ib}, \qquad b = \{A, AO, O\} \tag{9}$$

The results are presented in table 9. We used the full sample for both specifications. Focusing on the top panel of which the sample include ads appearing on Apple only, column (1) to (3) present results for which only lagged slant gap and the respective interaction terms are included. In all three columns, lagged slant gap has a negative and significant effect. Comparing

these coefficients with the coefficients on $\triangle\theta_{tq}$ in table 8, the magnitude of the effect appears to be stronger when $\triangle\theta_{tq-1}$ is the independent variable. This provides suggestive evidence that advertisers responded more strongly to slant gap in the previous period by shunning Apple.

Column (4) to (6) in table 9 show the results when both contemporaneous and lagged slant gap are included In all three specifications, both contemporaneous and lagged slant gap are negative and highly significant. Comparing the results with the first 3 columns in table 8, it appears that including lagged slant gap only mildly depresses the effect of contemporaneous slant gap on newspaper choice in the top panel. The result suggests that newspaper's slant had lingering impact on firms' choice of location. We did not extend our analysis to consider longer lags because of a short time series, but occurrence of larger and more intense political events is likely to have a longer effect than smaller ones.

7.2   Real Estate Industry

Jimmy Lai's comment in the interview suggested that the the real estate industry has actively avoided advertising in Apple Daily. If this is true, the real estate industry should exhibit higher tendency to avoid Apple relative to other industries even after controlling for political connection and slant gap. To investigate, we first examine the industries fixed effects and their interaction with firm's political connectivity and slant gap on likelihood of advertising on Apple from regression 8.

Figure 10 plots the confidence interval of the industry fixed effects for ads appearing on Apple only and figure 10 for ads appearing on both newspapers, using the real estate industry as the base category. For ads appearing on Apple only, all but the Food Beverage industry have a positive fixed effect. This suggests that most industries are more willing to advertise on Apple relative to the real estate industry. The effect is statistically significant at 95% level for all industries except the Travel and Retail industry. In particular, the automobile industry is 75.4% more likely to advertise on Apple alone than the real estate industry. The positive industry fixed effects disappear for most industries when we consider ads appearing on both newspapers, as shown in figure 11. This suggests that the real estate industry's preference for Oriental alone is not as strong when comparing with advertising in both Apple and Oriental.

We also examine whether industries exhibited differential response to slant gap. Figure 12 plots the interaction term of each industry and slant gap, again using the real estate industry

interaction as the base category for cases of which only Apple is chosen. The larger confidence intervals show that the interaction is less precisely measured compared to the industry fixed effects. Many industries have confidence intervals including 0, which suggests that industries did not react differentially to slant gap shocks. For cases of which both Apple and Oriental are chosen, the respective interaction terms in many industries are also insignificant from zero as shown in figure 13.

The industry fixed effect estimates do not allow us to tear out the effect of political consideration from economic motives. Preferences for advertising on Oriental alone by the real estate industry can be potentially driven by perceived better match between potential customers and Oriental readers. In other words, there might be unobservable newspapers readers characteristics that explain firms' decision. To partially address this issue, we focus on the connected companies and investigate whether connected companies in the real estate industry has stronger aversion from Apple Daily.

Figure 14 and 15 plot the interaction between firms' political connectivity with the industries fixed effect for ads that appeared on Apple only and ads that appeared on both, relative to Oriental only. The controls include all regressors in equation 8. The interaction term captures the differential likelihood of connected companies to advertise on Apple in different industries. For both figures, the base category is the interaction term between the real estate industry and firm's political connectivity. The estimates are positive and significant at 95% confidence interval for all industries interaction in figure 14. This suggests that connected companies in the real estate industry are much less likely to advertise on Apple alone comparing to connected companies in other industries even after controlling for industry fixed effects. In particular, the magnitude is largest for the education industry: connected companies in the education industry is 93% more likely than connected companies in the real estate industry to advertise on Apple alone. Figure 15 paints a similar picture with all industries have a positive estimate, but the effect is less precisely estimated as evident by the wider confidence intervals.

7.3 Alternative Measure of Political Climate

Our premise is that the slant gap reflects concurrent political climate. While we have shown in figure 9 that periods with a large slant gap is associated with periods with high-profile political events, to further illustrate that firms are wary of the political environment, we consider another proxy for political salience: number of protesters. Protest is a clear political expression: the

more the protesters, the stronger the pressure it exerts on the government. Number of protesters thus conveys a sense of political volatility [40], but it can lag slant gap as individuals could become more aggrieved and decided to protest after being exposed to slanted news reports.

A number of protests had erupted in our sample period. While the specific demand of each protest was different, all but one of the protests could be classified as anti-government. We count the total number of protesters (estimated by the public opinion program of Hong Kong University [41]) for all protests in each quarter. Table 10 lists all of the street protests and the number of protesters in our sample period. The Pearson correlation between number of protesters and slant gap is 0.419 with a two-tailed p-value of 0.066. This suggests a moderately positive correlation between the two measures of political climate.

We estimate the multinomial logistic regression 8 again but replace slant gap with the number of protesters on street. Table 11 presents the result on the Protesters variable only. As before, columns (1)-(3) use the full sample whereas columns (4)-(6) use ad assignments from HKSE-listed companies only. In both samples, the coefficient on the number of protesters in the top panel is negative and statistically significant at the 1% level in the specification with least number of controls but the power declines rapidly with an increasing set of control. The same pattern can be observed in the full sample in the bottom panel. In the bottom panel, the listed sample is statistically significant at 1% level across all 3 specifications. The result indicates that number of protesters has strong statistical power in explaining HKSE-listed companies' choice between advertising on both newspapers and advertising on Oriental only.

Since the observation on the number of protesters and slant gap is limited to 20 quarters, our result inevitably suffers from a lack of power. Nevertheless, both measure - slant gap and number of protesters - produce results consistent with our hypothesis that Apple is systematically discriminated when politics becomes a focal point in daily life.

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[40]Acemoglu et al (2014) used a similar approach in estimating the effect of protests in Arab Springs on Egyptian stocks

[41]The website: https://www.hkupop.hku.hk/english/features/rallies/summary.html. The website provides an estimated range of the number of protesters for each protest, and we use the middle of the range.

8 Mechanisms

Although the empirical evidence presented above is consistent with a theory in which 1). firms' political salience increase in politically-volatile periods and 2). firms close to the government suffer a cost from advertising in Apple, other explanations may be suggested. First, one might suspect that direct political pressure from the mainland government could intensify during volatile times as motivated by anecdote. In other words, the mainland Chinese government could directly persuade companies to boycott Apple Daily behind the scene. While we cannot dispel the hypothesis completely, given the large advertisers pool, it is quite unlikely that the government can apply direct pressure on each and every individual firm. To start with, one would expect direct pressure to be applied to politically-connected companies only. However, our result indicates that neutral firms also respond to slant gap, suggesting that firms refrain from Apple in self-motivated manner.

The second plausible mechanism is that firms have an economic interest in advertising to readers with a certain political stance only. To a certain extent, wealthier individuals tend to be more politically conservative (Powdthavee and Oswald, 2014) so readers' political ideology could be a strong predictor of their purchasing power. To test this hypothesis, we can compare advertising responses of different industries when slant gap is large. The idea is that given an increased sorting of readers in volatile times, the match between industries and newspapers would improve in volatile period. If firms are driven by economic motives, we would expect to see industries that target young customers to shift to Apple, and industries that target older customers to shift to Oriental. Figure 12 and figure 13, which plot the interaction terms between industry and slant gap, shed light on the validity of this hypothesis. For the majority of other industries, the effect is not statistically significant, which suggest that firms are not very motivated by improved newspaper-reader match. The result provides confidence to our interpretation that firms react to political shocks rather than economic shocks.

9 Apple Daily's Revenue Loss

We are interested in separately estimating the revenue impact on Apple Daily in 2014 due to 1). a heightened political awareness and 2). Beijing-friendly firms' preference for Oriental Daily over Apple Daily. To calculate the effect of 1), we use regressions results in table 8 to help forecast what ad volume would have been in 2014 if the degree of political awareness remained fixed at its values in 2010. To calculate the effect of 2), we use the regression results

in table 7 to predict the number of ads placed by connected and mainland companies on Apple if they do not exhibit political preference. We focus on 2014 alone because both qualitative and quantitative evidences suggest that it is the most politically volatile period.

In order to calculate the impact on revenue, we need to know the size of ad that firms will buy, which is unavailable in the Wisers dataset. To circumvent this issue, I collected a smaller sample of 2045 physical ads with ad size from a local public library in Hong Kong and manually recorded the size of the ads (Excluding tender, announcement, event promotion) from the following randomly selected 10 days in 2014: 3/6, 4/4, 5/3, 6/4, 7/1, 8/4, 9/6, 10/10, 11/3, 12/7. The dates are chosen arbitrarily to cover several politically important dates such as 6/4 (Annual anniversary of Tiananmen Student Massacre) and 7/1(Annual protest to voice various demands to the HKSAR government). The average ad size using all ads is 0.588 page, and connected and mainland ads is 0.783 page.

Revenue Impact of Political Salience - The average slant gap is 0.20497 in 2010, and 0.45435 in 2014. Slant gap is larger in all quarters in 2014 except quarter 3 compared with 2010. Using the estimation result of -0.042 from column (1) in the top panel of table 8 as our β_2 estimate and holding the industry effects at their means, this yields a 1.05 percent drop in probability of advertising on Apple for neutral firms[42]. This is equivalent to an ad loss quantity of 196 ads for Apple Daily[43]. Finally, we multiply the average ads size and the ad price in 2014 to the ad loss quantity to arrive at a ad revenue loss for Apple of $HKD 26.3 million($USD 3.4 million) [44][45]

Revenue Impact of Aversion by Beijing-friendly firms - Connected companies are 6.6% and mainland companies 18.8% less likely to advertise on Apple in 2014, which translates to a total ad loss of 273 ads in Apple Daily.[46], and leads to an ad revenue loss of $HKD 48.7 million ($USD 6.1 million) [47].

Putting the number in perspective, the advertising revenue at Apple in 2014 is HKD 343.7 million. This means that ad revenue loss due to political salience amounts to 7.7% of total ad-

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[42](0.45435 - 0.20497) * 4.2% = 1.05%

[43]The combined (Apple + Oriental) ad quantity was 18660 in 2014. 18660 * 0.0105 = 196

[44] The revenue impact due to neutral advertisers is : $196 * .588page * 1886.8cm^2 * 120.84\$/cm^2 =$HKD 26,276,649

[45]We have ignored the ads that advertise on both newspapers because the coefficient on slant gap is not significant.

