1-2019

Overseas listing location and cost of capital: Evidence from Chinese firms listed in Hong Kong, Singapore, and the United States

Warrington College of Business

Frank Weikai LI
Singapore Management University, wkli@smu.edu.sg

Central University of Finance and Economics

Overseas Listing Location and Cost of Capital: Evidence from Chinese Firms Listed in Hong Kong, Singapore, and the United States

Peixin Li[1], Frank Weikai[2] Li & Baolian Wang[3]

[1]School of Business, Central University of Finance and Economics, Beijing, China; [2]Lee Kong Chian School of Business, Singapore Management University, Singapore, Singapore; [3]Warrington College of Business, University of Florida, Gainesville, Florida, USA

Published in Emerging Markets Finance and Trade, 2019 January, 55 (2), 365-390.

DOI: 10.1080/1540496X.2018.1436436

Abstract

As at the end of 2012, more than 600 nonstate-owned Chinese firms were listed in overseas stock markets. We find that Chinese firms listed in the US have the lowest cost of capital when compared to those listed in Hong Kong and Singapore, and these results hold when controlling for firm characteristics and the endogeneity of listing locations. Cross-sectional tests indicate that listing in the US is more beneficial to those firms which face higher information asymmetry and agency costs. Overall, our evidence supports the view that the institutional environment has a first-order impact on a firm's cost of capital.

Keywords: Cost of capital, institutional environment, overseas listing

Classical finance theory assumes that firm owners (shareholders and debtholders) have indisputable claims to their firms' future cash flows (Modigliani and Miller 1958). Most early studies in the literature focus on the cash flow rights allocated by securities, with much less emphasis on the control rights embedded in these securities (La Porta et al. 1998). Modern finance theories view a firm as a nexus of various explicit and implicit contracts that define the rights of stakeholders (Hart 1995). In this view, investment opportunity is not the only factor determining a firm's value, and various real-world frictions such as information asymmetry, uncertainty, and contract enforceability all matter, especially when investor protection is weak. For example, Jensen (1986) argues that managers have a tendency to overinvest in unprofitable projects in attempts to gain personal benefits; and Johnson et al. (2000) argue that large shareholders have incentives to engage in tunneling. Hence, the institutional environment in which a firm operates becomes an important factor in determining the firm's value (La Porta et al. 1998). In this article, using overseas-listed Chinese firms as the sample, we examine the impact of listing locations on firms' costs of capital.

Almost all of the existing studies on overseas-listed firms focus on cross-listed firms (Chan, Wang, and Yang 2013; Karolyi 1998, 2006; Liu and Wang 2018). Our sample is unique in the sense that most foreign-listed Chinese firms are listed only in a foreign market and not domestically.1 According to Li, Xie, and Wang (2012), there were only 85 cross-listed Chinese firms at the end of 2010, while 90% of the 287 non-Chinese foreign firms listed on the US market were also cross-listed in their domestic markets.2 It is important to note that cross-listed firms are inherently different from firms that are only listed overseas. Stock prices of cross-listed firms are determined by both domestic and foreign investors as a result of arbitrage forces and shared information discovery (Gagnon and Karolyi 2010), whereas the prices of stocks that are only listed overseas are determined solely by foreign investors. Foreign investors are less informed about overseas-listed firms than are domestic investors (Chan, Menkveld, and Yang 2007, 2008), and increased information acquisition costs for foreign

Address correspondence to Baolian Wang, Warrington College of Business, University of Florida, Gainesville, FL 32611, USA. E-mail: Baolian.Wang@warrington.ufl.edu

investors can lead to an inferior information environment and depressed firm value (Li et al. 2013). Mukherjee (2012) finds that corporate governance mechanisms are effective only when the cost of information acquisition is low. The effects of cross listing on firm value may not, however, be applicable to single-listing cases. Our article fills this gap by empirically examining the impact of overseas listing locations on the cost of capital. In addition, most of the studies in this area focus on firms listed in the US and examine whether the institutional environments of their domestic markets matter. Our article keeps the domestic market the same in order to more closely examine whether the institutional environment of the listing location matters.

We focus on the three overseas markets in which most overseas-listed Chinese firms are listed: the US, Hong Kong, and Singapore. Our results show that Chinese firms have lower costs of capital when they are listed in the US than when they are listed in Hong Kong or Singapore. Our results are robust after we control for the systematic differences among firms listed in different locations, and for the endogeneity of the listing locations. In addition, we find that US-listed firms experience a more pronounced reduction in costs of capital when they face higher ex ante information asymmetry and higher ex ante agency costs. Our evidence supports the premise that the better institutional environment and information disclosure which are present in the US market mitigates information asymmetry and agency problems. The evidence documented in this article is consistent with our hypothesis that the institutional environment is an important factor affecting firms' costs of capital. Our article thus improves our understanding of the decisions of firms to go public in overseas markets, complements the existing studies on overseas listing, and contributes to the debate on whether listing in another market reduces a firm's cost of capital (Doidge, Karolyi, and Stulz 2004; Sarkissian and Schill 2009).

