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Abstract

There has recently been a wave of relaxing listing regulations to accommodate and attract firms going public with dual-class shares (DCS), notably in Asia. Stock exchanges have been under pressure to sharpen their competitive edge in a heightened stock market competition where public companies have more freedom to carry out jurisdiction shopping. We examine the value implications of DCS adoption by employing an event study around a regulatory change allowing DCS listings in Hong Kong. We find negative market reactions around these regulatory discussions for firms already listed in Hong Kong, especially for firms in technology (tech) sectors. However, the market reaction turned positive for tech firms during Hong Kong's first DCS listing. We identify two distinct channels that influenced shareholders' perspectives on DCS: the competition channel, which dominated in the earlier discussions, as firms facing more competitive threats experienced lower returns; and the capital channel, which arose later, as it became clear that the regulatory change would enable all tech firms to attract more institutional capital.

Keywords: Dual-class shares, technological industry, Asia, competition channel, capital channel

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1. Introduction

One-share, one-vote ("OSOV") has long been considered a bedrock principle of corporate governance as the structure stipulates that shareholder's voting right and economic rights are proportionately aligned. However, multiple class voting structure has been in existence for more than a century and has risen in popularity in the last two decades especially among technology companies. After Alphabet Inc. (formerly Google Inc.) went public via an initial public offering (IPO) with dual-class shares (DCS) in 2004, the adoption of multiple class share structures has spread in the US and all around the globe. In recent years, several so-called unicorns—privately held startups valued above one billion dollars—have emerged in Asia, primarily China.[1] Many of these companies have expressed interest in adopting the multi-class structures for their IPOs. When it comes to where to park their IPOs, many of these companies consider Hong Kong for its geographical link.[2] For many decades, Hong Kong and Singapore—two major financial centers and former British colonies in Asia—had followed the British tradition of requiring OSOV. Stock exchanges around the world have diverse views towards unequal voting right structures, ranging from fully open (e.g., the US, Sweden,

[1] From 2016 to 2020, China's unicorn company number rose from 131 to 251, and the total value of China's unicorn companies amounted to $1.06 trillion in 2020 (Number of China's unicorn company reaches 251 in2020 | ChinaDaily.com.cn)

[2] A survey by PricewaterhouseCooper of 101 high-valuation unicorns in China identified Hong Kong as the preferred market for an IPO (43%), compared to the USA (25%) and China (23%) (The new Chinese unicorns)

Netherlands) to complete ban (e.g., Australia, Malaysia, Germany). Faced with the weakening of their competitive position in attracting new IPOs from technology unicorns, several stock exchanges – including Hong Kong, Singapore, and China in Asia, have chosen to abandon the OSOV requirements. In 2018, Hong Kong Stock Exchange (HKEX) and Singapore Stock Exchange (SGX) revised their listing regulations to accommodate DCS companies. Regulatory reforms to embrace DCS listings attract rigorous debate among policymakers, investors, and researchers around the globe. Our paper examines market sentiment toward DCS in Asia by focusing on the recent removals of OSOV requirements in the region.

DCS is considered a governance mechanism that is far more powerful than other anti-takeover protections, such as poison pills, a staggered board, or golden parachutes (Gompers, Ishii & Metrick, 2010). A typical DCS company has a publicly traded "inferior" class of stock that follows the one-share-one-vote principle (Class A shares), and a non-publicly traded "superior" class with multiple (typically 10) votes per share (Class B shares). The superior class is mainly owned by the founders and other insiders, creating a significant wedge between voting and cash flow rights. The disproportionate voting rights allow the insiders to retain their management power, even if they have only a minority of the company's shares.

The merits and perils of DCS have been a topic of dispute for decades. The literature of theoretical and empirical studies on the costs and benefits of DCS remains divided. Proponents argue that the dual-class mechanism insulate founders from market short-termism and allow them to focus on long-term value creation (Stein, 1988, 1989; Cremers, Masconale & Sepe, 2016; Chemmanur &

Jiao, 2012). Many studies show that DCS can benefit shareholders when firms are young or growing (Lehn, Netter & Poulsen, 1990; Bauguess, Slovin & Sushka, 2007; Cremers, Lauterbach & Pajuste, 2020; Kim & Michaely, 2019). In addition, the DCS structure can help promote innovation, creating more value for the whole firm (Lehn *et al.,* 1990; Dimitrov & Jain, 2006; Goshen & Hamdani, 2016).

On the other hand, opponents claim that DCS undercuts shareholders' voting power and undermines corporate governance. The existence of unequal voting power increases agency conflicts between insiders (e.g., directors and controlling shareholders) and outsiders (e.g., minority investors), hence lowering firm value (Bebchuk, 1999; Gompers, Ishii & Metrick, 2010). In addition, protection from capital market pressure provides leeway for founders and controlling insiders to extract private benefits of control (Bebchuk *et al*., 2000; Masulis, Wang & Xie, 2009). DCS also prevents potential acquirers from taking over the companies and implementing potentially more efficient business plans, resulting in an opportunity cost for public investors (Gurrea-Martinez, 2021).

Recent studies focus on the role of DCS over a company's life cycle. Bebchuk & Kastiel (2017) argue that the potential advantages of DCS tend to recede and the potential costs tend to rise as time passes from the IPO. They dismiss the idea of a "perpetual dual-class structure" and suggest that companies with DCS include a sunset provision to terminate the structure after a fixed period. This idea has been empirically supported by Cremers, Lauterbach & Pajuste (2020) and Kim & Michaely (2019) using samples of U.S. firms. The recent amendments to listing regulations in Hong Kong, Singapore, and China all include safeguards that require companies going public with DCS to have certain type of sunset clauses.

Many studies have examined the performance implications of DCS by comparing firms that have already chosen to adopt DCS to those with single class structures. However, little has been done to identify the causal effect of DCS on firm value. Our paper aims to fill this gap through the lens of peer-firms' stock market reactions to an exogenous regulatory shock related to DCS adoption. This provides a novel setting to examine the relationship between DCS and shareholder value that is less subject to endogeneity issues. If investors, on average, favor DCS, we expect the prospect of allowing DCS listings in a market to lower the shareholder value of existing listed firms, as they cannot convert to DCS. In contrast, if investors see DCS as harmful to firm value, due to governance concerns, we expect investors in listed peer firms to react positively to the potential regulatory changes, as they are better protected. This is essentially a competition channel. In addition, we argue that, if by allowing DCS, a stock exchange can attract more institutional capital, all firms can benefit, but technology firms will disproportionally benefit, as they are the major adopters of DCS and targets of institutional investors. This is the capital channel.

To evaluate these two potential channels, we use the recent regulatory consultations in Hong Kong as a shock to investor expectations about the value implications of DCS. On one hand, this regulatory amendment exemplified the "race to the bottom" concern about stock exchanges competing for listings by relaxing their requirements. On the other, the move also aimed to enhance Hong Kong's position as the leading financial centre in Asia. Since the launch of new listing regime in 2018, the HKEX has attracted such major Chinese tech companies as Xiaomi, Alibaba, JD.com, and NetEase.

We further argue that the relative importance of the competition and capital channels and thus investors' perceptions of DCS change over time. To this end, we employ a multi-event study to examine the evolving market reaction to the releases of DCS-related news in Hong Kong over time. We also conduct additional analyses on the market reactions to the embrace of DCS in Singapore and China, which took place a few months after the regulatory change in Hong Kong.

Our study builds on the large event study literature that use stock price reactions to study the effects of regulatory changes (e.g., Schwert, 1981; Binder, 1985; MacKinlay, 1997; Bhagat & Romano, 2002; Larcker et al., 2011). We calculate the cumulative abnormal returns (CARs) of more than 2000 companies listed on HKEX during the public discussions about DCS listing regulations between 2015 and 2018. We find that the two most significant events about HKEX's consideration of allowing DCS are associated with negative CARs for listed firms in Hong Kong over a seven-day window. These results suggest that investors in Hong Kong on average had a negative view of the increased likelihood that HKEX would allow companies with DCS to list.

The DCS structure is typically adopted by technology companies, which are often founded by those with significant intangible assets (e.g., human capital) but relatively little financial capital. These founders face the risk of their ownership being diluted with multiple rounds of financing and thus losing control of their companies. As a result, they prefer a governance scheme that can preserve their power without forcing them to make significant capital commitments. Therefore, we expect the regulatory change regarding DCS listing to affect firms in technology sectors more strongly than firms in other sectors. To this end, we divide

our sample into companies in technology (tech) sectors and nontechnology (non-tech) sectors based on GICS two-digit classification. We observe that tech firms, on average, experience significantly lower returns than non-tech firms do during the regulatory discussion of the possible listing relaxation for DCS firms in Hong Kong in July 2015. After controlling for firm and industry characteristics in cross-sectional regressions, we find that tech firms earn 0.1% and 0.26% lower returns, relative to firms in non-tech sectors, during the two discussion rounds concerning DCS listing. These findings suggest that investors view the adoption of DCS as a competitive advantage, especially for tech firms. Hence firms without DCS are perceived to be at a competitive disadvantage, triggering the negative market reactions. We also find this negative market reaction to be stronger for firms in more competitive industries and more financially constrained. Such firms face greater threats in their product market from newly listed firms with competitive advantage brought by their DCS, and they may not have the financial resources to compete and catch up. This result further supports the importance of the competition channel during the initial announcement of DCS adoption by HKEX.

