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Article

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The spillover effect of disclosure rules and materiality thresholds: Evidence from profit warnings issued in Hong Kong market [☆]

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ABSTRACT

Dual-listed firms simultaneously follow the relevant rules in their home country and in their cross-listed country. In contrast, other firms only listed in the cross-listed country are only subject to the local regulations. Previous literature has found evidence that cross-listing can improve firms' information transparency because of more stringent listing rules in the cross-listed country. The existing research, however, has not paid enough attention to the potential influence of dual-listed firms and their home country institutional factors (e.g. unique disclosure policies) on other firms only listed in the cross-listed country (i.e. spillover effect). In the Hong Kong market, Chinese dual-listed firms are under the mandatory profit warning regulation of mainland China, but other firms listed only in Hong Kong only need to follow the voluntary disclosure rule of the Hong Kong Stock Exchange. Such a setting provides us with the opportunity to investigate a spillover effect, i.e. whether these Chinese dual-listed firms influence their peers only listed in Hong Kong to release profit warnings. We find that firms only listed in Hong Kong are more likely to issue profit warnings if their Chinese dual-listed peers have also issued warnings. We further find that this spillover effect increases with the market capitalization of Chinese dual-listed firms and increases with the market share of these firms before they dominate the industry. Lastly, due to an underlying duty to disclose material information in Hong Kong, the spillover effect is weaker for firms with large earnings surprises.

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"Usually advanced markets like the US, the UK and Australia do not have profit-warning requirements and I do not think Hong Kong should have such a requirement."

– Mark Dickens, HKSE

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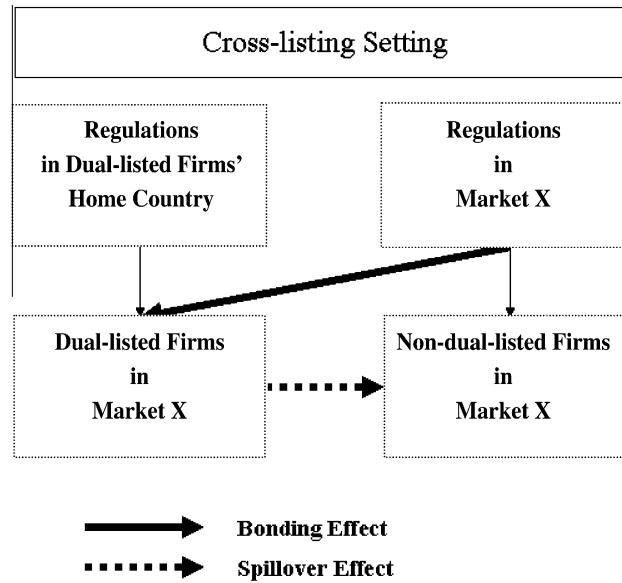


Fig. 1. Two effects in the cross-listing setting.

1. Introduction

Mark Dickens, the Hong Kong Stock Exchange's newly appointed listings head has urged the government to toughen penalties on companies that fail to disclose price-sensitive information to the market. But Mr. Dickens rejected suggestions that Hong Kong needed to follow the mainland in introducing a specific profit-warning threshold. Given that timely profit warnings can reduce information asymmetry and reduce profits from insider trading, setting regulatory standards appropriately requires intimate knowledge of different rules and their consequences. This study investigates the nature and extent of the externality from mainland China's profit warning regulation over listed firms in the Hong Kong market.

In a typical cross-listing setting (see Fig. 1), there are two groups of firms: cross-listed firms and non-cross-listed firms. Some of the cross-listed firms also issue shares in their own country ("dual-listed firms" hereafter). These dual-listed firms need to comply with two sets of regulations: the regulations in their own country and the regulations in the cross-listed country, Market X. In contrast, other firms only listed in Market X ("non-dual-listed firms" hereafter) merely need to comply with the regulations of Market X. Obviously, the regulations in Market X have an impact on these dual-listed firms, which we call the "bonding effect".¹ Meanwhile, it is possible that the regulations in the dual-listed firms' home countries can also affect the behavior of non-dual-listed firms in Market X through the influence of dual-listed firms, which we call the "spillover effect".

Up to now, most cross-listing literature has focused on the bonding effect on cross-listed firms. Recent empirical work shows that foreign firms with cross listings in the U.S. raise more external finance, have higher valuations, a lower cost of capital, higher analyst following and report higher quality accounting numbers than their counterparts in their own countries (Reese and Weisbach, 2002; Lang et al., 2003a,b; Doidge et al., 2004; Bailey et al., 2006; Hail and Leuz, 2006). However, it is important to remember that dual-listed firms are subject to the relevant laws and regulations in both their home countries and the cross-listed country. Licht (2003), Leuz (2006) and Leuz and Wysocki (2008) indicate that the existing research has not paid enough attention to the potential influence of institutional factors from the dual-listed firms' home countries (e.g. unique disclosure policies) on non-dual-listed firms' voluntary disclosure in the cross-listed country. Therefore, in this paper, we examine this "spillover effect", by exploring whether Chinese dual-listed firms that are required to follow mainland China's disclosure rules have an influence on other firms only listed in the Hong Kong market to make profit warnings.

Accordingly, our study focuses on the "spillover effect" of regulations and raises the research question: Does a spillover effect of regulation exist? Specially, we examine the spillover effect of mainland China's regulations on other firms only listed in the Hong Kong market (H shares, Red Chips and others) through the influence of Chinese dual-listed firms. We use a sample of 298 profit warnings in Hong Kong from 2003 to 2009 and find that Chinese dual-listed firms push the non-dual-listed firms in Hong Kong towards better transparency by issuing profit warnings. That is, non-dual-listed firms in Hong Kong are more likely to issue profit warnings if their Chinese dual-listed peers have also issued warnings. We further find that this spillover effect increases with the market capitalization of Chinese dual-listed firms and increases with the market share of these firms before they dominate the industry. The spillover effect, however, diminishes with an increase in the earnings surprise of the non-dual-listed firms. This implies that firm disclosure behavior is more likely to be

¹ That is, firms can opt into a foreign regime and thereby bond themselves to the more onerous disclosure, accounting and governance requirements and stricter enforcement regime of another country, which is called the bonding hypothesis (Coffee, 1999; Stulz, 1999).

independent of their peer's actions if the disclosed information is material. Such results are consistent with and extend the findings of [Heitzman et al. \(2010\)](#).

Since we argue that the spillover effect of profit warnings is due to a common market/industry environment, we perform additional analysis to corroborate this conjecture. Our additional checks repeat the main regression analysis by replacing the full sample of non-dual-listed firms in Hong Kong with two subsamples: non-dual-listed firms with a major Chinese shareholder (H shares and Red Chips) and a matched sample by size and industry. Because H shares, Red Chips and size-industry matched firms share more firm characteristics with Chinese dual-listed firms than other firms only listed in Hong Kong ([Albuquerque, 2009](#)), we expect that the common market/industry environment is likely to be more pronounced in these subsamples. Consistent with this prediction, we find that the spillover effect is primarily driven by firms in these subsamples. We also find that our main results are robust to a variety of sensitivity tests, including the reclassification of peers by one-digit SIC codes and Datastream sectors, and an alternative proxy for spillover effects from Chinese dual-listed firms.

We view our paper as making four main contributions. First, we contribute to the literature on cross-listed firms and their behavior. Prior literature focuses on the bonding effects of cross listing. These studies largely ignore the impact of those cross-listed firms on other participants only listed in the host market (spillover effect). In our study, we investigate this less explored "spillover" effect. We find that the behavior of dual-listed firms, largely due to their home country institutional factors (e.g. unique disclosure policies), does have an influence on other firms only listed in the cross-listed country.

Second, we extend and complement prior literature on voluntary disclosure, especially studies related to multiple-firm disclosure settings ([Tse and Tucker, 2010](#)). While prior studies examine the timing of earnings disclosures in a multiple-firm setting, our paper examines the choice of firms to disclose or not disclose earnings information in a multiple-firm setting. In addition, our study provides evidence that supports the "information transfer" story. That is, common factors that firms in the same equity market share with each other are one of the major reasons that their disclosure behavior is interdependent.

Third, our evidence also contributes to the emerging literature that examines relationships between mandatory and voluntary disclosure practices. While prior literature shows that the materiality of information influences disclosure decisions in a single firm setting, our study extends this point to a multiple-firm setting by showing that the materiality of information also moderates the interdependence of voluntary disclosure ([Heitzman et al., 2010](#)). Our study also offers some international evidence on the importance of the materiality of information.

Fourth, our study has some regulatory implications. We find that the regulatory environment in China has an effect on the behavior of Hong Kong firms through the behavior of Chinese dual-listed firms. This shows that the regulations of one country can have an indirect impact on the disclosure environment in another country, something regulators and other market participants should take into account when making policy decisions. For example, when Hong Kong policy makers and practitioners debate about whether to follow the regulation of mainland China, they should know that the mainland regulation already has an impact on the market participants in Hong Kong.

The reminder of the paper is organized as follows. In Section 2, we describe the institutional background of the Hong Kong market, including the market structure and profit warning rules. In Section 3 we discuss previous literature and develop hypotheses. Section 4 presents the research design and Section 5 provides the sample selection and test results. Additional checks are discussed in Section 6 and Section 7 concludes.

2. Institutional background

In this section, we discuss the Hong Kong market structure and the profit warning regulations in Hong Kong and mainland China.