[46]Connected firms accounts for 15% of total ad, and mainland firm 2.5%. There was a total of 18660 ads in 2014. The expected number of ad loss due to firms' political connection: 18660*0.15*0.066 = 185 ads, and mainland firms: 18660*0.025*0.188 = 88 ads. Total ad loss: 185 +88 = 273

[47]$-273 * .783page * 1886.8cm^2 * 120.84\$/cm^2 =$ 48.7 million

vertising revenue, and Beijing-friendly firms' political preference contributes to another 14.2%. In sum, Apple Daily loses 21.9% of its advertising revenue due to political reasons. In an economy where it is increasingly difficult for print media to remain profitable, the effect of politics on media is sizable. For smaller newspapers, this financial pressure could very well affect their position on the political spectrum.

An obvious limitation of the above calculation is that we cannot account for the endogenous ad price adjustment. Newspapers can adjust the ad price in expectation of heightened political awareness or knowing the fraction of Beijing-friendly firms in the pool of potential advertisers. Lowing the ad price could potentially mitigate the revenue impact. However, given the short time series, we are unable to say much concerning the degree to which the evolving prices were due to increased political awareness or political preferences of Beijing-friendly firms.

Another limitation of this calculation is that we do not consider possible existence of pro-Democracy companies. The existence of such companies would generate a politically-induced economic benefit for Apple Daily. While our regression analysis suggests that Foreign firms are more likely to advertise on Apple, it is unclear whether foreign firms are pro-Democracy or simply react to the economic incentives due to a more attractive price-to-reader ratio at Apple. Finally, Apple's readership might increase in volatile periods, leading to higher profit from paper sales. But since we do not observe readership composition at different time period, we cannot account for the effect of this channel on revenue.

10   Conclusions

This paper has provided empirical evidence on the effect of newspapers' political stance on firms' newspaper choice of advertising. Using daily advertising data of the two major newspapers in Hong Kong, I have shown that increase in political salience in politically-sensitive period leads to stronger aversion from the pro-Democracy Apple Daily among advertisers. Furthermore, Beijing-friendly advertisers, which include politically connected and mainland Chinese firms, exhibit stronger aversion from pro-Democracy newspaper relative to the neutral firms even in relatively stable periods. Using the regression results, I estimated that Apple Daily suffered from an ad revenue loss equivalent to 21.9% of its total advertising revenue in 2014 due to political reasons. It is important to note that our reduced-form findings do not account for the endogenous ad price. Accounting for price change will likely amplify the effect of political reasons on Apple's advertising revenue because Apple Daily could adjust ad price

to attract advertisers.

While Hong Kong has a unique political institution, the relevance of the findings is not restricted to regions or countries of specific political system. Rather, the implications pertain to both democratic or nondemocratic countries in which large businesses share cozy relationship with the government (e.g. South Korea[48]) or owned by the government (e.g. China). This paper has shown that businesses can inherit government's preference and behave as extension of the state. The mechanism highlighted in this paper - politically-induced advertising pressure - can generate an unfavorable impact on the media's willingness to adopt a liberal political stance. This finding is especially important in an era when online news, of which the main source of revenue is advertising but not readers subscription, become more a dominant information channel.

There are several papers that analyze media bias in response to advertisements in specific contexts[49] but this paper did not address whether increasing advertising pressure could lead to an intensification of self-censorship. This is an important question left for future research.

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[48]Schoenherr documented that politically connected firms in South Korea allocated contracts in favor of firms from the same connected network, resulting in a total annual cost of about 0.21-0.32% of GDP.

[49]Reuter and Zitzewitz (2006) studied mutual fund recommendation and Dewenter and Heimeshoff (2014) studied automobile reviews in response to advertising from the respective products.

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11 Figures and Tables

Figure 1: Ad Share on print version of Apple Daily and Sing Tao relative to Sum of Apple, Oriental and Sing Tao.
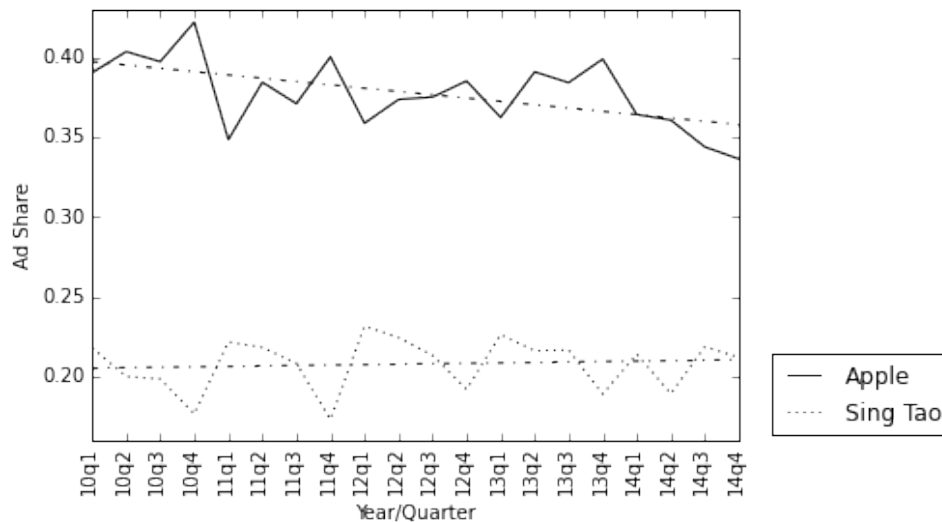
Note: Tender ads, and ads that are event promotion, announcement are excluded. Sing Tao issued an ad-filled real-estate magazine that was free with the purchase of the newspaper between 2010 to early 2012. This makes the number of ads from the real estate industry very high in that period. Therefore we excluded ads by the real estate industries because to make the comparison across time consistent.

Figure 2: Ad Share on print version of Apple Daily and Sing Tao relative to Oriental Only.
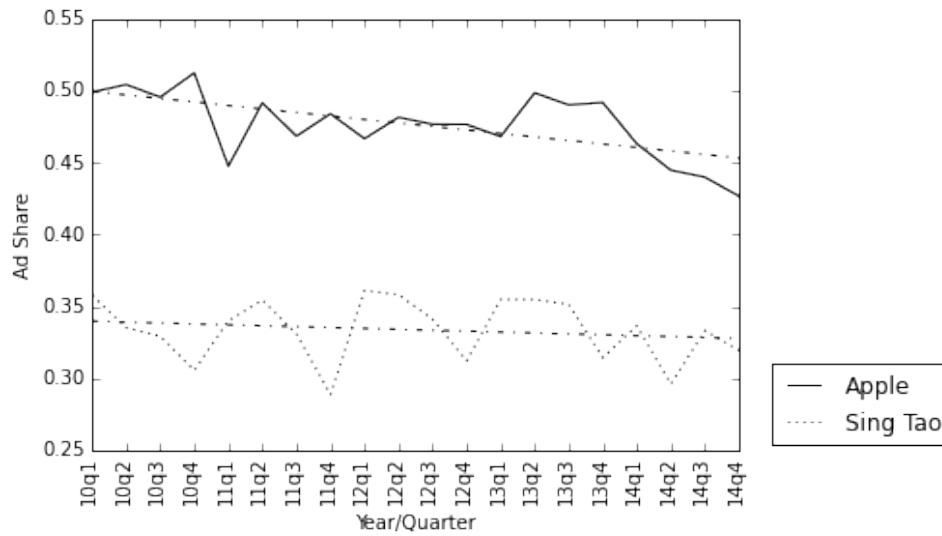
Note: Tender ads, and ads that are event promotion, announcement are excluded. Sing Tao issued an ad-filled real-estate magazine that was free with the purchase of the newspaper between 2010 to early 2012. This makes the number of ads from the real estate industry very high in that period. Therefore we excluded ads by the real estate industries because to make the comparison across time consistent.

Figure 3: 2016 Press Freedom Index issued by the Freedom House
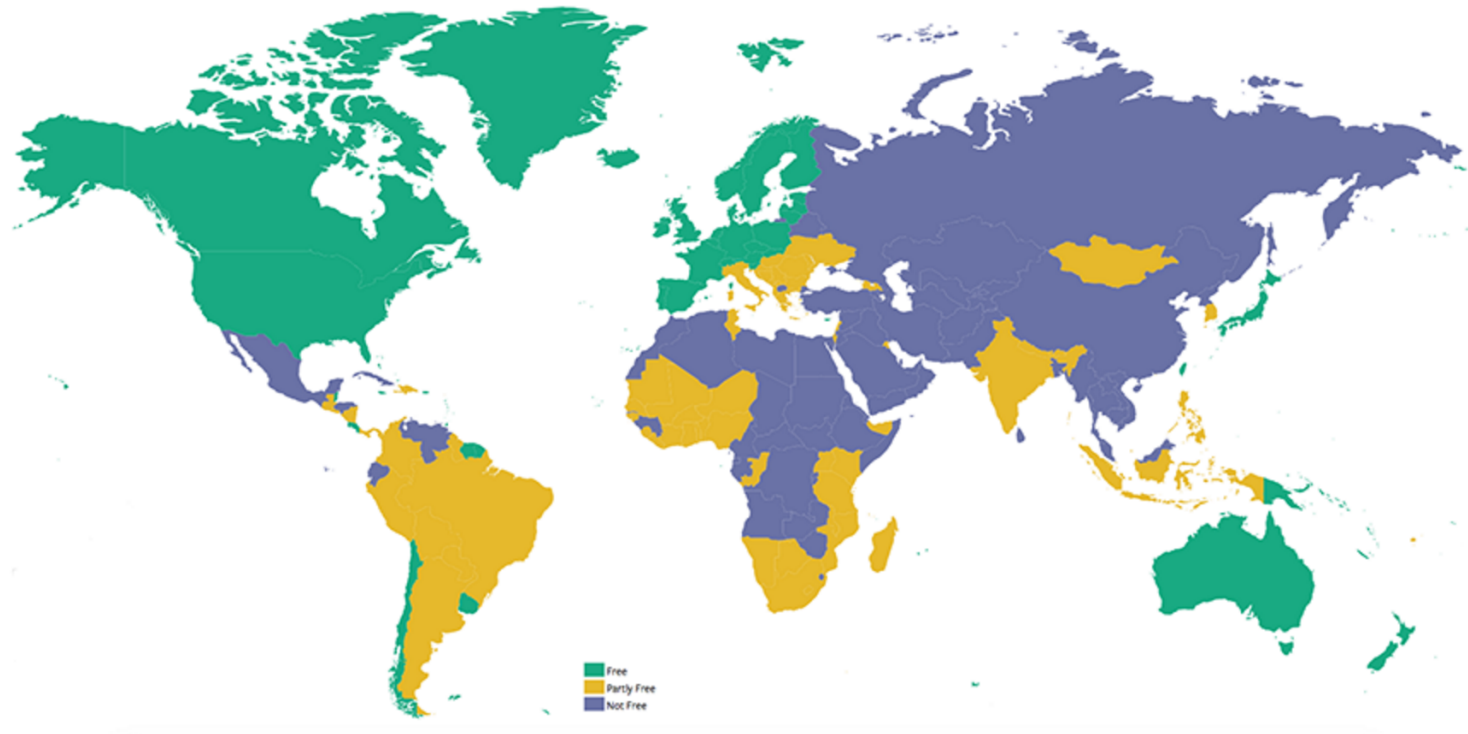
Table 1: Readership ('000) in 2014 (Including online readership)

	Apple	Economic Journal	Economic Times	Ming	Oriental	Sing Tao	Sun
Apple	1684	54	65	168	316	103	119
Economic Journal	54	93	37	47	19	13	12
Economic Times	65	37	142	32	55	37	28
Ming	168	47	32	356	76	83	83
Oriental	316	19	55	76	1158	48	60
Sing Tao	103	13	37	48	83	157	36
Sun	119	12	28	36	83	60	224

Note: 2014 Data from AC Nielsen Media Index Report.