For the event of first HKEX's IPO with DCS in June 2018 of Xiaomi Corp., however, we observe that tech firms earn positive and greater abnormal returns, compared to non-tech firms, an effect that is stronger among firms with fewer financial constraints and more institutional ownership. These results are consistent with the increasing importance of the capital channel, as more information is available to the market. Corroborating this interpretation, we find that the implied cost of capital (ICC) is reduced more for tech firms after the formal adoption of DCS by HKEX. These findings indicate that policies supporting DCS

listings are more valuable when it comes to capital flows: by allowing companies with DCS to go public, the Hong Kong market also attracted more investors. Companies in Hong Kong might find this capital influx beneficial, as they would be able to raise more equity and debt in a more liquid market. An influx of new capital would also help ensure that they will have a set of loyal investors during difficult times. The capital channel effects counteract the competition channel effects and appear to be more dominant toward the end of the regulatory discussion as well as during the first dual-class listing in 2018.

Furthermore, we conduct post-hoc analyses for the DCS regulation amendment in Singapore and the proposed IPO by Ant Group in 2020, which was subsequently suspended. Shortly after Hong Kong finalized its DCS listing regulations, Singapore followed by allowing companies to go public with DCS starting in June 2018. The Singapore Exchange (SGX) had pushed for the adoption of DCS since 2016 to strengthen its competitiveness and attract the "new-economy" companies and investors, aligning with the government's direction for future development (Singapore Economy 2030). Before the official amendment, SGX went through two rounds of public discussion in July 2017 and March 2018. Applying a similar event study methodology, we find that incumbent tech companies listing on SGX experience positive abnormal returns, compared to non-tech companies, highlighting the importance of the capital channel. Finally, we analyse the market reactions to the historic Ant Group IPO in October 2020: the IPO announcement and its abrupt suspension merely one week later. When the world's largest financial technology company announced its plan for IPOs in both China and Hong Kong, incumbent tech-firms listed in Shanghai and Shenzhen earned positive

abnormal returns. However, just a few days prior to the official launch, Chinese regulators terminated the IPO, citing concerns about potential risks to the financial system. As a result, we then observe completely opposite reactions in the market, especially for the tech firms. These findings reflect investors' political sentiment toward China's regulatory challenges: investors in Mainland China are concerned about the government trying to gain control over private enterprises.

Our paper contributes to the debate on the economic impact of dual-class structures in two major ways. First, we contribute to the recent discussions on the life-cycle view (Gompers, Ishii & Metrick, 2010; Bebchuk & Kastiel, 2017; Cremers, Lauterbach & Pajuste, 2018; Kim & Michaely, 2019). The path to relaxing stock exchange listing regulations to allow DCS firms did not come easily, and market commentators have stipulated that DCS should come with safeguards, including a sunset clause. Our study provides practical insights at a time when policymakers around the world have been working to cultivate regulatory environments that foster the innovative economy while keeping corporate insiders in check. By examining the shock to the ability of firms to adopt DCS, we demonstrate how investors value the structure without focusing on firms that endogenously select into having DCS. The results highlight that investors value the human capital benefit of DCS, especially for technology firms.

Second, our study provides new insights on the corporate governance landscape in Asia, which has attracted much attention in recent years (e.g., Johnson *et al.*, 2000; Globerman, Peng & Shapiro, 2011; Morck & Yeung, 2014; Claessens & Fan, 2002; Kimber & Lipton, 2005). State- and family-owned enterprises, featuring concentrated ownership structures and a lack of rules facilitating litigation

against corporate insiders (Claessens *et al.*, 2000), are prominent in Asia. With the recent growing importance of Asian markets and businesses in the global economy, especially the rise of Chinese multinationals, and an heightened interest in adopting DCS for the governance structure among these companies, we join the growing literature on corporate governance reforms around the world, especially in Asia (Nam & Nam, 2004; Peng & Jiang, 2010; Mutlu *et al.*, 2018). Most DCS research has focused on the United States (Gompers, Ishii & Metrick, 2004, 2010; Bebchuk & Kastiel, 2017; Cremers, Lauterbach & Pajuste, 2018; Kim & Michaely, 2019) and Europe (Lauterbach & Pajuste, 2015). However, as suggested by Gurrea-Martinez (2021), the desirability for DCS may vary across jurisdictions. We aim to shed light on an understudied region with different institutions from those of the West.

2. Institutional Background of Regulatory Reform in Asia

Dual-class structure is not a novel concept in Asia. Incorporated companies in Hong Kong have been allowed to issue different classes of shares with varying rights, and prior to 1987, the HKEX did not have a default listing restriction concerning DCS. However, when the market reacted negatively to the three local giants (Jardine Matheson Holdings Limited, Cheung Kong (Holdings) Ltd, and Hutchingson Whampoa Ltd) issuing superior shares (B shares), the regulators imposed a default DCS restriction under Rule 8.11 of the Main Board listing rule in 1989. Rule 8.11 prohibits any form of differential voting rights and upholds the one-share, one-vote structure to align the voting power and equity interest of shares (Huang, Zhang, and Lee, 2019). Since the adoption of Rule 8.11, the matter

of DCS had not resurfaced in Hong Kong, even when major U.S. stock exchanges started to allow DCS in the early 2000s during the tech boom and several companies, including Google, Facebook, and Groupon, adopted DCS.

The situation in Asia began to change in 2013 with the IPO application of Alibaba to HKEX. The Chinese e-commerce giant wanted to go public with a "partnership structure" in which twenty-eight partners – mostly senior executives – would decide on major decisions of the companies despite holding a minority equity stake. Hong Kong regulators rejected the listing application under Rule 8.11. As a result, Alibaba took its IPO to the New York Stock Exchange (NYSE) and raised an unprecedented amount of fund (USD 25 billion) only a year later. This tremendous loss of capital spurred the Hong Kong regulators to seriously consider a possible weighted voting right regime in Hong Kong to enhance its competitiveness vis-à-vis other stock exchanges, particularly the U.S. market. On June 19, 2015, the HKEX published a concept paper to seek market's view on DCS framework proposals.[3] However, only six days following the publication, the Securities and Futures Commission (SFC) of Hong Kong issued a statement announcing that its board had unanimously rejected HKEX's proposal.

Two years later, in June 2017, HKEX revived the matter with a new concept paper.[4] The paper argued for greater diversity and investment opportunities for investors in Hong Kong, hence maintaining Hong Kong's position as a leading IPO venue. To address concerns about DCS's impact on the whole market, HKEX proposed a separate listing board, outside of the Main and the Growth Enterprise

[3] Hong Kong Exchanges and Clearings Ltd, "Consultation Conclusions: To Concept Paper on Weighted Voting Rights" (2015).
[4] Hong Kong Exchanges and Clearings Ltd, 'Concept Paper – New Board' (June 2017).

Market (GEM) boards. This round of campaign received great support from the market as well as the SFC (Yiu, 2017). Considering the public's attitudes towards DCS, on December 25, 2017, HKEX published the conclusions to the concept paper, inserting a new chapter into its Main Board Listing Rules to cater to the needs of DCS companies instead of setting up a separate new board.

With effect from April 30, 2018, companies from "emerging and innovative sectors" have been allowed to list on HKEX with DCS. The amendments come with an extensive set of conditions and safeguards for a company to be qualified to adopt DCS (Chapter 8A): only new applicants can list with a DCS, voting rights are capped at 10 votes per share, and DCS must include a sunset clause.[5] (The shares lapse permanently if the beneficiary dies or ceases to be a director or if the shares are transferred to another person. These provisions mitigate the expropriation and entrenchment risks of corporate insiders.) Two months later, in June 2018, Xiaomi Corp. was the first DCS company to list on HKEX. By the end of 2024, there were 25 listed companies with DCS structures on HKEX.

With its regional rival taking steps toward allowing DCS companies to list, the Singapore Exchange (SGX) was under pressure to catch up. Singapore authority had begun to consider the adoption of dual-class structures since 2012.[6] The Amendments to the Companies Act introduced in 2013 has permitted companies to issue different classes of shares subject to certain safeguards and restrictions for investor protection. The goal of this is to maintain Singapore's competitiveness

[5] Hong Kong Exchanges and Clearings Ltd, 'Consultation Conclusions: A Listing Regime for Companies from Emerging and Innovative Sectors' (2008).
[6] English football club Manchester United initially considered listing on the SGX but eventually opted for NYSE in August 2012, citing as a major reason the difficulty of obtaining approval for its DCS offer in Singapore.

and attractiveness as a financial centre.[7] Such developments triggered an arduous discussion with respect to whether SGX would allow DCS listings to capture opportunities, especially of the "new economy" companies. In July 2017, SGX announced that companies with a DCS structure that were primarily listed in developed markets could seek a secondary listing on the exchange.[8] In March 2018, SGX proposed a framework allowing companies with DCS structures to seek a primary listing on its main board. The introduction of the primary listing framework for dual-class companies officially took effect in June 2018.[9] The relaxation of regulations in Singapore also came with a set of restrictions in terms of company types, number of shares, and certain types of sunset clauses.

In 2019, the Shanghai Stock Exchange (SSE) launched a new Sci-Tech Innovation Board, also known as the STAR Market, where the DCS structure is permitted. Its new listing rules were formally enacted in March 2019 to attract high-profile technology companies to list domestically in China, again with safeguards to mitigate investor concerns. These regulation changes in Hong Kong, Singapore, and Shanghai have triggered fierce public debate on the merits and welfare implications of DCS. They also show that financial centers in Asia are striving to sharpen their competitive edge to attract and accommodate IPOs, especially from the new high-profile tech companies that tend to opt for DCS.

