

# Advertisers Capture: Evidence from Hong Kong

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## Abstract

This paper shows that non-coercive pressure on the media can be substantial. Using daily advertising data between 2010 and 2014 in Hong Kong, this paper shows that private advertisers boycotted a newspaper that adopts a political stance regarded as against the mainland Chinese government policy. To establish causality, I exploit 1). differences in firms' characteristics that reflect their closeness to the mainland government and 2). exogenous outbreak of political events and their intensity to examine the effect of political salience on firms' decisions to place ads on a pro-Democracy (as opposed to pro-Beijing) newspaper. I estimate that the pro-Democracy newspaper suffered from an ad revenue loss equivalent to 33.9% of its total advertising revenue in 2014 due to these mechanisms.

JEL Code: D22, F50, P16

## 1 Introduction

Freedom of press is a constitutional right in many countries, particularly those that are considered democratic. Even so, the media environment in many of these countries can be hostile towards liberal journalists. According to the 2016 annual Freedom of Press report, many democratic countries are rated "not free" or "party free".<sup>1</sup> This leads to the question of how political pressure outside of legislative boundary could find its way to influence media reporting, and to what extent government could wield its power via informal means. This paper sheds light on this question by showing that censorship often works through incentives rather than legal coercion.

By studying the print newspaper advertising market in Hong Kong between 2010 and 2014, I show that private advertisers boycotted a pro-Democracy newspaper as opposed to a pro-Beijing newspaper. I quantify the size of revenue impact on the newspaper by exploring two mechanisms, illustrated in a simple model, that explain advertisers' decision to boycott. The first is identified by time series variation in intensity of the polarized reporting. I show that

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<sup>1</sup>The methodology comprises of questions that could be divided into three broad categories: the legal environment, the political environment, and the economic environment. 'Not free' countries include Malaysia and Mexico, whereas 'partly free' countries include countries like India, Japan and South Korea.

more polarized reporting in turbulent periods led to more aversion to the pro-Democracy media among firms. The second is identified by cross-sectional variation in firms' characteristics. I show that local firms that are politically connected with the mainland Chinese government and mainland firms are more likely to engage in boycott, compared to otherwise similar firms.

The identification strategy of the time series analysis relies on a behavioral insight that consumers' attention tend to be drawn to an attribute which stands out among products (Schkade and Kahneman 1998; Koszegi and Szedil, 2013; Bordalo et al, 2013, 2015). The product is advertising outlet, the attribute is newspaper slant and the consumers are the advertisers in our context. We exploit unexpected outbreak of political events and their intensity to obtain exogenous variation in newspaper slant. The main intuition is that news reports always demonstrate a stronger interpretative narrative that is consistent with the newspapers' underlying political ideology when covering political events. In other words, ideological slant gap implied in the news articles appearing on newspapers representing opposite political stance should diverge when covering political events, but relatively indistinguishable on non-political news such as weather report. We argue that this divergence creates greater awareness on newspaper's ideology and more aversion to the pro-Democracy newspaper among advertisers<sup>2</sup>. One might suggest an alternative explanation which is that under the assumption of improved newspaper-reader ideology match in polarizing times, firms might gain by advertising to readers with a certain political stance only. We addressed this concern by showing that the interaction between industries fixed effects and slant gap do not vary significantly by industry. If firms are driven by improved advertiser-reader match, we would expect industries that target young customers, who are more likely to support Democracy, to shift to Apple, and industries that target older customers to shift to Oriental in turbulent times. This is not the case, and bolsters the interpretation that advertisers are motivated by political concerns.

The basic empirical strategy to establish firms' closeness to the mainland government on their newspaper choice is to compare the newspaper choice of politically-connected and mainland firms with that of otherwise similar firms. The wealth of data allows me to include industry and firm-level fixed effect to control for market-based preference for a particular group of readers. The key assumption is that holding observable firms characteristics constant, connected or mainland companies do not target readers of the pro-Beijing newspaper more. The biggest threat to identification is that readers of pro-democracy newspaper could be significantly different from that of pro-Beijing newspaper, rendering firms' choice of newspaper purely market-based rather than politics-driven. To address this concern, I show that readers' demographic summary is very similar between the two newspapers. Furthermore, there is significant fraction of readers who read both newspapers. It would be difficult to micro-target a specific demographic group by only advertising on one newspaper. However, one might suggest that even in absence of

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<sup>2</sup>Eisensee and Strömberg (2007) and Metzger et al (2016) adopted a similar identification strategy. Eisensee and Strömberg (2007) show that the 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. Metzger et al (2016) use moments of heightened political tension between Russia and Ukraine to assess whether increase in political salience led to increased identification as either "Russian" or "Ukrainian" among Ukrainian citizens.

observable differences in readers demographics, firms' decision may still be justified without invoking the argument that firms are concern about politics . Pro-democracy readers may be bias against connected firms because they might simply dislike the firms' political connection. Connected firms could rationally respond to readers' bias by targeting their ads to the pro-Beijing readers who are more receptive to their ads. I offer two counter-arguments. First, firm's political connectivity is not a salient attribute among readers. Readers need to be motivated enough to look up the board members of the firms and determine whether any of them serve in the mainland government. Second, many of the connected firms are major players in their respective industries and in some cases, there are few to no non-politically connected business alternatives, which makes boycotting connected firms impractical.

We also examined whether connected or mainland companies exhibit extra aversion during polarizing times than other companies. We did not find any significant effect from the interaction of slant gap and firms' connectivity: connected firms were not less likely to advertise on the pro-Democracy newspaper than local firms in polarizing times. There is however evidence that mainland firms are more responsive to polarized reporting. One possible reason for the inconclusive finding is that mainland firms' business are more affected by mainland politics than connected firms, whose business might be more geographically diverse. However, without access to firms' balance sheets, we are unable to say more about how firms' investment affects their newspaper choice. In addition, we found that the local government do not exhibit a preference for the pro-Beijing newspaper, which suggests that economic incentives is a more important channel at play here.

Hong Kong presents several attractive features for the purpose of this study. First, freedom of press is protected by law. This means that political opinions different from that of the government are officially allowed. More importantly, the government cannot directly interfere with newspaper reporting. If freedom of press is not a legal right, newspapers can be easily regulated and there will be no voice from opposition. Second, the political divide in Hong Kong can be projected onto a single dimensional spectrum that spans from pro-Democracy to pro-Beijing, and newspapers' ideology can be ranked on this spectrum. This allows us to follow the methodology of Gentzkow-Shapiro (2010) to quantify polarization by using the text from two newspapers sitting at the opposite sides of the political spectrum.<sup>3</sup> Third, several important political events - including the Umbrella Movement, the largest political unrest in Hong Kong in decades - erupted in our sample period. This provides sources of variation in intensity of political events, as well as variation in newspaper slant gap. Forth, Apple's strong pro-Democracy owner-billionaire allows the newspaper to withstand pressure. This allows

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<sup>3</sup>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. Beattie(2017) uses a text-based method, which also draws inspiration from Gentzkow-Shapiro (2010) to construct an index that captures tone variation of environmentalist and skeptics of climate change.

Apple to report with a pro-Democracy slant even in turbulent periods when tension was high. Absent of that will render it impossible to identify time variation in slant gap.

This study focuses on the print version of 2 paid-for newspapers with the largest readership in Hong Kong: Apple and Oriental. The combined readership of the two newspapers represent approximately 75% of the total readership (including online readership). Apple is widely recognized as a pro-Democracy newspaper whereas Oriental is considered as pro-Beijing. The owner of Apple, Jimmy Lai, is known to be a anti-Communist tycoon and frequently attacked by pro-Beijing critics. He stepped down as the company's Chairman in December 2014, days after he was arrested in the Umbrella Movement. In contrary, owner of the Oriental, Ma Ching Kwan, was appointed to be the member of the 10th and 11th session of PCC, an important political organ of the mainland government.

Our thesis is most comparable to Di Tella and Franceschelli (2011) and Szeidl and Szucs (2017), which empirically illustrate government's intent to capture the media through ad allocation.<sup>4</sup> While their focus is primarily on advertisements by the government and its subsidiaries, we examine advertising patterns of private firms. This is an important distinction. If private firms act independently in accord to government's preference without central coordination, it suggests that government's influence extends beyond its own institutions. While other paper such as DellaVigna et al (2015) also revealed political considerations of private advertisers, the mechanism studied in this paper differs in that it concerns directly with the effect of news content, rather than media ownership, on advertisers' decisions. News content is arguably a more direct channel of influence because news content is intrinsically linked to the information readers receive and can affect meaningful economic outcome such as voting ( DellaVigna and Kaplan 2007).<sup>5</sup> This paper is different in its focus on the effect of newspaper content on advertising decision, rather than the vice versa, which is the emphasis of a large strand of literature that aims to establish causal effect of advertising spending on media content (For example, Reuter and Zitzewitz 2005, Gurun and Butler 2012, Beattie et al 2017, Beattie 2017 etc <sup>6</sup> ). The validity of our design hinges on the newspaper ownership's strong anti-government stance, which is not always available in other context.

The identification strategy of this paper is also closely related to DellaVigna et al (2015), Szeidl and Szucs (2017) which exploits changes in political environment to study the effect of political considerations on advertisers' decision. This work also contributes to the literature on the relevance of firms' political connections (Faccio, 2006; Khwaja and Mian, 2005; Knight, 2007;

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<sup>4</sup> McMillan and Zoido (2004) provided the most direct evidence of media capture by the government. They show the monetary transfer from the Peruvian government to the media companies during Fujimoto's presidency

<sup>5</sup> Work on the effects of news contents on readers 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

<sup>6</sup> The tendency of consumer and advertisers' desire for the same information posts an empirical challenge to identify causal effect of advertising spending on editorial content is due to. Some of these papers including Reuter and Zitzewitz 2005 and Beattie et al 2017 focus on more specific context where the two effect work in opposite direction.

Cingano and Pinotti, 2013; Coulomb and Sangnier, 2014; Luechinger and Moser, 2012). Much of the emphasis of literature is on the financial benefit of political connections. This paper extends this literature by showing that politically connected firms could inherit government's stance and act as extension of the state. The suggested mechanism is also 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 that consumers' attention is drawn to the attribute that stands out from that of the rest of the choices.<sup>7</sup> This paper provides new empirical evidence in a novel context. Finally, the finding of this paper suggests that to the extent that private firms can be captured by government via economic incentives, this view that a large private advertising market can promote media independence warrants caution (Petrova, 2011; Gehlbach and Sonin, 2011 ).

## 2 Institutional Context

The Sino-British Joint Declaration ensures that freedom of speech and press in Hong Kong, among other rights, will be respected for at least 50 years after the transfer of sovereignty. Despite the agreement, there are signs that suggest press freedom in Hong Kong has eroded since 1997. The most telling example is the physical assault on an editor of a liberal newspaper by an unknown attacker in 2014<sup>8</sup>, which caused a chilling effect among liberal journalists. While local journalists saw the attack as effort of the mainland government to rein in Hong Kong's vibrant media, the pro-Beijing camp dismissed any link between the assault and press freedom. Another example is the repeated attempts to downgrade politically-sensitive material in news air time by the exclusive free TV channel (TVB), which critics claimed were act of self-censorship.<sup>9</sup> The annual report by Reporters Without Borders also pointed to these incidents and drastically lowered Hong Kong's press freedom ranking in recent years<sup>10</sup>; the city was ranked 18 in 2002, 58 in 2013, 61 in 2014 and 70 in 2015.

Researchers have noted that in parallel to a growing shadow on the media, politics had become gradually polarized over the same period (Cheng, 2014). One manifestation was the increased occurrence of filibusters in the Legislative Council and large-scale protests compared to the early post-colonial period. Several important examples of large-scale protests in this time period follow. In the second half of 2012, a major political controversy involving the government-backed Moral and National Education (MNE) led many to the street. Student leaders and other opponents believed that the goal of MNE was to brainwash students into viewing the Chinese Communist regime favorably. They launched a protest with more than 100,000 protesters, which led to occupation of government headquarter that last for a few days, and resulting in government's temporary withdrawal of the program. In the last quarter of 2013, HKTV, a content provider started by self-made billionaire Ricky Wong with no political

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<sup>7</sup>See DellaVigna(2009) for a detailed review.

<sup>8</sup>Kevin Lau, the editor of Ming Pao, was stabbed and suffered from serious injuries

<sup>9</sup>For example, coverage of the 20th anniversary of the 4 June Incident was downgraded.

<sup>10</sup>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.

connection, was denied a operation license while other two politically connected companies were granted one. The decision spurred suspicion that HKTV was denied for political reasons, which sparked public outcry and led to tens of thousands protested on the street. In the last quarter of 2014, Umbrella Movement erupted. It was the biggest political unrest in decades and drew tens of thousands of protesters to the street. Many of them were young people who were united by demand for universal suffrage.

## 2.1 Business and Politics

The business sector has been the chief ally of the mainland government in fending off demands for progressive democratization from pro-Democracy politicians since before the transfer of sovereignty (Fong, 2014). The close relationship between business and government could be inferred from the post-colonial institutional design. The chief executive of Hong Kong is elected by an election committee, of which the composition is weighted in favor of the business committee (Ma, 2007). In addition, half of the seats to "Functional Constituency" in the Legislative Council - seats allocated to professional interest group with very narrow electoral base - are allocated to business groups. Business and professionals also made up a large percentage of the major advisory committees, as well as the Executive Council in the government. (Cheung and Wong, 2004; Ma, 2007)<sup>11</sup>. Many business and professional elites in these advisory committees also held seats in the organizations of United Front, which is a mainland initiative to bring different individuals and groups together to rally support for the Chinese Communist Party.