2.1. Hong Kong market structure

In this study, we categorize listed firms in Hong Kong into two groups: (1) Chinese dual-listed firms, which trade both in mainland China (e.g. Shanghai or Shenzhen Stock exchanges) and Hong Kong ("AH firms" hereafter) and are subject to the rules of both exchanges; (2) other firms ("non-AH firms" hereafter) that are not listed in mainland China, but are listed in Hong Kong.²

In the last twenty years, over 200 Chinese firms (AH, H and Red Chip firms) have listed in the Hong Kong market.³ These firms have become so important that they now account for more than half of the market capitalization and more than 60% of equity turnover on the main board.⁴ Among these China-based firms, 57 are AH firms. These AH firms are usually giants in their

² Among non-AH firms in Hong Kong, there are three sub-groups. First, Red Chip shares refer to mainland Chinese controlled firms that are incorporated outside China (Hong Kong, Bermuda, or the Cayman Islands) and trade on the HK Stock Exchange. Red Chips function primarily as foreign subsidiaries of the parent's operations in mainland China. Their assets and earnings have significant mainland Chinese exposure, but except for the regulations on the HK Stock Exchange, there are no 'explicit' additional listing and disclosure requirements for Red Chips. Second, incorporated in mainland China, H shares are subject to mainland China's Company Law. Third, local firms and other shares comprise the rest of the listed firms not included in the above two groups in Hong Kong. In our study, we recognize these within-group (non-AH firms) differences between local firms and China-affiliated firms (Red Chips and H shares). Therefore, all analysis is also conducted on the non-China-affiliated firm subsample.

³ Up to April 30, 2009, there are 100 H share firms and 92 Red Chip firms listed on the main board. There are also 40 H share firms and 4 Red Chip firms listed on the GEM. (Data resource: <http://www.HKSE.com.hk/data/chidimen/chidimen.htm>).

⁴ More details can be found at: http://www.HKSE.com.hk/data/chidimen/CD_TO.htm

Table 1

The regulation on profit warnings in mainland China.

Period	Deadlines (M) ^a	Frequency	Thresholds
Before 1998	N/A	N/A	N/A
1998–2000	2	Annual	(1) Substantial loss; (2) loss that will continue in three consecutive years
2001–2005	1 (A) ^b ; 0.5 (I) ^c	Annual; interim	(1) Loss; (2) >50% change in earnings
After 2005	1	Annual; interim; 1st quarter	(1) Loss; (2) >50% change in earnings; (3) loss to profit

^a Number of months.^b Annual.^c Interim.

industry; therefore, although the number of firms is not large, they account for 30% of the market capitalization on the main board (calculated on April 30th 2009).

2.2. Profit warning regulations

In this paper, we focus on one particular event—profit warnings—to test for a spillover effect. We do so for two reasons: (1) both mainland China and Hong Kong have regulations on profit warnings and the differences in the two regulations exactly satisfy our requirements to produce a spillover effect; (2) after two big companies⁵ in Hong Kong were found to breach the profit warning disclosure rules, professionals suggested that the Hong Kong Stock Exchange ("HKSE", hereafter) should follow the mainland in introducing specific profit-warning regulations.⁶ Therefore, we think it is helpful for regulators to know: under the current situation, what is the impact of mainland China's regulation on the listed firms in Hong Kong.

2.2.1. Regulation in mainland China

The regulation on profit warnings has passed through four periods in China: (1) before 1998, no rules regarding profit warnings existed; (2) From 1998 to 2000, listed firms must make a profit warning within two months after the fiscal year end if they incur a substantial loss or loss that will continue in three consecutive years. Four points are worth noting during this period. First, firms only need to make a profit warning when they incur a loss. Second, the rules are only effective on annual earnings. Third, there is no clear threshold: whether it is "substantial" depends on management's judgment. Fourth, management is not required to make any forecast, only an announcement; (3) From 2001 to 2005, the rules become more complicated and began to cover interim earnings. Listed firms need to issue a profit warning once their earnings changes by more than 50% from last year or if they incur a loss. Additionally, the deadline for such a warning is one month after the fiscal period end for annual earnings and half a month for interim earnings; (4) Three changes were made to the rule after 2005. First, the rule now includes earnings in first quarter. Second, the deadlines for all profit warnings (annual, quarterly, and half-year) are one month after the fiscal period. Third, a new threshold is added: listed firms are now required to issue a warning if their earnings changes from a loss to a profit. Fourth, firms are encouraged to issue a profit warning before the end of the fiscal period. We summarize this information in Table 1.

2.2.2. Regulation in Hong Kong

The "Listing Rules" in Hong Kong require listed firms to make timely public disclosure of price-sensitive information.⁷ But this minimum mandatory standard does not define the meaning of the term "material" and the exact mechanism of how information should be disclosed to the public. In order to help issuers and their directors fulfill their obligations under the Listing Rules, HKSE introduced the "Guide on Disclosure of Price-Sensitive Information" on January 7, 2002. Specifically, Rules 13, 15 and 17 of HKSE require companies to promptly issue an announcement warning investors of the likely impact once they become aware that their financial results may be significantly worse than the generally accepted market expectation.

Thus, compared with AH firms that are also under mainland China's regulation, non-AH firms, i.e. other firms only listed in Hong Kong, have a voluntary disclosure environment for profit warnings. In addition, the thresholds of warnings are decided by managers, the timing of the profit warnings are decided by managers and only bad news is emphasized in the guidance in Hong Kong.

⁵ For CITIC Pacific, a review of the audited accounts of the company for the financial year ending 31 December 2007 as well as its interim accounts for the 6 months to 30 June 2008 does not reveal any material exposure to leveraged foreign exchange contracts, let alone one as substantial as that which was disclosed in its profit warning. In March, 2009, the Democratic Party reprimanded HSBC Holdings for not issuing a profit warning before announcing an earnings plunge of 70% on huge provisions for its United States business. The bank defended its decision to make the write-down just before the results announcement.

⁶ "Southern China Morning Post: Tougher disclosure penalties sought – Listings chief says law change needed to ensure firms comply with price-sensitive news" by Enoch Yiu on April 18, 2009.

⁷ See paragraph 2 of Appendix 7 of the Main Board Rules (the "Listing Agreement") and Rule 17.10 of the GEM Rules.

3. Literature review and hypothesis development

3.1. Literature review

Up to now, most cross-listing literature has focused on the “bonding effect” on cross-listed firms. [Reese and Weisbach \(2002\)](#) find that firms can get more external financing following cross-listing. [Lang et al. \(2003a\)](#) document that firms have higher analyst following and higher valuations after cross listing. In addition, previous research suggests that cross-listed firms experience improvement in accounting quality in the post-cross-listing period ([Lang et al., 2003b](#)). [Doidge et al. \(2004\)](#) also report that foreign companies with shares cross-listed in the U.S. have Tobin's *q* ratios that are 16.5% higher than the *q* ratios of non-cross-listed firms from the same country. [Bailey et al. \(2006\)](#) show that changes in the cross-listed firm's disclosure environment significantly affects its stock return and trading volume response to earnings announcements. [Hail and Leuz \(2006\)](#) provide strong evidence that cross-listing on a U.S. exchange reduces firms' cost of capital. However, [Licht \(2003\)](#), [Leuz \(2006\)](#) and [Leuz and Wysocki \(2008\)](#) indicate that the existing research has not paid enough attention to the potential influence of institutional factors from the dual-listed firms' home countries (e.g. unique disclosure policies) on non-dual-listed firms' voluntary disclosure in the cross-listed country.

The decision on whether to warn or not to warn has been studied extensively. [Kasznik and Lev \(1995\)](#) investigate management's discretionary disclosures prior to a large earnings surprise. They find the likelihood of warnings to be positively associated with the magnitude of the earnings surprise, firm size and membership in the high technology industry. [Tucker \(2007\)](#) also shows that firms with a larger amount of unfavorable non-earnings news are more likely to warn. Using the partial observability discrete choice model, [Heitzman et al. \(2010\)](#) demonstrate that not merely voluntary disclosure incentives ([Verrecchia, 1983, 2001](#)) but also managers' obligation to disclose material information forces managers to disclose private information.

Besides the above studies on single-firm decisions, early in 1989, Pownall and Waymire examine whether information transfer from intra-industry firms is a substitute for voluntary disclosure by their peers. [Dye and Sridhar \(1995\)](#) also explore this area by introducing a model in a multiple-firm setting. They show that as long as there is a positive correlation among firms' receipt of information, one firm's disclosure will cause investors to revise their perception of other firms. This will increase the probability that other firms will disclose their information. Recently [Acharya et al. \(2008\)](#) also propose that the reduced mean of the posterior distribution of firm value lowers the disclosure threshold and consequently some bad news that was previously withheld is now disclosed. [Brown et al. \(2004\)](#) and [Tse and Tucker \(2010\)](#) empirically investigate this “interdependent” behavior. Specifically, assuming that an earnings surprise can be caused by a combination of firm-specific factors and market or industry factors external to the firm, [Tse and Tucker \(2010\)](#) find that managers time their warnings to occur soon after their industry peers' warnings to minimize their apparent responsibility for earnings shortfalls. However, they only investigate this interdependence by the type of news, not by the magnitude of the earnings news. These multiple-firm studies imply that information transfer from intra-industry firms does not substitute for voluntary disclosure by their peers, but voluntary disclosure by intra-industry firms is correlated with each other.

3.2. Spillovers in Hong Kong

First of all, managers in Hong Kong are reluctant to disclose information voluntarily.⁸ Previous literature shows that when managers' and investors' preferences are not aligned, managers are reluctant to disclose information ([Lo, 2003](#); [Nagar et al., 2003](#)). The more severe the principal-agent problems are, the less likely managers disclose private information. Chinese firms and other firms in Hong Kong (mainly family firms) have been consistently highlighted as having severe principal-agent problems and pervasive expropriation from small shareholders ([Berkman et al., 2009](#); [Claessens et al., 2000, 2002](#); [Cheung et al., 2006](#)). The pervasiveness of insider trading is one reason for managers in Hong Kong to withhold information. [Cheng and Leung \(2006\)](#) find that there are significant net insider-buying activities before the announcement of good news and significant net-insider-selling activities before bad news in Hong Kong. What's more, Guanxi, informal relationships to exchange favors, dominate business activity throughout China and East Asia. Chinese tend to rely on private communication through “guanxi” rather than through public information channels. For information suppliers, they build up their long-term relationships with potential or current interested parties to save formal contracting costs by leaking private information earlier to these parties who can make profits from such an information advantage ([Xin and Pearce, 1996](#); [Lovett et al., 1999](#)). Based on these reasons discussed above, we expect that voluntary disclosure is poor in the Hong Kong market. In other words, it is reasonable to conjecture that, *ceteris paribus*, without a mandatory profit warning regulation, when investors are not sure whether a manager has private information, in equilibrium only firms that have sufficiently positive news will release their information. Similarly, firms with more negative information will prefer to keep their market value higher—at least temporarily—by claiming that they do not yet

⁸ The newly appointed Chairman of Hong Kong Stock Exchange, Mark Dickson talked about disclosure in Hong Kong in an interview: “I am not happy with the disclosure of price-sensitive information in Hong Kong as some listed companies do not have the culture of making continuous disclosure of price-sensitive information.” See “Southern China Moring Post: Tougher disclosure penalties sought – Listings chief says law change needed to ensure firms comply with price-sensitive news” by Enoch Yiu on April 18, 2009.

have any information to report. It is consistent with the fact that less than 15% of firms with more than a 200% change to their earnings make profit warnings.⁹

Second, as discussed above, the rules in mainland China require AH firms to announce their profit warnings no later than one month after the fiscal period end. Under this rule, AH firms disclose their big surprises in earnings more than 42 days earlier than non-AH firms that have no such deadline to disclose on average (−13.42 vs. 29.41 days). The result arises after controlling for industry and firm size. This shows that most non-AH firms issue warnings about their earnings as late as possible, even several days before the earnings announcement date. As a result, most non-AH firms can learn from information disclosed by their AH peers and decide whether to warn or not afterward.