3. Research design and sample description

For our main event study, we identify the significant events based on the public

[7] 'Singapore to Allow Dual Class Shares to Attract Listings', *Reuters* (3 October 2012)
[8] SGX defined developed markets as any of the 22 market the international index providers Financial Times Stock Exchange (FTSE) and Morgan Stanley Composite Index (MSCI) classified as developed.
[9] Singapore Exchange, 'SGX Launches Rules for Listing of Dual Class Shares Companies' (June 2018).

discussions and the realization of the first dual-class listing in Hong Kong. The event dates, together with their corresponding estimation periods and event windows, are presented in Figure 1. We examine the stock market reactions to the information from the regulatory discussion and realization during these event dates.

3.1. Abnormal returns calculation

We first calculate the abnormal returns of already-listed companies (which cannot adopt DCS) during the event dates. The assumption is that, in an efficient market, security prices reflect all publicly available information and the intrinsic value of companies based on their future cash flows (Fama, 1970). Any unanticipated change in regulation would result in a temporary change in stock prices. Hence, we measure the magnitude of firms' abnormal returns during the period of the event to estimate the impacts of the regulatory change on shareholder wealth. In particular, we employ the market model to calculate abnormal returns for each firm. The market model relates the returns of any given security to the return of the market portfolio (MacKinlay, 1997). We use the daily returns of the Hang Seng Index—a major market index for the largest companies in Hong Kong—as a proxy for market returns. Daily abnormal returns for individual firms are calculated by subtracting the expected returns based on the market model from the actual returns. We aggregate daily abnormal returns over the event window to get the cumulative abnormal returns (CARs) for each event.

News of the concept papers and market discussions on the stock exchange regulations were probably leaked to the market prior to the official announcements. Thus, to take into account some impact on the stock prices and at

the same time minimize the noise-to-signal ratio, we use seven-day event windows [-3, +3] in our main study. We conduct robustness checks on alternative event windows, including a three-day window [-1, +1] and the announcement day (day 0). We use a 230-trading-day estimation period, starting at day -250 and ending at day -22, relative to the event dates. Twenty-two trading days preceding the announcement date are excluded to prevent contamination due to information leakage concerning the event and other confounding factors. All the event announcements in this study occurred on a trading day. We require the securities in the sample to have at least 100 observations within the estimation window and no missing return data during the event window.

3.2. CAR analysis

The CAR tests address the hypothesis that (i) the market understands and revises its priors about the probability of the regulation changes and (ii) the regulation in question, on average, affects shareholders' wealth. After calculating the CAR for the incumbent firms around an event, we conduct a univariate test on the difference in CARs between the tech firms (treatment group) and the non-tech firms (control group). We then use a multivariate analysis by including firm characteristics and fixed effects as controls, as follows.

$$CAR_{it} = \alpha + \beta_1 Tech_{it} + \mu_j + \gamma' X_{it} + \varepsilon_{it},$$

where CAR_{it} is the CAR for firm i around the event date t; $Tech_{it}$ is a binary indicator variable for whether firm i belongs in tech sectors; and μ_j captures the industry group (following GICS four-digit classification) fixed effects. X_{it} is a vector of control variables, including firm size, age, leverage, and profitability.

Lastly, ε_{it} represents standard errors clustered at the GICS four-digit industry group level.

To disentangle the potential channels influencing investor responses to the regulatory change, we further interact the tech-sector indicator with proxies for the different channels as explanatory variables. Specifically, we examine how the market reaction to each event depends on a firm's competitive environment, financial constraints, and institutional ownership. Competitive environment and financial constraints are meant to capture the cash-flow channel, as they affect a firm's operating costs as well as a firm's potential to increase sales and market shares. [10] We measure a firm's competitive environment by calculating its industry-level Herfindahl-Hirschman Index (HHI); firms in high HHI industries possess high market concentration and face less competitive pressure. Financial constraints are usually associated with the size and age of the firm (Hadlock & Pierce, 2010), [11] and financially constrained firms are less likely to devote resources to market competition. This is especially true for tech firms, whose business models usually rely on significant cash usage at the startup stage to gain market share.

Institutional ownership is meant to capture the capital channel, as greater

[10] One may argue that financial constraints may also capture the capital channel, as financially constrained firms may have difficulties in raising capital. We acknowledge this possibility, but argue that a firm's financial constraints usually first and more directly affect its investment-cash flow sensitivity (Fazzari, Hubbard, Petersen, 1988; Almeida & Campello, 2002; Moyen, 2004; Denis & Sibilkov, 2010), which is supported by our empirical results. Nevertheless, we stress that the results based on financial constraints should be interpreted as reflecting the net effect of the competition channel and the capital channel.

[11] Financial constraint is not directly observable, so the empirical literature usually relies on proxies or indices, such as KZ Index (Kaplan & Zingales, 1997; Lamont et al., 2001), WW Index (Whited & Wu, 2006), and SA index (Hadlock & Pierce, 2010). We measure our firm-level financial constraint in the spirit of Hadlock and Pierce (2010), as that measure is purely based on firm's size and age, which can be universally applied and thus is most suitable for our study of the Hong Kong market.

institutional ownership indicates that the firm can better attract external capital. In addition, we categorize institutional investors into domestic and foreign investors. Domestic institutional investors are those located in the same jurisdiction as the company's headquarters. For example, if a company is headquartered in Hong Kong, institutional investors from Hong Kong are identified as "domestic" and those from other jurisdictions as "foreign." If a company is headquartered in China, institutional investors from China are domestic, and all others, including from Hong Kong, are foreign. In the robustness check, we reclassify domestic and foreign institutional ownership by treating Hong Kong and China as one jurisdiction.

We test our predictions by estimating the following regression for each event:

$$CAR_{i,t} = \beta_0 + \beta_1 Tech_{i,t} + \beta_2 Channel_{i,t} + \beta_3 Tech_{i,t} \times Channel_{i,t} + \theta\, Controls_{i,t} + \varepsilon_{i,t},$$

where $CAR_{i,t}$ is the cumulative abnormal returns of firm i around an event date in year t. $Tech$ is a binary indicator that equals one if firm i belongs to the tech sectors, according to our classification, and zero otherwise. $Channel_{i,t}$ is either an industry-level HHI index, a firm-level SA index, or the percentage of institutional ownership (either domestic, foreign, or total) of firm i in year t. *Controls* is a vector of control variables, including *Size*, *Age*, *Leverage*, and *ROA*. We include GICS four-digit industry fixed effects to account for unobserved common sector shocks. The standard errors are also clustered at industry level.

3.3. Sample and key variables

We construct a sample of all firms listed on HKEX between 2014 and 2018 to cover all the public discussion concerning DCS regulations. We obtain daily stock

returns from the FactSet database. After excluding firms from the financial (GICS=40) and real estate sectors (GICS=60), due to their distinctive capital structures, our sample covers 2,262 individual companies. To analyze the effects of listing regulation changes on the competitive landscape in tech sectors, relative to other sectors, we identify the treatment and control groups based on GICS two-digit sector level. Our treatment group is composed of companies that belong to the technology (GICS=45) and communication services sectors (GICS=50). The control group consists of firms in all other sectors, according to GICS classification (consumer discretionary, consumer staples, healthcare, materials, industrials, energy, utilities, and others).

For subsequent cross-sectional tests, we collect accounting and ownership data from FactSet for the variables serving as proxies for the competition and capital channels. First, the HHI index is calculated for each firm's industry based on GICS four-digit classification. We take the ratio of the firm's revenue to the industry's total revenue and then get the total sum of the square of the market share's ratio. A firm's financial constraint is measured using the SA Index, developed by Hadlock and Pierce (2010), which is calculated based on a linear combination of firm's age and size.[12] Third, a firm's percentage of institutional ownership (IO) is calculated as the annual total percentage ownership held by all institutional investors. We further decompose the IO measure into domestic IO and foreign IO, based on the firm's country of headquarters. Finally, we calculate firm-level control variables, including firm size (natural logarithm of total assets), firm age

[12] The SA index is calculated as $(-0.737 \times Size) + (0.043 \times Size^2) - (0.040 \times Age)$, where $Size$ equals to log of total assets and Age is the number of years since the firm is incorporated. In calculating this index, $Size$ and Age are winsorized at 5% and 95%.

(the difference between event year and firm's incorporation year), leverage (debt-to-assets ratio), and profitability (returns on assets). All the explanatory and control variables are lagged by one year and winsorized at the 5% and 95% tails to mitigate the influence of outliers.

Table 1 reports descriptive statistics for our sample. Panel A presents the distribution of firms. Out of 2,262 firms, 374 firms are in the tech sectors (16.5%), and the rest (83.5%) are in the non-tech sectors. Panel B reports descriptive statistics for firm characteristics across firm-years in our sample. Since the DCS events in Hong Kong were between 2015 and 2018, we acquire the financial data from 2014 to 2017 to have a one-year lag. The variables are winsorized at 5% and 95%.

[Table 1 here]

4. Results

4.1. The effects of regulation change on CARs.

Table 2 examines the average cumulative abnormal returns (CARs) between firms in tech sectors and non-tech sectors. Panel A presents the results of the univariate analysis between the two groups. Column (1) is the average CAR of tech firms, and column (2) is the average CAR of non-tech firms. Column (3) compares the difference between the two groups ($Tech - NonTech$). The negative coefficients in the last columns for the first two events in 2015 and 2017 indicate that, on average, firms in the tech sectors experienced lower returns than firms in non-tech sectors upon discussion of the stock exchange allowing DCS listings. Specifically, when HKEX first published its concept paper proposing DCS on June 19, 2015, firms in tech sectors on average earned 1.1% lower returns than firms in

non-tech sectors (t-stat = 2.17). The difference in returns between tech versus non-tech firms became larger (and significant at 1% level) when the New Board, which allowed listing of DCS companies, was confirmed on December 15, 2017.