Both politically-connected and mainland firms are more likely to depend on exposure to to the mainland Chinese market than other firms. While there is no systematic study that examines the relationship between political connectivity and firm's investment in mainland, major real estate companies, such as the Sun Hung Kai Properties and the Cheung Kong Property Holdings, are examples of politically connected companies with heavy investment in mainland (Kan, 2016<sup>12</sup>). In our sample period, mainland companies have also become increasingly visible and influential in the Hong Kong economy as mainland capital continued to invest in local economy.

## 2.2 Participation in Mainland Politics

Very few selected Hong Kong residents can participate in mainland politics. The two main government bodies that allow limited involvement are the National People Congress (NPC, 全國人民代表大會) 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. It consists of roughly 3000 delegates, and each delegate serves a 5-year term<sup>13</sup>. There are 36 delegates from Hong Kong, and they are elected by a pre-selected group of members. The PCC is a political advisory body. Unlike the NPC, the PCC does not have actual legislative

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<sup>11</sup>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)

<sup>12</sup>This paper collected statistics on the land bank of Hong Kong real estate developers in mainland.

<sup>13</sup>The number of delegates varies slightly in each session.

power. Nevertheless, it is an important political organization with the stated goal to "bring 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 backgrounds to secure the continuing ruling of the Chinese Communist Party. To that end, Hong Kong delegates of the PCC have varied professional backgrounds including 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.

## 2.3 Newspaper Market

The print news market in Hong Kong is vibrant. Despite the high internet penetration rate and the growing popularity of internet news sites, traditional paid-for newspapers remained a major source of information for locals in the sample period. There are 7 major paid-for newspapers in a city of 7 million population. Aside from Apple and Oriental, Economic Times, Economic Journal, Ming Pao, Sing Tao and the Sun all have a non-trivial fraction of overall readership but their market share is significantly less than that of the two major newspapers.<sup>14</sup> On the ideology spectrum, Ming Pao leans moderately toward pro-Democracy while others adopt a more pro-Beijing stance. Despite the popularity of the two newspapers, neither is known for its credibility as an information source: Apple was ranked 15 out of the 17 newspapers in 2010 in a newspaper credibility survey while Oriental was ranked 9<sup>15</sup>

Turning to the readers, unlike the US, periodic subscription is not a common form of purchase. Most readers purchase a copy from local news vendor on the street every day. This means that daily readership fluctuates and neither the exact size nor the demographic composition of readership is known to the advertisers and the newspapers in advance. Furthermore, many readers are exposed to more than 1 newspaper. Table 1 shows that about 19% of Apple's readers also read Oriental but it is unclear how many of them purchase both. These features of readers' habit suggest that it is difficult for advertisers to forecast readership on a specific day with high confidence.

Most paid-for newspapers were sold at a cover price of \$7HKD (less than \$1 USD) in 2014. The price was raised from \$6HKD to \$7HKD in 2013 by Apple, Oriental and the Sun on the same day, and the decision was soon followed by other newspapers. This suggests the possibility of price collusion and that price is not the distinguishing factor that newspapers use to compete for readers. According to Sing Tao Daily's online advertising rate card, the newspaper requires at least one week notice in order to cancel a previously-placed advertisement.<sup>16</sup> This means that an advertiser cannot easily cancel an ad reservation in response to the news report published on the day before the date the advertisement is scheduled to appear. However, an advertiser can respond to the news report today when trying to decide where to put an ad tomorrow. This affects our decision in choosing the window size for the time unit measurement of

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<sup>14</sup>the Sun has ceased publication in April, 2016.

<sup>15</sup>[http://www.com.cuhk.edu.hk/ccpos/en/research/Credibility\\_Survey%20Results\\_2010\\_ENG.pdf](http://www.com.cuhk.edu.hk/ccpos/en/research/Credibility_Survey%20Results_2010_ENG.pdf)

<sup>16</sup><http://std.stheadline.com/daily/upload/singtao.pdf>

slant. A key determinant of advertisers' newspaper choice is ad price. In Hong Kong, ad prices are usually set in the beginning of the year and are committed by the newspapers throughout the year.

### 3 Illustrative Model

This section considers a highly stylized supply and demand model of newspaper advertising to illustrate the equilibrium effects on ad prices and ad share due to firms' characteristics and their salience to newspaper's political stance. The demand side depicts firms' choice between two newspapers: Apple (A) and Oriental (O). Firms' choice is affected by their salience to newspapers' political stance and their relation to the PRC government. The supply side assumes Bertrand-Nash competition between the two newspapers and ad price is the only decision variable.

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<sup>17</sup>, which includes politically connected firms and mainland firms in the empirical section. Each firm runs one ad on the chosen newspaper. We assume that advertising is always more beneficial than not advertising, regardless on which newspaper of the ad appears. Firm  $i$  receives a random economic benefit  $e_{ij}$  for reaching the readers of newspaper  $j$ . Economic benefit differs across firms because the quality of the match between firms' target audience and newspapers readers can vary across firms, and is unknown to the researcher.

Firms pay the fixed ad price  $p_j$  for running an ad on newspaper  $j$ .<sup>18</sup> 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  $\nu$  on Beijing-friendly firms when they advertise on Apple. This cost could be interpreted as a costly signal needed to demonstrate loyalty to Beijing (Spence, 1973), and is necessary to ensure future economic benefit such as access to profit-enhancing information and asset.

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, Beijing-friendly firms could potentially enjoy a political benefit by advertising on Oriental and the interpretation of  $\nu$  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 is the only newspaper with a strong pro-Democracy stance. Second, none of the pro-Beijing

<sup>17</sup>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. From the government's perspective, there is a potential trade-off in providing economic benefit for the firm and gaining loyalty from them.

<sup>18</sup>I assume that prices are the same for all firms and that there is no quantity discount.



newspapers is owned by government officials in Beijing, and advertising on them does not buy political favors directly.

As discussed in section 2, firms in Hong Kong are generally wary of being seen as pro-Democracy. To model that, we assume that all firms derive disutility from advertising on Apple, and the level of disutility depends on the firms' political salience and newspapers' ideology. Political salience is determined by news report slant, while ideology is news-invariant. In this setup, firms have a preference for Oriental even in periods with no political event because Apple's pro-Democracy ideology is already ingrained in the public's mind. Denote the news report slant of newspaper  $j$  as  $\theta_j$ . The larger the  $\theta$  the more pro-Democracy the news report slants towards. We represent the underlying ideology of Apple and Oriental by  $\bar{\theta}_A$  and  $\bar{\theta}_O$ , and  $\bar{\theta}_A > \bar{\theta}_O$ . Given all of these, the neutral and Beijing-friendly firms' indifference condition between the two newspapers can be described as follows:

$$e_{iA} - p_A - \theta_A - \bar{\theta}_A = e_{iO} - p_O - \theta_O - \bar{\theta}_O \quad (1)$$

$$e_{iA} - p_A - \nu - \theta_A - \bar{\theta}_A = e_{iO} - p_O - \theta_O - \bar{\theta}_O \quad (2)$$

The first equality implies that even when the news report slant is the same between two newspaper, Oriental is still more attractive to advertisers than Apple because of its ideology. The second equality implies that it takes a larger economic benefit from advertising on Apple for Beijing-friendly firms to advertise on Apple relative to the neutral firms. Note that demand for Oriental will also suffer if their reporting becomes more pro-Democracy holding Apple's slant constant. The equalities also imply that the larger the slant gap ( $\Delta\theta \equiv \theta_A - \theta_O$ ), 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 firms' newspapers choice if both newspapers slant towards the same direction. Increasing contrast in news report slant, however, sway firms away from Apple. That consumer salience increases with contrasts in options has been highlighted 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. In particular, a pro-Democracy newspaper might engage in self-censorship and report in milder language, while the pro-Beijing paper would use more intense pro-Beijing language to win ads. While the exogeneity assumption in the model is made for convenience, it should be noted that our identification strategy does not require the newspapers to report in the same degree of slant as if politically-induced advertising pressure is absent, which is impossible to verify empirically. All that is required for identification is that newspapers, under a fixed perceived underlying ideology, to report with more slant that are consistent with their ideology in politically turbulent periods than in regular periods. And since the occurrences of political events are exogenous, the slant gap over time is also exogenous. This is a reasonable assumption since newspapers still have to fulfill the role of information provider: they cannot squeeze strong political sentiment into its news report in regular periods.

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

$$S_{NO} \equiv \frac{p_A - p_O + \Delta\theta + \Delta\bar{\theta} + \delta}{2\delta} \quad (3)$$

$$S_{BO} \equiv \frac{p_A - p_O + \nu + \Delta\theta + \Delta\bar{\theta} + \delta}{2\delta} \quad (4)$$

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

On the supply side, our view is that advertising space on newspaper is flexible and can be easily adjusted to accomodate fluctuation in ad volume; there is no capacity constraint such that newspapers can print as many pages as needed,<sup>19</sup> and there is no minimum ad quota to fill. I model ad 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 each other 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 polarization over the period such that price is set correctly to reflect how political climate affects demand. Given these assumptions, Apple and Oriental choose ad price to maximize the following profit functions respectively:

$$\begin{aligned} \pi_A &\equiv p_A [r(1 - S_{BO}) + (1 - r)(1 - S_{NO})] \\ \pi_O &\equiv p_O [r(S_{BO}) + (1 - r)(S_{NO})] \end{aligned}$$

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 ad price. The equilibrium share can be obtained by evaluating equations 3 and 4 at the respective equilibrium ad prices.

$$\begin{aligned} p_O^* &= \delta + \frac{r\nu + \Delta\theta + \Delta\bar{\theta}}{3} \\ p_A^* &= \delta - \frac{r\nu + \Delta\theta + \Delta\bar{\theta}}{3} \\ S_O^* &= \frac{1}{2} + \frac{r\nu + \Delta\theta + \Delta\bar{\theta}}{6\delta} \\ S_A^* &= \frac{1}{2} - \frac{r\nu + \Delta\theta + \Delta\bar{\theta}}{6\delta} \end{aligned}$$

Ad price is sticky in the short run because newspapers have to commit to its price set in the beginning of the time period. Therefore ad share is the only moving variable if we vary other parameters. Holding ad price constant, the model predicts that an increase in occurrences and

<sup>19</sup> In contrary to TV commercials studied in DellaVigna et al (2015) ad spaces on newspapers are much more flexible since editors can rearrange news stories to fit however many number of pages needed to fit all advertisements.

intensity of political events leads to a fall in Apple's ad share. In the medium run, newspapers can adjust prices and the model predicts that an increase in political events will lead to wider price gap and ad share gap also diverges. In the empirical section, we test the following specific predictions:

- 1 Apple's ad share drops relative to Oriental in politically polarizing periods.
- 2 Ad price gap increases in politically polarizing periods.
- 3 Beijing-friendly firms are less likely to advertise on Apple relative to Oriental in all periods.
- 4 All firms are less likely to advertise on Apple in politically polarizing periods.

The simple framework outlined here provides a useful way to organize our empirical analysis. Since our data does not contain variation in readership composition over time, our model does not explore reader's potentially endogenous newspaper choice to slant. In richer models, readers can become more salient to the newspapers' political stance in turbulent times. They might be more likely to read the newspapers when big news happened. And if the underlying population purchases more copies of Apple in turbulent times, the economic benefit of advertising on Apple will increase for firms. Our model prediction will then underestimate the cost of political salience imposed on Apple.<sup>20</sup>

## 4 Suggestive Evidence

A crude way to assess whether Apple was discriminated against relative to Oriental is to examine the companies' stock price. Figure 4 shows the stock prices movement of the two corporations that own Apple (Next Digital) and Oriental (Oriental Press), as well as the Hong Kong Heng Sang Index over the sample period. While both corporations under-performed relative to the market, 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, and experienced larger volatility in this period.

Another way is to examine Apple's revenue composition over time. More readers should be associated with more advertising revenue so the proportion between these two sources of revenue should be relatively stable. Table 2 presents the revenue composition between newspaper sales and advertising for Apple, taken from Apple's annual investor report. Advertising revenue in 2014 reduced to approximately 1/2 of that in 2010 whereas readership revenue in 2014 was 68% of that in 2010. In addition, fraction of advertising revenue to total revenue fell by almost 6% between 2013 and 2014 alone. The fall in Apple's advertising revenue composition relative to overall revenue suggests that economic factors might not be fully accountable for Apple's financial woes.

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<sup>20</sup>This benefit from advertising on Apple to firms is likely to be unevenly distributed across firms. Firms that target a pro-Democracy demographic group, which are more likely to be younger, will benefit whereas firms that target older consumers may be less well-off.

To illustrate that other pro-Beijing newspaper did not experience the same downward trend in ad share as Apple did, I separately plot the ad share of Apple and Sing Tao relative to Oriental, defined as the ratio of the number of ads on Apple and Sing Tao to Oriental, over the sample period in figure 1 and 2. Sing Tao is another pro-Beijing newspaper but has a much a smaller readership. The figure shows that Apple's ad share has a downward trend while Sing Tao's remains flat. In particular, Apple's ad share declined consistently in 2014 when the political climate was most polarized.