Third, we argue that the issuance of profit warnings by AH firms in the same industries will affect the issuance of profit warnings by their peers. Given that investors are not sure whether a manager has private information, in equilibrium only firms that have sufficiently positive news will release their information, and firms with more negative information will prefer to keep their market value higher by claiming that they do not yet have any information to report. While in a multi-firm setting, investors are informed of what a non-disclosing manager should know from a peer firm's disclosures, so non-disclosing managers cannot get the same equilibrium payoff by keeping silent (Banerjee, 1992; Bikhchandani et al., 1992; Welch, 1992; Dye and Sridhar, 1995). In the Hong Kong market, when a AH firm issues a profit warning to follow mainland China's regulation, investors are informed of what a non-AH manager should know, because the AH peer's news shares a common market/industry environment with its non-AH counterpart. Therefore, the non-AH peer manager would be more likely to make a good news announcement to show she also has competitive managerial talent (Trueman, 1986). Also, the non-AH peer manager would be more likely to make a bad news announcement as long as she believes that investors are less likely to hold her responsible for bad news when other firms also issue bad news, thereby lowering their penalty for the earnings shortfall (Skinner, 1994, 1997; Acharya et al., 2008; Tse and Tucker, 2010).

Hypothesis 1. Non-AH firms are more likely to issue profit warnings if their AH peers make profit warning announcements.

That AH peer's news shares a common market/industry environment with the non-AH counterpart is the key assumption for this spillover effect. In other words, AH peer's news is informative for investors' judgments regarding the earnings' news of non-AH firms (Dye and Sridhar, 1995). The more common factors the two groups share, the higher the probability that a non-AH firm will warn if AH peers warn. Here we further construct two subsamples of non-AH firms. These two subsamples share more common market/industry environments with AH firms. First, we create a sub-group of non-AH firms only composed of Red Chips and H share firms. Red Chips and H share firms are Chinese firms listed in Hong Kong.¹⁰ Most of those companies are doing business in Mainland China. It is long recognized that H shares and Red Chips share many common institutional and market factors with AH firms. Therefore, we predict that the spillover effect will be more pronounced when the non-AH peers of AH firms are H shares and Red chips. Second, industry factors play an important role in determining firms' earnings and influence executive's decisions. Companies in the same industry, however, may vary a lot in many aspects so that managers and investors do not think these companies are actual peers of AH firms. If the investors and managers of a non-AH firm do not think the AH firm is a comparable firm, then the warning of this AH firm would have little impact on the non-AH firm. To mitigate this concern, we use a size-industry matched sample to build a more comparable peer group of AH firms.¹¹ Supported by Albuquerque (2009), the method of picking peers matched on size and industry is a better way to find peers based on similar firm characteristics. We also predict that the spillover effect will be more pronounced in these two new peer groups. In sum, we propose the following two hypotheses¹²:

Hypothesis 2a. The likelihood that non-AH firms do warn if their AH peers make profit warning announcements is more pronounced when non-AH firms are H shares and Red Chips.

Hypothesis 2b. The likelihood that non-AH firms do warn if their AH peers make profit warning announcements is more pronounced when non-AH firms are matched by industry and size.

⁹ See the detail in Fig. 2b.

¹⁰ Companies incorporated in the Mainland and approved by the China Securities Regulatory Commission for a listing in Hong Kong are called H share companies, the letter H stands for Hong Kong. H-share companies are traded in Hong Kong dollars, but financial statements are reported in RMB yuan. A Chinese controlled company incorporated and listed in Hong Kong is called a "red chip" company, the word red comes from "red China" (Trenck et al., 1998). Red chips are trading in Hong Kong dollars, financial statements are also reported in the same currency. Recently, these distinctions between H-shares and red Chips have become blurred. Many leading companies are issued as red chips, such as China Mobile, China Insurance and China National Offshore Oil Corp. At the same time, a larger number of small companies, including private enterprises, are classified as H shares.

¹¹ We also realize that interdependence between Red Chips, H shares and AH firms might be due to their common political preference of Chinese shareholders, not simply because of their economic incentives we hypothesize in our study. The size-industry matched sample emphasizes the economic rather than political incentives. Therefore, this alternative subsample mitigates this concern.

¹² We recognize that an alternative peer group could be built in terms of how much sales of non-AH firms come from mainland China. Such composition could better reflect the common factors of business and industry environment than the one based on their shareholders (Red Chips and H shares vs. local firms). We have two methods to access the data in need: (1) geographic segment disclosure or (2) Hang Seng China affiliated firm index composite that includes some listed firms with more than 50% sales from mainland China. Unfortunately, we cannot obtain available data from (1). And we would further lose too many observations if we use the composite index. This is one of the limitations of our study.

It is natural for investors to look at industry leaders to uncover industry-relevant information. [Hou \(2007\)](#) shows that industry-specific information is reflected first in the stock prices of industry leaders and then spreads to other firms, resulting in a lead-lag relationship between the stock returns of industry leaders and industry followers. Specifically, industry leaders are the firms who are more liquid, have bigger size, have greater market share and are covered by more analysts. Therefore, in the Hong Kong market, the information transfer from leading AH firms to follower non-AH firms shall become more pronounced with the growth of AH firms in terms of their relative market capitalization and market share. In sum, we propose the following two hypotheses:

Hypothesis 3a. The likelihood that non-AH firms do warn if their AH peers make profit warning announcements is more pronounced when AH peers have greater market capitalization on HKSE.

Hypothesis 3b. The likelihood that non-AH firms do warn if their AH peers make profit warning announcements is more pronounced when AH peers have greater market share in the industry.

Under the profit warning rules in mainland China, AH firms are only required to warn about their earnings news if the change in earnings is larger than 50%, earnings are negative and earnings change between positive and negative. On the other hand, [Heitzman et al. \(2010\)](#) demonstrate that the incentives to voluntarily disclose information must recognize that such information is often disclosed because of an underlying duty to disclose. Under this materiality framework, independent of the costs the firm might incur as a result (e.g. proprietary costs), the manager discloses warning information when the magnitude of earnings news is greater than the threshold of materiality. In other words, the behavior of firms with higher magnitudes of earnings changes would become more independent of the behavior of their peers. Therefore, it is important to examine whether this spillover effect varies with the magnitude of the earnings news. We expect that the spillover effect from AH peers is not linear and becomes weaker with an increase in the magnitude of earnings news. This hypothesis is stated as follows:

Hypothesis 4. The positive relationship in H1 is attenuated when the magnitude of earnings surprise of non-AH firms is greater.

Last but not least, it is important to remember that the spillover effect from AH to non-AH firms in our study is not asymmetric. That is, the interdependence of profit warnings between AH and non-AH firms works for both good and bad news. Meanwhile, one confounding factor in the chosen setting is the effect of litigation risk on bad news disclosure. As proposed by the voluntary disclosure rule on HKSE, only bad news is emphasized in the guidance. Therefore, if we only find evidence of the interdependence of profit warnings between AH and non-AH firms when they have bad news, but not good news, then we cannot reject the alternative explanation that what we document is simply a *post hoc* fallacy. That is, in a negative market shock, a non-AH manager will warn about its bad news to mitigate its litigation risk, no matter whether or not there is a AH peer manager who discloses their bad news to the market. In the real world, to meet the deadline of the regulation in mainland China, a AH firm has to issue bad news far earlier than the non-AH peer. The post hoc relationship between AH and non-AH firms does not come from an interdependent decision-making process, but mechanically does appear because they share common/industry factors and different deadline requirements.

Therefore, it is a must to do an additional test, here to reduce the chance of error from this possible *post hoc* fallacy in our study. [Acharya et al. \(2008\)](#) find that the reduced mean of the posterior distribution of firm value lowers the disclosure threshold and consequently some news that was previously withheld is now disclosed. **Hypothesis 4** gives us an opportunity to find whether there are non-AH managers who may NOT warn in a single firm setting, but they issue warnings if AH peers do so. Specially, if spillover effects from AH firms exist, non-AH firms with relatively immaterial earnings news (e.g. less than 50% earnings changes) will still be likely to warn when AH firms disclose a 50% material change in earnings news. So non-AH firms with immaterial earnings surprise comprise a more powerful sample to justify our spillover effect, i.e. a positive relationship in the lower earnings change partition strengthens the power of the evidence in H1.

4. Research design

4.1. Variable definitions

For the main variable, we measure AH peer's spillover effect by constructing *AHONLY*, an indicator variable set equal to 1 if AND ONLY if for non-AH firm i in industry j , no other non-AH firms made but at least one AH firm in industry j made a profit warning before firm i 's action.¹³ "Peers" in our main tests are defined as companies in the same industry group via two-digit SIC codes.