The distinct responses to the DCS regulation for tech versus non-tech firms is confirmed in Panel B, after controlling for firm characteristics. The first two events have negative coefficients and are statistically significant at the 1% level (Columns (1) and (2)). Over the seven-day event window during the two discussion rounds of DCS regulations in 2015 and 2017, tech firms, on average, earned lower returns when the GICS4 industry fixed effects are included. These results reflect investors' sentiment toward DCS, which would create competitive advantages for the companies, enabling the pursuit of the founder's long-term vision through protection from short-term capital market pressures. When HKEX allowed companies with the dual-class structure to go public, investors believed more companies would adopt DCS and enter the market. For companies already listed on the stock exchange that could not adopt DCS, this prospect presented a competitive threat, which might have been able to undermine these firms' operating efficiency and market shares, lowering their future cash flows.

[Table 2 here]

Even though we observe that tech firms responded more negatively during the discussion rounds, the result flipped when Xiaomi made its IPO debut in HKEX on June 28, 2018, making it the first dual-class IPO in Hong Kong. As shown in Column (3), listed firms in tech sectors on average earned higher CAR than those in non-tech sectors within the seven-day windows of the IPO, and the difference is significant at the 1% level in both univariate analysis (Panel A) and multivariate

analysis (Panel B). These findings illuminate a shift in investors' perspective toward DCS. When the possible adoption of DCS was first introduced, shareholders of currently listed firms were concerned about competition. DCS can give competitive advantage for tech firms, which pose a threat to its rival firms that cannot adopt it. Also, this competitive effect should be more pronounced for high-tech firms than for non-tech firms, for whom founders' vision and long-term orientation play less important roles. These concerns triggered negative market reactions. However, as time passed and more information on DCS and the framework was released, shareholders became aware that new investors and more capital would follow, assuming more unicorns would be listed on the stock exchange. This could facilitate listed companies, especially those in tech sectors, in raising capital, thus lowering their cost of capital. In other words, the change in the regulatory environment influenced incumbent firms' value through a capital channel during the later consultation.

We also conduct a quick analysis using a Factiva search of all major news sources and publications in Hong Kong and China regions based on keywords "dual-class" and "capital". Figure 2 shows the textual analysis of local media mentioning "capital" and the prospect of Hong Kong allowing companies with DCS to list on the market. Figure 2a considers various sources of media, including newspapers, industry reports, and journal articles, while figure 2b focuses on a search within the South China Morning Post (SCMP)— a Hong Kong-based mainstream newspaper. We find that over the period from 2015 through 2018, the number of media articles linking DCS and capital flows to Hong Kong increased by roughly eight times (53 to 448). Within the SCMP alone, the number of articles

jumped from merely six in 2015 to 94 in 2018. This anecdotal evidence illuminates an elevation in recognition of the capital effect DCS might bring to the market.

[Figure 2 here]

The results of the event study are depicted in Figure 3. The graphs show the average CARs for firms in tech and non-tech groups throughout the seven-day event window across the three events. We also include the 95% confidence interval. In general, the CARs are negative for tech firms both before and after the events. When the first proposal on DCS listing regulation was published in 2015, the stock prices for the firms in our sample dropped one day prior to the event date and continued to fall in the next two days. The negative price moments of companies in tech sectors are larger than those of their non-tech counterparts (Figure 3a). During the seven days surrounding the last discussion on the New Board in 2017, the abnormal returns of tech firms are negative, while those of non-tech firms are positive (Figure 3b). This result illustrates that the DCS listing regulations affect the tech stocks much more strongly and negatively than non-tech stocks. Finally, during the first DCS IPO of Xiaomi, the firms in our sample experienced a decrease in stock prices for 3 days prior to the announcement date, and then the price increased for one day before slightly dropping again in the next two days. The negative price movements of companies in tech sectors are smaller, compared to those of non-tech sectors (Figure 3c). This result presents a shift in market reactions toward DCS in Hong Kong, indicating that the potential of multiple channels to be driving investor sentiment.

[Figure 2 here]

4.2. Disentangling the cash flow and discount rate channels

Table 3 presents the results of testing the cash flow channel (i.e., the competition channel) using the industry HHI, by interacting the tech dummy with the industry HHI index. In Column (1), we observe a positive and significant coefficient on the interaction term $ch \times HHI$, which corresponds to the first event date of June 19, 2015, when the first discussion paper on DCS was published. Tech companies in a more competitive market (lower HHI) earned even lower CARs, compared to those in industries with higher HHI. This indicates that the negative effect HKEX's proposal on DCS had on tech listed firms was amplified when they were in highly competitive industries. These results accentuate the effects of the cash flow channel, as investors of firms in highly competitive industries considered the regulatory change bad news, as it would give a competitive advantage to tech entrants that adopted DCS. However, the coefficient on the interaction becomes insignificant in Column (2), during the Xiaomi IPO in June 2018. This suggests that the effect of the cash flow channel (i.e., the market competition) lessened over time. This is probably because by the time the regulatory framework was officially amended, the market had already absorbed the information on the regulations and there was no new information from the final confirmation that could influence the firm's value via stock price. Alternatively, the adverse effect from competition might have been offset by the positive effect of capital inflows to the tech sectors for listed companies in Hong Kong, resulting in a zero net effect.

[Table 3 here]

We replace the HHI index with the SA index as another test of the cash flow channel. The SA index indicates the level of financial constraint for firms based on its size and age. The higher the SA index, the more financially constrained the

firm is. These results support the previous findings in terms of HHI. We observe negative and statistically significant coefficients on the interaction term $Tech \times SA\ Index$ for the June 2015 event when the DCS proposal first came out, and the effect faded for the 2018 events. This shows that tech firms already listed on HKEX did not favor the proposal of DCS listing rule during the early days, especially those in more competitive industries and with high levels of financial constraints, as they were concerned about new competitors. Thus, we observe a decrease in firm values, as investors lost confidence. However, the negative sentiment faded over time, as more information was released.

As the stock market relaxed regulations for DCS firms, the market could also attract more capital, especially from institutional investors from all over the world. We replace the HHI or financial constraint measures in the previous table with measures of a firm's institutional ownership (IO). Table 4 presents the results. In Column (1), when we interact the tech dummy with a firm's total institutional ownership ($Tech \times IO\_Share$), we find an insignificant interaction effect during the first two events, but total IO increased the positive cumulative abnormal returns of tech firms, relative to non-tech firms, during the announcement of Xiaomi's IPO. In addition, when we further decompose the total IO into domestic and foreign IO, based on the country of headquarters, we observe that tech firms with higher foreign IO earned higher CARs during the Xiaomi IPO announcement but not during the first two discussion events. These results corroborate the idea that, as time passed, listed firms with more ability to attract institutional capital (i.e., tech firms with higher level of institutional ownership) would benefit from the amendment.

[Table 4 here]

A key mechanism of the capital channel through which attracting more institutional capital can increase the value of already-listed firms is by lowering its cost of capital. If allowing DCS attracts more listings of unicorns and increases capital inflows into the market, listed companies would have easier access to capital. Therefore, we expect the cost of capital for tech firms to decrease more over time, compared to that of non-tech firms, after the allowance of DCS listings. To test this discount rate channel, we use the implied cost of capital (ICC) method from Hou et al. (2012), which generates forecasted future earnings using a cross-sectional model based on the company's historical financial and accounting information. This method has the benefit of not relying on analyst forecasts to estimate expected earnings, which tends to reduce sample sizes significantly. After computing earnings forecasts, we compute two individual ICC estimates based on (i) the residual income valuation model (Claus & Thomas, 2001) and (ii) the modified price-earnings growth model (Easton, 2004). We obtain the ICC for the years before the DCS regulation change (2015 and 2016) and after the final discussion round (2018 and 2019) for our sample of firms that are already listed on the HKEX. Then we regress the ICC measure on an indicator of firms in tech sectors based on GICS two-digit classification and an indicator for the years after 2017 when the final discussion on DCS regulation happened, as well as their interaction, in a difference-in-difference fashion.

$$ICC_{it} = \beta_0 + \beta_1 Tech_{it} + \beta_2 Post_{2017_i} + \beta_3 Tech_{i,t} \times Post_{2017_i} + \theta\, Controls_{i,t} + \varepsilon_{i,t}.$$

The result is presented in Table 5. Columns (1) and (2) present the results for the two individual estimates. On average, the cost of capital for firms in tech

sectors decreased more, compared to that of firms in non-tech sectors, after the DCS regulatory amendments. The result holds when we use an average measure of the two ICC estimates in column (3). We find that tech firms listed in Hong Kong experienced a 0.28 percentage point lower cost of capital over time, relative to non-tech firms. Collectively, these findings suggest an increase in value of the firms, once the DCS regulation changed, as it became easier for companies to raise capital.

[Table 5 here]

5. Robustness checks

5.1 Alternative different event windows

For the first robustness check, we examine the stock returns at alternative event windows. We shorten the event window to three days around the discussion paper's publication as well as calculate the abnormal returns on the event date (day 0). The results are presented in Table 6. The lower returns experienced by tech companies relative to non-tech firms during the discussion periods of 2015 – 2017 remain significant. Specifically, the CAR [-1, +1] of firms in the tech sectors is 0.1% lower than those of firms in non-tech sectors (t-stat = 3.05).