Figure 4: Hang Seng Index and relative Stock Price of the corporations that own Apple Daily (Next Digital, Ticker: 0282) and Oriental Daily (Oriental Press, Ticker: 0018)

Note: The data comes from Google Finance. The percentage represents the stock price relative to that on 1/1/2010. The spike in Apple Daily's stock price in 2012 corresponded to the sale of its Taiwanese subsidiary.

Table 2: Apple Daily's Revenue Composition

year	subscription	advertising	fraction of advertising revenue to total revenue
2010	388,600,000	706,600,000	0.645
2011	349,900,000	679,700,000	0.662
2012	308,800,000	596,900,000	0.659
2013	305,400,000	500,600,000	0.621
2014	264,000,000	343,700,000	0.566

Note: Data comes from Next Digital's annual investor relations report

Figure 5: Total number of ads assignments and ads assignments placed by connected organizations in each industry.
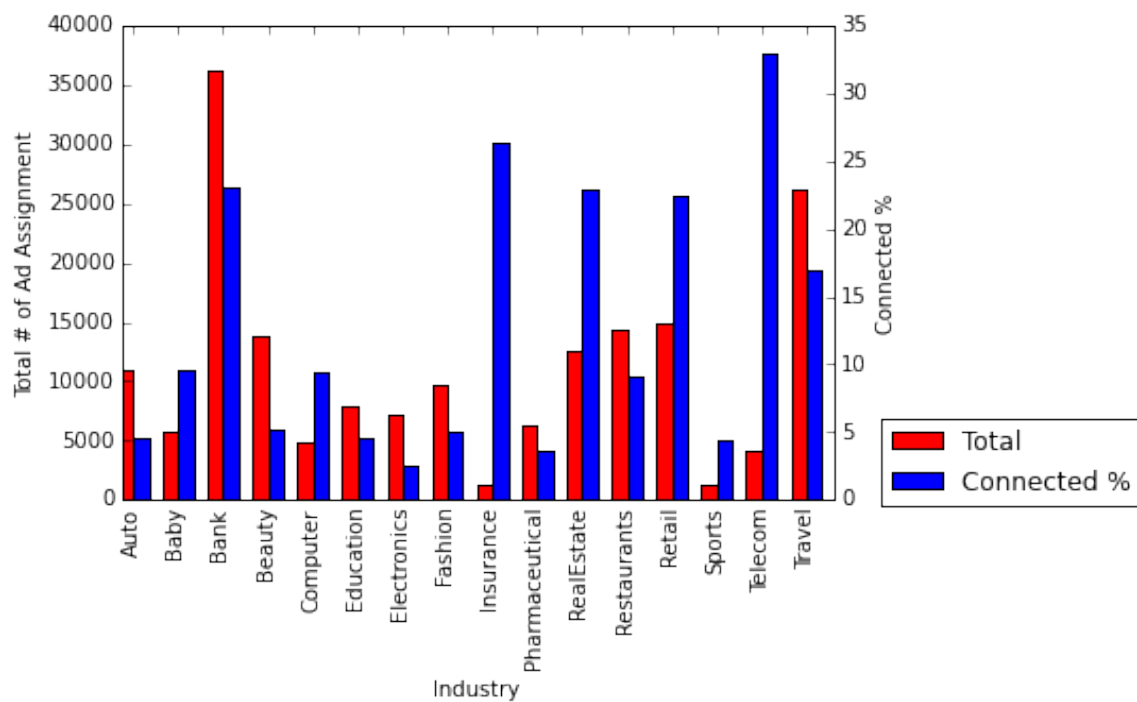

Figure 6: Ads Assignment by company characteristics
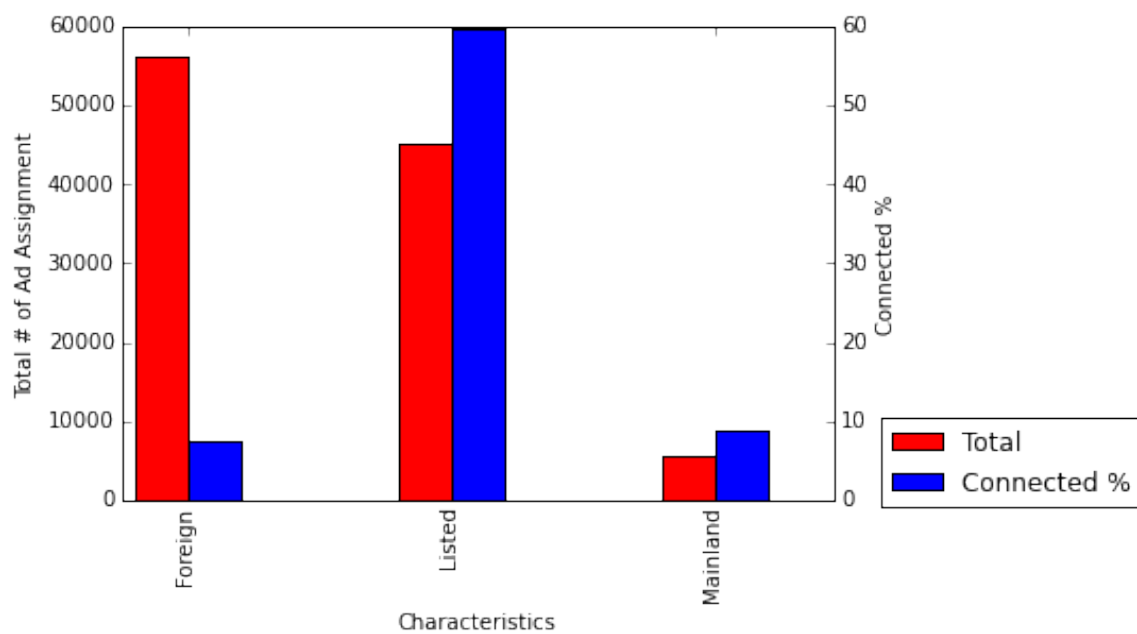
Figure 7: Percentage of Connected Ad Assignment
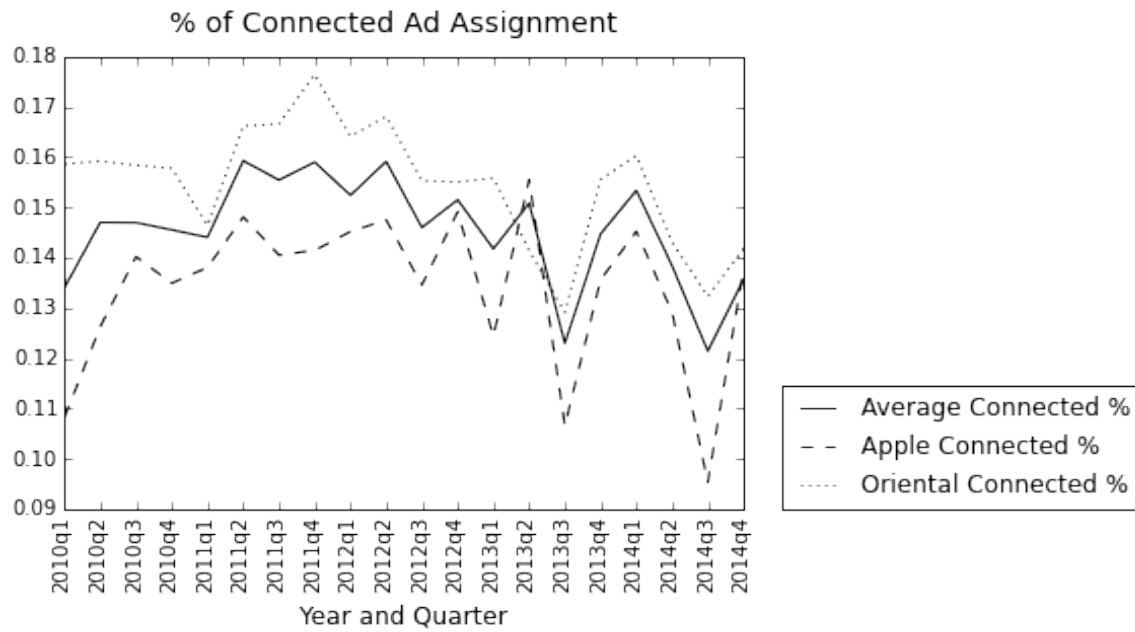
Figure 8: Percentage of Mainland Ad Assignment
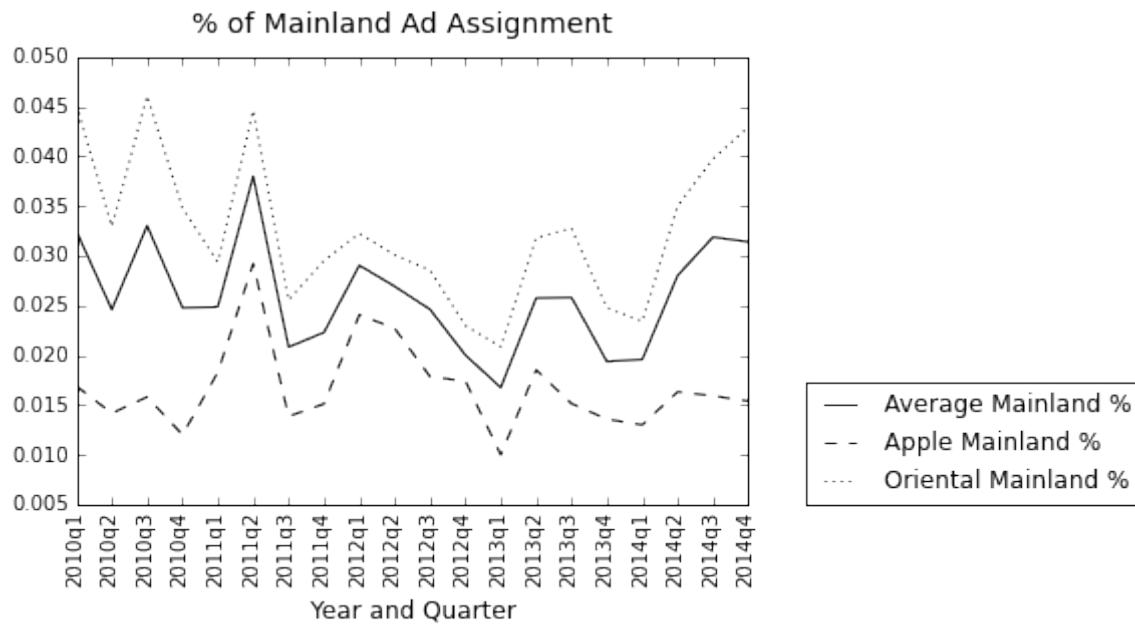
Table 3: Ad Price and Readership

	Apple	Oriental	Apple	Oriental
	Ad Price		*Readership (Print + Online)*	
2010	85.3	104.95	1,566	1,457
2011	109.02	124.88	1,535	1,392
2012	114.48	121.95	1,503	1,344
2013	114.48	150.68	1,411	1,207
2014	120.84	165.92	1,684	1,158

Note: Ad price measures the price per cm^2 of color ads in the run-of-paper. The unit of readership is 1000. Price data from 2010-2012 comes from Wisers. Prices from 2010-2012 come from a private mainland company (`http://www.cmtad.com.cn/`). Unit of price is Hong Kong dollars per cm^2. Readership data from Next Media annual financial report.