¹³ The proxy, *AHONLY*, will underestimate the spillover effect. There are other 4 scenarios of lead-follow warning relations: (1) for non-AH firm i in industry j , both AH and non-AH firms made profit warnings before firm i 's action. And a AH firm is the lead firm; (2) for non-AH firm i in industry j , both AH and non-AH firms made profit warnings before firm i 's action. And a non-AH firm is the lead firm; (3) For non-AH firm i in industry j , no AH firms made but at least one non-AH firm in industry j made a profit warning before firm i 's action; (4) for non-AH firm i in industry j , this non-AH firm is the lead firm to make profit warning in industry j . We also construe these scenarios into additional three dummy variables, *AHLC*, *LCAH*, and *LCONLY* respectively to test our results in the robustness checks.

For the control variables, we cover determinants of the decision to warn or not from the previous literature (Kasznik and Lev, 1995; Soffer et al., 2000; Baginski et al., 2000, 2002, 2004; Tucker, 2007). In detail, we control for the magnitude of the earnings change (ABSURP), the type of earnings news (BN), negative current earnings (LOSS), change from loss to profit (LTP), firm size (SIZE), market-to-book ratio (MBRANKS), earnings volatility (EARN_VOLT), magnitude of earnings change at industry-level (IND_SURP). Following Baginski et al. (2002), we employ the change in earnings (ABSURP) to maximize the sample size. The bad news indicator (BN) considers the asymmetric behavior of management forecasts (Skinner, 1994, 1997). Firm size (SIZE) captures many aspects of a firm's operational and business environment, for example, a firm's political costs (Watts and Zimmerman, 1986) and higher private information acquisition (higher information demand) (Lang and Lundholm, 1993). Hence, we include SIZE as the logarithm of the market value of equity at the beginning of the fiscal year when firms issue warnings. Market-to-book ratio (MBRANKS), defined as the decile rank of the market value of equity divided by the book value of total assets at the beginning of the fiscal year, indicates a firm's investment opportunity set and growth potential. It captures the motive of growth firms to soften the earnings-torpedo effect (Skinner and Sloan, 2002). In addition, management of unstable firms (high earnings volatility), lacking real control, attempt to manage an illusion of control by attributing to themselves more credit for negative outcomes (Kasznik and Lev, 1995; Baginski et al., 2000, 2004). Therefore, we use EARN_VOLT, measured as the standard deviation of the earnings per share during the prior 4 fiscal periods, in order to capture the volatility of the business. Two other indicators, negative current earnings (LOSS) and a change from a loss to a profit (LTP) are to cover the mainland's rules. At last, we add a group of indicator variables to control the effects from SOE companies (SOE), year, industry, market segments (main board stock or GEM stock), and interim or annual results.

4.2. Regression specification

Based on the above arguments, we use the following logistic model to examine the impact of AH peer's spillovers on other firms.

$$Prob(Warn_{i,t} = 1) = \Phi(\delta_0 + \delta_1 AHONLY_{i,j,t} + Controls + \epsilon_{i,j,t}) \quad (1)$$

$Warn_{i,t}$ equal to 1 if the firm i makes a profit warning in fiscal period t
 $AHONLY_{i,j,t}$ equal to 1 if AND ONLY if for non-AH firm i in industry j , no other non-AH firms made but at least one AH firm in industry j made a profit warning in fiscal period t before firm i 's action

Controls:

$ABSURP_{i,t}$ equals the absolute value of the change in net income between event fiscal period t and same fiscal period last year deflated by net income for the same fiscal period last year
 $BN_{i,t}$ equal to 1 if the change in net income between event fiscal period t and same fiscal period last year deflated by net income for the same fiscal period last year is <0 , otherwise, 0
 $LOSS_{i,t}$ equal to 1 if the net income of the event fiscal period t is <0 , otherwise, 0
 $LTP_{i,t}$ equal to 1 if the net income of the event fiscal period t is >0 and the net income of the same fiscal period last year is <0 ; otherwise, 0
 $SIZE_{i,t}$ equals the logarithm of the market value of equity at the beginning of the event year t
 $MBRANKS_{i,t}$ is the decile rank of the market to book ratio at the beginning of the event year, and is coded from 0 to 9
 $EARN_VOLT_{i,t}$ equals the standard deviation of the annual return on assets for the last 4 years
 $IND_ABSURP_{i,t}$ equals the absolute value of the change in industry net income between event fiscal period t and same fiscal period last year deflated by industry net income for the same fiscal period last year
 $SOE_{i,t}$ equal to 1 if firm i is a SOE company, otherwise 0

If δ_1 is positive and significant, we conclude that non-AH firms are more likely to warn if there is no other non-AH firms but at least one AH peer issuing a profit warning announcement, i.e. a spillover effect exists from AH firms to non-AH firms. Furthermore, a positive relation between $AHONLY$ and $WARN$ would imply that: (1) not many non-AH firms make their profit warnings as leading announcers; and (2) non-AH firms follow their AH peers to disclose big earnings surprises but do not follow their non-AH peers.

4.3. Sample selection and descriptive statistics

The HKSE provides investors with listed-company filings and maintains all price-sensitive information announcements from 1999 till now in its HKEx News online searching system. We choose the sample period from 2003 to 2009. The period starts with 2003 because of the passage of the *Guide on Price-Sensitive Information* in Hong Kong. We collect the warning

Table 2

(A) Sample selection procedure. (B) Profit warnings distributed across fiscal years. (C) Fiscal periods distributed across market segments. (D) Profit warnings distributed across market segments. (E) Profit warnings distributed by good and bad news. (F) Timeliness of profit warnings.

		Annual	Interim	Total
(A)				
Total profit warnings		552	301	853
Less: forecasted year is before 2003 or after 2008		46	99	145
Less: lost due to changes in Datastream coverage		191	58	247
Listed on Datastream		315	144	459
Less: missing Datastream data		106	55	161
Complete data on Datastream		209	89	298
Year	# of warnings			
	Interim		Annual	
	Good news	Bad news	Good news	Bad news
(B)				
2003	9	9	9	9
2004	6	6	9	9
2005	6	11	9	13
2006	3	7	10	9
2007	12	7	22	26
2008	4	9	14	70
Total	40	49	73	136
# of obs.	AH		Non-AH	
		All		Non-China
(C)				
Main board	331	4682	4448	
GEM	0	833	600	
Total	331	5515	5048	
# of warnings	AH		Non-AH	
		All		Non-China
(D)				
Main board	106	176	160	
GEM	0	16	11	
Total	106	192	171	
	AH		Non-AH	
		All		Non-China
(E)				
<i>Good news</i>				
# of warnings	77	36	34	
% of warnings	72.64	18.75	19.77	
<i>Bad news</i>				
# of warnings	29	156	138	
% of warnings	27.36	81.25	80.23	
<i>Total profit warnings</i>				
# of warnings	106	192	172	
% of warnings	100.00	100.00	100.00	
# of days to fiscal period end	AH		Non-AH	
		All		Non-China
(F)				
Mean	-13.42	29.34	31.81	
Std. Dev.	41.60	57.17	58.50	
Min.	-114	-28	-28	
25%	-15	-14	-12	
Median	-7	19.5	21.5	
75%	62	56	56	
Max.	117	186	186	

AH: Chinese dual-listed firms; Non-AH: listed firms in Hong Kong market, excluding AH firms; Non-AH and Non-China: non-AH firms in Hong Kong, excluding H shares and Red Chips; good news: earnings change is not less than zero, otherwise, bad news.

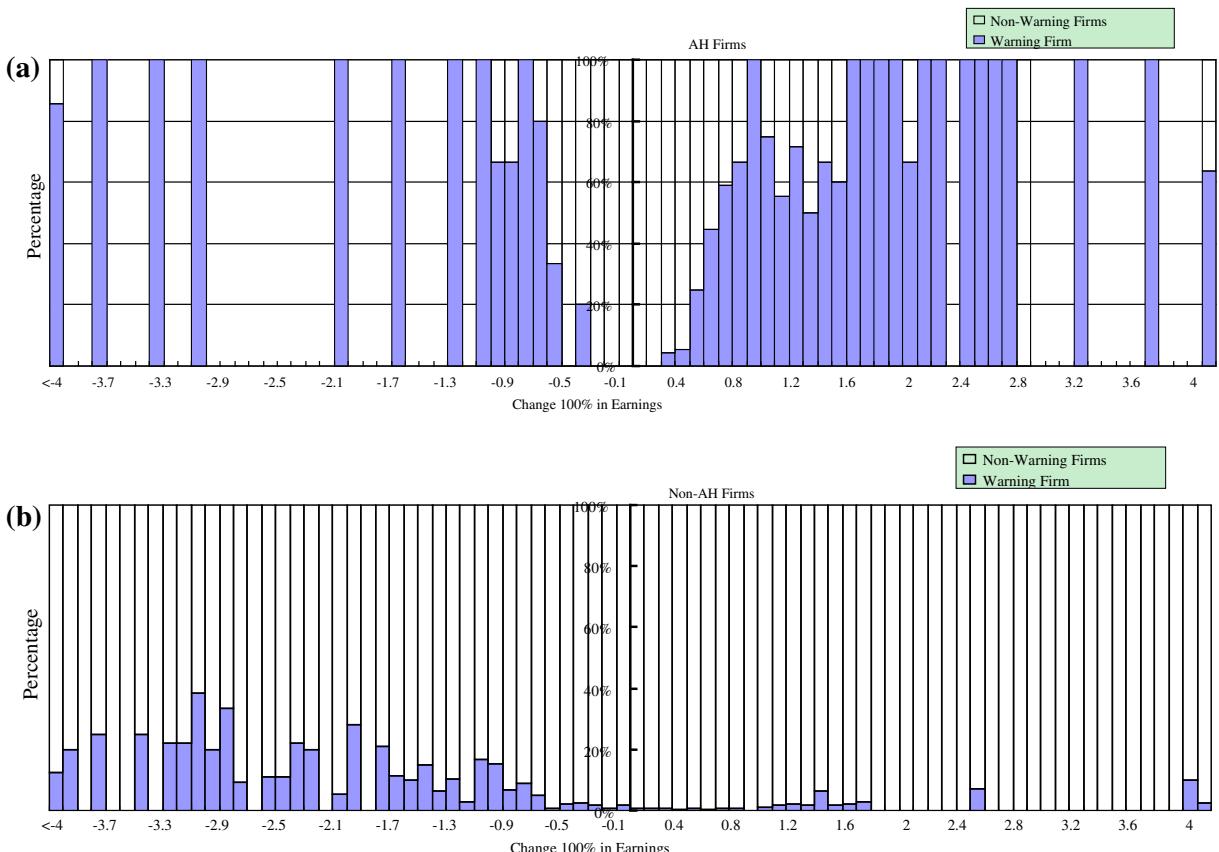


Fig. 2. (a) Warning firms distributed by percentage of earnings changes (AH sample). (b) Warning firms distributed by percentage of earnings changes (non-AH sample).

announcements after June 25, 2007 from the HKSE website and stop on April 30, 2009.¹⁴ We then manually collect the rest of warnings data from Bloomberg.¹⁵ All financial information and stock market data are from the Datastream database.