[Table 6 here]

5.2 Alternative definition of domestic versus foreign institutional investors

We also repeat our test on the capital channel based on institutional ownership where we reclassify the domestic versus foreign institutional investors. In the main analysis, domestic and foreign investors are identified based on the jurisdiction where the company is headquartered. Given that the aim of the listing

reform by HKEX is to attract IPOs by unicorns from Mainland China, we reclassify domestic investors as those from Hong Kong and China. Investors from all other jurisdictions are classified as foreign. In Table 7, we again find larger abnormal returns for listed firms in tech sectors, relative to non-tech sectors, during the IPO of Xiaomi but not during the discussions.

[Table 7 here]

6. Evidence from Singapore Exchange and Ant Group IPO

We conduct another two post-hoc analyses focusing on the amendment in listing regulations in Singapore in 2018 as well as the proposal and suspension of the IPO by Ant Group in 2020.

6.1. Singapore Exchange regulatory reform

As HKEX pushed forward with relaxing DCS regulations, Singapore Exchange (SGX) was pressured to amend its regulation in order to compete for new listings and maintain its competitiveness as a major financial center. We examine the market reactions to the two main events surrounding this regulatory reform. The first event was July 28, 2017, when SGX allowed a second listing of dual-class companies with primary listings in developed markets. The second event was March 28, 2018, when the exchange proposed new listing rules allowing new-economy stocks, such as those of technology startups with different voting rights, to seek primary listings on its main board.

Following the main analysis of HKEX events, we derive abnormal returns and CARs for companies listing on the SGX following the market model. We use the Strait Times Index (STI)—a market-capitalization weighted index that tracks the

performance of the top 30 companies listed on SGX—as the market index. For the Singapore sample, we collect firm daily stock returns from FactSet during 2016–2018. The companies are divided into tech and non-tech groups based on GICS two-digit sector classification, as previously discussed. The sample covers 888 companies, with 143 (16.1%) belonging to tech sectors and the rest being non-tech. Table 8 presents the Singapore market reactions to DCS regulations on the two event dates.

[Table 8 Here]

We observe insignificant results for the first event date for both univariate and multivariate analyses. This could be due to the fact that DCS listing at this point being only applied as a secondary listing for companies already listed in developed markets. The Singapore regulators were taking a cautious step to enhance market familiarity with the risks and benefits of DCS companies. On March 28, 2018, when the SGX officially allowed companies with DCS to list primarily on the main board, firms in tech sectors earned higher and positive returns than those in non-tech sectors. These results show that, on average, investors believed that companies in technology and communication services in Singapore would benefit from allowing DCS listings on the market. This positive market reaction could stem from the awareness that the new framework included several safeguard measures to protect the investors' interests and mitigate the risks involved (e.g., maximum voting differential of 10 to one, sunset clauses, restricting voting power of multiple vote shares during the election of independent directors). Another plausible argument is that, given that SGX had a much smaller market capitalization compared to HKEX, the competition effect was minimal. With DCS

listings allowed, the market expected an influx of capital, especially from foreign institutions, that could benefit the incumbent firms.

6.2. Ant Group IPO

In October 2020, Ant Group, an affiliate company of Alibaba Group, which owned China's largest digital payment platform, Alipay, was set to raise US$34.5 billion in the world's largest IPO up to that time, after the country issued new rules to regulate financial holding companies. The company was planning to make dual listings of new shares on the tech-focused STAR Market in Shanghai Stock Exchange (SSE) and in HKEX. However, on the eve of the IPO, the Chinese government halted the process, flagging risks associated with the rapid development of financial technology. The IPO in SSE was suspended, causing Ant to also freeze its Hong Kong listing. These events create a unique setting, each affecting the same set of companies but in opposite directions. We focus on two dates: (1) October 21, 2020, when Ant Group got the green light from security regulators, and (2) November 3, 2020, when the news came out about the IPO suspension.

As we are examining a sample of listed firms in both the Shanghai and Shenzhen stock exchanges, we use the CSI 300—a free-float weighted index consisting of 300 A-share stocks listed on the two exchanges—as a market index. Following the main analysis on HKEX, we use the market model to calculate the cumulative abnormal returns for companies in tech and non-tech sectors, based on the GICS two-digit classification. As the two opposite events were merely two weeks apart, we use three-day window [-1, +1] rather than a longer event window.

We collect data for stock returns of companies listing in China, both on Shanghai stock exchange (SSE) and Shenzhen stock exchange (SZSE), during the period of 2019–2020 to cover the estimation window of one year prior. The sample covers 4,199 companies, with 872 (20.8%) belonging to tech sectors. Table 9 presents the results.

[Table 9 here]

We indeed observe opposite results for the two events. When Ant Group received the green light for its IPO in October, firms in tech sectors listed in China on average earned higher returns than firms in non-tech sectors. The difference in returns between tech and non-tech firms is positive and significant at 1% confidence interval. However, one week later, when the IPO was suspended, tech companies on average received negative and lower returns than non-tech companies, and the negative difference is significant at 1%. One possible explanation is the impact of the capital channel: incumbent firms believed that the Ant Group IPO would bring an influx of new investors and new capital to the market. Furthermore, these findings also reflect the political sentiment of the investors: there was concern about how private companies were being regulated in China. Such regulation may render the future of companies' IPOs uncertain, damaging investors' confidence and affecting firms' future valuation.

7. Conclusion

The merits of dual class shares have been at the center of corporate governance debates for decades. This debate has reignited in recent years, with technological unicorns demanding the structure for their IPOs, and stock exchanges around the

world removing the DCS taboo to attract new listings. These debates usually speak to the deployment of founders' human capital and the isolation of corporate insiders from market short-termism, essentially the cash flow channel. Some recent discussions have also focused on the potential to attract institutional capital, which lowers the firms' cost of capital and is essentially a discount rate channel. However, the literature usually fails to properly identify the causal effects of DCS on firm value and to disentangle the two channels.

We join this important debate and identify its causal effect by focusing on the recent amendments in stock exchange regulations in Asia, including in Hong Kong, Singapore and China. Within the span of two years, the three exchanges decided to abandon their long-standing OSOV principle and allow companies with DCS to be publicly listed. These changes were carried out after an arduous process of discussions, and they attached a set of safeguard measures due to the controversial nature of DCS. Nevertheless, these stock exchanges were under pressure to relax their regulations, so that they were more capable of competing with their US counterparts.

Through examining the reactions of the firms listing on the exchanges, we find that in Hong Kong companies in tech sectors earned significantly lower returns than companies in non-tech sectors following the initial proposal of DCS regulations. The effect was more severe for firms in more competitive industries and with greater financial constraints. This demonstrates a competitive channel, as investors of non-DCS companies became concerned about the new (DCS) entrants, whose founders would have greater ability to pursue long-term value enhancement for the firms. However, the negative effect mitigated nearer to the

finalization of the DCS regulations, and the effect even reversed during the first DCS IPO of Xiaomi. We believe the shift was driven by firms with stronger ability to attract institutional capital, illuminating the presence of a discount rate channel—the capital channel in our context—influencing firm values. This also indicates an evolution of the relative strength of the two distinct channels as more information on DCS and the regulations became available in the market.

Our study also highlights the importance of understanding the institutional context in DCS discussions. Investors in different jurisdictions could have differing sentiments toward this governance mechanism, and their views are shaped by their institutional environments. As stock exchanges around the world are increasingly embracing DCS, cross-country comparative analysis is critical. Our findings shed light on investor perceptions of DCS in Asia and complement a literature that largely relies on US studies. In addition, we provide insights into the life-cycle argument of DCS. Investors are concerned about the wedge between cash flow rights and voting rights. Asian markets stipulate that stock exchanges embrace the inclusion of sunset clauses as part of their safeguards when allowing DCS listings. The question now is how effective these measures are. As it has not been a long time since the regulatory reform took place, we have yet to see the real effects of DCS on firm performance and societal welfare in these jurisdictions, which is a fruitful area of research in the future.

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Figure 1. Timeline for Hong Kong event study

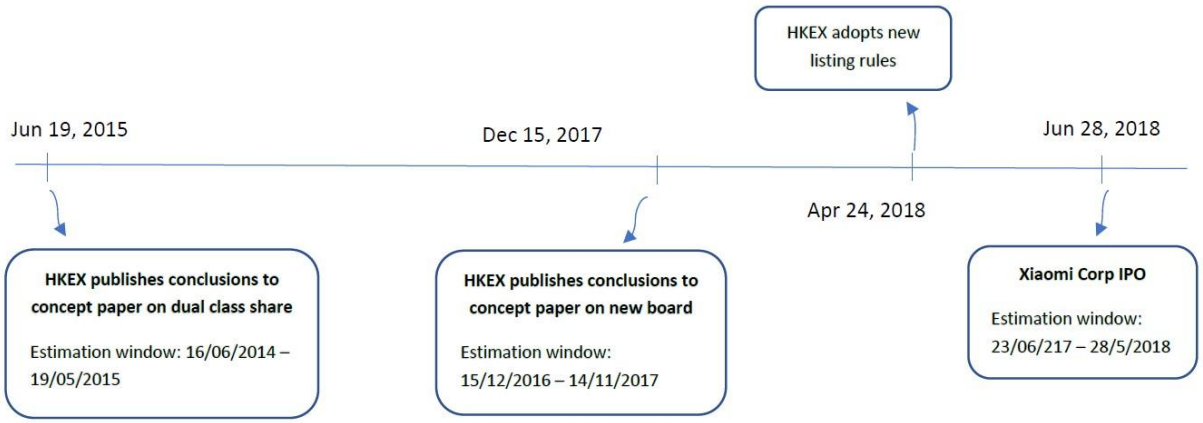

Figure 2. Media mention related to Hong Kong proposal for dual-class share structure and capital flows