## 5 Data

### 5.1 Advertising

Our ad dataset contains all newspapers ads between 2010 and 2014. It is made available by a Hong Kong-based private company, Wisers, whose main business is to produce market intelligence for businesses. We exclude tender, announcement, events promotion and obituary because they are often ran by individuals rather than companies. All ads that were posted by the newspapers themselves are also discarded. The information for each ad includes the ad headline, date of the ad, the industry(s) that the ad product(s) belongs to, the company(s) that sells the ad product(s), and the section of newspaper that the ad appeared.

I merge the ads dataset with a company information dataset that I constructed by matching the company name.<sup>21</sup> In the company information dataset, I classify a company as "Local", "Foreign" or "Mainland" based on the company's headquarter location by manually looking up the headquarter location from the companies' website.<sup>22</sup> I also classify an organization as "listed on Hong Kong Stock Exchange (HKSE)", "for-profit", "not-for-profit" or "government agencies" based on other publicly available information. Finally, I look up the mother company of the advertiser.<sup>23</sup> Based on Wisers' classification, there are 17 possible industries assignment.<sup>24</sup> 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 count an ad by the unique combination of the ad headline and the date for which the ad appeared. An ad with the same headline could appear on multiple days, and would be considered as different ads. Since we do not observe ad size, an ad with the same headline appearing on the same date with different size on different newspapers would still be considered the same ad. We count an ad assignment by unique combination of an ad (defined above) and the company associated with the ad. As an example, a cell phone ad associated with both the cell phone carrier company and the manufacturer company have two ad assignments.

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<sup>21</sup>Since there is variation in company names across the datasets, I perform fuzzy match using the library *difflib* in Python and manually verified the quality of the match.

<sup>22</sup>Companies from Taiwan are classified as "Foreign" whereas Companies from Macau are classified as "Mainland"

<sup>23</sup>In most cases, Wisers lists the owner of the brand and I cross check to make sure the mother company is correct

<sup>24</sup>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 116954 ads, 15666 firms, 13757 mother firms, and 300607 ad assignments. On average, there are 1.77 companies, and 1.23 industries assignment per ad. 32604 ads have a HKSE-Listed advertiser assignment. 41248 ads have at least one or more foreign advertisers, but only 4520 ads have at least one or more mainland advertisers. 968 ads are related to the government, and 2569 have at least one or more not-for-profit organizations. Over the sample period, there are 27312, 25939, 22456, 22568, 18679 ads in each year between 2010-14. Finally, only 4899 unique ads appear on both Apple and Oriental.

## 5.2 Politically Connected Advertisers

Following the literature on political connection (Faccio 2006, Khwaja and Milan 2005, Acemoglu et al 2014), I classify a HKSE-listed firm as "connected" to Beijing if at least one of the mother firm's board members appears on the list of connected individuals. I identify the board members through the list of board directors from the Hong Kong Exchange and Clearing Limited.<sup>25</sup> The list of connected individuals consists of all Hong Kong representatives of the NPC and PCC from the 9th to 12th session. The 9th congress was in session from 1998 to 2003, and each session is 5 year long. Hence, the members list only includes members selected after the 1997 transfer of sovereignty. In total, there are 73 NPC members, and 264 PCC members. Since there are overlapping members between the NPC and PCC, the combined list results in 331 unique individuals after removing duplicates.<sup>26</sup>

There are many business conglomerates in Hong Kong, and they play an important role in major industries. The presence of these business conglomerates means that despite the relatively few number of connected individuals, these connections can spread through the web of business empire and have a large effect on newspapers' advertising revenue. For example, both 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 (CEO: Li Ka-Shing) parents the Hutchison Group (telecommunications) and Watsons (A large retail chain in Hong Kong) among others. These children companies are all major players in their respective industries.

For advertisers that are not listed on the HKSE, there is no formal way to identify their ownership information. Instead, I gathered the profile of the list of connected individuals from the official website of their respective organizations (NPC and PCC ).<sup>27</sup> The online profile has the occupation and outside positions of each member. However, this information is incomplete

<sup>25</sup>[http://www.hkexnews.hk/reports/dirsearch/dirlist/directorlist\\_c.htm](http://www.hkexnews.hk/reports/dirsearch/dirlist/directorlist_c.htm)

<sup>26</sup>The list excludes representatives of other provinces who are Hong Kong residents. 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.

<sup>27</sup> 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 :

[http://www.npc.gov.cn/npc/gadzbz1/xgdbz1\\_11/node\\_8514.htm](http://www.npc.gov.cn/npc/gadzbz1/xgdbz1_11/node_8514.htm)

<http://www.cppcc.gov.cn/CMS/icms/project1/cppcc/wylibrary/wjWeiYuanList.jsp>

since many individuals have multiple affiliations but the online profiles usually list the primary affiliation only. I then check whether the businesses and organizations associated with the profiles appear on the ads dataset.

In summary, there are 20032 ads that have at least one or more connected advertiser. Table 5 shows the total number of all and fraction of connected ad assignments by industry. The "Banking" industry has the most ad assignments, followed by the "Travel", "Retail" and "Restaurants" industries. The percentage of connected ad assignments within each industry varies. The "Insurance" industry has 29% of connected ad assignment - the highest among all industries -, followed by "Telecommunications", "Banking" and "Real Estate".

Figure 6 shows the breakdown of ad assignments by firm characteristics.<sup>28</sup> Foreign companies are responsible for over 80,000 ad assignments as opposed to less than 10,000 ad assignments from mainland companies. Less than 10% of the foreign ad assignments are connected. In contrast, the percentage of connected ad assignment is over 60% among HKSE-listed ad assignments, which accounts for over 60,000 ad assignments in total.

Figure 7 plots the percentage of connected ad assignments in each quarter by newspaper. In all but one quarter, the percentage of connected to total number of ad assignments is higher on Oriental. The gap appears to be bigger in the first half of our sample period. There is no visible trend over time. Figure 8 shows a similar plot for mainland ad assignment. The percentage of mainland ad assignments to total ad assignments at each newspaper is higher at Oriental in all quarters. Notably, the gap between the two newspapers diverges in 2014.

### 5.3 Readers' Demography

The 2014 AC Nielsen's media index summarizes the readers demographics of the two newspapers, as presented in table 4. AC Nielsen surveyed over 6000 individuals of the Hong Kong general population aged 12-64. The samples are weighted to the population of Hong Kong based on government statistics, making the sample representative to the 7 million residents in Hong Kong. The average reader of Oriental is slightly older while the average household income is very close between the two newspapers. Both newspapers have slightly more than 1/3 of their readers living in government housing.<sup>29</sup> The percentage of readers who have completed university or above is 5% higher at Apple. Given the 1). slight difference in readers' demography between the newspapers and 2). a significant fraction of readers who read both newspapers (noted in previous subsection), it would be difficult for firms to isolate a certain population segment by just choosing one newspaper over another.

A limitation of the readership dataset is that the exact date of the survey is not recorded and therefore, we cannot estimate if and how readership is affected during politically-polarized dates. However, as previously mentioned, the day-to-day fluctuation in readership and its composition is also unknown to the advertisers in advance, and hence should not be factored into

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<sup>28</sup>Remember ad assignment is different from ad

<sup>29</sup>Government housing residents are in general poorer compared to the average population.

their short-term advertising decision. However, rational advertisers can still form expectation on future readership using past data.

## 6 Measuring Slant Gap

I follow the methodology of Gentzkow and Shapiro (2010) to quantify slant gap between Apple and Oriental in each quarter. The main idea is to compare the relative frequencies of the most "ideology-telling" phrases in the two newspapers with that of the relative frequencies in the reference pro-Beijing and pro-Democracy rhetoric. These "ideology-telling" phrases are phrases that are indicative of the political stance of the user. For example, one would expect the reference pro-Beijing rhetoric to use words such as "stability" more heavily and reference pro-Democracy rhetoric to use words such as "freedom" and "justice" more often to emphasize on the values that they represent.

The main input of the slant measure is the front-page articles that appeared on Apple and Oriental between 2010 and 2014. Access to the newspapers archives is provided by Wisers. Other inputs to the slant measure are the editorial of the Hong Kong version of Wen Wui daily and the newspaper column "Law and Politics" ( Chinese: 法政隨筆 ). They are used as the reference Pro-Beijing and pro-Democracy rhetoric respectively. Wen Wui Daily is a state-owned newspaper. It is controlled by the Liaison Office of the mainland government, and is often regarded as the mouthpiece of the Chinese Communist party. The official editorial is published daily (sometimes multiple editorials are posted in a day) and is publicly available on their website. I wrote a Python script to scrape all editorials from the newspaper's website.

"Law and Politics" is written by 7 pro-Democracy politicians/lawyers. The column has been published daily on Ming Pao since 2003. The contributors include Margaret Ng, Audrey Eu, Ronny Tong, Alan Leong, Gladys Li, Johannes Chan, Martin Lee, Albert Ho and Benny Tai.<sup>30</sup> Many of them belong to the pro-Democracy political party, the Civic Party. Notably, Benny Tai - the initial advocate of "Occupy Central" movement, which later became the umbrella movement, has contributed to the column since 2011.<sup>31</sup>

The computed-assisted processing of Chinese language only differs from that of English slightly. The first step involves removing all numbers, punctuation, and non-Chinese words from the text. Because the Chinese language does not have white space between words like English, we have to apply a procedure to parse sentences into meaningful phrases (We consider bi-gram, tri-gram and quad-gram as phrases made up of two, three and four Chinese characters respectively.). This is done by implementing an existing package (rwordseg) in R. For this step, we supplement the package with a list of words that are specific to Hong Kong usage because local dialogues and newly created phrases do not exist in the dictionaries that come with 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

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<sup>30</sup>Some authors dropped out and others joined during the sample period.

<sup>31</sup>Most articles are writted in Chinese, and I excluded all articles written in English.

whether some phrases should be joined together. For example, many names of the government officials were not recognized by the script, so I added them to the dictionary. Second, I wrote a script to concatenate unigram into bi-, tri- and quadgram, and rank them by the frequency they appear. I then manually check whether these high-frequency terms represent any meaningful phrases. If so, these high-frequency terms are added to the dictionary.

## 6.1 Selecting Phrases

The next step is to select the phrases that most likely contain ideological valence. Let  $f_{plw}$  and  $f_{pll}$  denote the total number of times phrase  $p$  of length  $l$  used by Wenwui and Law and Politics, respectively. And let  $f_{-plw}$  and  $f_{-pll}$  denote the total occurrences of length- $l$  appeared in by Wenwui and Law and Politics that are not phrase  $p$ . We compute the Pearson's  $\chi^2$  statistic for each phrase:

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

Pearson's  $\chi^2$  statistic is a test statistic for the null hypothesis that a phrase is equally likely to appear in Wenwui and Law and Politics. A large Pearson's  $\chi^2$  suggests that the phrase is unlikely to be in both, and would therefore imply high ideological valence.

For each period, I rank the phrases by their Pearson's  $\chi^2$  and identify the top 80 phrases with the largest  $\chi^2$ . The 80 phrases can be of any combinations of bi-gram, tri-gram and quad-grams.<sup>32</sup> There is nothing in this procedure that guarantees equal number of "ideology-telling" phrases from both sides. In the appendix I show the distribution of the number of pro-Beijing and pro-Democracy phrases over the sample period.<sup>33</sup>

Table 5 shows the phrases that are more heavily used in pro-Beijing rhetoric by quarter. Table 6 shows a similar table for Pro-Democracy phrases. Many phrases in the tables are for what our intuition would say are chosen to express the users' ideological leaning. For example, the economy and foreign relations are emphasized more in the Wenwui editorials. In 2011, phrases such as "Development", "Economy", "Financial Crisis", and "United States" are among the most pro-Beijing phrases. In contrary, "Ai Weiwei" (A famous Chinese artist and dissident), "Election", "Democracy" and "Freedom of Press" are among the most pro-Democracy phrases in this period. The emphasis changes over time for both references. In quarter 4 of 2014, Wenwui made its view on the "Occupy Central" movement clear by using phrases such as "Law-Violating Central Occupation". It also uses phrases such as the "police" and "Basic Law" to emphasize the need to bring law and order back. In contrary, the pro-Democracy phrases in this period includes "Civil disobedience" to justify the morality and legality of the occupation and emphasize the government's wrongdoing.

<sup>32</sup>Gentzkow and Shapiro (2010) use equal number of bi-grams, tri-grams 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.

<sup>33</sup>There is consistently more pro-Democracy phrases than pro-Beijing phrases identified by this procedure. 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-Beijing phrase will always be lower.



## 6.2 Mapping Phrases to Slant

The list of 80 phrases gives us a basis to evaluate the slant of the news report in each period. We next compare the frequencies of these phrases used in the reference rhetoric and the news report. For each quarter, I index the phrases by  $p \in \{1...80\}$  (Ignore phrase length, quarter for convenience of notation.). Let  $f_{pn}$  denote the frequency of phrase  $p$  on newspaper  $n$ . We also let  $\tilde{f}_{pw} \equiv f_{pw} / \sum_{p=1}^{80} f_{pw}$  denote the relative frequency of phrase  $p$  in the Wenwui editorials in each period.  $\tilde{f}_{pl}$ , the relative frequency of phrase  $p$ , is defined similarly for phrases in the Law and Politics column. We estimate slant in each period separately for the two newspapers as follows:

- i For each phrase  $p$ , calculate the difference in relative frequencies between Law and Politics and Wenwui:  $\Delta \tilde{f}_p \equiv \tilde{f}_{pl} - \tilde{f}_{pw}$ .
- ii Regress the relative frequencies of the selected phrases in newspaper  $n$   $\tilde{f}_{pn}$  on  $\Delta \tilde{f}_p$ . The slope estimates, which is our estimate of slant, gives:

$$\theta_n = \frac{\sum_{p=1}^{80} \Delta \tilde{f}_p \tilde{f}_{pn}}{\sum_{p=1}^{80} \Delta \tilde{f}_p^2} \quad (6)$$

This approach is a slight variation of Gentzkow and Shapiro (2010). Gentzkow and Shapiro (2010) uses speech by all congressmen as references and therefore need to account for their individual ideological leaning separately. We bypass this step because we have a single reference for each end of the ideology spectrum.