Table 2, Panel A reports the profit warnings sample selection process. 5846 fiscal periods with 298 profit warning announcements are available. During the sample period, 2003–2009, companies in the Hong Kong market issued 853 warnings about interim and annual earnings. In addition to events excluded due to company coverage in Datastream, we also delete events that don't have enough financial data to calculate variables in the model. As a result, the final number of warnings is 298, which includes 209 warnings for annual earnings and 89 warnings for interim earnings.

Panel B of **Table 2** further summarizes profit warnings distributed across fiscal years. Consistent with previous literature, managers are not only reluctant to disclose warning news, but are also more likely to warn if the news is bad. Panel C of **Table 2** shows no firm-fiscal period observations of AH firms in GEM. Both for AH and non-AH firms, the Main Board market includes more observations. There are more warnings on the Main Board than GEM. Based on the results in the Panel E, partly because of the clear cut-off and symmetric rule in mainland China, AH firms make a higher percentage of good news warnings than non-AH firms. Panel F confirms that AH firms issue profit warnings on a more timely basis than non-AH firms. Moreover, these results in **Table 2** remind us to control for year, fiscal period (annual or interim) and market segment effects in warning behavior.

¹⁴ We include all quarterly result announcements of fiscal period $t-1$, if these announcements contain any profit warning information on fiscal period t . In practice, many AH firms issue their warnings with their quarterly results.

¹⁵ We also match the news data from Bloomberg with the price-sensitive information filings in the HKSE website to make sure our sample is complete. One of the seminar participants was concerned whether listed firms in Hong Kong do not only file profit warnings to HKSE officially, but rather choose other communication channels to inform the markets of their earnings news. We use the key words "profit/earning + warning/surprise/estimate", "significantly/substantially/significant/substantial/expected + increase/decrease/change/surge/decline", "expected/estimated/expectation on + improvement/performance/financial results", and "" to search for the warning news in the Wisenews database. The results almost match perfectly with our profit warning announcement data from the HKSE website and Bloomberg. Only two additional pieces of news are not included previously. These two indicate that two non-AH firms announced through press releases a refusal to make any profit warnings. We add these two non-profit warnings into our profit warning sample. Moreover, this additional search in the Wisenews database shows that listed firms in Hong Kong do not choose other communication channels but only the official filing to HKSE to inform the market of their earnings news.

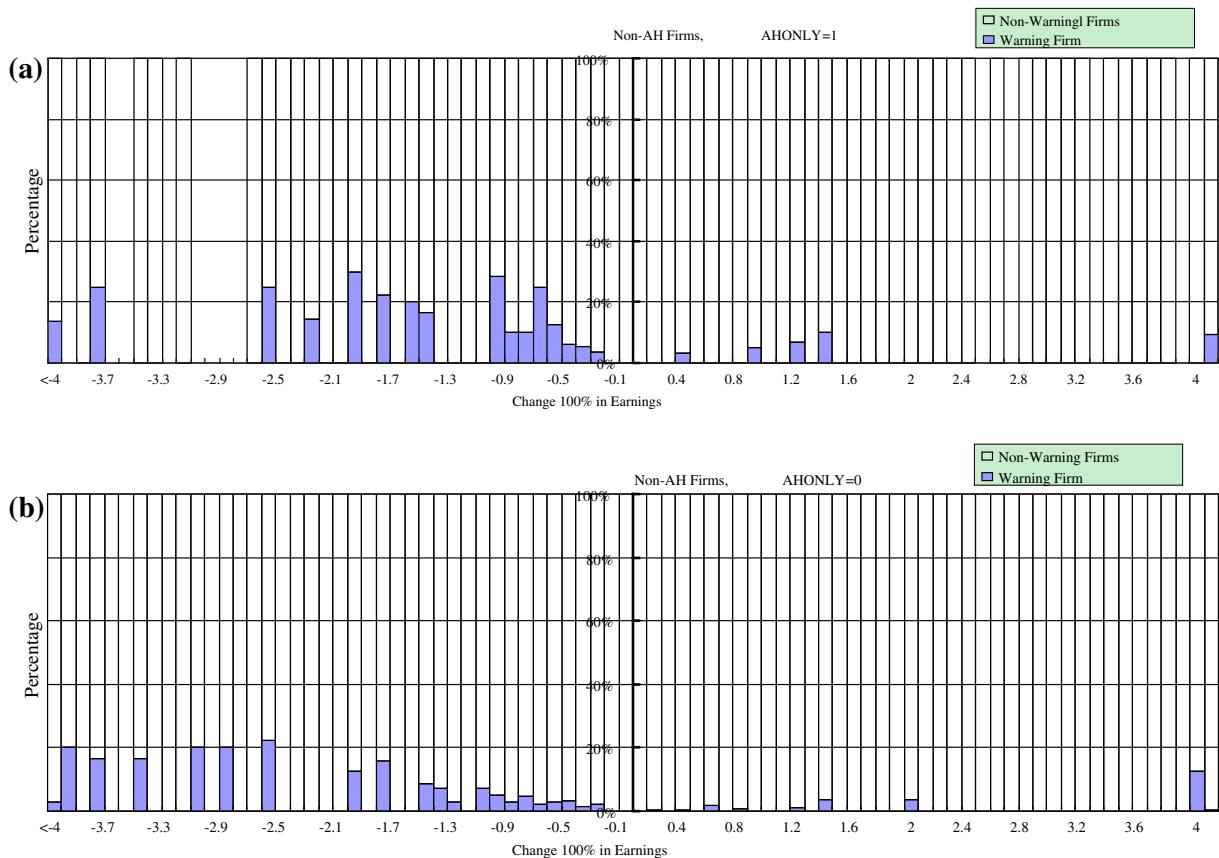


Fig. 3. (a) Warning firms distributed by percentage of earnings changes (non-AH sample, AHONLY = 1). (b) Warning firms distributed by percentage of earnings changes (non-AH sample, AHONLY = 0).

5. Results

5.1. Variable distributions and descriptive statistics

Fig. 2a and b describe the frequency of firms that make profit warnings based on the percentage of earnings changes. In the AH sample, firms start to warn about their earnings when earnings changes reach 30%, but non-AH firms make warnings for even less than 10% changes in their earnings. On average, however, AH firms make more warnings than non-AH firms (66.01% vs. 4.29%). Fig. 3a and b provide us with a detailed picture of non-AH firm warnings distributed by the percentage of earnings changes, conditional on whether a AH peer warns or not (AHONLY = 1 or 0). Non-AH firms under AH peer pressure (Fig. 3a, AHONLY = 1) have a higher percentage of warnings than non-AH firms without AH peer pressure (Fig. 3b, AHONLY = 0). This univariate result confirms our hypothesis that non-AH firms are more likely to warn if their AH peers make profit warning announcements (5.84% vs. 3.60%).

Table 3, Panel A provides descriptive statistics of the variables in our regressions. All control variables are winsorized at the lower and upper one percentile. Both firm- and industry-level earnings changes of non-AH firms are larger than their AH counterparts. AH firms tend to be large firms, thus both the mean and median natural logarithm of market capitalization are about 16. The average earnings volatility of AH firms is -3.77, the absolute value of which is also bigger than non-AH firms.

5.2. Primary results

5.2.1. Tests of Hypotheses 1–3

Table 4 presents the logistic regression test of H1, including two subsample tests, H2a and b. We first regress the warn dummy on the control variables. These results are consistent with Tucker (2007) and Baginski et al. (2002) and imply our controls are effective for the Hong Kong market. Then we add our main independent variable, AHONLY, into the model. As H1 predicts, the coefficient of AHONLY in the second column is significantly positive (1.01, $z = 2.44$), indicating that non-AH firms depend on their AH peers' behavior when issuing profit warnings. These results still hold after controlling for the expected positive effects of ABSURP (positive; $z = 2.37$), bad news warnings (BN) (positive; $z = 2.13$), negative earnings news (LOSS) (positive; $z = 2.22$) and positive earnings news after a loss in the previous fiscal period (LTP) (positive;

Table 3

(A) Descriptive statistics. (B) Descriptive statistics of warning and non-warning firms. (C) Descriptive statistics of non-AH firms by AHONLY.