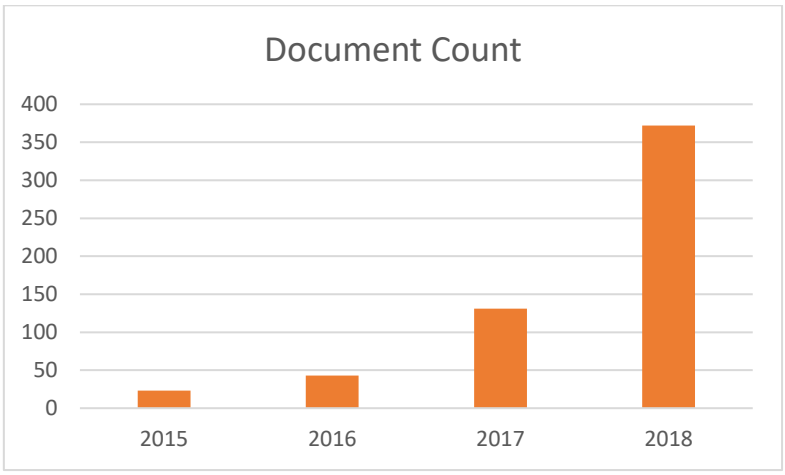

Figure 2a: All sources with keywords "Hong Kong", "dual class" and "capital"

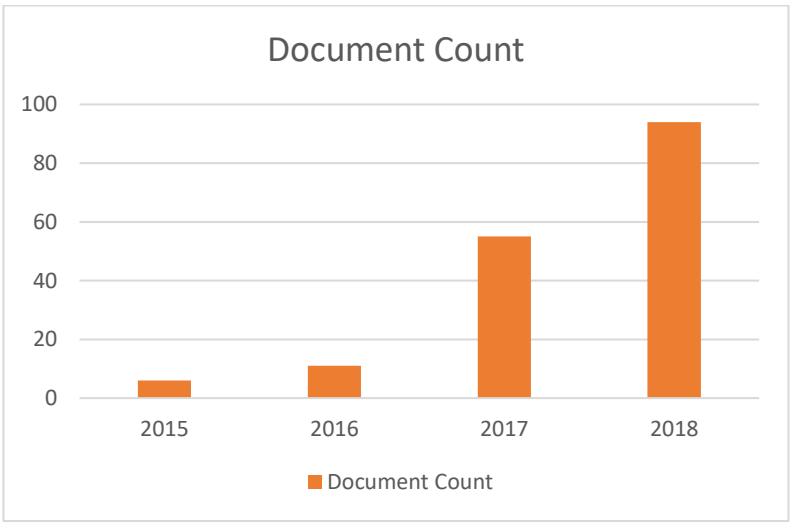

Figure 2b: South China Morning Post (SCMP)
with keywords "Hong Kong", "dual class" and "capital"

Figure 3. Cumulative Abnormal Returns for Tech and Non-tech firms

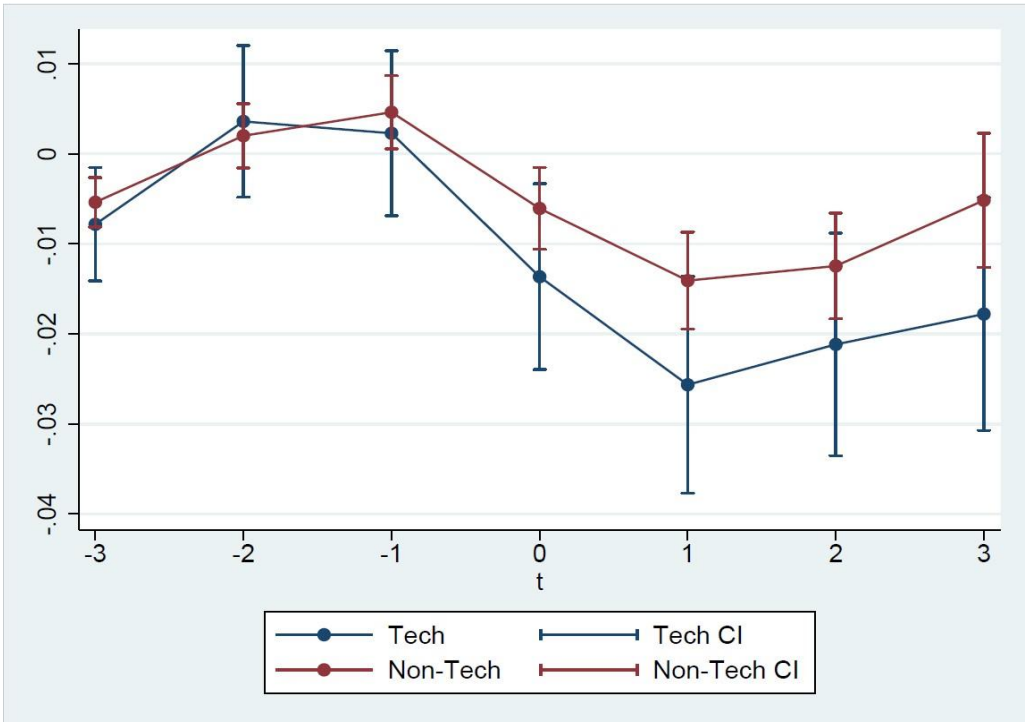

Figure 3a: 7-day window cumulative abnormal returns for 19 Jun 2015

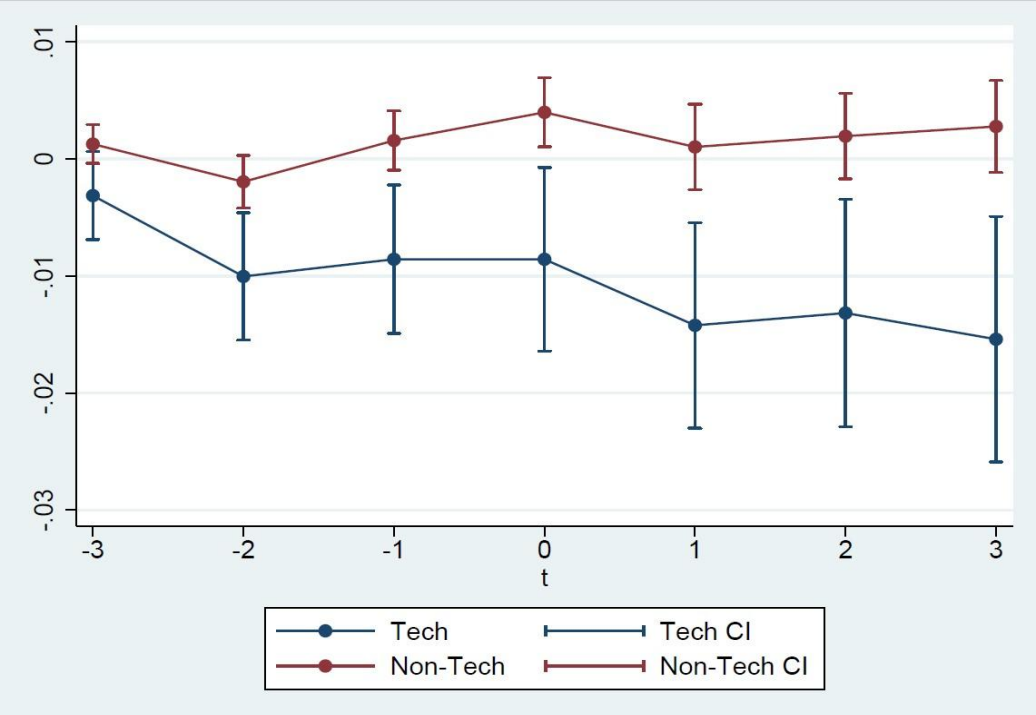

Figure 3b: 7-day window cumulative abnormal returns for 15 Dec 2017

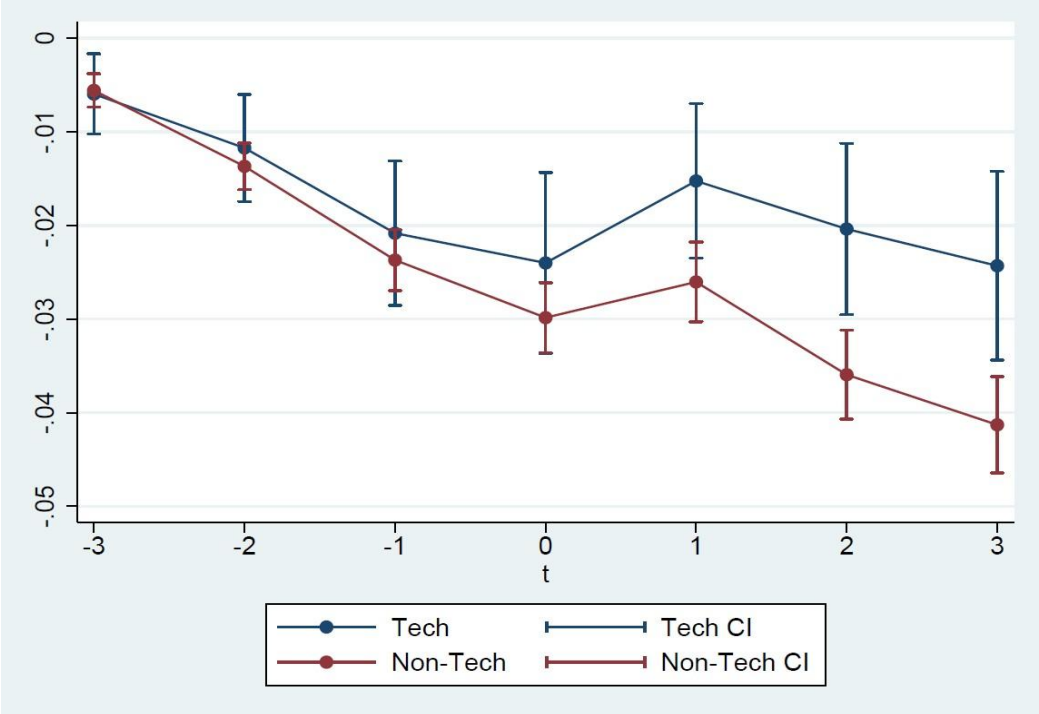

Figure 3c: 7-day window cumulative abnormal returns for Xiaomi IPO (28 Jun 2018)