To illustrate the working of the slant estimate, note that the larger the difference of the relative frequencies  $\Delta f$  of a phrase, the more pro-Democracy the phrase implies. If the news report uses that phrase more often, the slant estimate of the newspaper will become more positive. Slant gap is calculated by subtracting the slant of Oriental from the slant of Apple ( $\Delta \theta = \theta_A - \theta_O$ ). In politically turbulent periods, newspapers presumably use more phrases that telling of their political stance. Their word choice would be closer to the respective reference, and further away from each other's reporting, thereby increasing the slant gap.

The evolution of the slant gap between the two newspapers is presented in figure 9. A large difference indicates that the reports in the two newspapers is closer to the respective reference in that period. In all but one period, slant gap is positive, which aligns with the perception that Apple is more pro-Democracy than Oriental. Importantly, periods with large slant gap correspond to periods that intuition would suggest are politically polarizing. For example, slant gap increases sharply in third quarter of 2012, which aligns with the timing of the National and Moral Education controversy. First and second quarter of 2014 also register large slant gap. In these two quarters, the White Paper controversies and the physical assault on the liberal journalist took place. Notably, quarter 4 of 2014, during which the Umbrella Movement happened, has the highest slant gap in the sample period.

It should be pointed out that the slant measure does not tell us whether the newspapers' report slant becomes more extreme in a given period. The reason is that word choices of the

reference rhetoric changed over time. Certain words are ideologically relevant in some periods but not others. One might also reasonably suspect that the set of "ideology-telling" phrases became more polarized in politically sensitive periods, so our measure will underestimate absolute slant gap. In the appendix, we consider a measure of polarization of the reference rhetoric over time to access this possibility.

### 6.3 Validating the Slant Gap Measure

Our premise is that slant gap reflects the concurrent political climate: more intense political events trigger a larger slant gap because the media is presumably compelled to take a stance in their reporting. While we have shown in figure 9 that sharp increases in slant gap are associated with occurrences of high-profile political events, to further validate the measure, we consider a proxy for the intensity of political events: number of protesters on street. While protest is a clear political expression, the number of protesters could convey a sense of the prevalence of dissatisfaction towards the government.<sup>34</sup>

A number of protests erupted in our sample period. While the specific demand of each protest was different, all but one could be classified as expression of government dissatisfaction. We present the estimated total number of protesters (estimated by the public opinion program of Hong Kong University<sup>35</sup>) for each quarter in table 10. The Pearson correlation between number of protesters and slant gap is 0.419 with a two-tailed p-value of 0.066. Since the number of observation is limited to 20 quarters, our result inevitably suffers from a lack of power. Nevertheless, the positive significant correlation between the two time series reassures us that slant gap moves in the same direction as number of protesters.

## 7 Empirical Evidence

The first model prediction says that Apple's ad share falls in politically turbulent periods. To test, we regress Apple's quarterly ad share relative to Oriental on slant gap. Without any controls, the resulting coefficient on slant gap is statistically significant at the 5% level. To investigate heterogeneity of industry responses, I regress Apple's ad share of each of the 16 industries on slant gap. Slant gap has a negative and significant effect in 5 of them: banking, electronics, real estate, restaurants and the telecommunication. For the other industries the coefficient is insignificant, but neither has a positive and significant effect. The result affirms the model prediction that slant gap affects negatively on Apple's advertising. We also regress Apple's ad share on the fraction of Beijing-friendly ads to all ads in each quarter to investigate if fluctuation in Beijing-friendly ads over time affects aggregate ad share. Given that the fluctuation is relatively mild, we don't find any significant effect.<sup>36</sup>

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<sup>34</sup>Acemoglu et al (2014) used a similar approach in estimating the effect of protests in Arab Springs on Egyptian stocks

<sup>35</sup>The website: <https://www.hkpop.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.

<sup>36</sup>The coefficient is 0.67 and the p-value is 0.22

The next model prediction says that ad price between Apple and Oriental diverges in more turbulent times. The first two columns of table 3 show the ad price of a full-color page in the run-of-paper for each year in the sample period.<sup>37</sup> In 2010, Apple's ad price was 81% of Oriental's. The ratio increased to 94% in 2012 but dropped again to 73% in 2014. Despite the increase in price gap in 2014, Apple's relative advertising volume declined considerably. Given the short time series and the absence of individual ad price information in the dataset, we are unable to conduct more systematic empirical analysis but the pattern broadly reflects the model's prediction.

Decline in Apple's readership could potentially explain Apple's falling ad share. I turn to the estimated readership reported in Apple's annual investor report to investigate this possible pathway. Data presented in Apple's annual investor report came from surveys conducted by AC Nielsen.<sup>38</sup> Apple only reports the combined readership of print and online readers but not separately. The numbers are presented in columns 3 and 4 in table 3. In 2010, the total readership was quite close between the two newspapers, but readership of Oriental gradually shrunk there after. In contrary, readership has remained relatively flat for Apple at around 1.5 million total readers. We gather information from 2014 AC Nielsen's media report to understand the newspapers' print and online readers composition. We noted that in 2014, Apple's readers were much more likely to be online readers than Oriental readers: the fraction of total readers who are online readers in Apple and Oriental were 41% and 11% respectively. Hence, it is still possible to conclude that the print version of Apple had become less attractive relative to print version of Oriental to advertisers from an economic standpoint only if we assume that Apple's online readership grew much faster than Oriental in the period.<sup>39</sup>

Next, we test the third model prediction that Beijing-friendly firms are less likely to advertise on Apple in all periods by estimating a logistic regression model. Our data allows for three possible choices :Apple (A), Oriental (O) or both Apple and Oriental (AO). We lumped A and AO into one category to estimate a binary outcome model. We do not use a multinomial logistic regression because 1). we care about Apple being chosen in one way or another and not just exclusively, and 2) the choice categories are not mutually exclusive and therefore violate the IIA assumption.

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

<sup>37</sup>Newspapers charge different prices for ads at different positions, size and color scheme.

<sup>38</sup>Oriental 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 very large number seems dubious and we choose to use the estimate of Apple instead. Another reason we use Apple's estimate is that we have access to AC Nielsen's Media Index 2014 report, and have verified their 2014 reported number. Finally, Oriental only reported the estimated readership for their own, but not the other newspapers.

<sup>39</sup> 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 print 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 print readership (Apple- Oriental) would be 109, 48, -28, -153, -36 in each year. The readership gap of this hypothetical calculation has little correlation with the slant gap in this period.

where  $y_{itq}$  is the newspaper choice of firm  $i$  in quarter  $q$  of year  $t$ .  $c_i = 1$  if firm  $i$  is classified as Beijing-friendly firm, which includes politically-connected, and mainland firms.  $X_i$  is a vector of firm-specific characteristics including the place of origin, whether the firm is a government entity or not-for-profit organization, and industry fixed effects. Industry fixed effects control for industry-specific preference for a certain newspaper. For example, the sports industry might find a pro-democracy paper more attractive because young people are more likely to be supporter of the pro-democracy parties and purchase sports products. The fixed effect will take into account for these market-based preferences.  $\delta_{qt}$  are time controls that include dummies for each quarter in the year, a linear and quadratic time trend. The unit of analysis is ad assignment. We did not use the total number of advertisements per firm as the dependent variable because the ad level analysis allows us to control for ad-specific attributes such as the product of the ad, which might differ across ads for the same firm. Some companies also have businesses in multiple industries, which makes it difficult to control for ad-level industry effect if we use a firm-level dependent variable.

The result is presented in table 7. 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.<sup>40</sup> The HKSE-listed firms are usually larger in size by number of employees and revenue, and have heavier exposure to the mainland market. In columns 1 and 4, I include industry fixed effects. In columns 2 and 5, I additionally include quarter and industry-quarter fixed effects to control for quarter and industry specific preference for a newspaper. In columns 3 and 6, I add a linear and quadratic time trend to control for other time-related variations that can potentially explain the decline of Apple's desirability to advertisers.

The coefficient of "Connect" is negative and significant at the 1% level for all specifications using the full sample. Adding extra industry and time controls does not alter the magnitude of the coefficient significantly and the coefficient remains highly significant. The same pattern holds for mainland firms as well. This supports the model prediction that Beijing-friendly companies are less likely to advertise on a pro-Democracy newspaper. The magnitude of the coefficient of "Connect" in the HKSE-listed firm sample is insignificant. This result suggests that among the listed corporations, being connected does not have explanatory power on individual firms' decision to boycott. On the other hand, listed foreign (mainland) companies are more (less) likely to advertise on Apple compared with other listed firms. In particular, the tendency for foreign firms to advertise on Apple is stronger in the listed sample than the full sample.

To determine the effect in probability scale, we calculate the marginal effects at the median, as shown in parenthesis in the same table. Using the first specification, our result implies that connected companies are 4.4% and mainland companies are 19.4% less likely while foreign companies are 2.0% more likely to advertise on Apple. The result suggests that the aversion to Apple is stronger for mainland companies than connected companies, while foreign companies are more fond of Apple. It is possible that foreign companies are not as aware or

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<sup>40</sup>We do not include control on government, and not-for-profit in the HKSE sample as the sample only have HKSE companies.

concern about the 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. But our analysis does not allow us to separate the two effects.

In table 7, we also show that ads from the local government do not have a strong preference for Oriental over Apple, which suggests that the local government bureaucracy might be more impartial than profit-motivated private firms. While the number of local government ads represents a small portion of the overall ad pool (as shown in table 11) and that local and central government are quite different in nature, the finding stands in contrast to previous evidence that suggests government exchanges favor with the media through ad allocation of government-controlled bodies (Di Tella and Franceschelli (2011) and Szeidl and Szucs (2017)), which underscores the incentive-based mechanism explored in this paper.

It is possible that firms within the same industry target different demographic groups. For example, within the broad restaurant industry, more expensive restaurant might target the affluent population whereas the more affordable fast-food chain might target younger family. While this speaks to the difficulty to control for all market-based preference, which is further complicated by the fact that assigning each ad to specific target demographic group inevitably involves some degree of subjectivity, we argue that 1). the similarity of readers' demographic between the two newspapers, and 2). the fact that significant fraction of readers read both newspapers make this kind of micro-targeting difficult. Furthermore, many ad products or services in our dataset such as travel and banking ads have broad appeal and aim to reach a wide demographics.

The model only yields prediction on firms' choice of newspaper, but not on ad characteristics. In practice, an advertiser can choose different ad specifications on different newspapers. For example, a firm can place a large color ad on newspaper A and a small gray-scale ad on newspaper B, and thereby discriminating newspaper B through the ad specifications it chooses. Our data does not have information on the ad characteristics so our result only captures the extensive margin of firm's choice. However, this concern of intensive margin is more relevant to firms that choose to advertise on both newspapers. Given that only small amount of ads appeared on both newspapers, the extensive margin is the more important margin in our context.

Could the observed pattern a result of Apple's refusal to print 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 the content of their ads are devoid of any political content. Turning away ads from politically-connected companies means turning away ads from a wide array of companies including grocery stores, cell phone carrier...etc. This translates to a large voluntary advertising revenue loss, which is arguable difficult for Apple to justify financially to its shareholders as a company listed on the stock exchange.

We test the last model prediction that firms are less likely to advertise on Apple in politically sensitive periods next. To do that, we estimate the following logit model:

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

This estimating equation is the same as equation 7 with the addition of  $\Delta\theta_{tq}$  and  $c_i \cdot \Delta\theta_{tq}$ .  $\Delta\theta_{tq}$  represents the slant gap in quarter  $q$  of year  $t$  whereas  $c_i \cdot \Delta\theta_{tq}$  represents the interaction between firm characteristics dummy and slant gap.  $\beta_2$  is expected to be negative: the larger the slant gap, the less likely a firm would advertise on Apple.  $\beta_3$  measures the possible differential impact of newspapers' slant gap on firms of different characteristics.

The result is presented in the top panel of table 8. The coefficient of  $\Delta\theta_{tq}$  is negative and significant at 1% level in all 3 specifications, even when a linear and quadratic time trend is included as control. The magnitude attenuates slightly as more controls are added. Using the most liberal specification in column (1), the result implies that one unit increase in slant gap decreases firms' probability of advertising in Apple by 12.5%. To put the number in context, the average slant gap in 2014 is 0.454, which translates to a 5.7% decrease in likelihood to advertise on Apple. Using the HKSE-listed sample, the magnitude of coefficient for all 3 specifications become smaller but the coefficients are still significant at 1%. This means that the effect of slant gap is still significant among larger corporations. The results confirm the model predictions that slant gap negatively affects firms' likelihood to advertise on Apple.