Classification variable		WARN		WARN = 1		# of obs.		% # of obs.		WARN = 0		# of obs.		%	
(A)															
AH				38		12.97				293		87.03			
Non-AH				191		3.46				5324		96.54			
AHONLY		AHONLY = 1		# of obs.		%		AHONLY = 0		# of obs.		%			
Non-AH				286		4.89				5560		95.11			
Continuous variable															
ABSURP		Mean		Std. Dev.		Min.		25th		Median		75th		Max.	
AH		1.25		3.97		0.00		0.16		0.40		0.97		51.10	
Non-AH		2.50		6.94		0.00		0.26		0.66		1.50		51.10	
Classification variables															
BN		BN = 1		# of obs.		%		BN = 0		# of obs.		%			
AH				95		28.70				236		71.30			
Non-AH				2165		39.26				3350		60.74			
LOSS		LOSS = 1		# of obs.		%		LOSS = 0		# of obs.		%			
AH				18		5.44				313		94.56			
Non-AH				1410		2.56				4105		74.43			
LTP		LTP = 1		# of obs.		%		LTP = 0		# of obs.		%			
AH				9		2.72				322		97.28			
Non-AH				502		9.10				5013		90.90			
Other control variables															
SIZE		Mean		Std. Dev.		Min.		25th		Median		75th		Max.	
AH		16.08		1.84		12.77		14.64		16.17		17.17		21.41	
Non-AH		13.65		2.07		14.97		12.19		13.40		14.97		21.74	
MBRANKS		Mean		Std. Dev.		Min.		25th		Median		75th		Max.	
AH		5.32		2.08		1		4		5		7		9	
Non-AH		4.45		2.90		0		2		4		7		9	
EARN_VOLT		Mean		Std. Dev.		Min.		25th		Median		75th		Max.	
AH		−3.77		.94		−7.30		−4.39		−3.76		−3.09		−1.98	
Non-AH		−2.59		1.59		−9.01		−3.54		−2.72		−1.79		4.36	
IND_ABSURP		Mean		Std. Dev.		Min.		25th		Median		75th		Max.	
AH		0.62		0.93		0.00		0.14		0.36		0.82		7.34	
Non-AH		0.85		1.22		0.00		0.15		0.47		0.96		7.34	
								AH				Non-AH			
								Mean		Mean		Median		Median	
(B)															
WARN = 1		ABSURP		3.69		0.99		5.25		1.37		5.09		1.34	
		SIZE		16.23		15.98		14.28		14.33		14.29		14.32	
		MBRANKS		5.37		5		4.01		4		4.04		4	
		EARN_VOLT		−3.73		−3.65		−2.71		−2.96		−2.59		−2.91	
		IND_ABSURP		0.91		0.50		0.89		0.72		0.93		0.78	
WARN = 0		ABSURP		1.16		0.42		3.67		0.63		3.58		0.65	
		SIZE		16.09		16.19		13.63		13.35		12.59		12.31	
		MBRANKS		5		5.32		4		4.47		4		4.40	
		EARN_VOLT		−3.79		−3.78		−2.08		−2.11		−2.20		−2.62	
		IND_ABSURP		0.57		0.31		0.83		0.45		0.86		0.47	
								Non-AH							
								Mean		Mean		Std. Dev.		Min	
(C)												Max		Diff. t (z)	
AHONLY = 1		ABSURP		1.61		0.64		4.48		0.01		51.10		−2.51	
		SIZE		13.76		13.32		2.17		9.62		21.22		0.83	
		MBRANKS		5.86		5		2.84		1		10		2.24	
		EARN_VOLT		−2.67		−2.72		1.71		−7.35		3.06		−0.84	
		IND_ABSURP		0.76		0.41		0.89		0.00		7.43		1.34	

Table 3 (continued)

		Non-AH					
		Mean	Median	Std. Dev.	Min	Max	Diff. t (z)
AHONLY = 0	ABSURP	2.53	0.66	7.02	0.01	51.10	(1.15)
	SIZE	13.65	13.41	2.06	7.79	21.73	(−0.37)
	MBRANKS	5.43	5	2.90	1	10	(−2.25)
	EARN_VOLT	−2.58	−2.77	1.58	−9.01	4.36	(1.14)
	IND_ABSURP	1.04	0.49	3.24	0.00	8.19	(3.67)

AH: Chinese dual-listed firms; Non-AH: listed firms in Hong Kong market, excluding AH firms; Non-AH and Non-China: Non-AH firms in Hong Kong market, excluding H shares and Red Chips; AHONLY: equals 1 if and ONLY IF a AH peer warns its earnings performance before the firm makes any decisions of profit warning in fiscal period t ; ABSURP: equals the absolute value of the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year; BN: equals 1 if the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year is <0, otherwise, 0; LOSS: equals 1 if the net income of the event fiscal period is <0, otherwise, 0; LTP: equals 1 if the net income of the event fiscal period is >0 and the net income of the same fiscal period last year is <0; otherwise, 0; SIZE: equals the logarithm of the market value of equity at the beginning of the event year; MBRANKS: is the decile rank of the market to book ratio at the beginning of the event year, and is coded from 0 to 9; EARN_VOLT: equals the standard deviation of the annual return on assets for the last 4 years; IND_ABSURP: equals the absolute value of the change in industry net income between event fiscal period and same fiscal period last year deflated by industry net income for the same fiscal period last year; SOE: equals 1 if firm i is SOE company, otherwise, 0.

Table 4

Logistic regression of the decision to issue profit warnings for Non-AH firms: $\text{Prob}(\text{Warn}_{i,t} = 1) = \Phi(\delta_0 + \delta_1 \text{AHONLY}_{i,j,t} + \text{Controls} + \epsilon_{i,j,t})$.

Variables	Predicted sign	Non-AH		(H1)		(H2a)		Non-AH and Non-China		(H2b)	
		Non-AH		Non-AH and China		Non-AH and Non-China		Non-AH matched sample			
		Coff.	Z	Coff.	Z	Coff.	Z	Coff.	Z	Coff.	Z
AHONLY	+			1.01	2.44**	1.77	2.13**	0.41	1.77*	2.68	3.41***
ABSURP	+	0.02	2.67***	0.01	2.37**	0.02	0.90	0.02	3.21***	0.44	0.84
BN	+	1.56	2.20**	0.42	2.13**	3.63	2.59***	1.39	3.10***	–	–
LOSS	+	0.68	2.17**	0.57	2.22**	1.45	0.94	0.60	2.88***	1.34	2.14**
LTP	+	0.90	0.63	0.14	0.61	2.00	1.03	0.74	6.11***	–	–
SIZE	+	0.23	2.72***	0.34	2.10**	0.34	0.25	0.15	1.00	0.32	2.56**
MBRANKS	+	−0.16	−1.70*	−0.12	−1.74*	−0.25	−0.29	−0.17	−1.86*	−0.12	−2.36**
EARN_VOLT	?	−0.19	−3.43***	−0.29	−3.37***	−0.79	−2.39**	−0.14	−2.00**	−0.77	−1.81*
IND_ABSURP	+	0.64	4.11***	1.06	4.14***	0.94	1.17	0.63	2.77***	1.00	3.65***
SOE	+	1.17	2.33**	1.57	2.52**	2.12	2.21**	N/A	N/A	0.99	2.11**
Year dummies	Yes			Yes		Yes		Yes		Yes	
Industry dummies	Yes			Yes		Yes		Yes		Yes	
Mkt seg. dummy	Yes			Yes		Yes		Yes		Yes	
Interim/annual dummy	Yes			Yes		Yes		Yes		Yes	
# of obs.	5515			5515		467		5048		331	
Wald Chi ²	825.80			873.73		93.82		678.15		142.29	
Prob > Chi ²	0.0000			0.0000		0.0000		0.0000		0.0000	
Pseudo R ²	27.01%			30.00%		44.85%		29.38%		38.62%	

When estimating the coefficients' standard errors, we use a clustering procedure that accounts for serial dependence across fiscal periods of a given industry. We include dummies for year, industry, market segment and interim or annual results in the regressions to control for temporal fixed effects; the results are not tabulated.

Non-AH: listed firms in Hong Kong market, excluding AH firms; Non-AH and Non-China: Non-AH firms in Hong Kong market, excluding H shares and Red Chips; Non-AH and China: Non-AH firms that are H shares and Red Chips; AHONLY: equals 1 if and ONLY IF a AH peer warns its earnings performance before the firm makes any decisions of profit warning in fiscal period t ; ABSURP: equals the absolute value of the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year; BN: equals 1 if the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year is <0, otherwise, 0; LOSS: equals 1 if the net income of the event fiscal period is <0, otherwise, 0; LTP: equals 1 if the net income of the event fiscal period is >0 and the net income of the same fiscal period last year is <0; otherwise, 0; SIZE: equals the logarithm of the market value of equity at the beginning of the event year; MBRANKS: is the decile rank of the market to book ratio at the beginning of the event year, and is coded from 0 to 9; EARN_VOLT: equals the standard deviation of the annual return on assets for the last 4 years; IND_ABSURP: equals the absolute value of the change in industry net income between event fiscal period and same fiscal period last year deflated by industry net income for the same fiscal period last year; SOE: equals 1 if firm i is SOE company, otherwise, 0.

* $p < 10\%$, two-tailed.

** $p < 5\%$, two-tailed.

*** $p < 1\%$, two-tailed.

$z = 0.61$). Other controls include firm size (SIZE), Market-to-book ratio (MB, negative; $z = -1.74$), earnings volatility (EARN_VOLT, negative; $z = -3.37$), industry earnings news (IND_ABSURP, positive; $z = 4.14$) and SOE dummy (positive; $z = 2.52$).

As for H2a and b, we also report the results of Eq. (1) for these different sub-samples in Table 4. After controlling for other determinants of issuing profit warnings, in the column "Non-AH and China", the coefficient on AHONLY (1.77, $z = 2.13$) is more significant for the Chinese non-AH firms (Red Chips and H Shares). But the coefficient on AHONLY becomes weaker

Table 5Logistic regression of the decision to issue profit warnings for non-AH firms by *AHCAP_M* and *AHCAP_IND*: $Prob(Warn_{i,t} = 1) = \Phi(\delta_0 + \delta_1 AHONLY_{i,j,t} + Controls + \epsilon_{i,j,t})$.

Variables	Predicted sign	H3a						H3b					
		High <i>AHCAP_M</i>		Mid <i>AHCAP_M</i>		Low <i>AHCAP_M</i>		High <i>AHCAP_IND</i>		Mid <i>AHCAP_IND</i>		Low <i>AHCAP_IND</i>	
		Coff.	Z	Coff.	Z	Coff.	Z	Coff.	Z	Coff.	Z	Coff.	Z
<i>AHONLY</i>	+	1.52	3.17***	1.11	1.79*	-0.21	-0.96	-0.61	-1.51	1.29	5.91***	0.03	1.13
Controls		Yes		Yes		Yes		Yes		Yes		Yes	
Year dummies		Yes		Yes		Yes		Yes		Yes		Yes	
Industry dummies		Yes		Yes		Yes		Yes		Yes		Yes	
Mkt seg. dummy		Yes		Yes		Yes		Yes		Yes		Yes	
Interim/annual dummy		Yes		Yes		Yes		Yes		Yes		Yes	
# of obs.		1512		3280		1054		1659		899		2957	
Wald Chi ²		316.47		270.09		60.46		111.90		290.34		285.54	
Prob > Chi ²		0.0000		0.0000		0.0025		0.0000		0.0000		0.0000	
Pseudo R ²		33.32%		32.50%		25.04%		27.48%		31.54%		32.67%	

When estimating the coefficients' standard errors, we use a clustering procedure that accounts for serial dependence across fiscal periods of a given industry. We include dummies for year, industry, market segment and interim or annual results in the regressions to control for temporal fixed effects; the results are not tabulated.