Table 1. Descriptive Statistics

This table presents descriptive statistics for 2,262 firms in our sample. The annual data is collected from FactSet from 2014 to 2017. Panel A presents the sector distribution of sample observations, classified by the Global Industry Classification Standard (GICS) eleven sectors (excluding financial and real estate firms (GICS code 40 and 60)). Panel B reports descriptive statistics for selected firm characteristics. *Leverage* is the ratio of total debts to total assets, *Age* is calculated based on the year of incorporation, HHI is the Herfindahl-Hirschman index for firm's market concentration, *SA Index* is the measure of financial constraint status, *Total IO* is the holdings by institutional investors as a fraction of market capitalization, *Foreign IO* is the holdings by foreign institutional investors (institutions located in a different jurisdiction from where the firm's headquarter locates) as a fraction of market capitalization, *Domestic IO* is the holdings by institutional investors located in the same jurisdiction as the firm's headquarter as a fraction of market capitalization. Continuous variables are winsorized at the 5% and 95% level.

Panel A. Sector Classification

GICS Sector Name	*Frequency*	*% of Sample*	Hightech
Communication Services	137	6.83	Yes
Consumer Discretionary	542	27.02	No
Consumer Staples	129	6.43	No
Energy	71	3.54	No
Health Care	147	7.33	No
Industrials	515	25.67	No
Information Technology	237	11.81	Yes
Materials	163	8.13	No
Utilities	65	3.24	No
No info	256	11.32	No
Total	*2,262*	*100*	

Panel B. Firm-Level Characteristics (2014 – 2017)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	*#Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*	*p25*	*p50*	*p75*
Total Assets	7,727	9296.01	19193.9	52.98	83814.68	351.20	1451.57	6265.52
Leverage	7.722	20.17	18.67	0	61.52	2.65	16.32	32.96
ROA	7,200	1.69	12.24	-32.37	23.82	-2.57	3.21	8.26
Age	8,540	17.86	13.77	1	51	6.00	17.00	25.00
HHI	8,016	0.13	0.11	0.03	0.44	0.06	0.08	0.14
SA Index	7,574	-3.35	0.50	-4.32	-2.21	-3.69	-3.35	-3.01
Total IO	4008	9.31	11.48	0	51.10	0.55	4.50	13.89
Foreign IO	4008	8.02	10.72	0	41.88	0.29	2.80	11.99
Domestic IO	4008	1.29	2.52	0	10.96	0.00	0.00	1.07

Table 2. Market Reaction to Listing Regulation Events

This table displays the announcement-period results for firms listing on Hong Kong Stock Exchange (HKEX) during the discussions of DCS listing regulation from 2015 – 2017, and the first DCS IPO listing of Xiaomi Corp on 28 Jun 2018. Following the market model, daily abnormal returns (ARs) are estimated from the daily stock returns and the HangSeng index. Firms in the sample must have at least 100 return observations in the estimation period. The cumulative abnormal returns (CARs) are obtained by summing the ARs over seven days of the event window. Panel A is the univariate analysis of the CARs between the treatment group (Tech firms) and the control group (Non-tech firms). Panel B shows cross-sectional OLS estimations where the dependent variable is the firm's CAR [-3, +3] around DCS discussions. The main independent variables is an indicator variable of firms in tech sectors (GICS code 45 and 50). All specifications include control variables for firm size (natural logarithm of total assets), firm age, leverage level and ROA, as well as industry FE. Standard errors are clustered by 4-digit GICS industry. Significance at the ten-, five- and one-percent levels is indicated by *, **, and ***, respectively.

Panel A: Univariate Test of 7-day Cumulative Abnormal Returns (Tech vs. Non-Tech)

	Tech		Non-Tech		Difference	
	(1)		(2)		(3)	
Events	Obs.	Mean	Obs.	Mean	Diff.	t-stat
Jun 19, 2015	245	-0.0226	1077	-0.0117	-0.011*	(2.1676)
Dec 15, 2017	288	-0.0143	1253	0.0029	-0.017***	(4.0790)
Jun 28, 2018	297	-0.0226	1315	-0.0396	0.017***	(-3.9286)

Panel B: Multivariate Test of 7-day Cumulative Abnormal Returns

Dep. Var.:	(1)	(2)	(3)
CAR[-3,+3]	19 Jun 2015	15 Dec 2017	28 Jun 2018
Tech	-0.011***	-0.026***	0.006**
	(0.0035)	(0.0019)	(0.0021)
Size	-0.000	0.002*	0.001
	(0.0022)	(0.0010)	(0.0014)
Age	0.009***	0.001	0.007***
	(0.0019)	(0.0026)	(0.0026)
Leverage	-0.000	-0.000	-0.000
	(0.0001)	(0.0001)	(0.0001)
ROA	0.000	-0.000	-0.000
	(0.0002)	(0.0001)	(0.0003)
Industry FE	Yes	Yes	Yes
SE Clustering	Industry	Industry	Industry
Obs.	1242	1490	1566
R2	0.032	0.030	0.045
Adj. R2	0.014	0.015	0.031

Table 3: Product Competition Channel

This table shows cross-sectional OLS estimations where the dependent variable is the firm's CAR [-3, +3]. The main independent variables include an indicator for firms in tech sectors, the Herfindahl-Hirschman index measuring market concentration (*HHI)* – calculated by squaring the market share of each firm in the industry and then summing the results, and a measure of financial constraint level (*SA Index)* – calculated based on the Hadlock and Pierce (2010) index using firm's age and size as $(-0.737 * Size) + (0.043 * Size^2) - (0.040 * Age)$. As additional explanatory variables, we include firm size (natural logarithm of total assets); firm age; leverage; the returns of asset (ROA); as well as GICS industry FE. Standard errors are clustered at GICS 4-digit industry group level. Significance at the ten-, five- and one-percent levels is indicated by *, **, and ***, respectively.

Dep. Var.: CAR[-3,+3]	(1) 19Jun2015	(2) 28Jun2018	(3) 19Jun2015	(4) 28Jun2018
Tech sector	-0.025***	0.009**	-0.101**	0.053
	(0.0082)	(0.0038)	(0.0390)	(0.0324)
Industry HHI	-0.024	0.012		
	(0.0227)	(0.0246)		
Tech× HHI	0.071**	0.028		
	(0.0319)	(0.0261)		
SA Index	-0.003	-0.009	-0.014	-0.012
	(0.0090)	(0.0049)	(0.0104)	(0.0080)
Tech × SA Index	-0.026**	-0.006	-0.027**	0.013
	(0.0121)	(0.0115)	(0.0110)	(0.0094)
Industry FE	No	No	Yes	Yes
SE Clustering	Industry	Industry	Industry	Industry
Controls	Yes	Yes	Yes	Yes
Obs.	1239	1571	1234	1565
R2	0.013	0.025	0.034	0.043
Adj. R2	0.007	0.021	0.014	0.027

Table 4. Capital Market Channel – Institutional Ownership

This table shows cross-sectional OLS estimations where the dependent variable is the firm's CAR [-3, +3] around the DCS discussion in Hong Kong. The main independent variables include an indicator for firms in tech sectors and measures of the firm's institutional ownership share: *IO share* is the total percentage share held by institutional investors, *Domestic* is the percentage share held by domestic investors, defined as those from the same jurisdiction as the company's headquarter, *Foreign* is the percentage share held by foreign investors. As additional explanatory variables, we include firm size (natural logarithm of total assets); firm age; leverage; the returns of asset (ROA); GICS industry fixed effects. Standard errors are clustered at GICS 4-digit industry group level. Significance at the ten-, five- and one-percent levels is indicated by *, **, and ***, respectively.