Table 4: Readers Demography. The number indicates the fraction of readers reading the respective newspaper, except average Age, household income and totals. *Source*: AC Nielsen 2014.

	Apple Daily	Oriental Daily	Total
Average Age	43	47	40
Average Household Income HK$ Per Month	33878	32835	32115
Female	46.37	48.4	53.69
Government Housing	35.58	34.08	29.21
Working	71.98	65.44	63.34
Student	3.73	4.74	11.71
Retired	7.76	11.62	7.3
Unemployed	4.03	7.84	6.49
Primary Completed	11.49	16.07	10.52
F4-F5	24.4	25.17	25.06
University Or Above	22.58	17.23	27.88

Figure 9: Difference in slant between the two newspapers.
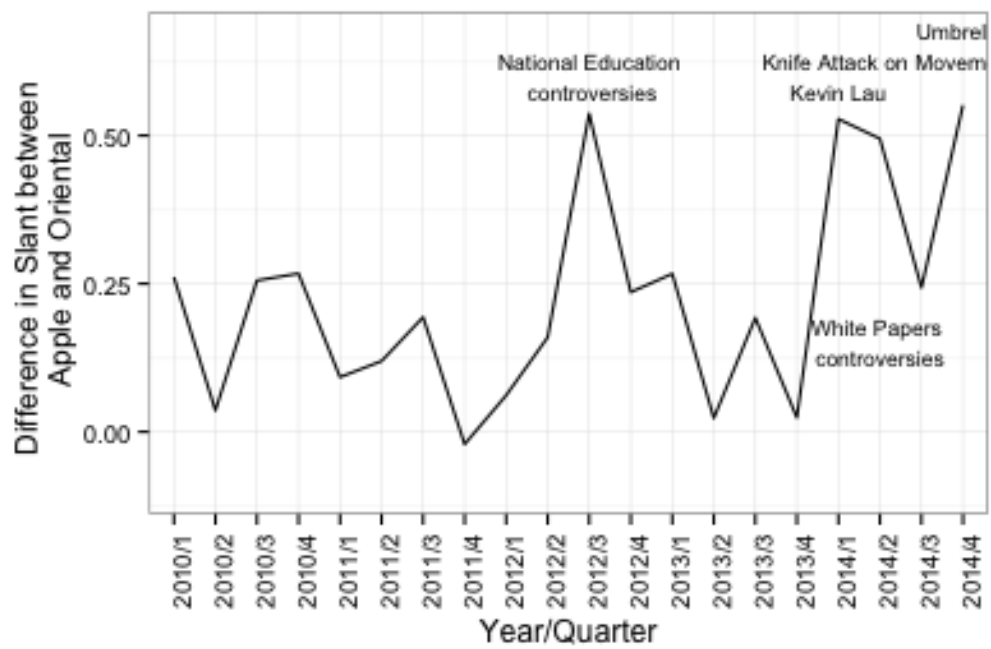
Table 5: Phrases with highest χ^2 and used by Wenwui Daily in each year and quarter

		Bigram	Trigrm	Quadgram
2010	Q1	本港 (Hong Kong)	人民幣(Renminbi)	公社兩黨 (Civic Party & League of Social Democrats)
		經濟 (Economy)	投資者 (Investor)	金融海嘯 (Financial Crisis)
		市場 (Market)	房地產 (Real Estate)	主流民意 (Mainstream Opinion)
	Q2	本港 (Hong Kong)	反對派 (Opposition Group)	金融海嘯(Finance Crisis)
		經濟 (Economy)	人民幣(Renminbi)	公社兩黨 (Civic Party & League of Social Democrats)
		樓市 (Real Estate Market)	消費者(Investor)	主流民意 (Mainstream Opinion)
	Q3	本港 (Hong Kong)	人民幣(Renminbi)	骨灰龕場 (Columbarium field)
		中國 (China)	釣魚島 (Diao-Yu Islands)	金融海嘯 (Financial Crisis)
		經濟 (Economy)	八達通 (Octopus Card)	停車熄匙 (Switch Off Idling Vehicles)
	Q4	本港 (Hong Kong)	人民幣 (Renminbi)	直資學校 (Directly Subsidized Schools)
		經濟 (Economy)	投資者 (Investor)	貨幣政策 (Monetary Policy)
		美國 (United States)	房地產 (Real Estate)	通脹壓力 (Inflationary Pressure)
2011	Q1	中國 (China)	利比亞 (Libya)	最低工資 (Minimum Wage)
		經濟 (Economy)	核危機 (Nuclear Crisis)	通脹壓力 (Inflationary Pressure)
		美國 (United States)	社民連 (League of Social Democrats)	經濟學家 (Economist)
	Q2	中國 (China)	人民幣 (Renminbi)	通脹壓力 (Inflationary Pressure)
		經濟 (Economy)	塑化劑 (Plasticizer)	中小企業 (Small and Medium-Sized Enterprises)
		本港 (Hong Kong)	研究所(Research Institute)	食品安全 (Food Safety)
	Q3	經濟 (Economy)	投資者 (Investor)	債務危機 (Debt Crisis)
		(China)	人民幣 (Renminbi)	歐債危機 (European Debt Crisis)
		發展 (Development)	研究所 (Research Institute)	豬肉價格 (Price of Pork)
	Q4	經濟 (Economy)	人民幣 (Renminbi)	歐債危機 (European Debt Crisis)
		中國 (China)	反對派 (Opposition Group)	貨幣政策 (Monetary Policy)
		市場 (Market)	準備金 (Reserve Fund)	債務危機 (Debt Crisis)
2012	Q1	中國 (China)	人民幣 (Renminbi)	愛國愛港 (Love the Country Love Hong Kong)
		經濟 (Market)	敘利亞 (Syria)	貨幣政策(Monetary Policy)
		市場 (Market)	競爭力 (Competitive Power)	研究中心 (Research Institute)
	Q2	中國 (China)	菲律賓 (Philippines)	歐債危機 (European Debt Crisis)
		經濟 (Economy)	立法會 (Legislative Council)	經濟學家(Economists)
		美國(United States)	人民幣(Renminbi)	貨幣政策 (Monetary Policy)
	Q3	日本 (Japan)	釣魚島 (Diao-Yu Islands)	中國政府 (Chinese Government)
		中國(China)	國有化 (Nationalization)	經濟學家 (Economist)
		經濟 (Economy)	研究所(Research Institute)	架構重組 (Restructuring)
	Q4	中國 (China)	釣魚島 (Diao-Yu Islands)	改革開放 (Reform and Open)
		經濟 (Economy)	習近平 (Xi Jinpin)	中國海軍 (Chinese Navy)
		日本 (Japan)	十八大 (18th National Congress of the Communist Party of China)	最低工資 (Minimum Wage)
2013	Q1	中國 (China)	釣魚島 (Diao-Yu Islands)	施政報告 (Policy Address)
		日本 (Japan)	習近平 (Xi Jinpin)	火控雷達 (Fire Control Radar)
		經濟(Economy)	人民幣(Renminbi)	中國軍隊 (Chinese Military)
	Q2	中國 (China)	釣魚島 (Diao-Yu Islands)	改善民生 (Improve Livelihood)
		日本 (Japan)	反對派 (Opposition Group)	全國人大 (National People's Congress)
		經濟(Economy)	職工盟 (Hong Kong Confederation of Trade Unions)	泛政治化 (Pan-politicalization)
	Q3	中國 (China)	反對派 (Opposition Group)	愛國愛港 (Love the Nation Love Hong Kong)
		經濟 (Economy)	夏千福 (Clifford Hart)	中國海軍 (Chinese Navy)
		日本 (Japan)	堆填區 (Landfill)	海洋權益 (Rights in the Ocean)
	Q4	中國 (China)	反對派 (Opposition Group)	三中全會 (Third Plenary Session)
		日本 (Japan)	基本法 (Basic Law)	特首普選 (Universal Suffrage of Chief Executive)
		本港 (Hong Kong)	釣魚島 (Diao-Yu Islands)	堅定不移(Unflinching)
2014	Q1	本港 (Hong Kong)	反對派 (Opposition Group)	施政報告 (Policy Address)
		經濟 (Economy)	基本法 (Basic Law)	落實普選 (Fulfill Universal Suffrage)
		美國(United States)	邵逸夫 (Run Run Shaw)	軍國主義 (Militarism)
	Q2	美國 (United States)	反對派 (Opposition Group)	佔中公投 (Occupy Central Referendum)
		中國 (China)	釣魚島 (Diao-Yu Islands)	新界東北 (Northeast New Territories)
		日本 (Japan)	財委會 (Finance Committee)	軍國主義(Militarism)
	Q3	本港 (Hong Kong)	反對派 (Opposition Group)	落實普選 (Fulfill Universal Suffrage)
		依法 (Accord to Law)	基本法 (Basic Law)	人大決定 (National People's Congress's Decision)
		議員 (Council Members)	戴耀廷 (Benny Tai)	主流民意 (Mainstream Opinion)
	Q4	佔中 (Occupy Central)	反對派 (Opposition Group)	佔領行動 (Occupation)
		經濟(Economy)	滬港通 (Shanghai-Hong Kong Stock Connect)	佔中搞手 (Occupy Central Schemer)
		警方 (Police)	基本法 (Basic Law)	違法佔中 (Law-Violating Central Occupation)

Table 6: Phrase with highest χ^2 and used by pro-Democracy politicians in each year and quarter