AHONLY: equals to 1 if and ONLY IF a AH peer warns its earnings performance before the firm makes any decisions of profit warning in fiscal period *t*; *ABSURP*: equals to the absolute value of the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year; *BN*: equals 1 if the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year is <0, otherwise, 0; *LOSS*: equals 1 if the net income of the event fiscal period is <0, otherwise, 0; *LTP*: equals 1 if the net income of the event fiscal period is >0 and the net income of the same fiscal period last year is <0; otherwise, 0; *SIZE*: equals the logarithm of the market value of equity at the beginning of the event year; *MBRANKS*: is the decile rank of the market to book ratio at the beginning of the event year, and is coded from 0 to 9; *EARN_VOLT*: equals the standard deviation of the annual return on assets for the last 4 years; *IND_ABSURP*: equals the absolute value of the change in industry net income between event fiscal period and same fiscal period last year deflated by industry net income for the same fiscal period last year; *AHCAP_M*: equals market capitalization of AH firms in period *t* over total market capital of all firms in period *t*; *AHCAP_IND*: equals market capitalization of AH firms in industry *j* in period *t* over total market capital of industry *j* in period *t*; *SOE*: equals 1 if firm *i* is SOE company, otherwise, 0.

* $p < 10\%$, two-tailed.

** $p < 5\%$, two-tailed.

*** $p < 1\%$, two-tailed.

(0.41, $z = 1.77$) for non-Chinese firms (local firms excluding Red Chips and H Shares, in the column "Non-AH and Non-China"). The results are consistent with our H2a, i.e. the likelihood that non-AH firms do warn if their AH peers make profit warning announcements is more pronounced when non-AH firms are H shares and Red Chips. As we discussed in the previous section, we think there are two possible reasons for such differences: (1) the impact from AH firms depends on the level of how much non-AH firm's news shares a common market/industry environment with their AH counterparts (Dye and Sridhar, 1995). Non-Chinese firms might share less common market/industry factors with their AH counterparts; (2) non-Chinese firms in the Hong Kong market are composed of many penny firms, which are too small in terms of their size and market capitalization. Therefore, these small firms are not real industry counterparts with AH peers.

To further confirm these two explanations, we also test H2b based on a matched sample of non-AH firms by size and industry on a fiscal-period basis with AH firms (Albuquerque, 2009). The results presented in Table 4, column "Non-AH matching sample", show that in the AH matched sample, δ_1 holds for *AHONLY* (2.68, $z = 3.41$) and is more significant than the other sub-samples.

In summary, the main results reported in Table 4 indicate that after controlling for other factors that influence the warning decision, non-AH firms are more likely to warn about their earnings news if a AH peer has also warned. Moreover, this positive relationship is more pronounced if non-AH firms share more common market/industry factors with their AH peers.

To investigate whether the spillover effect becomes greater with growth of the AH firms' market power, we divide AH firms into three groups based on their market capitalization. We expect with more AH firms listing in the Hong Kong market, they provide more information about their industries. Therefore, our H3 implies the spillover effect should become greater with the increase in growth of AH firms. In Table 5, to test H3a, we sort firm-periods into three groups based on the percentage of market capitalization of AH firms over total market capitalization of the Hong Kong Stock Exchange (*AHCAP_M*) in each fiscal period. We find that coefficients on *AHONLY* increase when market capitalization of AH firms in Hong Kong Stock Exchange (*AHCAP_M*) becomes greater (Low: -0.21, $z = -0.96$; Middle: 1.11, $z = 1.79$; High: 1.52, $z = 3.17$). To test H3b, in addition, we sort our sample into three groups based on the percentage of market capitalization of AH firms within each industry (*AHCAP_IND*) in each fiscal period. Only the coefficient on *AHONLY* in the middle group of *AHCAP_IND* is significant (Low: 0.03, $z = 1.13$; Middle: 1.29, $z = 5.91$; High: -0.61, $z = -1.51$). In sum, the results in Table 5 are consistent with H3a, which implies that the spillover effect from AH firms depends on the extent of how many non-AH firms share common market/industry factors with their AH counterparts. Rather, our results do not support H3b. We think the possible explanation is that if a AH firm has a low market share in one industry, the spillover is weak (Hou, 2007). In addition, if the AH firms dominate their industries, investors cannot find a proper comparable firm to match with, so the spillover effect is diminished.

Table 6

Logistic regression of the decision to issue profit warnings for non-AH firms by good and bad news: $Prob(Warn_{i,t} = 1) = \Phi(\delta_0 + \delta_1 AHONLY_{i,j,t} + Controls + \epsilon_{i,j,t})$.

Variables	Predicted sign	Non-AH				Non-AH and Non-China			
		Good news		Bad news		Good news		Bad news	
		Coff.	Z	Coff.	Z	Coff.	Z	Coff.	Z
AHONLY	+	−0.44	−0.99	1.19	3.12**	−1.42	−1.07	0.19	1.78*
Controls		Yes		Yes		Yes		Yes	
Year dummies		Yes		Yes		Yes		Yes	
Industry dummies		Yes		Yes		Yes		Yes	
Market segment dummy		Yes		Yes		Yes		Yes	
Interim/annual dummy		Yes		Yes		Yes		Yes	
# of obs.		3350		2165		3058		1990	
Wald Chi ²		110.95		260.27		129.36		265.69	
Prob > Chi ²		0.0000		0.0000		0.0000		0.0000	
Pseudo R ²		25.81%		31.44%		26.44%		32.40%	

When estimating the coefficients' standard errors, we use a clustering procedure that accounts for serial dependence across fiscal periods of a given industry. We include dummies for year, industry, market segment and interim or annual results in the regressions to control for temporal fixed effects; the results are not tabulated.

Non-AH: listed firms in Hong Kong market, excluding AH firms; *Non-AH and Non-China*: non-AH firms in Hong Kong market, excluding H shares and Red Chips; *AHONLY*: equals 1 if and ONLY IF a AH peer warns its earnings performance before the firm makes any decisions of profit warning in fiscal period t ; *ABSURP*: equals the absolute value of the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year; *BN*: equals 1 if the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year is <0 , otherwise, 0; *LOSS*: equals 1 if the net income of the event fiscal period is <0 , otherwise, 0; *LTP*: equals 1 if the net income of the event fiscal period is >0 and the net income of the same fiscal period last year is <0 ; otherwise, 0; *SIZE*: equals the logarithm of the market value of equity at the beginning of the event year; *MBRANKS*: is the decile rank of the market to book ratio at the beginning of the event year, and is coded from 0 to 9; *EARN_VOLT*: equals the standard deviation of the annual return on assets for the last 4 years; *IND_ABSURP*: equals the absolute value of the change in industry net income between event fiscal period and same fiscal period last year deflated by industry net income for the same fiscal period last year.

* $p < 10\%$, two-tailed.

** $p < 5\%$, two-tailed.

*** $p < 1\%$, two-tailed.

In Table 6, we report additional logit results for Eq. (1) by good and bad news. Of the full non-AH sample, 3350 convey good news and 2165 convey bad news. The AHONLY coefficients are only significant for bad news. For non-China-affiliated firms, the results (in the column "Non-AH and Non-China") are similar. Therefore, managers in non-AH firms are more likely to issue bad-news warnings if their AH peers made such warnings. On the other hand, these non-AH managers are reluctant to make good-news announcements, even if their AH peers disclose good news. The asymmetric results are consistent with the findings by Skinner (1994, 1997), Tse and Tucker (2010), Cheng and Leung (2006) may offer another reason why Hong Kong firms are inclined to withhold good news. They find Hong Kong managers withhold good news and buy the shares of their own firms before the earnings news is released.

The asymmetric disclosure of good and bad news implies that if we only find evidence of the interdependence of profit warnings between AH and non-AH firms when they have bad news, but not good news, then we cannot reject the alternative explanation that what we document simply is a *post hoc* fallacy. As discussed previously, testing of H4 will help to distinguish between these two explanations.

5.2.2. Tests of Hypothesis 4

With respect to H4, the results are also consistent with our expectations. In Table 7, we provide empirical evidence of our arguments by estimating the logistic model separately on observations ranked by their magnitude of *ABSURP*. We form groups based on quartile cutoffs. Specifically, the bottom group consists of firms where *ABSURP* is below 26% (bottom 25% of firms). The middle two groups contain firms with *ABSURP* of 26% to 66% and 66% to 151%. The top group consists of the 25% of firms in which *ABSURP* is at its highest, at least 151%. *Ceteris paribus*, this top group is most likely to be material and thus most likely to be forced to disclose, which implies that the spillover effects from AH peers should have little and insignificant explanatory power.

In our sample period, no AH firms with less than 30% earnings change makes a profit warning. Thus, it is important to remember that we can get more powerful evidence of the spillover effect, if we find non-AH firms with "immortal" earnings news (e.g. $<30\%$) are also more likely to warn if a AH peer with "material" earnings news has made a profit warning. Compared to big earnings changes (e.g. $>30\%$), this scenario lowers the possibility that non-AH firms warn after AH peers simply because they have a similar duty to disclose similar material earnings news as their AH peers. Thus this subsample test mitigates the *post-hoc* fallacy in our design.¹⁶ Panel B of Table 7 reports the results.

¹⁶ We admit that the "interdependence" of disclosure also exists within non-AH firms. But we can hardly have a powerful test to argue this interdependence is based on a simple *post-hoc* relation for the pure non-AH sample.

Table 7

(A) and (B) Descriptive statistics of non-AH firms by ABSURP.