Our slant gap unit of measurement is set to quarterly. As a result of the relatively wide window, the observed advertising decision could happen before a major political event in that quarter took place. To address this issue, we replace slant gap and all the slant gap interaction in equation 8 with one-quarter lagged slant gap in a separate specification. The result is presented in the bottom panel of table 8. In all six columns, lagged slant gap has a negative and significant effect. Comparing these coefficients with those of  $\Delta\theta_{tq}$  in table 8, the magnitude of the effect is stronger among the listed firms when  $\Delta\theta_{tq-1}$  is the independent variable.

Coefficients of interaction between mainland or connected firms and slant gap are insignificant using the contemporaneous slant gap. However, there is weak evidence that suggests the intensity of boycott among mainland firms, but not connected firms, increased during more polarized periods, when lagged slant gap is used as the independent variable and the full sample is used. We interpret this finding as indication that mainland firms are more receptive to media reporting. The finding, though inconclusive, is consistent with previous finding that mainland firms exhibit stronger aversion to than their connected companies counterparts. There is also weak evidence that suggests foreign firms are more likely to advertise on Apple in turbulent times, when using the contemporaneous in the full sample.

To address the concern that firms' response to slant gap is due to improved newspaper-reader ideology match and therefore more efficient ad targeting, we examine the interactions between slant gap and industries fixed effects. If firms are driven by market-based and not political preference, we expect industries that predominately target young (old) customers would respond to slant gap more strongly (lightly) than other industries who have more diverse customer de-

mographics<sup>41</sup>. Age is a strong predictor of political preference, and younger people are much more like to support the pro-Democracy movement than the older generation. To examine this empirically, we modified the estimating equation 8 to also include the interactions of slant gap and industries. The result is presented in table 13 in the appendix. None of the coefficient of the interactions is significant using the most liberal specification, which suggests that neither industry exhibit extra aversion to Apple in turbulent times.

*Persistence of Slant Gap's Effect:* Slanted newspaper reporting in volatile periods could have a lingering impact on firms' decision because advertisers might have a stronger impression on more polarized reporting. To address this, we include both the contemporaneous and lagged slant gap in the logistic regression:

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

The result is presented in table 9. Columns (1) - (3) use the full sample and columns (4) - (6) use the HKSE-listed sample. Both contemporaneous and lagged slant gap are negative and highly significant in all specifications. The magnitude of the coefficients of both contemporaneous and lagged slant gap are greater using the HKSE-listed sample than using the full sample when the same specification is used. Using the full sample, the coefficients of the contemporaneous slant gap is stronger than that of the lagged slant gap. The pattern is less conclusive using the HKSE-listed sample. Nevertheless, the result suggests that newspaper's slant could have lingering impact on firms' choice of newspaper. 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, suggesting that the lagged slant gap is not predictive of contemporaneous slant gap.

We also examined the interactions between contemporaneous and lagged slant gaps with other firm characteristics. In all specifications, the coefficient on the interaction term between mainland firms and contemporaneous slant gap is negative and significant. This provides further evidence that mainland firms exhibit extra aversion during volatile periods. We did not extend our analysis to consider longer lags because of data limitation, but occurrence of larger and more intense political events is likely to have a longer lasting effect than smaller ones.

## 8 Apple's Revenue Loss

We are interested in separately estimating the revenue impact on Apple in 2014 due to 1). a heightened political awareness among all firms and 2). Beijing-friendly firms' preference for Oriental over Apple. To calculate the effect of 1), we use regressions results in table 8 to estimate what ad volume would have been in 2014 if the degree of political awareness remained fixed at its quarterly values in 2010. To calculate the effect of 2), we use the regression results in table 7 to estimate the number of ads on Apple would have been placed by connected and mainland companies if they did not exhibit preference against the newspaper. We focus on 2014 because

<sup>41</sup> An example of a "young" industry is the Education industry. An example of a "old" industry is the Pharmaceutical industry.

both qualitative and quantitative evidences suggest that it is the most volatile year and political concern is expected to have the largest effect on advertisers' decision.

In order to calculate the impact on revenue, we would also need to know the size of ads but that information is absent in the dataset. To circumvent this issue, I collected a smaller, physical sample of 2045 ads from a local public library and manually recorded the size (Excluding tender, announcement, event promotion) and other ad characteristics of the following 10 dates 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 Square Massacre ) and 7/1 (HKSAR establishment date and the annual protest to the government). In addition, this smaller sample is designed to cover different months in the year and only extracted ads from the main news section of the newspaper. The average ad size for 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 0.205 in 2010, and 0.454 in 2014. Slant gap is larger in all quarters in 2014 except quarter 3. Using the estimation result of  $-0.125$  as the probability estimate corresponding to  $\beta_2$  from column (1) in table 8 while holding the industry effects at their means, the increase in slant gap yields a 3.13 percent drop in probability of advertising on Apple<sup>42</sup>. This is equivalent to an ad loss quantity of 330 ads<sup>43</sup>. We then multiply the average ads size and the ad price in 2014 to the ad loss quantity to arrive at an revenue loss of \$HKD 78.2 millions (\$USD 10.0 million).<sup>4445</sup>

*Revenue Impact of Aversion by Beijing-friendly firms* - Connected companies are 4.4% and mainland companies 19.4% less likely to advertise on Apple in 2014 using the first specification in table 7.<sup>46</sup> Connected firms accounts for 15% of total ad, and mainland firm 2.5%. There was a total of 18660 ads in 2014. This translates to a total of 229 ads loss, and a revenue loss of \$HKD 38.2 million (\$USD 4.9 million ).<sup>4748</sup>

Putting the numbers in perspective, the ad revenue loss due to increased political salience amounts to 22.8% of Apple's 343.7 million \$HKD total advertising revenue, and Beijing-friendly firms' political preference contributes to another 11.1%. These two channels sum to 33.9% of Apple's advertising revenue. In an economy where it is increasingly difficult for print media to remain profitable, the financial pressure due to politics on media is sizable, and it could very well persuade smaller newspapers to adopt a more pro-government political stance.

<sup>42</sup> $(0.454 - 0.205) * 12.5\% = 3.13\%$

<sup>43</sup>The combined (Apple + Oriental) ad quantity was 18660 in 2014.  $18660 * 0.0313 = 584$

<sup>44</sup>The revenue impact due to neutral advertisers is :  $584 * .588\text{page} * 1886.8\text{cm}^2 * 120.84\$/\text{cm}^2 = \$\text{HKD } 78,293,689$

<sup>45</sup>Using the most conservative estimate yields an ad loss of  $(0.454 - 0.205) * 12.5\% * 18660 = 258$  ads, which leads to \$HKD 34.6 million (\$USD 4.43 million) revenue loss

<sup>46</sup>The estimates using the most conservative specification are not very different from that of the most liberal specification: 4.2% and 20.7% for connected and mainland companies respectively

<sup>47</sup>The expected number of ad loss due to firms' political connection:  $18660 * 0.15 * 0.044 = 123$  ads, and mainland firms:  $18660 * 0.025 * 0.194 = 91$  ads. Total ad loss:  $123 + 91 = 214$

<sup>48</sup> $214 * .783\text{page} * 1886.8\text{cm}^2 * 120.84\$/\text{cm}^2 = \$\text{HKD } 38.2\text{million}$



An obvious limitation of the above calculation is that endogenous ad price adjustment is not accounted for. Newspapers presumably adjusted the ad price in anticipation of heightened political awareness and to account for the fraction of Beijing-friendly firms in the pool of potential advertisers. Lowering the ad price potentially could mitigate the adverse 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 these two channels.

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. Our regression analysis suggests that foreign firms are more likely to advertise on Apple, but it is unclear whether foreign firms have a pro-Democracy preference or simply reacting to a lower price-to-reader ratio. Finally, readers' interest in Apple might increase in volatile periods, leading to higher revenue from paper sales. But since our readership data is sparse and we do not observe readership composition at different time period, we cannot account for the effect of this possible channel.

## 9 Conclusions

This paper has provided empirical evidence on the effect of newspapers' reporting slant on advertisers' newspaper choice. Using daily advertising data on the two major newspapers in Hong Kong, I have shown that an increase in political salience among advertisers in politically-sensitive periods leads to stronger aversion to advertise on the pro-Democracy newspaper. Furthermore, Beijing-friendly firms exhibit stronger aversion to Apple relative to the neutral firms even in relatively stable periods. Using the regression results, I estimated that Apple suffered from an ad revenue loss equivalent to 33.9% of its total advertising revenue in 2014 due to these two channel. Accounting for endogenous price change will likely amplify the effect of political reasons on Apple's advertising revenue because Apple 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 where large businesses share cozy relationship with the government (e.g. South Korea<sup>49</sup>) or owned by the government (e.g. China, Italy or Hungary). 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 a more dominant information channel.

As a closing note, this paper did not address whether increasing advertising pressure could lead

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<sup>49</sup>Schoenherr documented that politically connected firms in South Korea allocated contracts in favor of firms from the same connected network.

to an intensification of self-censorship. This is an important question left for future research.

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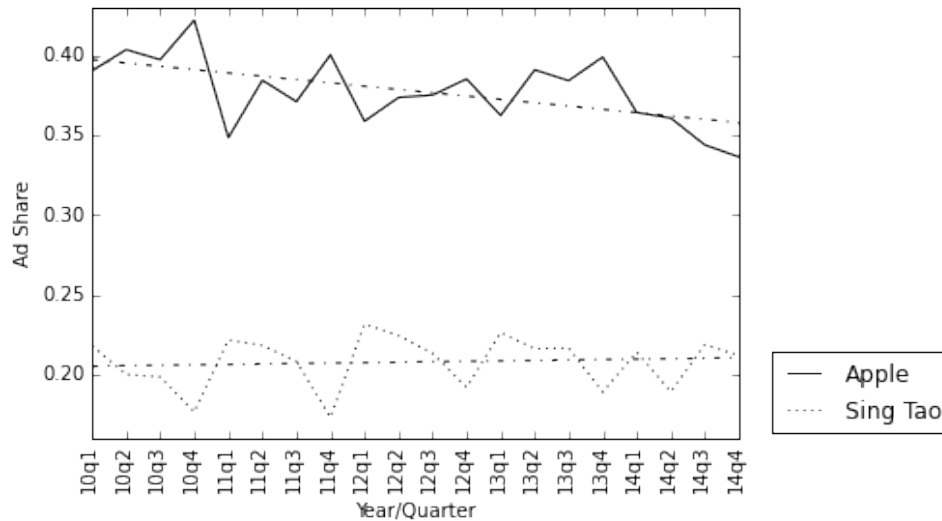
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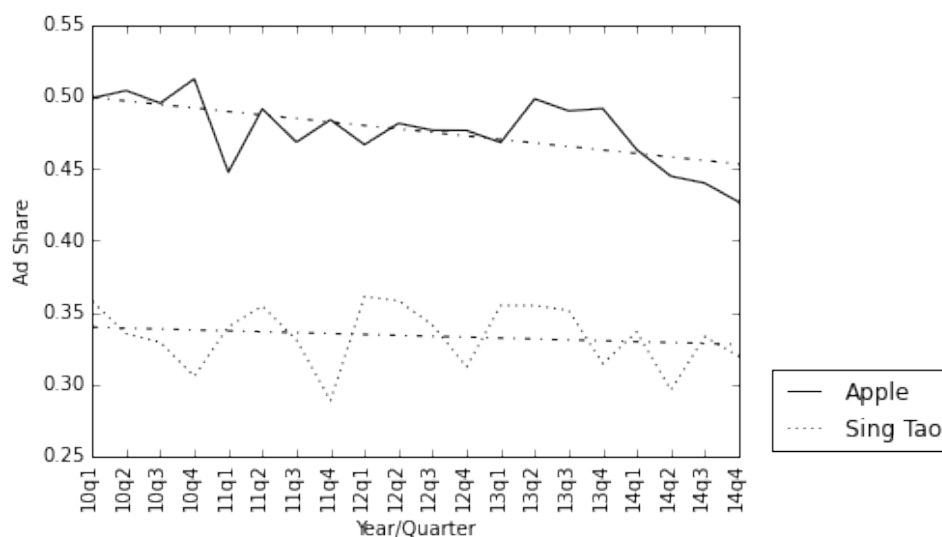
## 10 Figures and Tables

Figure 1: Ad Share on print version of Apple 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 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