		Bigram	Trigrm	Quadgram
2010	Q1	民主(Democracy)	八十後 (Post-'80)	功能組別(Functional Constituency)
		憲政 Constitutional Forms)	戴耀廷 (Benny Tai)	變相公投 (De facto Referendum)
		人民 (People)	劉曉波(Liu Xiaobo)	零八憲章 (Charter 08)
	Q2	民主(Democracy)	香港人 (Hong Kong people)	功能組別 (Functional Constituency)
		投票(Voting)	民主派 (Democratic Group)	變相公投(De facto Referendum)
		選舉(Election)	戴耀廷 (Benny Tai)	民主運動 (Democratic Movement)
	Q3	民主(Democracy)	戴耀廷 (Benny Tai)	司法制度 (Judiciary System)
		特首(Chief Executive)	基本法 (Basic Law)	功能組別(Functional Constituency)
		政治 (Politics)	廿三條 (Article 23)	行政長官 (Chief Executive)
	Q4	民主 (Democracy)	劉曉波 (Liu Xiaobo)	國民教育 (National Education)
		法治 (Rule of Law)	趙連海 (Zhao Lianhai)	社會主義 (Socialism)
		法院 (Counts)	立法會 (Legislative Concuil)	普世價值 (Universal Values)
2011	Q1	政府 (Government)	立法會 (Legislative Concuil)	特區政府 (Judicial Review)
		民主 (Democracy)	戴耀廷 (Benny Tai)	剛愎自用 (Headstrong)
		入境 (Border Entry)	香港人 (Hong Kong people)	高度自治 (High Degree of Autonomy)
	Q2	法院 (Courts)	艾未未 (Ai Weiwei)	司法獨立 (Judiciary Independence)
		報名 (Apply to)	立法會 (Legislative Council)	國民教育 (National Education)
		立法 (Legislative)	戴耀廷 (Benny Tai)	終審法院 (Court of Final Appeal)
	Q3	選舉 (Elections)	香港人 (Hong Kong people)	新聞自由 (Freedom of Press)
		法律 (Law)	候選人 (Candidates)	核心價值 (Core Values)
		名單 (Candidate List)	基本法 (Basic Law)	武俠小說(Martial Arts Fiction)
	Q4	特首 (Chief Executive)	法改會 (Law Reform Commission)	司法覆核 (Judicial Review)
		檔案	梁振英 (CY Leung Chun Ying)	私立大學 (Private Universities)
		法律 (Law)	公民黨 (Civic Party)	六十五億 (6.5 billions)
2012	Q1	特首(Chief Executive)	香港人 (Hong Kong people)	特區政府 (HKSAR government)
		議員 (Council Members)	梁振英 (CY Leung Chun Ying)	特區政府 (HKSAR government)
		監察 (Monitor)	中聯辦(Liaison Office of the PRC in HKSAR)	核心價值 (Core Values)
	Q2	法律 (Law)	梁振英 (CY Leung Chun Ying)	議事規則 (Rules of Procedure)
		法治 (Rule of Law)	中聯辦(Liaison Office of the PRC in HKSAR)	律政司長 (Secretary of Justice)
		民主 (Democracy)	李旺陽 (Li Wangyang)	終審法院 (Court of Final Appeal)
	Q3	民主 (Democracy)	債權人 (Creditor)	公民教育 (Civil Education)
		教育 (Education)	戴耀廷 (Benny Tai)	負面批評 (Negative Criticism)
		程序 (Sequence)	梁振英 (CY Leung Chun Ying)	(Judiciary Traditions)
	Q4	特首 (Chief Executive)	梁振英 (CY Leung Chun Ying)	司法獨立 (Judiciary Independence)
		法院 (Courts)	法律界 (Law Circles)	終審法院 (Court of Final Appeal)
		法官 (Judges)	香港人 (Hong Kong people)	公民社會 (Civic Society)
2013	Q1	法律 (Law)	梁振英 (CY Leung Chun Ying)	佔領中環 (Peaceful Occupation of Central)
		律師 (Lawyers)	戴耀廷 (Benny Tai)	公民抗命 (Civil Disobedience)
		行動 (Action)	香港人 (Hong Kong people)	和平佔中(Peaceful Occupation of Central)
	Q2	商討 (Negotiation)	香港人(Hong Kong people)	和平佔中 (Occupy Central)
		民主 (Democracy)	湯顯明 (Timothy Tong)	紅十字會 (Red Cross)
		父親 (Father)	梁振英 (CY Leung Chun Ying)	廉政專員 (Commissioner of ICAC)
	Q3	提名 (Nomination)	不公義 (Injustice)	公民抗命 (Civil Disobedience)
		公義 (Justice)	委員會 (Committee)	和平佔中 (Peaceful Occupation of Central)
		選民 (Voter)	民主派 (Democratic group)	公民社會 (Civic Society)
	Q4	大學 (Election)	曼德拉 (Mandela)	司法覆核 (Court of Final Appeal)
		兒子 (Son)	梁振英 (CY Leung Chun Ying)	新香港人 (New Hong Kong people)
		篩選 (Screening)	香港人 (Hong Kong people)	言論自由(Freedom of Speech)
2014	Q1	傳媒 (Media)	香港人 (Hong Kong people)	新聞自由 (Freedom of Press)
		明報 (Ming Pao)	劉進圖 (Kevin Lau)	言論自由 (Freedom of Speech)
		民主 (Democracy)	李慧玲(Li Wei-ling)	公眾利益 (Public Interest)
	Q2	中共 (Chinese Communist)	香港人 (Hong Kong people)	公民提名(Civil Nomination)
		民主 (Democracy)	民主派 (Democratic Group)	和平佔中 (Peaceful Occupation of Central)
		公民 (Citizen)	提委會 (Nominating Committee)	選舉辦法 (Election rules)
	Q3	民主 (Democracy)	香港人 (Hong Kong people)	公民抗命 (Civil Disobedience)
		篩選 (Screening)	袋住先 (Take it on board first)	和平佔中(Peaceful Occupation of Central)
		抗命 (Disobedience)	法律界 (Law Circles)	司法獨立 (Judiciary Independence)
	Q4	運動 (Citizen)	香港人 (Hong Kong people)	民主運動 (Democratic Movement)
		雨傘 (Umbrella)	梁振英 (CY Leung Chun Ying)	公民抗命 (Civil Disobedience)
		民主 (Democracy)	候選人 (Candidate)	聯合聲明 (Joint Declaration)

Table 7: Multinomial Logit Regression Results

	Dependent variable: 1 if only Apple is chosen					
Connect	−0.2799***	-0.2457***	-0.2463***	-0.1108***	-0.1165***	-0.1173***
	0.014	0.014	0.014	0.022	0.022	0.022
	(-0.0664)	(-0.0570)	(-0.0573)	(-0.0273)	(-0.0264)	(-0.0268)
Foreign	0.1133***	0.0948***	0.0948***	0.3814***	0.3861***	0.3858***
	0.011	0.011	0.011	0.036	0.036	0.036
	(0.0272)	(0.0222)	(0.0223)	(0.0868)	(0.0830)	(0.0836)
Mainland	−0.7883***	-0.7814***	-0.7806***	-1.1421***	-1.1417***	-1.1413***
	0.031	0.031	0.031	0.061	0.061	0.061
	(-0.1877)	(-0.1823)	(-0.1826)	(-0.2589)	(-0.2448)	(-0.2468)

	Dependent variable: 1 if both Apple and Oriental is chosen					
Connect	−0.2165***	-0.2079***	-0.2076***	0.0870	0.0857	0.0879
	0.034	0.035	0.035	0.055	0.055	0.055
	(-0.0023)	(-0.0028)	(-0.0027)	(0.0056)	(0.0040)	(0.0039)
Foreign	0.0669***	0.0612**	0.0611**	0.1339	0.1295	0.1313
	0.026	0.026	0.026	0.109	0.109	0.109
	(0.0003)	(0.0006)	(0.0006)	(-0.0006)	(1.29e-05)	(1.908e-05)
Mainland	-0.5640***	-0.5620***	-0.5622***	-0.4582***	-0.4512***	-0.4522***
	0.078	0.078	0.078	0.132	0.133	0.133
	(-0.005)	(-0.0062)	(-0.0061)	(-0.0006)	(-0.0022)	(-0.0020)

Industry FE	X	X	X	X	X	X
Quarter FE	X	X	X	X	X	X
Linear Time Trend	X	X	X	X	X	X
IndustryQuarter FE		X	X		X	X
Quadratic Time Trend			X			X
Observations	206425	206425	206425	45036	45036	45036

Note: *p<0.1; **p<0.05; ***p<0.001. The first row of each variable shows the coefficient, the second the standard deviation, and the third the marginal effect. Column (4)-(6) uses ad sample from companies listed on HKSE. The second row of the coefficients indicate the p-value. Industry classification consists of the following categories:Automobile, Baby products, Banking, Beauty, Computers, Education, Electronic Appliances, Fashion and Accessories, Food & Beverages, Insurance, Pharmaceutical, Real Estate /property, Restaurants, Retail, Sports, Telecommunication, Travel (airline, hotel).

Table 8: Results on Slant Gap and Interactions

	Dependent variable: 1 if only Apple is chosen					
$\triangle\theta_{tq}$	-0.1722***	-0.1721***	-0.1621***	-0.2392**	-0.1966**	-0.1652
	0.037	0.037	0.039	0.101	0.101	0.106
	(-0.0420)	(-0.0408)	(-0.0381)	(-0.0443)	(-0.0353)	(-0.0281)
Connect·$\triangle\theta_{tq}$	0.0433	0.0644	0.0636	0.2277*	0.1676	0.1645
	0.080	0.080	0.080	0.124	0.125	0.125
	(0.0021)	(0.0097)	(0.0096)	(0.0354)	(0.0247)	(0.0246)
Mainland ·$\triangle\theta_{tq}$	-0.2465	-0.2004	-0.1993	-1.1364***	-1.1744***	-1.1734***
	0.185	0.185	0.185	0.407	0.407	0.409
	(-0.0520)	(-0.0423)	(-0.0421)	(-0.2863)	(-0.2698)	(-0.2705)
Foreign ·$\triangle\theta_{tq}$	0.0854	0.0686	0.0677	0.2537	0.2623	0.2600
	0.06	0.061	0.061	0.192	0.194	0.194
	(0.0217)	(0.0169)	(0.0167)	(0.0506)	(0.0510)	(0.0510)

	Dependent variable: 1 if both Apple and Oriental is chosen					
$\triangle\theta_{tq}$	-0.0660	-0.0659	-0.0953	-0.8321***	-0.8885***	-0.9929***
	0.092	0.092	0.097	0.275	0.279	0.290
	(0.0008)	(0.0002)	(-0.0007)	(-0.0262)	(-0.0211)	(-0.0230)
Connect·$\triangle\theta_{tq}$	0.5240***	0.5290***	0.5310***	1.2986***	1.3955***	1.4064***
	0.195	0.196	0.196	0.319	0.323	0.323
	(0.0160)	(0.0132)	(0.0131)	(0.0429)	(0.0343)	(0.0331)
Mainland ·$\triangle\theta_{tq}$	-0.5759	-0.5555	-0.5582	1.6677**	1.7057**	1.7062**
	0.491	0.492	0.492	0.803	0.807	0.808
	(-0.0143)	(-0.0124)	(-0.0123)	(0.0743)	(0.0535)	(0.0513)
Foreign ·$\triangle\theta_{tq}$	-0.0236	-0.0325	-0.0312	0.6201	0.7178	0.7216
	0.148	0.148	0.148	0.608	0.606	0.605
	(-0.0022)	(-0.0016)	(-0.0016)	(0.0185)	(0.0162)	(0.0156)
Firms Characteristics	X	X	X	X	X	X
Industry FE	X	X	X	X	X	X
Quarter FE	X	X	X	X	X	X
Linear Time Trend	X	X	X	X	X	X
IndustryQuarter FE		X	X		X	X
Quadratic Time Trend			X			X
Observations	206425	206425	206425	45036	45036	45036

Note: *p<0.1; **p<0.05; ***p<0.001. The first row of each variable shows the coefficient, the second the standard deviation, and the third the marginal effect. *Note:* *p<0.1; **p<0.05; ***p<0.001. Column (4)-(6) uses ad sample from companies listed on HKSE. Firms characteristics include political connectivity and country of origin (foreign, mainland). Industry classification consists of the following categories:Automobile, Baby products, Banking, Beauty, Computers, Education, Electronic Appliances, Fashion and Accessories, Food & Beverages, Insurance, Pharmaceutical, Real Estate /property, Restaurants, Retail, Sports, Telecommunication, Travel (airline, hotel).