Partitions by ABSURP	Mean	Std. Dev.	Min.	25th	Median	75th	Max.
(A)							
<26%							
ABSURP	0.13	0.07	0.01	0.06	0.13	0.19	0.26
BN	0.35	0.48	0	0	0	1	1
LOSS	0.12	0.32	0	0	0	1	1
LTP	0	0	0	0	0	0	0
SIZE	14.24	2.15	8.78	12.71	14.02	15.57	21.22
MBRANKS	4.47	2.48	0	1	3	6	9
EARN_VOLT	-2.95	1.61	-9.01	-3.91	-3.08	-2.22	3.83
IND_ABSURP	0.68	1.40	0.00	0.13	0.33	0.70	15.75
26–66%							
ABSURP							
BN	0.39	0.49	0	0	0	1	1
LOSS	0.20	0.40	0	0	0	0	1
LTP	0	0	0	0	0	0	0
SIZE	13.85	2.10	8.80	12.35	13.60	15.21	21.12
MBRANKS	4.45	4	0	2	4	7	9
EARN_VOLT	-2.68	1.53	-7.47	-3.57	-2.87	-1.94	3.73
IND_ABSURP	0.92	3.61	0.00	0.15	0.41	0.84	7.34
66–151%							
ABSURP	0.98	0.23	0.66	0.79	0.94	1.14	1.51
BN	0.42	0.49	0	0	0	1	1
LOSS	0.28	0.45	0	0	0	1	1
LTP	0.15	0.36	0	0	0	0	1
SIZE	13.47	13.18	8.26	11.94	13.19	14.79	21.74
MBRANKS	3.95	2.88	0	1	3	6	9
EARN_VOLT	-2.50	1.58	-7.47	-3.39	-2.50	-1.60	4.35
IND_ABSURP	1.52	4.34	0.00	0.21	0.58	1.29	8.19
>151%							
ABSURP	8.45	12.06	1.51	2.14	3.48	7.90	51.10
BN	0.41	0.49	0	0	0	1	1
LOSS	0.41	0.49	0	0	0	1	1
LTP	0.21	0.41	0	0	0	0	1
SIZE	13.04	1.69	7.79	11.80	12.90	14.05	18.41
MBRANKS	3.87	2.98	0	1	3	6	9
EARN_VOLT	-2.30	1.55	-9.01	-3.24	-2.39	-1.64	3.83
IND_ABSURP	1.19	1.61	0.00	0.21	0.59	1.34	7.34
Partitions by ABSURP	AHONLY	Z		Controls	Pseudo R ²		Prob > Chi ²
(B)							
0–26%	-0.36	-0.63		Yes	24.75%		0.000
26–66%	2.34	3.47***		Yes	31.30%		0.000
66–151%	1.77	4.21***		Yes	25.17%		0.000
>151%	0.63	1.37		Yes	25.68%		0.000

AHONLY: equals 1 if and ONLY IF a AH peer warns its earnings performance before the firm makes any decisions of profit warning in fiscal period t ; ABSURP: equals the absolute value of the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year; BN: equals 1 if the change in net income between event fiscal period and same fiscal period last year deflated by net income for the same fiscal period last year is <0 , otherwise, 0; LOSS: equals 1 if the net income of the event fiscal period is <0 , otherwise, 0; LTP: equals 1 if the net income of the event fiscal period is >0 and the net income of the same fiscal period last year is <0 ; otherwise, 0; SIZE: equals the logarithm of the market value of equity at the beginning of the event year; MBRANKS: is the decile rank of the market to book ratio at the beginning of the event year, and is coded from 0 to 9; EARN_VOLT: equals the standard deviation of the annual return on assets for the last 4 years; IND_ABSURP: equals the absolute value of the change in industry net income between event fiscal period and same fiscal period last year deflated by industry net income for the same fiscal period last year. When estimating the coefficients' standard errors, we use a clustering procedure that accounts for serial dependence across fiscal periods of a given industry. We include dummies for year, industry, market segment and interim or annual results in the regressions to control for temporal fixed effects; the results are not tabulated.

* $p < 10\%$, two-tailed.** $p < 5\%$, two-tailed.*** $p < 1\%$, two-tailed.

Among firms with the lowest ABSURP (<26%), AHONLY has no significant effect on disclosure on profit warnings of non-AH firms (-0.36 , $z = -0.63$). In unreported tables, earnings surprise (ABSURP, $z = 2.10$), bad earnings news (BN, $z = 2.00$) and firm size (SIZE, $z = 1.83$) significantly determine the disclosure decision. We report estimates from the same model for firms with ABSURP between 26% and 66% and find that the coefficient on AHONLY becomes positive and significant (2.34, $z = 3.47$). For ABSURP between 66% and 151%, we also find that the coefficient on AHONLY is positive and significant but becomes weaker in

magnitude (1.77, $z = 4.21$). This indicates that the positive relationship in H1 is attenuated when the magnitude of earnings surprise of non-AH firms is greater. For both of the middle groups of *ABSURP*, other controls, earnings surprise (*ABSURP*, $z = 2.93, 1.98$), bad earnings news (*BN*, $z = 3.58, 4.65$), and firm size (*SIZE*, $z = 2.56, 1.79$) still hold their positive relationships with the disclosure decision. Moreover, the coefficients of negative earnings news (*LOSS*) (positive; $z = 4.23, 2.54$) and positive earnings news after a loss in the previous fiscal period (*LTP*) (positive; $z = 1.74, 1.85$) which are not significant in the bottom group become significant.

To see further evidence that materiality forces non-AH managers to disclose profit warnings, independent of AH peer pressure, we report results for the group with the highest *ABSURP*. The coefficient on *AHONLY* becomes smaller and statistically insignificant ($z = 1.41$). *ABSURP* itself has no significant positive effect on disclosure either. The results are consistent with H4. They imply that firms with more “material” earnings news have a duty to disclose such material information. As a result, if the magnitude of earnings news is larger than the “threshold” of materiality, it has little explanatory power on the disclosure decision. Also, compared to firms with lower *ABSURP*, firms in the top group of *ABSURP* are more independent in making their warning decisions. These results arise after controlling for *BN* ($z = 3.57$), *SIZE* ($z = 2.38$), and *MB*, *LTP* and *EARN-VOLT* (insignificant). Therefore, the result in the Top *ABSURP* group in Table 6 shows that spillover effects from AH firms have little power on their non-AH peers when the earnings news is material.

In summary, the results of testing spillover effects via sub-groups of *ABSURP* confirm H4. Spillover effects from AH firms are strongest in the lower *ABSURP* group—when earnings news is immaterial, non-AH peers are more likely to lower the disclosure threshold and consequently some news that was previously withheld is now disclosed. However, the spillover effects diminish with the increase in the magnitude of the earnings news. Because when such news becomes more material, managers in non-AH firms have a duty to disclose this material information. Therefore, spillover effects from AH peers are weaker.

6. Additional tests

6.1. Alternative proxy for spillovers from AH peers: *AHWARN*

Throughout the paper, we use the indicator variable, *AHONLY*, as a proxy for the spillover effect from AH firms to non-AH peers. As defined in the above section, *AHONLY* is an understated measure of this spillover effect, because we disregard two situations AH firms could still possibly influence their non-AH peers on the decision to warn or not to warn. First, after a AH firm warns, there is a non-AH peer that has also warned about its profit before other non-AH firms do. Second, AH firms are not the first movers, but follow non-AH peers in issuing profit warnings. In these situations, we cannot make clear-cut conclusions as to whether non-AH firms are influenced by AH firms or other non-AH peers. However, the measurements based on the above two situations overstate the AH firm's spillover effects. In the additional test section, we conduct a robustness check on these two situations by using an alternative proxy, *AHWARN*, equal to 1 if a AH peer warns about its earnings performance before the firm makes any decision about its profit warning in fiscal period t . Our main results in Tables 3–6 continue to hold. In particular, as we expect, we find that the spillover effect measured by *AHWARN* is greater than *AHONLY*.

6.2. Industry reclassification

Our sample includes 61 industries based on SIC two-digit codes. Given that our hypotheses are based on intra-industry effects, potential sensitivity might arise if we reclassify the sample industries. Moreover, industries are highly clustered in Hong Kong, with financial, real estate and industrials dominating the corporate landscape. Therefore, it is important to re-test our hypotheses based on alternative industry classifications. We use both the Datastream sector data and SIC one-digit codes to check our main results. We find the coefficients on *AHONLY* are still positive and significant.

7. Conclusion

In this paper, we examine the effects of a regulatory “spillover effect” between Chinese and Hong Kong firms. More specifically, we investigate whether Chinese dual-listed firms that are required to follow mainland China's mandatory disclosure rules influence other listed firms under a voluntary disclosure rule in the Hong Kong market to issue profit warnings. The clear cut mandatory disclosure rule in mainland China forces Chinese firms to issue profit warnings if they have more than a 50% earnings change, negative bottom lines or positive earnings after a loss year, within one month after the fiscal period end. We find that these disclosures by Chinese dual-listed firms lower the disclosure threshold for Hong Kong firms and consequently some news that was previously withheld by Hong Kong firms is now disclosed. In addition, the incentives to voluntarily disclose information must recognize that such information is often disclosed because of an underlying duty to disclosure. Therefore, we expect the spillover effect from AH firms on non-AH firms to become weaker when the earnings news is material.

The evidence presented above suggests that non-AH firms are more likely to warn if their AH peers make profit warning announcements. We further find that for the non-AH firm side, this behavior is more pronounced if non-AH firms are Red Chips and H shares or are in the same industry as AH firms with similar size. For the AH firm side, this spillover impact

increases with the market capitalization of AH firms and increases with the market share of these firms before they dominate the industry. Lastly, this spillover effect diminishes with the increase in earnings surprise of non-AH firms. This implies that disclosure behavior is more likely to be independent of peer's actions when the news is material.

Although we find that AH firms entice some of their non-AH peers to issue earnings news warnings, these warnings are not issued on a timely basis. An interesting direction for future research involves studying the link between the timeliness of profit warnings of non-AH firms and their incentives to withhold or delay such information. Many of these late warnings are disclosed only several days before the earnings announcement date that is 4 months after the fiscal year end. This long period gives insiders room to take advantage of private information to divert wealth away from public investors. We leave these issues for further study.

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