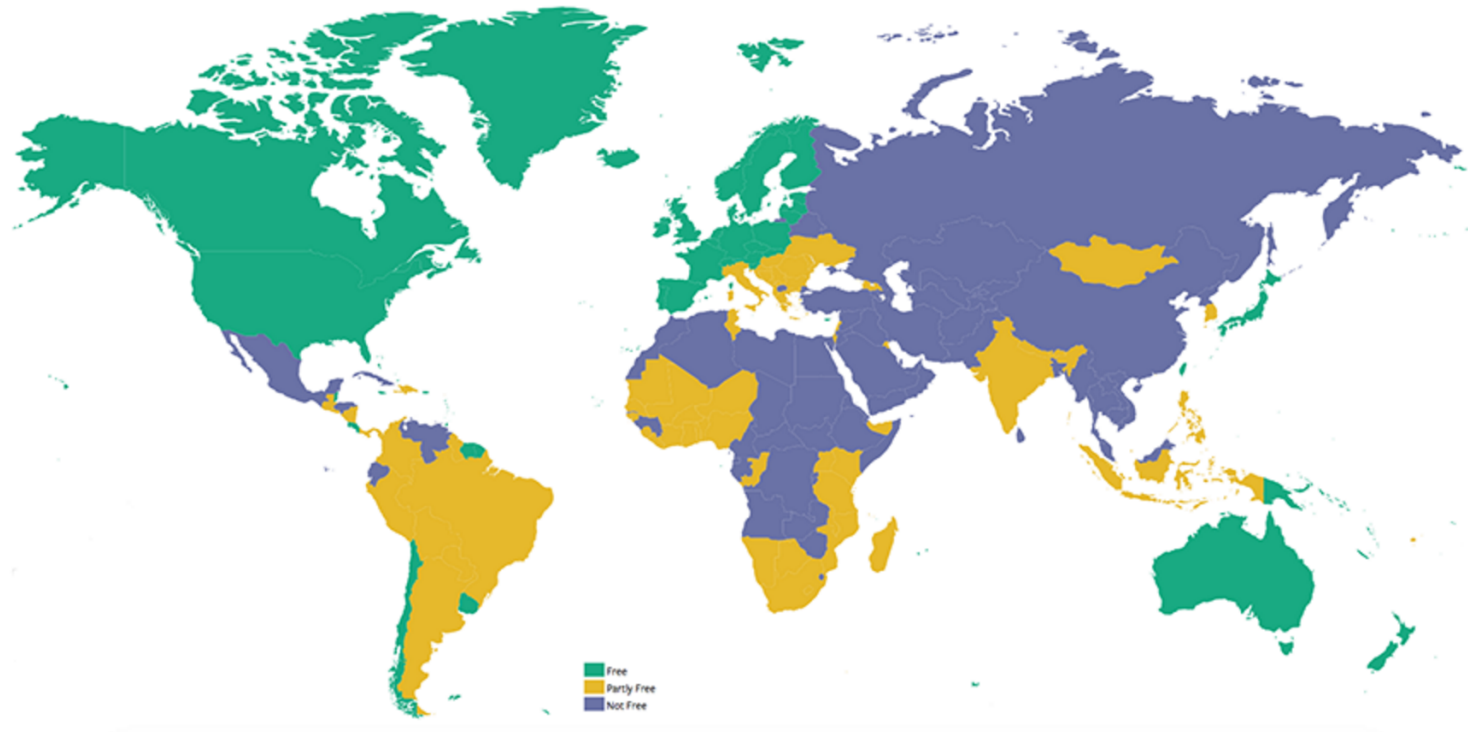




Table 1: Readership ('000) in 2014 (Including online readership)

	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 (Next Digital, Ticker: 0282) and Oriental (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's stock price in 2012 corresponded to the sale of its Taiwanese subsidiary.

Table 2: Apple'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 ad assignments and ads assignments placed by connected organizations in each industry.

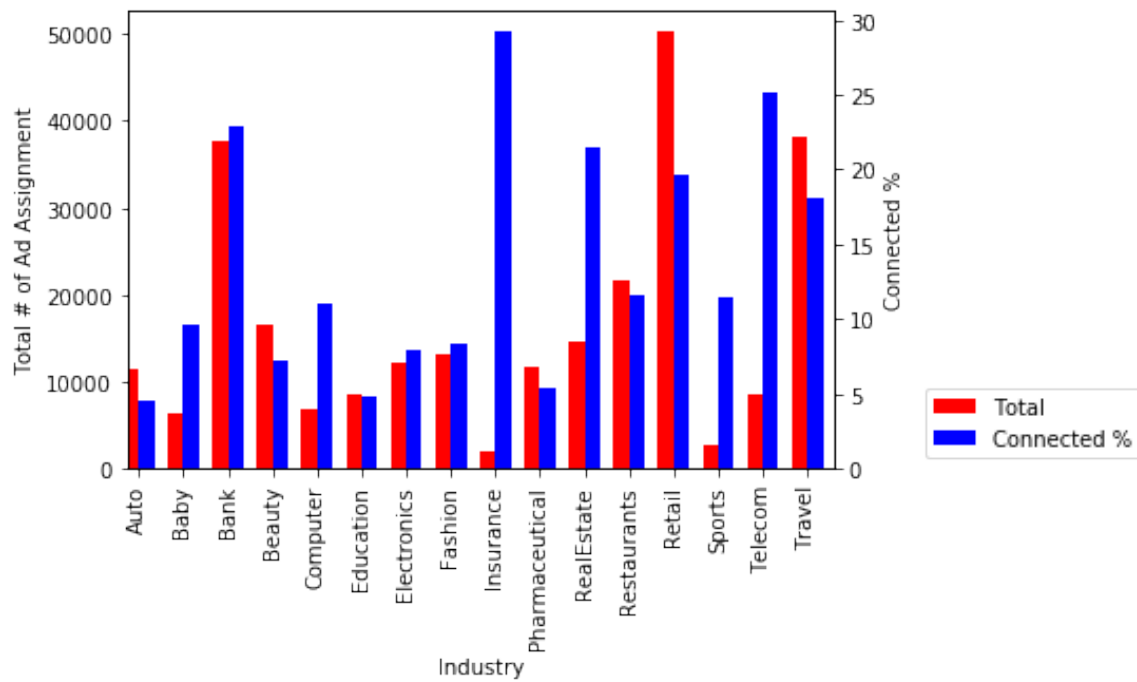


Figure 6: Ad Assignment by company characteristics

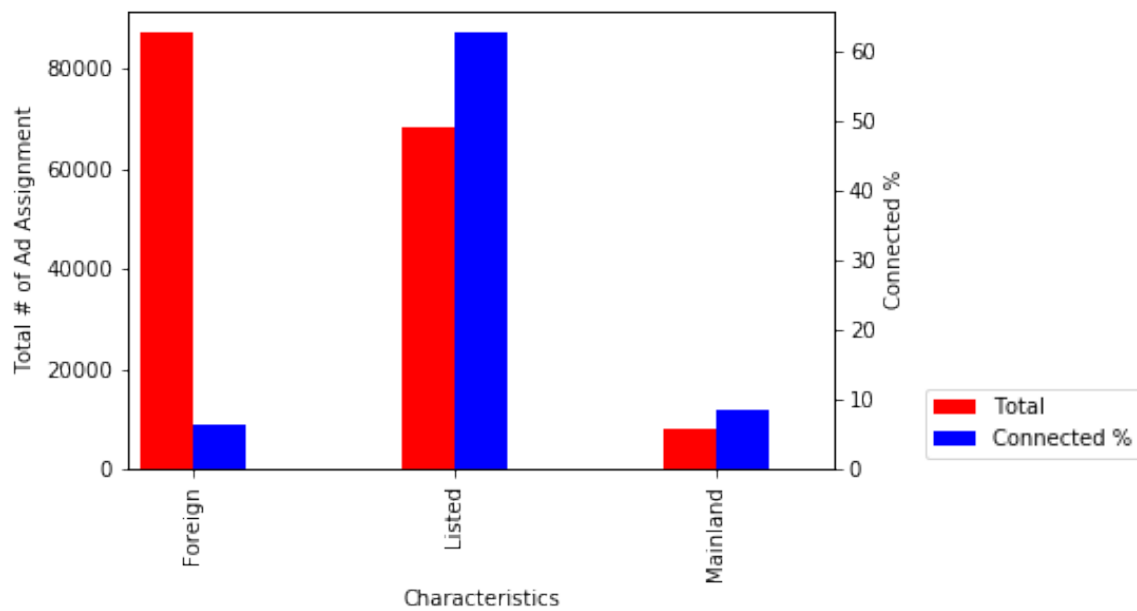


Figure 7: Percentage of Connected Ad Assignment

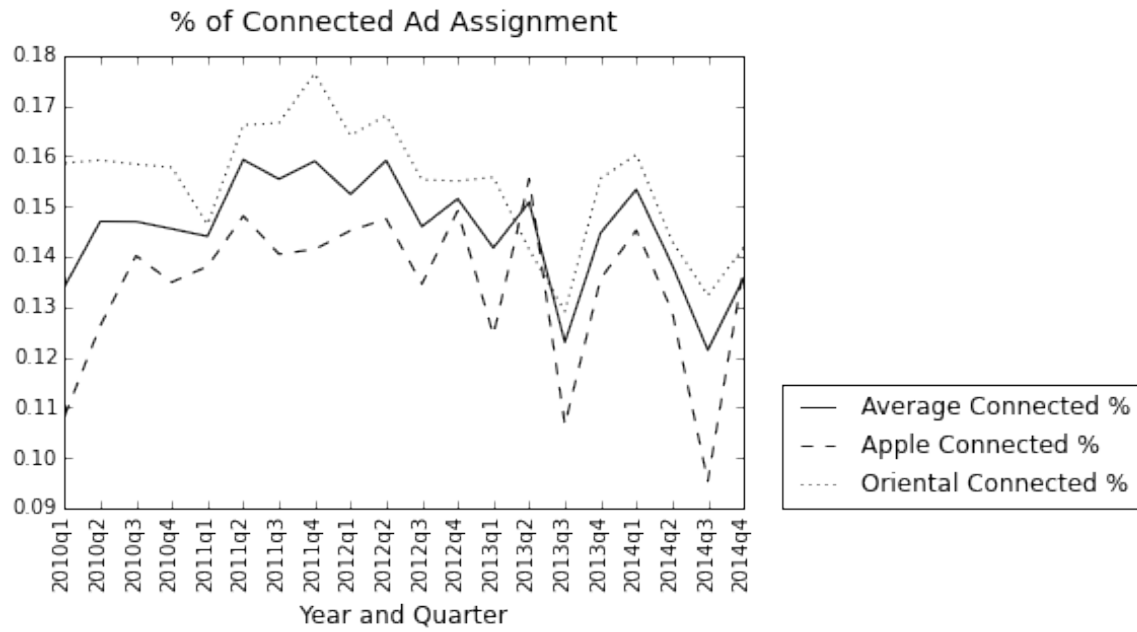


Figure 8: Percentage of Mainland Ad Assignment

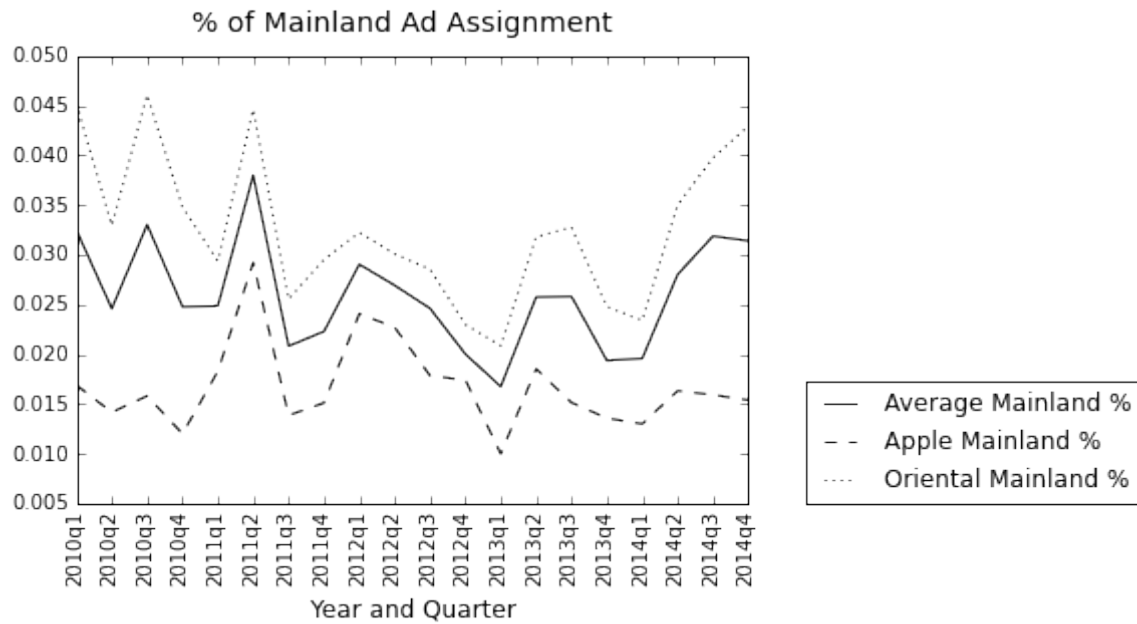


Table 3: Ad Price and Readership

	Apple	Oriental	Apple	Oriental
	<i>Ad Price</i>		<i>Readership (Print + Online)</i>	
2010	85.3	104.95	1,566	1,457
	81.3%		107.5%	
2011	109.02	124.88	1,535	1,392
	87.3%		110.3%	
2012	114.48	121.95	1,503	1,344
	93.9%		111.8%	
2013	114.48	150.68	1,411	1,207
	76.0%		116.9%	
2014	120.84	165.92	1,684	1,158
	72.8%		145.4%	

*Note:* The second row in each year indicates the % of Apple's price and readership to Oriental's. Ad price measures the price per cm<sup>2</sup> 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<sup>2</sup>. 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	Oriental	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.