Table 9: Results on Slant Gap Lags

	Dependent variable: 1 if only Apple is chosen					
$\triangle\theta_{tq}$				-0.1814***	-0.1767***	-0.1586***
				0.038	0.038	0.040
				(-0.0431)	(-0.0422)	(-0.0376)
$\triangle\theta_{tq-1}$	-0.1875***	-0.2237***	-0.2001***	-0.1609***	-0.1976***	-0.1864***
	0.041	0.042	0.042	0.042	0.042	0.043
	(-0.0432)	(-0.0525)	(-0.0467)	(-0.0369)	(-0.0463)	(-0.0435)

	Dependent variable: 1 if both Apple and Oriental is chosen					
$\triangle\theta_{tq}$				-0.0752	-0.0728	-0.0906
				0.094	0.095	0.098
				(0.0001)	(8.487e-05)	(-0.0006)
$\triangle\theta_{tq-1}$	-0.1654	-0.1690	-0.1810*	-0.1548	-0.1579	-0.1700
	0.102	0.103	0.105	0.104	0.104	0.105
	(-0.0029)	(-0.0019)	(-0.0024)	(-0.0029)	(-0.0019)	(-0.0023)
Firms Characteristics	X	X	X	X	X	X
Industry FE	X	X	X	X	X	X
Quarter FE	X	X	X	X	X	X
Linear Time Trend	X	X	X	X	X	X
IndustryQuarter FE		X	X		X	X
Quadratic Time Trend			X			X
Observations	206425	206425	206425	206425	206425	206425

Note: *p<0.1; **p<0.05; ***p<0.001. The second row of the coefficients prints the standard deviation and the third prints the marginal effects at the median.*Note:* *p<0.1; **p<0.05; ***p<0.001. Column (4)-(6) uses ad sample from companies listed on HKSE. Firms characteristics include political connectivity and country of origin (foreign, mainland). Industry classification consists of the following categories:Automobile, Baby products, Banking, Beauty, Computers, Education, Electronic Appliances, Fashion and Accessories, Food & Beverages, Insurance, Pharmaceutical, Real Estate /property, Restaurants, Retail, Sports, Telecommunication, Travel (airline, hotel).

Table 10: List of Major Protests in Hong Kong between 2010 and 2014

| Date	Protest	Number of Participants (Estimated)
2010/1/1	New Year Protest	10000-12000
2010/7/1	Annual July 1st Protest	22000-26000
2011/7/1	Annual July 1st Protest	59000-67000
2012/4/1	Protest against Mainland Influence on the Chief Executive Election	Few thousands
2012/06/10	Death of Li Wangyang	25000
2012/7/1	Annual July 1st Protest	90000-100000
2012/7/29	National and Moral Education	90000
2012/12/30	Support Leung Protest	50000
2013/1/1	New Year Protest	30000-33000
2013/7/1	Annual July 1st Protest	88,000-98,000
2013/10/20	HKTV Free Licence Controversies	120,000
2014/1/1	New Year Protest	13,000-16,000
2014/3/2	Kevin Lau Knife Attack	13,000
2014/6/27	White Paper Controversies	1800
2014/7/1	Annual July 1st Protest	150,000 - 166,000
2014/8/17	Anti- Occupy Central	79,000-88,000
2014/9/25	Student Protest for Universal Suffrage	4000
2014/09/28-2014/12/11	Umbrella Movement	> 200,000

Note: The estimate of the number of participants comes from the public opinion programme conducted by the University of Hong Kong.

Table 11: Results on Protesters Turnout and Interactions

|	Dependent variable: 1 if only Apple is chosen					
$Protesters_{tq}$	-0.0008***	-1.873e-05	5.569e-05	-0.0018***	-0.0007**	-0.0005*
	7.59e-05	9.81e-05	0.000	0.000	0.000	0.000
	Dependent variable: 1 if both Apple and Oriental is chosen					
$Protesters_{tq}$	-0.0009***	0.0004	0.0004	-0.0037***	-0.0282***	-0.0024***
	0.000	0.000	0.000	0.001	0.006	0.001
Firms Characteristics	X	X	X	X	X	X
Firms Characteristics Interaction	X	X	X	X	X	X
Industry and Quarter FE	X	X	X	X	X	X
Linear Time Trend		X	X		X	X
IndustryQuarter FE			X			X
Quadratic Time Trend			X			X
Observations	206425	206425	206425	45036	45036	45036

Note: *p<0.1; **p<0.05; ***p<0.001. Protesters turnout measured in 000s. The second row of the coefficients indicate the standard deviation.*Note:* *p<0.1; **p<0.05; ***p<0.001. Column (4)-(6) uses ad sample from companies listed on HKSE. Industry classification consists of the following categories:Automobile, Baby products, Banking, Beauty, Computers, Education, Electronic Appliances, Fashion and Accessories, Food & Beverages, Insurance, Pharmaceutical, Real Estate /property, Restaurants, Retail, Sports, Telecommunication, Travel (airline, hotel).

Figure 10: Industry Fixed Effects Relative to the Real Estate Industry for ads appearing on Apple only, relative to Oriental only
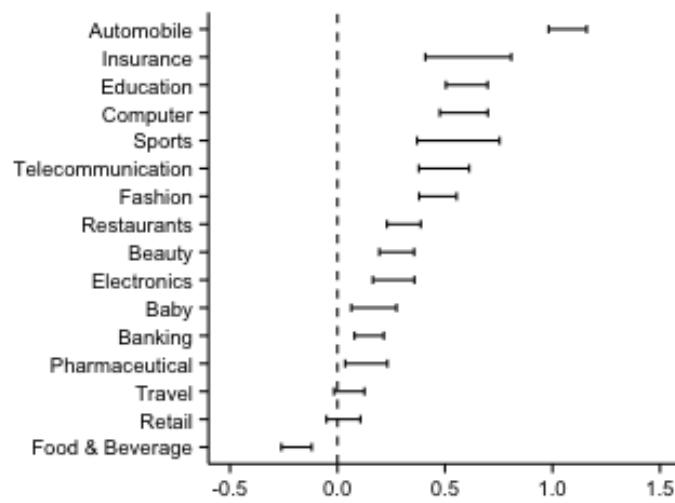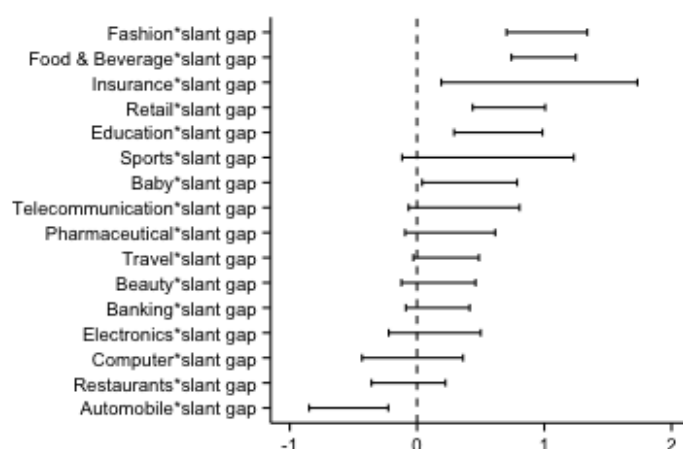

Note: The fixed effects and the interaction terms are estimated with these controls: firms characteristics, linear time trend, quarter fixed effects, slant gap and slant gap interaction terms.

Figure 11: Industry Fixed Effects Relative to the Real Estate Industry for ads appearing on both Apple and Oriental are chosen, relative to Oriental only
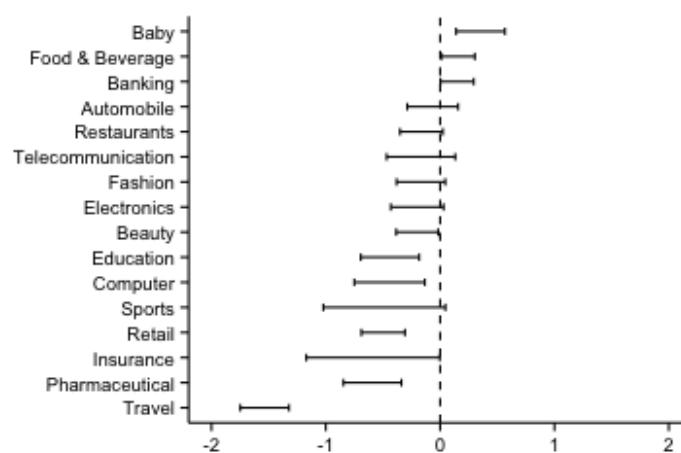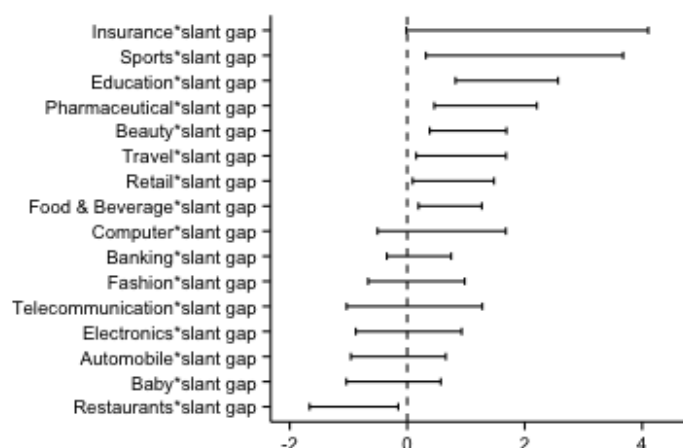

Note: The fixed effects and the interaction terms are estimated with these controls: firms characteristics, linear time trend, quarter fixed effects, slant gap and slant gap interaction terms.