Dep. Var.: CAR[-3,+3]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	19Jun2015	15Dec2017	28Jun2018	19Jun2015	15Dec2017	28Jun2018	19Jun2015	15Dec2017	28Jun2018
Tech	-0.008	-0.029***	0.004	-0.005	-0.033***	0.009**	-0.009	-0.028***	0.004
	(0.0063)	(0.0031)	(0.0036)	(0.0054)	(0.0037)	(0.0035)	(0.0061)	(0.0030)	(0.0036)
IO share	-0.000	0.000	-0.000						
	(0.0002)	(0.0002)	(0.0002)						
Tech × IO share	0.000	-0.000	0.001**						
	(0.0004)	(0.0003)	(0.0005)						
Domestic				-0.000	-0.000	-0.000			
				(0.0007)	(0.0006)	(0.0007)			
Tech × Domestic				-0.001	0.004	0.002			
				(0.0015)	(0.0022)	(0.0025)			
Foreign							-0.000	0.000	-0.000
							(0.0002)	(0.0002)	(0.0002)
Tech × Foreign							0.000	-0.000	0.001**
							(0.0005)	(0.0005)	(0.0006)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE Clustering	Industry	Industry	Industry	Industry	Industry	Industry	Industry	Industry	Industry
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	848	948	968	848	948	968	848	948	968
R2	0.050	0.034	0.060	0.049	0.039	0.056	0.050	0.035	0.060
Adj. R2	0.021	0.008	0.035	0.020	0.013	0.031	0.021	0.008	0.035

Table 5: Implied Cost of Capital

This table shows OLS estimations where the dependent variable is the firm's implied cost of capital (ICC). All ICC calculations follow Hou, van Dijk, and Zhang (2012), using a cross-sectional model to estimate expected earnings based on historical earnings, dividends and accruals. We calculate two different ICC measures following Claus & Thomas (2001) and Easton (2004). The main independent variables include an indicator for firms in tech sectors and for year 2017 when the DCS regulation was finalized in Hong Kong. As additional explanatory variables, we include firm size (natural logarithm of total assets); firm age; leverage; the returns of assets (ROA); as well as GICS industry FE and year FE. Standard errors are clustered by 4-digit GICS industry group. Significance at the ten-, five- and one-percent levels is indicated by *, **, and ***, respectively.

Dep. Var.: ICC	(1) CT (2001)	(2) Easton (2004)	(3) Average
Tech	0.013*	0.019***	0.011
	(0.008)	(0.006)	(0.007)
Post2017	-0.032***	0.005	-0.021***
	(0.006)	(0.005)	(0.005)
Tech × Post2017	-0.029***	-0.016**	-0.028***
	(0.011)	(0.007)	(0.009)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
SE Clustering	Industry	Industry	Industry
Controls	Yes	Yes	Yes
Obs.	9356	7042	9356
R2	0.051	0.042	0.035
Adj. R2	0.185	0.221	0.219

Table 6. Robustness Test: Alternative event windows

This table displays the announcement-period results for firms listing on Hong Kong Stock Exchange (HKEX) during the discussions of DCS listing regulation from 2015 – 2017, and the first DCS IPO listing of Xiaomi Corp on 28 Jun 2018. Following the market model, daily abnormal returns (ARs) are estimated from the daily stock returns and the HangSeng index. Firms in the sample must have at least 100 return observations in the estimation period. The cumulative abnormal returns (CARs) are obtained by summing the ARs over seven days of the event window. Panel A is the univariate analysis of the CARs between the treatment group (Tech firms) and the control group (Non-tech firms) for 3-day window. Panel B univariate analysis of the cumulative abnormal returns between the treatment group (Tech firms) and the control group (Non-tech firms) on the announcement date (day 0). The difference is between tech CARs and non-tech CARs. Significance at the ten-, five- and one-percent levels is indicated by *, **, and ***, respectively.

Panel A: Univariate Test of 3-day Cumulative Abnormal Returns (Tech vs. Non-Tech)

	Tech (1)		Non-Tech (2)		Difference (3)	
Events	Obs.	Mean	Obs.	Mean	Diff.	t-stat
Jun 19, 2015	245	-0.0291	1077	-0.0189	-0.010**	(3.0523)
Dec 15, 2017	288	-0.0054	1253	0.0023	-0.008**	(2.9741)
Jun 28, 2018	297	-0.0038	1315	-0.0113	0.007**	(-2.8618)

Panel B: Univariate Test of the Announcement Abnormal Returns (Tech vs. Non-Tech)

	Tech (1)		Non-Tech (2)		Difference (3)	
Events	Obs.	Mean	Obs.	Mean	Diff.	t-stat
Jun 19, 2015	245	-0.0168	1077	-0.0116	-0.005**	(2.7725)
Dec 15, 2017	288	0.0002	1253	0.0020	-0.002	(1.2844)
Jun 28, 2018	297	-0.0017	1315	-0.0069	0.005**	(-2.9295)

Table 7. Robustness Test: Reclassification of Domestic and Foreign Institutional Ownership

This table shows cross-sectional OLS estimations where the dependent variable is the firm's CAR [-3,+3] around the DCS discussion in Hong Kong. The main independent variables include an indicator for firms in tech sectors and measures of the firm's institutional ownership share: *Domestic* is the percentage share held by domestic investors, defined as those from China and Hong Kong, *Foreign* is the percentage share held by investors from all other countries. As additional explanatory variables, we include firm size (natural logarithm of total assets); firm age; leverage; the returns of asset (ROA); GICS industry fixed effects. Standard errors are clustered at GICS 4-digit industry group level. Significance at the ten-, five- and one-percent levels is indicated by *, **, and ***, respectively.

Dep. Var.: CAR[-3,+3]	(1)	(2)	(3)	(4)	(5)	(6)
	19Jun2015	15Dec2017	28Jun2018	19Jun2015	15Dec2017	28Jun2018
Tech	-0.008	-0.029***	0.005	-0.012**	-0.025***	0.002
	(0.0058)	(0.0039)	(0.0041)	(0.0051)	(0.0048)	(0.0037)
Domestic	-0.001	0.000	-0.000			
	(0.0006)	(0.0004)	(0.0006)			
Tech × Domestic	0.000	0.002	0.003***			
	(0.0010)	(0.0009)	(0.0010)			
Foreign				-0.000	-0.000	0.000
				(0.0002)	(0.0002)	(0.0002)
Tech × Foreign				0.001*	-0.000	0.001*
				(0.0004)	(0.0006)	(0.0007)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
SE Clustering	Industry	Industry	Industry	Industry	Industry	Industry
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	847	948	965	847	948	965
R2	0.042	0.025	0.040	0.040	0.024	0.043
Adj. R2	0.026	0.011	0.026	0.024	0.009	0.029

Table 8. Market Reaction to Listing Regulation Events in Singapore

This table displays the announcement-period results for firms listing on Singapore Stock Exchange (SGX) during the discussions of DCS listing regulation from 2017 – 2018. Panel A is the univariate analysis of the Cumulative Abnormal Returns (CARs) between the treatment group (Tech firms) and the control group (Non-tech firms). Panel B is the results of regression firm's cumulative abnormal returns on an indicator variable of tech sectors and particular firm characteristics including firm age, firm size (natural logarithm of total assets), leverage, ROA (returns on total assets), and GICS industry fixed effects. Standard errors are clustered by 4-digit GICS industry group. Significance at the ten-, five- and one-percent levels is indicated by *, **, and ***, respectively.

Panel A: Univariate Test of 7-day Cumulative Abnormal Returns (Tech vs. Non-Tech)

	Tech		Non-tech		Difference	
	(1)		(2)		(3)	
Events	Obs.	Mean	Obs.	Mean	Diff.	t-stat
Jul 28, 2017	64	-0.0418	453	-0.0412	-0.001	(0.0455)
Mar 28, 2018	63	0.0172	445	-0.0071	0.024*	(-2.4395)

Panel B: Multivariate Test of 7-day Cumulative Abnormal Returns

Dep. Var.: CAR[-3,+3]	(1)	(2)
	28Jul2017	28Mar2018
	b/se	b/se
Tech	0.011	0.021*
	(0.0296)	(0.0118)
Size	0.007*	-0.001
	(0.0037)	(0.0025)
Age	0.006	0.009
	(0.0065)	(0.0052)
Leverage	-0.000	0.000
	(0.0002)	(0.0003)
ROA	0.001**	0.000
	(0.0005)	(0.0004)
Industry FE	Yes	Yes
SE Clustering	Industry	Industry
Obs.	469	472
R2	0.070	0.059
Adj. R2	0.016	0.004

Table 9. Market Reaction to Ant Group IPO events

This table displays the announcement-period results for firms listing on Shanghai & Shenzhen Stock Exchange (SSE & SZSE) during the Ant Group IPO event in 2020. Panel A is the univariate analysis of the Cumulative Abnormal Returns (CARs) between the treatment group (Tech firms) and the control group (Non-tech firms). Panel B is the results of regression firm's cumulative abnormal returns on an indicator variable of tech sectors and particular firm characteristics including firm age, firm size (natural logarithm of total assets), leverage, ROA (returns on total assets), and GICS industry fixed effects. Standard errors are clustered by 4-digit GICS industry group. Significance at the ten-, five- and one-percent levels is indicated by *, **, and ***, respectively.

Panel A: Univariate Test of 7-day Cumulative Abnormal Returns (Tech vs. Non-Tech)

	Tech		Non-Tech		Difference	
	(1)		(2)		(3)	
Events	Obs.	Mean	Obs.	Mean	Diff.	t-stat
Oct 21, 2020	752	-0.0081	2778	-0.0129	0.005***	(-3.5404)
Nov 03, 2020	757	-0.0122	2786	-0.0053	-0.007***	(4.7060)

Panel B: Multivariate Test of 7-day Cumulative Abnormal Returns

Dep. Var.: CAR[-3,+3]	(1)	(2)
	21Oct2020	03Nov2020
	b/se	b/se
Tech	0.018***	-0.028***
	(0.0006)	(0.0014)
Size	-0.001	-0.000
	(0.0008)	(0.0012)
Age	-0.001	0.002
	(0.0018)	(0.0021)
Leverage	-0.000	0.000
	(0.0000)	(0.0001)
ROA	-0.000	0.000
	(0.0001)	(0.0002)
Industry FE	Yes	Yes
SE Clustering	Industry	Industry
Obs.	3405	3416
R2	0.027	0.054
Adj. R2	0.021	0.048