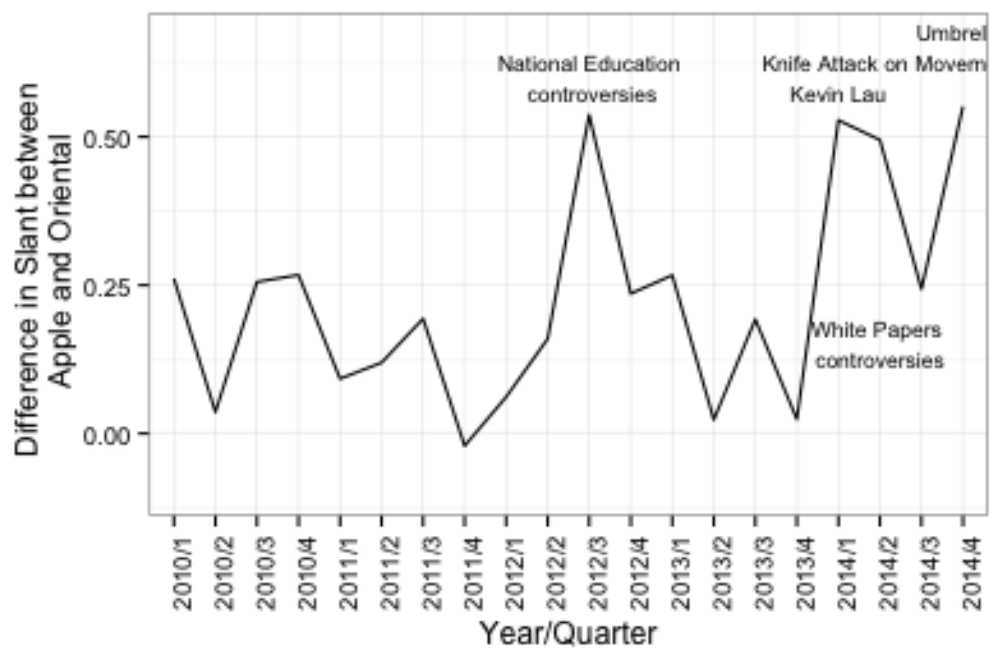


Table 5: Phrases with highest  $\chi^2$  and used by Wenwui Daily in each year and quarter

		Bigram	Trigram	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)
	Q3	樓市 (Real Estate Market)	消費者 (Investor)	主流民意 (Mainstream Opinion)
		本港 (Hong Kong)	人民幣(Renminbi)	骨灰龕場 (Columbarium field)
	Q4	中國 (China)	釣魚島 (Diao-Yu Islands)	金融海嘯 (Financial Crisis)
2011	Q1	經濟 (Economy)	八達通 (Octopus Card)	停車熄匙 (Switch Off Idling Vehicles)
		美國 (United States)	人民幣 (Renminbi)	直資學校 (Directly Subsidized Schools)
		市場 (Market)	投資者 (Investor)	貨幣政策 (Monetary Policy)
	Q2	中國 (China)	房地產 (Real Estate)	通脹壓力 (Inflationary Pressure)
		經濟 (Economy)	利比亞 (Libya)	最低工資 (Minimum Wage)
		美國 (United States)	核危機 (Nuclear Crisis)	通脹壓力 (Inflationary Pressure)
	Q3	中國 (China)	社民連 (League of Social Democrats)	經濟學家 (Economist)
		經濟 (Economy)	人民幣 (Renminbi)	通脹壓力 (Inflationary Pressure)
2012	Q1	本港 (Hong Kong)	塑化劑 (Plasticizer)	中小企業 (Small and Medium-Sized Enterprises)
		經濟 (Economy)	研究所 (Research Institute)	食品安全 (Food Safety)
		中國 (China)	投資者 (Investor)	債務危機 (Debt Crisis)
	Q2	發展 (Development)	人民幣 (Renminbi)	歐債危機 (European Debt Crisis)
		經濟 (Economy)	研究所 (Research Institute)	豬肉價格 (Price of Pork)
		中國 (China)	人民幣 (Renminbi)	歐債危機 (European Debt Crisis)
	Q3	市場 (Market)	反對派 (Opposition Group)	貨幣政策 (Monetary Policy)
		準備金 (Reserve Fund)	準備金 (Reserve Fund)	債務危機 (Debt Crisis)
2013	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)
2014	Q1	經濟 (Economy)	研究所 (Research Institute)	架構重組 (Restructuring)
		中國 (China)	釣魚島 (Diao-Yu Islands)	改革開放 (Reform and Open)
		經濟 (Economy)	習近平 (Xi Jinping)	中國海軍 (Chinese Navy)
	Q2	日本 (Japan)	十八大 (18th National Congress of the Communist Party of China)	最低工資 (Minimum Wage)
		中國 (China)	釣魚島 (Diao-Yu Islands)	施政報告 (Policy Address)
		日本 (Japan)	習近平 (Xi Jinping)	火控雷達 (Fire Control Radar)
	Q3	經濟 (Economy)	人民幣 (Renminbi)	中國軍隊 (Chinese Military)
		中國 (China)	釣魚島 (Diao-Yu Islands)	改善民生 (Improve Livelihood)
2015	Q1	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)
		中國 (China)	反對派 (Opposition Group)	愛國愛港 (Love the Nation Love Hong Kong)
	Q2	日本 (Japan)	夏千福 (Clifford Hart)	中國海軍 (Chinese Navy)
		經濟 (Economy)	堆填區 (Landfill)	海洋權益 (Rights in the Ocean)
		中國 (China)	反對派 (Opposition Group)	三中全會 (Third Plenary Session)
	Q3	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)
2016	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)
2017	Q1	議員 (Council Members)	戴耀廷 (Benny Tai)	主流民意 (Mainstream Opinion)
		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)
	Q2	警方 (Police)	基本法 (Basic Law)	違法佔中 (Law-Violating Central 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)
	Q3	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)
		經濟 (Economy)	滬港通 (Shanghai-Hong Kong Stock Connect)	佔中搞手 (Occupy Central Schemer)

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

		Bigram	Trigram	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)
	Q3	選舉(Election)	戴耀廷 (Benny Tai)	民主運動 (Democratic Movement)
		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)
	Q4	政治 (Politics)	廿三條 (Article 23)	行政長官 (Chief Executive)
		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 Council)	普世價值 (Universal Values)
2011	Q1	政府 (Government)	立法會 (Legislative Council)	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)
	Q3	立法 (Legislative)	戴耀廷 (Benny Tai)	終審法院 (Court of Final Appeal)
		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)
	Q4	名單 (Candidate List)	基本法 (Basic Law)	武俠小說(Martial Arts Fiction)
		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)
	Q3	民主 (Democracy)	李旺陽 (Li Wangyang)	終審法院 (Court of Final Appeal)
		教育 (Education)	債權人 (Creditor)	公民教育 (Civil Education)
		程序 (Sequence)	戴耀廷 (Benny Tai)	負面批評 (Negative Criticism)
	Q4	特首 (Chief Executive)	梁振英 (CY Leung Chun Ying)	(Judiciary Traditions)
		法院 (Courts)	梁振英 (CY Leung Chun Ying)	司法獨立 (Judiciary Independence)
		法官 (Judges)	法律界 (Law Circles)	終審法院 (Court of Final Appeal)
			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)
	Q3	父親 (Father)	梁振英 (CY Leung Chun Ying)	廉政專員 (Commissioner of ICAC)
		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)
	Q4	選民 (Voter)	民主派 (Democratic group)	公民社會 (Civic Society)
		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)
	Q3	公民 (Citizen)	提委會 (Nominating Committee)	選舉辦法 (Election rules)
		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)
	Q4	抗命 (Disobedience)	法律界 (Law Circles)	司法獨立 (Judiciary Independence)
		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: Logit Regression Results

Dependent variable: 1 if A or AO is chosen						
Connect	-0.1765*** 0.000 (-0.0441)	-0.1607*** 0.000 (-0.0400)	-0.1694*** 0.000 (-0.0422)	-0.0217 0.201 (-0.0054)	-0.0073 0.672 (-0.0018)	-0.0142 0.411 (-0.0035)
Foreign	0.0814*** 0.000 (0.0204)	0.0623*** 0.000 (0.0155)	0.0851*** 0.000 (0.0212)	0.3113*** 0.000 (0.0775)	0.2636*** 0.000 (0.0654)	0.2549*** 0.000 (0.0634)
Mainland	-0.7762*** 0.000 (-0.1940)	-0.8445*** 0.000 (-0.2102)	-0.8316*** 0.000 (-0.2073)	-0.9359*** 0.000 (-0.2329)	-1.0202*** 0.000 (-0.2530)	-1.0015*** 0.000 (-0.2489)
Government	-0.0856 0.117 (-0.0214)	-0.0890 0.105 (-0.0221)	-0.0835 0.128 (-0.0208)			
Industry FE	X	X	X	X	X	X
Quarter FE		X	X		X	X
IndustryQuarter FE		X	X		X	X
Linear Time Trend			X			X
Quadratic Time Trend			X			X
Observations	300607	300607	300607	68116	68116	68116

*Note:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.001. The unit of analysis is ad assignment. The first row of each variable shows the coefficient, the second row shows the p-value, and the third row shows 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 A or AO is chosen						
$\Delta\theta_{tq}$	-0.4987*** 0.000 (-0.1247)	-0.4856*** 0.000 (-0.1211)	-0.2228*** 0.000 (-0.0555)	-0.5576*** 0.000 (-0.1386)	-0.4579*** 0.000 (-0.0648)	-0.1474* 0.09 (-0.0366)
Connect· $\Delta\theta_{tq}$	-0.0481 0.435 (-0.0120)	-0.0428 0.489 (-0.0107)	-0.0085 0.891 (-0.0021)	0.0720 0.464 (0.0179)	0.0201 0.838 (0.0225)	0.1286 0.194 (0.0319)
Mainland · $\Delta\theta_{tq}$	-0.2066 0.167 (-0.0516)	-0.2108 0.162 (-0.0526)	-0.2065 0.175 (-0.0514)	-0.3220 0.242 (-0.0800)	-0.3025 0.279 (-0.0723)	-0.2761 0.325 (-0.0685)
Foreign · $\Delta\theta_{tq}$	0.0907* 0.057 (0.0227)	0.0750 0.117 (0.0187)	0.1325*** 0.006 (0.0330)	0.0640 0.693 (0.0159)	0.0459 0.779 (0.0144)	0.0597 0.715 (0.0148)
Observations	300607	300607	300607	68116	68116	68116
$\Delta\theta_{tq-1}$	-0.3107*** 0.000 (-0.0773)	-0.5223*** 0.000 (-0.0940)	-0.3112*** 0.000 (-0.0764)	-0.6870*** 0.000 (-0.1631)	-0.8572*** 0.000 (-0.1633)	-0.5883 *** 0.000 (-0.1430)
Connect· $\Delta\theta_{tq-1}$	0.1116 0.102 (0.0278)	0.1405** 0.040 (0.0333)	0.1291* 0.060 (0.0317)	0.5738*** 0.000 (0.1362)	0.5577*** 0.000 (0.1324)	0.5425*** 0.000 (0.1319)
Mainland · $\Delta\theta_{tq-1}$	-0.3189** 0.044 (-0.0793)	-0.2723* 0.088 (-0.0604)	-0.2315 0.148 (-0.0568)	0.0410 0.883 (0.0097)	0.0954 0.736 (0.0317)	0.1664 0.558 (0.0405)
Foreign · $\Delta\theta_{tq-1}$	0.0725 0.168 (0.0180)	0.0717 0.175 (0.0170)	0.0668 0.207 (0.0164)	-0.5770*** 0.000 (-0.1370)	-0.5966*** 0.001 (-0.1457)	-0.61560*** 0.001 (-0.1497)
Observations	287754	287754	287754	65215	65215	65215
Industry FE	X	X	X	X	X	X
Quarter FE		X	X		X	X
IndustryQuarter FE		X	X		X	X
Linear Time Trend			X			X
Quadratic Time Trend			X			X

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.001. The unit of analysis is ad assignment. Column (1) - (3) uses the full sample, and column (4) - (6) uses the HKSE-listed sample only. The first row of each variable shows the coefficient, the second row shows the p-value, and the third row shows 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 of the logit model including both contemporaneous and lagged slant gap in the regressors

Dependent variable: 1 if A or AO is chosen						
$\Delta\theta_{tq}$	-0.5648*** 0.000 (-0.1129 )	-0.4508*** 0.000 (-0.0850 )	-0.2643*** 0.000 (-0.0648)	-0.6824*** 0.000 (-0.1311 )	-0.5221*** 0.000 (-0.0903 )	-0.2720*** 0.002 (-0.0656)
$\Delta\theta_{tq-1}$	-0.2123*** 0.000 (-0.0953)	-0.3999*** 0.000 (-0.0804)	-0.2803*** 0.000 (-0.0687)	-0.5440*** 0.000 (-0.1752)	-0.7027*** 0.000 (-0.1444 )	-0.5404*** 0.000 (-0.1304)
Connect· $\Delta\theta_{tq}$	0.1485** 0.018 (0.0395)	0.15515** 0.014 (0.0374 )	0.1490** 0.018 (0.0365)	0.2961*** 0.003 (0.0758)	0.2870*** 0.005 (0.0690)	0.2850** 0.005 (0.0688 )
Mainland · $\Delta\theta_{tq}$	-0.3497** 0.022 (-0.0883)	-0.3347** 0.028 (-0.0816 )	-0.3300** 0.031 (-0.0809)	-1.1269*** 0.000 (-0.2679)	-1.1168*** 0.000 (-0.2691)	-1.1385*** 0.000 (-0.2747)
Foreign · $\Delta\theta_{tq}$	0.2909** 0.000 (0.0728)	0.2907*** 0.000 (0.0702)	0.2754*** 0.000 (0.0675)	0.1704 0.302 (0.0430)	0.1859 0.265 (0.0450)	0.1759 0.292 (0.0424)
Connect· $\Delta\theta_{tq-1}$	0.0851 0.218 (0.0201)	0.1125 0.106 (0.0271)	0.1061 0.128 (0.0260)	0.4961*** 0.000 (0.1197 )	0.4853*** 0.000 (0.1155 )	0.4791*** 0.000 (0.1156 )
Mainland · $\Delta\theta_{tq-1}$	-0.2165 0.184 (-0.0488)	-0.1817 0.268 (-0.0405)	-0.1531 0.352 (-0.0375)	0.3633 0.217 (0.0976)	0.4183 0.160 (0.1059)	0.4782 0.110 (0.1154)
Foreign · $\Delta\theta_{tq-1}$	0.0230 0.666 (0.0056)	0.0197 0.713 (0.0050)	0.0213 0.692 (0.0052)	-0.6017*** 0.001 (-0.1490)	-0.6263*** 0.001 (-0.1519)	-0.6444*** 0.000 (-0.1555)
Industry FE	X	X	X	X	X	X
Quarter FE		X	X		X	X
IndustryQuarter FE		X	X		X	X
Linear Time Trend			X			X
Quadratic Time Trend			X			X
Observations	287754	287754	287754	65215	65215	65215

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.001. This table reports the results of a logit model with both contemporaneous and lagged slant gap, as well as the interaction terms as the independent variables. The unit of analysis is ad assignment. Column (1) - (3) uses the full sample, and column (4) - (6) uses the HKSE-listed sample only. The second row of the coefficients prints the p-value 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: 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.