Figure 12: Interaction terms between Industry and Slant Gap relative to the Real Estate Industry for ads appearing on Apple only, relative to Oriental only
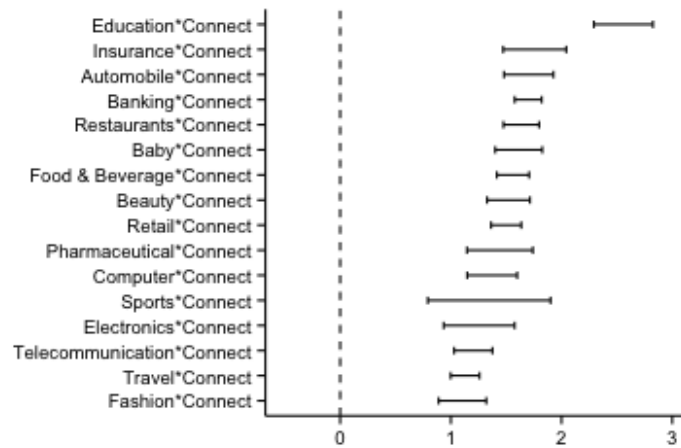

Notes: The fixed effects and the interaction terms are estimated with these controls: firms characteristics, linear time trend, quarter fixed effects, slant gap and slant gap interaction terms.

Figure 13: Interaction terms between Industry and Slant Gap relative to the Real Estate Industry for ads appearing in both Apple and Oriental, relative to Oriental only
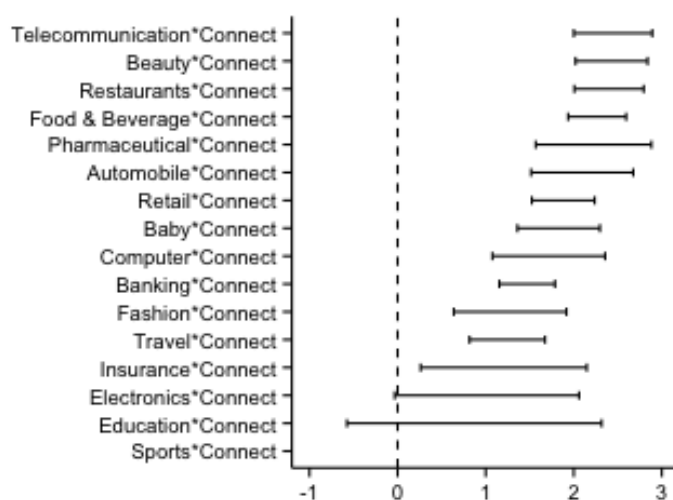

Notes: The fixed effects and the interaction terms are estimated with these controls: firms characteristics, linear time trend, quarter fixed effects, slant gap and slant gap interaction terms.

Figure 14: Interaction terms between industry fixed effects and firms' connectivity for ads appearing on Apple only, relative to Oriental only

Notes: Dependent variable: 1 if only Apple is chosen. The fixed effects and the interaction terms are estimated with these controls: firms characteristics, linear time trend, quarter fixed effects, slant gap and slant gap interaction terms.

Figure 15: Interaction terms between industry fixed effects and firms' connectivity for ads appearing on both newspapers, relative to Oriental only

Notes: Dependent variable: 1 if both Apple and Oriental are chosen. The fixed effects and the interaction terms are estimated with these controls: firms characteristics, linear time trend, quarter fixed effects, slant gap and slant gap interaction terms.

Table 12: Average Ad Size by Industry

Industry	Average Size
Baby Products	0.7187500
Clothing & Accessories	0.6057348
Communications & Internet	1.0000000
Consumer Durable	0.8144531
Cosmetics & Skincare	0.5637097
Credit Card	0.9583333
Education	0.3004167
Financial Services	0.5474954
Food & Beverages	1.0087535
Government	0.3560606
Holidays & Travel	0.6102201
Household Products	0.8381757
Lifestyle	0.5310256
Motoring	0.6287538
Others	0.5096026
Pharmaceutical & Personal	0.5401542
Real Estate	0.6344787
Restaurants	0.6173077

Note: Unit of Size is number of page. The data comes from a smaller sample of old newspapers collected through visits to local public library in Hong Kong

12 Appendix

12.1 Sample of Apple Daily and Oriental Daily Headline during Occupy Central

Figure 16: Headline of Apple Daily on December 12, 2014. Translated as "Do not forget the original intention. We will be back"

Figure 17: Headline of Oriental Daily on December 12, 2014. Translated as "Financier Jimmy Lai Pan-Democratic politicians accept bribes. Occupy Central Schemers All Caught"

12.2 Endogenous Readers' Choice of Newspaper

We extend the model in section 3 to incorporate endogenous readers' choice of newspaper while holding newspaper's per-period slant exogenous in this section. The goal is to illustrate the effect of newspaper slant at each period on firms' ad location decision through a change in readership composition. This has the effect of changing firms' economic benefit from advertising in each newspaper. I highlight the effect of an increase in slant gap on readers sorting.

Consider an economy of which the population is composed of young and elderly. The fraction of young people is denoted as g. Young people are more pro-Democracy whereas elderly more pro-Beijing. We assume that young readers derive higher utility from Apple when Apple slants more to pro-Democracy in turbulent times. Formally, denote b and $b - \delta$, $\delta > 0$, as the utility for which young and old readers obtain from reading Apply Daily in stable periods respectively. Let a be the utility that elderly readers obtain from Oriental Daily, and $a - \delta$ be that of young readers. Furthermore, young (elderly) readers obtain an extra benefit equivalent to the slant gap $\triangle \theta$ from Apple Daily (Oriental Daily) . Finally, there is an idiosyncratic utility ε_j^k for reader k to read newspaper j, assumed to distribute type-I extreme value. Individuals receive only an idiosyncratic benefit of ε_0^k from not reading any newspaper. Given all these, the demand is:

$$F_{ya} = \frac{exp(b + \triangle \theta)}{1 + exp(b + \triangle \theta) + exp(a - \delta)} \tag{10}$$

$$F_{ea} = \frac{exp(b - \delta)}{1 + exp(b - \delta) + exp(a + \triangle \theta)} \tag{11}$$

where F_{ya} is the probability that young readers choose Apple.

Turning to the firms, we assume that firms either sell products that only elderly or young people would buy. The economic benefit of advertising on Apple for firms targeting elderly then depends on Apple's ability to reach to the elderly: $e_e = (1 - g)f(F_{ea}) + v_i$, where f is an increasing function of its argument and v_i follows a uniform distribution $[-\delta, \delta]$. Similarly, the economic benefit for firms targeting young people would be $e_y = gf(F_{ya}) + v_i$. As in section 3, elderly firms choose Apple Daily if their v_i is above the threshold v_e^*, and young firms v_y^*.

The only difference from section 3 is that newspapers have to take into account of the in-and-out of young and elderly readers, and how that affect firms economic benefit from advertising on their newspapers. Suppose $|\frac{\partial F_{ea}}{\partial \triangle \theta}| > |\frac{\partial F_{ya}}{\partial \triangle \theta}|$ such that an increase in $\triangle \theta$ has a larger effect in turning elderly reader away than drawing young readers. Denote the fraction of young firms as h in the market. If $h > 0.5$, then the aggregate economic benefit at Apple for elderly firm decreases

more than that of young firms. Note that h can be a function of g: if the fraction of young people (g) in the economy is large, that the fraction of young firms can be large also. This means that there is a net decrease in expected demand for Apple Daily. When setting its ad price, Apple takes into account the lost of economic appeal and sets a lower price than it would have should there is no change in readership composition. The equilibrium ad share of Apple also falls.

The main idea is that economic benefit at Apple can increase for some firms but decrease for others due to change in readership composition depending on the target audience of the advertisers. We expect greater degree of sorting of firms between the two newspapers in turbulent times. In presence of political pressure, we expect that drop in companies targeting Apple's ad share decreases more for elderly firms than for young firms.

12.2.1 Endogenous Newspaper Slant

In this section, I allow the newspaper to choose how much slant to report when political events occur and show that the slant choice can be rationalized in a profit-maximizing framework. I focus on Apple Daily's decision problem. The main trade-off that Apple Daily faces is the advertising revenue gained versus the readership lost for reporting in a more neutral stance.

Readers are assumed to be aware of the occurrences of the political events and have a general sense of the intensity. They buy newspaper to get more in-depth stories and expect the slant implied in the stories to be consistent with the political ideology of the newspaper. If the news slant does not match the expectation, newspaper loses their good-will and future readership revenue. The assumption is different from Gentzkow and Shapiro (2006) in that Apple Daily wants to build a reputation as an anti-government voice, a provider of pro-Democracy information[50].

The key intuition is that when political events occur frequently, newspaper are also assessed frequently by the readers. Newspapers care about its reputation, and therefore report in accordance to readers' expectation. Advertisers on the other hand, are made more aware of newspaper slant when reporting diverges, and this creates a negative advertising revenue impact on Apple Daily.

To formalize this intuition, denote $z = 1$ when a political event occurs and $z = 0$ otherwise.

---

[50]Gentzkow and Shapiro (2006) assume that media wants to be seen as unbiased and provide accurate information

We write the following as the readership revenue function which depends on the gap between newspaper slant and the political image $\bar{\theta}$:

$$
r(\theta) = \begin{cases} r(\theta - \bar{\theta}) & \text{if } z = 1 \\ \bar{r} & \text{if } z = 0 \end{cases}
$$

where $\bar{\theta}$ is assumed to be a constant. We assume that if $\theta - \bar{\theta} < 0$, then $r < \bar{r}$. Furthermore, when political events occur, Apple might draw new readers with its anti-government slant in addition to be able to win good-will from its loyal readers so $\frac{\partial r(\theta)}{\partial \theta} > 0$ (The more pro-Democracy, the larger the θ). The implicit assumption here is that adopting a more pro-Democracy stance does not turn away loyal readers because they have already formed an expectation on Apple's political stance.

Advertising revenue depends on the readership and the instantaneous slant as laid out in the main text. Since Beijing-friendly firms avoid advertising on Apple regardless of slant, we can write the advertising revenue function as $a(r(\theta - \bar{\theta}), \theta)$ when there is political event, and a constant $\bar{a}$ when there is no political event. We assume that $\bar{a} \geq a(\theta)$, which suggests that Apple's advertising revenue is always higher in non-volatile times. So Apple's profit-maximizing function in politically volatile times is given by: $a(r(\theta - \bar{\theta}), \theta) + r(\theta - \bar{\theta})$. In equilibrium, the marginal cost must equal to the marginal benefit.

$$
\frac{\partial r(\theta - \bar{\theta})}{\partial \theta}\left[1 + \frac{\partial a}{\partial r}\right] + \frac{\partial a}{\partial \theta} = 0
$$

As long as $\left|\frac{\partial r(\theta - \bar{\theta})}{\partial \theta}\right|$ is significantly larger than $\left|\frac{\partial a}{\partial \theta}\right|$, readership subscription reacts more than advertising revenue to slant, Apple Daily would prefer to report in more slant.