## 11 Appendix

### 11.1 Sample of Apple and Oriental Headline during Occupy Central

Figure 10: Headline of Apple on December 12, 2014. Translated as "Do not forget the original intention. We will be back"



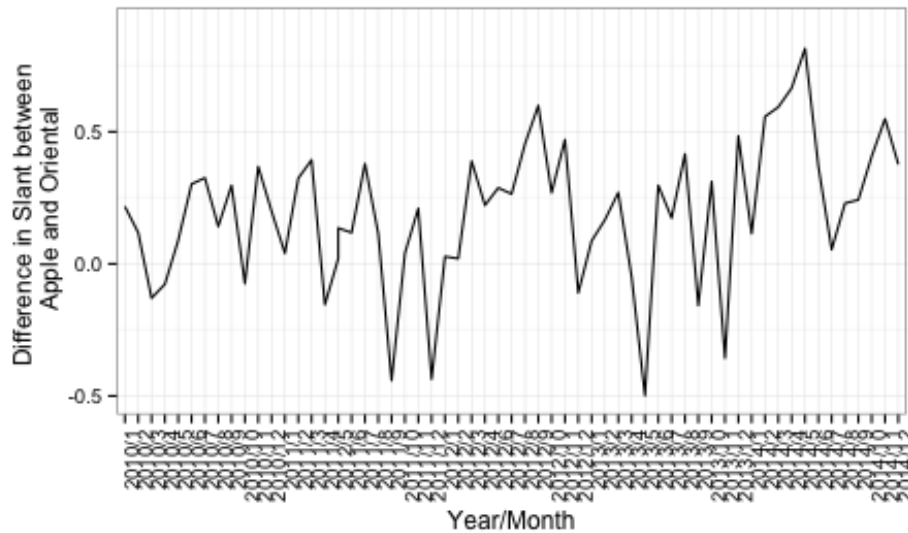
Figure 11: Headline of Oriental on December 12, 2014. Translated as "Financier Jimmy Lai Pan-Democratic politicians accept bribes. Occupy Central Schemers All Caught"



## 11.2 Finer Time Unit for Slant Gap

We studied the quarterly slant gap instead of a finer time unit of measurement such as monthly or weekly to balance the trade-off between having more words to analyze in each period (which gives us higher confidence of picking the most polarized words) and more data points of polarization (which might allow us to better capture advertisers' response to slant gap). In using a finer time unit of analysis, we inevitably introduce more noise to the slant gap measure. To illustrate this, figure 12 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. Noting the sensitivity of the measure to the size of input text, we therefore opt to use the wider, quarterly time unit of measure of slant gap.

Figure 12: Slant Gap Using Monthly Data



### 11.3 Polarization of the Benchmark Language

To approximate the degree of polarization of benchmark language over time, we consider a simple measure inspired by Jensen et al (2012). The idea is that in more polarizing periods, the "ideology-telling" phrases will be used even more disproportionately by the two benchmarks than peaceful periods. To operationalize this intuition, we calculate the sum of difference in relative frequencies between the two benchmark for the most polarized terms in each period. For each period  $t$ , we take the top 100 phrases of length  $l$  ranked by  $\chi^2$ , and compute the difference in relative frequencies that phrase  $p$  is used in *Law and Politics* and *Wenwui Daily*:

$$\phi_t = \sum_l \sum_p^{100} (f_{pll} - f_{plw}) \quad (10)$$

By construction, the absolute value of the measure is large when many of these statistically-identified polarizing phrases appear more frequently in one benchmark but not another. 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<sup>50</sup>. Note that this measure disregards relative ranking of phrase  $p$ . And by using a fixed number of polarizing phrases for every period, the measure also does not directly take into account of the difference in length and number of articles in each benchmark.

Figure 13 shows the evolution of our benchmark polarization measure over the sample period. The absolute value of the measure became larger over time, which suggests that polarization of the benchmark language has worsened in our period and reflected the contemporaneous 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 benchmark 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 could underestimate the true degree of polarization over time.

To explore the explanatory power of the polarization measure on advertisers' newspaper choice, we replace slant gap and its interaction term with  $-1/1000 \cdot \phi_t$  and reran equation 8. The results are presented in table 14. The coefficient on  $\phi_t$  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. The result suggests that the polarization measure, slant gap and the political events all have explanatory power on advertisers' choice of newspaper because these three measures are correlated. Our model clarifies the mechanism by showing that occurrence of political events alone does not drive advertisers away from Apple; slant gap has to respond to political events, and the mechanism rests on advertisers responding to the news content.

<sup>50</sup>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 13: A measure of polarization of word choices used by the benchmark

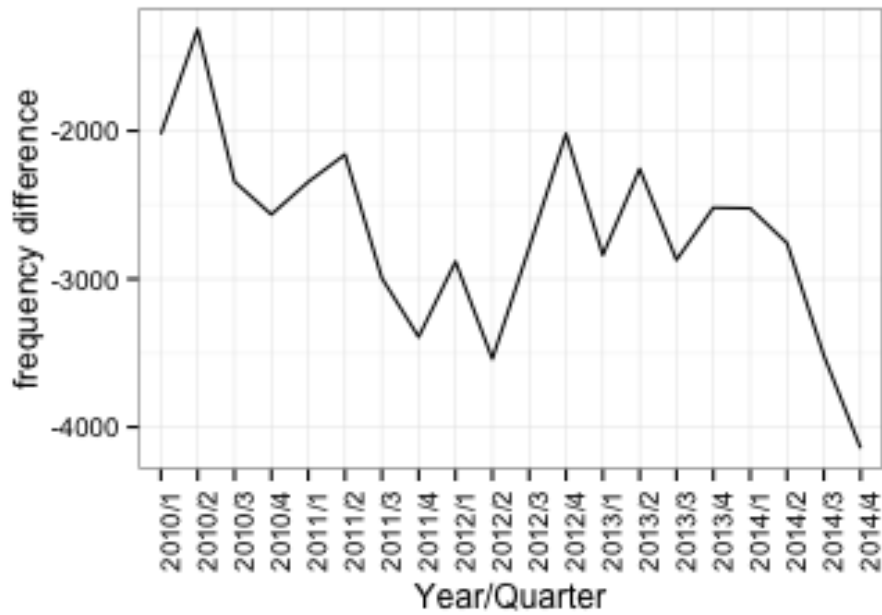


Table 12: Results on Benchmark Polarization and Interactions

Dependent variable: 1 if only Apple is chosen						
$\phi_{tq}$	0.1135***	0.1162***	0.0795***	0.1732***	0.1776***	0.1393***
	0.000	0.000	0.000	0.000	0.000	0.000
	(0.0283)	(0.0289)	(0.0198)	(0.0431)	(0.0438)	(0.0345)
Connect· $\phi_{tq}$	0.0181	0.0117	0.0289	-0.0019	-0.0626	-0.0642**
	0.291	0.496	0.094	0.186	0.021	0.019
	(0.0045)	(0.0029)	(0.0072)	(-0.0089)	(-0.0154)	(-0.0159)
Mainland · $\phi_{tq}$	0.2097***	0.1985***	0.2385***	0.2964***	0.2893***	0.2969***
	0.000	0.000	0.000	0.000	0.000	0.000
	(-0.0524)	(0.0494)	(0.0594)	(0.0737)	(0.0713)	(0.0734)
Foreign · $\phi_{tq}$	0.0033	0.0052	-0.0022	-0.0310	-0.0170	-0.0331
	0.803	0.699	0.870	0.489	0.707	0.465
	(0.0008)	(0.0013)	(-0.0005)	(-0.0077)	(-0.0042)	(-0.0082)
Industry FE	X	X	X	X	X	X
Quarter FE		X	X		X	X
IndustryQuarter FE		X	X		X	X
Linear Time Trend			X			X
Quadratic Time Trend			X			X
Observations	300607	300607	300607	68116	68116	68116

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.001. The second row of the coefficients indicate the p-value. 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 13: Results on the interactions between Slant Gap and Industries fixed effects

Dependent variable: 1 if A or AO is chosen			
Automobile	0.0172	-0.0013	-0.0029
	0.908	0.994	0.985
Baby products	-0.0219	-0.0247	-0.0153
	0.899	0.890	0.932
Banking	-0.0566	-0.0574	-0.0363
	0.623	0.634	0.764
Beauty	-0.0213	-0.0259	-0.0101
	0.872	0.851	0.942
Computers	0.0077	0.0025	0.0095
	0.964	0.989	0.958
Education	0.1040	0.0919	0.1028
	0.528	0.596	0.553
Electronic Appliances	-0.0929	-0.0895	-0.0858
	0.52	0.557	0.574
Fashion and Accessories	0.0281	0.0142	0.0326
	0.839	0.921	0.821
Food & Beverages	0.1624	0.1092	0.1556
	0.149	0.352	0.186
Insurance	0.0554	0.0505	0.0586
	0.851	0.870	0.850
Pharmaceutical	-0.0645	-0.0639	-0.0455
	0.648	0.661	0.755
Restaurants	-0.0831	-0.0951	-0.0839
	0.510	0.470	0.525
Retail	0.1733	0.1349	0.1975
	0.111	0.234	0.082
Sports	-0.0129	-0.0179	-0.0116
	0.956	0.940	0.961
Telecommunication	0.0009	-0.0025	-0.0005
	0.995	0.989	0.998
Travel	-0.1703	-0.1713	-0.1570
	0.135	0.150	0.188
Industry FE	X	X	X
Quarter FE		X	X
IndustryQuarter FE		X	X
Linear Time Trend			X
Quadratic Time Trend			X
Observations	300607	300607	300607

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.001. The second row of the coefficients indicate the p-value. Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.001. Firms characteristics include political connectivity and country of origin (foreign, mainland).

## 11.4 Real Estate Industry

From an interview in 2007, owner of Apple Jimmy Lai explicitly claimed that Apple is the target of boycott and highlighted the role of the real estate developers in the boycott,<sup>51</sup>

There's a very well organized 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 organized.

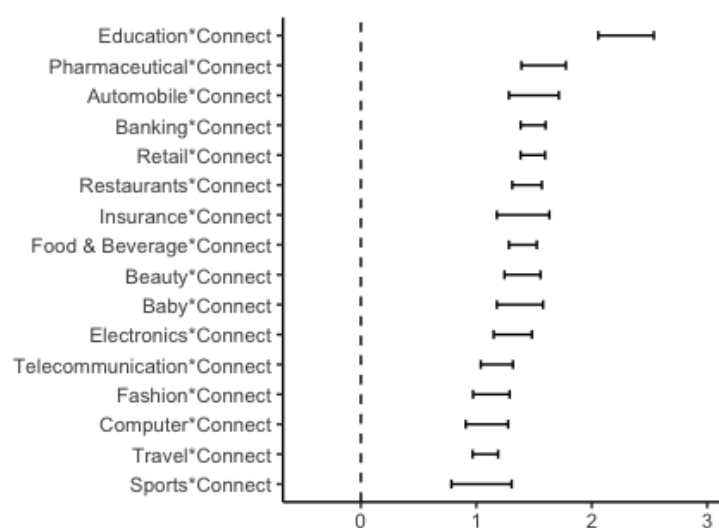
Many of the largest capitalists in Hong Kong, including Li Ka-shing, Kwok Ping-sheung, Lee Shau-kee and Cheng Yu-tung, are major real estate developers and close to the political nexus in mainland. Major companies in the real estate industry also deserve special attention because they represent some of the largest advertisers in the market. To empirically test Jimmy Lai's claim, we examine whether the coefficient of the interaction between the real estate industry fixed effect, and firm's political connectivity are more negative than the other industries. The interaction term captures the differential likelihood of connected companies in different industries to advertise on Apple, and allow us to compare connected companies in real estates with that of other industries.

Figure 14 plots the interaction between firms' political connectivity and the industries fixed effect, using the estimates from column 1 in table 8. The control variables include all regressors in equation 8. 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. This suggests that connected companies in the real estate industry are much less likely to advertise on Apple compared 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. To the extent that connected companies equally target the Apple and Oriental readership, the analysis provides evidence that the real estate industry has stronger aversion to Apple than other industries.

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<sup>51</sup><https://www.theguardian.com/media/2007/may/14/mondaymediasection8>

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.

## 11.5 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.)