12.3 Finer Time Unit for Slant Gap

We chose the time unit of slant gap as quarterly instead of a finer unit such as monthly or weekly to balance the trade-off between having more words to choose from (which gives higher confidence of picking the most polarized words) and more data points of polarization (which gives higher statistical power). In using a finer time unit of analysis, we inevitably introduce more noise to the slant gap measure but we might be able to capture more accurate advertisers' response to slant gap.

Figure 18 shows the slant gap using monthly text data. The period-to-period fluctuation is high. Furthermore, the second half of 2014 does not register high slant gap, which is contrary to the consensual perception that newspapers became more polarized during umbrella movement. We are therefore hesitant in using finer time units than quarters in our slant gap measurement.

Figure 18: Slant Gap Using Monthly Data
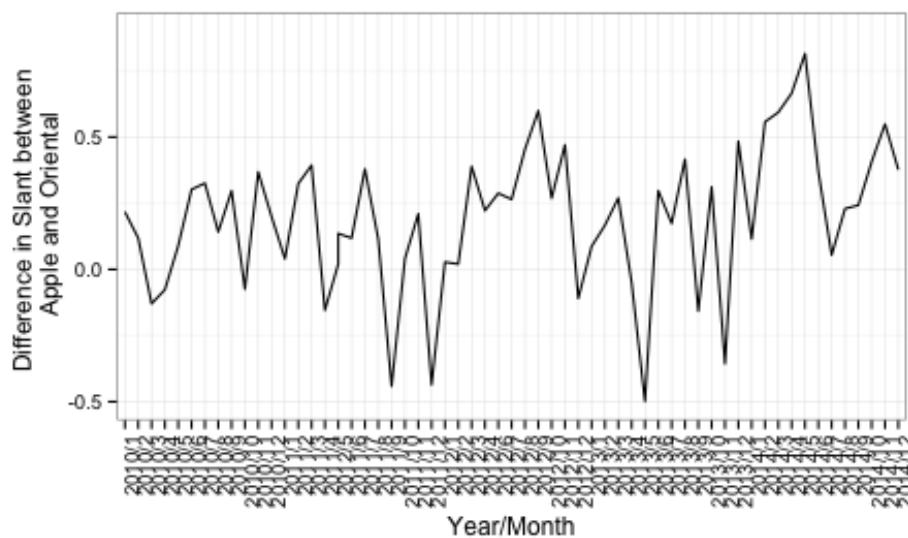
12.4 Polarization of the Benchmark Language

To capture the degree of polarization of benchmark language overtime, we consider a simple measure inspired by Jensen et al (2012). For each period t, we take the top 100 phrases of length l ranked by χ^2. We then compute the difference in the frequencies that the phrase p is used in *Law and Politics* and Wen wui Daily:

$$\phi_t = \sum_l \sum_p^{100} (f_{pll} - f_{plw}) \tag{12}$$

In absolute term, the measure is large when a certain phrase appears more frequently in one benchmark but not another. The measure ignores the length and number of articles that each benchmark has. This design is meant to address two issues: 1. We observe that the length of the articles tend to be longer in periods with many political events. 2. In addition, Wenwui started to post more than 1 editorial later in the sample period. This measure also disregard relative ranking of phrase p. This simple measure does not suffer from the finite-sample bias highlighted by Gentzkow et al (Working Paper) because with only two references, we do not calculate the correlation between the newspaper and the phrase frequency[51].

Figure 19 shows the evolution of the polarization measure over the sample period. There is a general downward trend, indicating that the absolute value of the measure became larger over time. This suggests that polarization of the benchmark language has worsened in our period, which reflected the general political environment. The decrease in especially in 2014. This matches the general sense of the growing polarization of the political climate.

The Pearson correlation between the slant gap and the polarization measure is -0.3 suggesting a moderately strong correlation. This means that as the slant gap becomes large, frequency difference becomes more negative (the absolute value becomes larger). Since the benchmark language became more polarized over time, the slant gap used in the main text actually underestimate the degree of polarization over time.

To assess the explanatory power of the polarization measure, we ran equation 8 again but replace slant gap and its interaction term with ϕ_t. The results are presented in table 14. The coefficient on ϕ_t is positive and significant at 1% across the specifications. This suggests that the more negative the polarization measure, the less likely a firm will advertise on Apple Daily.

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[51]Jensen et al (2012) calculate the correlation between the party of the speaker and the normalized frequency, but in any finite sample the correlation will be nonzero with positive probability, so the measure may imply some amount of polarization even when speech is unrelated to party.

Figure 19: A measure of polarization of word choices used by the benchmark
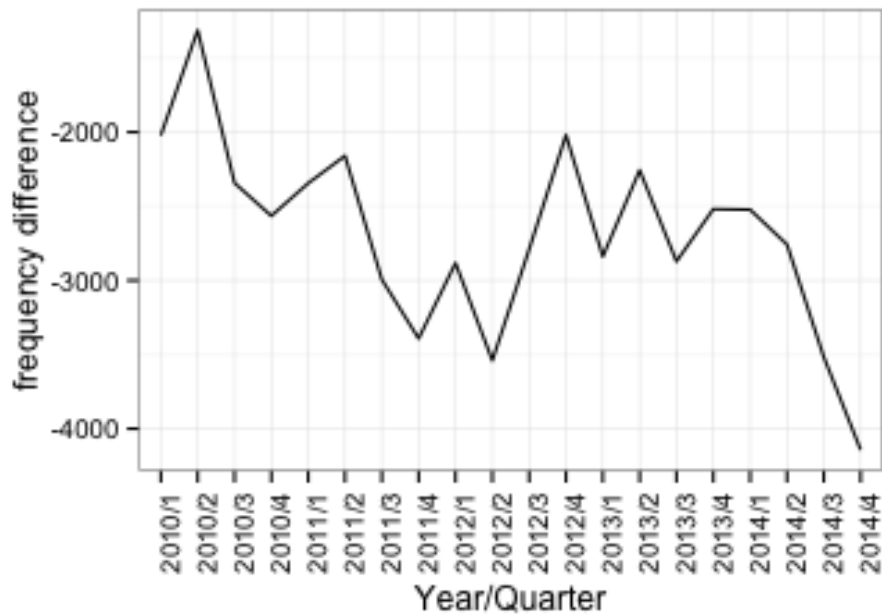
The result suggests that the polarization measure, slant gap and the political events all have explanatory power on advertisers' choice of newspaper. In our model, however, political events alone, does not drive advertisers away from Apple Daily; slant gap has to respond to political events, and the mechanism rests on advertisers responding to the news content. The rationale is that if newspapers do not slant more in respond to occurrences of political events, the newspaper will lose its reputation as a pro-Beijing or pro-Democracy paper which is costly. Once the political image of the newspaper is lost, advertisers no longer face the same decision problem and will not avoid a pro-Democracy newspaper.

Table 13: Results on Polarization and Interactions

			Dependent variable: 1 if only Apple is chosen			
ϕ_{tq}	5.205e-05***	5.626e-05***	5.912e-05***	0.0001***	0.0001***	0.0001***
	1.1e-05	1.11e-05	1.12e-05	2.88e-05	2.91e-05	2.92e-05
Connect·ϕ_{tq}	3.881e-05*	3.375e-05	3.558e-05	-9.458e-05***	-7.995e-05**	-7.81e-05**
	2.19e-05	2.2e-05	2.2e-05	3.39e-05	3.42e-05	3.43e-05
Mainland ·ϕ_{tq}	-1.045e-05	-1.776e-05	-1.777e-05	0.0002*	0.0002*	0.0002*
	4.8e-05	4.81e-05	4.82e-05	0.000	0.000	0.000
Foreign ·ϕ_{tq}	1.76e-05	2.217e-05	2.291e-05	4.909e-05	5.295e-05	5.466e-05
	1.67e-05	1.68e-05	1.68e-05	5.36e-05	5.45e-05	5.46e-05
			Dependent variable: 1 if both Apple and Oriental is chosen			
ϕ_{tq}	-4.527e-05*	-5.106e-05*	-5.433e-05**	0.0003***	0.0003***	0.0003***
	2.67e-05	2.69e-05	2.7e-05	7.65e-05	7.82e-05	7.84e-05
Connect·ϕ_{tq}	-9.8e-05*	-9.717e-05	-9.659e-05*	-0.0004***	-0.0004***	-0.0004***
	5.31e-05	5.32e-05	5.29e-05	8.55e-05	8.67e-05	8.59e-05
Mainland ·ϕ_{tq}	-0.0001	-9.823e-05	-9.733e-05	-0.0002	-0.0002	-0.0002
	0.000	0.000	0.000	0.000	0.000	0.000
Foreign ·ϕ_{tq}	0.0001***	0.0001***	0.0001***	6.448e-05	2.921e-05	2.479e-05
	3.99e-05	4.01e-05	3.99e-05	0.000	0.000	0.000
Firms Characteristics	X	X	X	X	X	X
Industry FE	X	X	X	X	X	X
Quarter FE	X	X	X	X	X	X
Linear Time Trend	X	X	X	X	X	X
IndustryQuarter FE		X	X		X	X
Quadratic Time Trend			X			X
Observations	206425	206425	206425	45036	45036	45036

Note: *p<0.1; **p<0.05; ***p<0.001. The second row of the coefficients indicate the standard deviation.*Note:* *p<0.1; **p<0.05; ***p<0.001. Column (4)-(6) uses ad sample from companies listed on HKSE. Firms characteristics include political connectivity and country of origin (foreign, mainland). Industry classification consists of the following categories:Automobile, Baby products, Banking, Beauty, Computers, Education, Electronic Appliances, Fashion and Accessories, Food & Beverages, Insurance, Pharmaceutical, Real Estate /property, Restaurants, Retail, Sports, Telecommunication, Travel (airline, hotel).

12.5   Time Series of the Number of Pro-Democracy Phrases

Table 14: Number of Pro-Democracy Phrase over the sample period

Year	Quarter	Number
2010	Q1	50
	Q2	55
	Q3	54
	Q4	56
2011	Q1	55
	Q2	61
	Q3	53
	Q4	61
2012	Q1	55
	Q2	63
	Q3	58
	Q4	57
2013	Q1	58
	Q2	60
	Q3	58
	Q4	53
2014	Q1	60
	Q2	54
	Q3	58
	Q4	58

Note: The number of pro-Democracy phrases is constantly more than 40, and fluctuates between 50 to 63. That means the ratio of pro-Democracy phrases is constantly over half (80 phrases used every period.)

12.6 Political Ads and Government Ads

Table 15: Number of political and government ad assignments in Apple and Oriental

	Apple	Oriental
Pro-Beijing Political Ads	0	314
Pro-Democracy Political Ads	5	0
Government Ads	453	644

Note: We define an ad as pro-Beijing or pro-Democracy by the ad title. For example, the ad title "強烈反對佔領中環" (Strongly oppose Central Occupation) is pro-Beijing and the ad title "我要真普選" is considered to be pro-Democracy.