In this article, in addition to the widely used method of backing out firms' costs of capital from analysts' earnings forecasts, we also employ a new method as proposed by Hou, Dijk, and Zhang (2012). This new approach does not rely on analysts' earnings forecasts, and is therefore more flexible and less fraught with the various issues which arise from using analysts' forecast data (Easton and Monahan 2005; Gebhardt, Lee, and Swaminathan 2001; Guay, Kothari, and Shu 2011). Various studies in the literature have proposed many different methods for calculating the implied cost of capital. To ensure that the results in this study are not sensitive to the specifications of these models, we follow Hou, Dijk, and Zhang (2012) and investigate five different models: Claus and Thomas (2001); Easton (2004); Gebhardt, Lee, and Swaminathan (2001); Gordon and Gordon (1997); and Ohlson and Juettner-Nauroth (2005). For each of these five models, we calculate two implied cost of capital measures: one based on analysts' forecast data, and one based on the method proposed by Hou, Dijk, and Zhang (2012). In most of the analyses, our results are based on the average of these 10 costs of capital measures.[3]

Our article contributes to the literature on overseas listing. Although there have been many studies on cross listing, the amount of literature on firms that are only listed in a foreign market is small. Blass and Yafeh (2001) study the factors that motivated Israeli firms to list in the US, and find that high-quality innovative firms are willing to incur the additional costs associated with listing in the US in order to signal their quality. Sun, Tong, and Wu (2013) examine 92 state-owned Chinese firms listed in Hong Kong and find that these firms can leverage on the better governance environment of Hong Kong. Hornstein (2014) studies Chinese firms listed in the US, Singapore, Hong Kong, and the UK. They find that the local institutional environment of these firms affects their choice of listing location. Our study contributes to this small but growing literature and furthers our understanding of how foreign listing locations can affect firms' costs of capital.

Institutional barriers are the main factor leading to Chinese firms choosing to raise equity capital in foreign stock markets. Nonstate-owned Chinese firms are discriminated against in the domestic capital markets (Allen, Qian, and Qian 2005; Brandt and Li 2003). For these firms, going public in foreign stock markets becomes an appealing alternative. Since the first Chinese firm, Qiaoxing Universal Telephone, listed on NASDAQ on February 17, 1999, more than 600 nonstate-owned Chinese firms have chosen to list in foreign stock markets. The number of Chinese initial public offerings (IPOs) in overseas markets remained notable, with 75 and 59 in 2011 and 2012, respectively—a period when

Chinese stocks were shunned by foreign investors due to a series of accounting scandals and a general distrust of Chinese firms. We expect that overseas stock markets will continue to be among the most important sources of external capital for nonstate-owned Chinese firms as financial discrimination against these firms in their domestic market will not disappear quickly. By documenting the institutional differences of various overseas markets and their impacts on firms' costs of capital, our article may also provide some guidance for firms on overseas listing location choices.

The remainder of this article is organized as follows: Section 2 briefly reviews the literature and develops our main hypotheses; Section 3 introduces our measures of implied costs of capital; Section 4 describes the data and presents empirical results; and in the final section, we present our conclusions.

Literature Review and Hypotheses Development

Asset pricing theories, such as the capital asset pricing model, prescribe that a stock's expected return is determined solely by its systematic risk, which is measured as its return covariance with the market. Subsequent studies, however, find that a firm's corporate governance mechanisms could also affect its cost of capital. The institutional environment affects not only the corporate governance mechanisms a firm chooses but could also influence its cost of capital through its interactions with its governance environment. In this section, we briefly review relevant literature and develop our hypotheses.

Literature Review

Listing locations affect firms' costs of capital because they affect the corporate governance environment that firms face. We therefore break the review into two subsections: in Section 2.1.1 we review the literature on the relationship between corporate governance and cost of capital; and in Section 2.1.2 we review the literature on the relationship between institutional environment (which is determined by listing location) and corporate governance. These reviews will pave the way for our hypotheses development in Section 2.2.

Corporate Governance and Cost of Capital

Contract theory views a firm as a nexus of various explicit or implicit contracts, which specify the rights and duties of various stakeholders such as shareholders, debtholders, and firm managers. Since contracts are typically incomplete, conflicts of interest among principals and agents will inevitably arise (Hart 1995). In this article, we study firms' costs of equity capital. Therefore, we focus mainly on the conflicts of interest between shareholders and managers, as well as those between large controlling shareholders and minority shareholders.

As the agents of shareholders, corporate managers' incentives may not be perfectly aligned with those of the shareholders. First, managers must incur personal cost (i.e., effort) to generate profits to be shared with shareholders, and they have less incentive to work hard when their effort is difficult to observe and monitor. In other words, managers tend to shirk when their efforts are not contractible. Using the staggered passage of antitakeover laws in different states of the US as a natural experiment, Bertrand and Mullainathan (2003) found that managers exert less effort after the passage of antitakeover laws because the likelihood of firms being acquired is reduced and, therefore, managers face less threat from the takeover market. Specifically, they found the shirking result after the passage of antitakeover laws, after worker pay rises were enacted, and when the destruction of old plants and the creation of new plants to replace them failed. Furthermore, they found that productivity and profitability declined in response to the passage of these laws.

Second, managers have a tendency to increase firm size and invest in value-destroying projects rather than distribute cash to shareholders in the form of dividends (Jensen 1986). This is because managers' personal benefits increase with firm size (Gabaix and Landier 2008). Blanchard, Lopez-de-Silanes, and Shleifer (1994) found that, when firms acquire large cash windfalls from lawsuits, they tend to use it for investment or increase cash holding, rather than distribute the cash back to shareholders.

Conflicts of interest between large and minority shareholders often take the form of tunneling. Generally speaking, large shareholders have control rights and discretion over the daily operations of firms. Enormous empirical studies have found that large shareholders tend to use their control rights to obtain personal benefits (Lemmon and Lins 2003; Zingales 1994). There are many different ways to do this, such as via related party transactions (Cheung, Rau, and Stouraitis 2006) and perquisite consumption (Chen, Chen, and Hui 2009).

Conflicts of interest between managers and shareholders, and between large shareholders and minority shareholders, arise as a result of the separation of ownership and control (Fama and Jensen 1983). This separation creates adverse incentives for those with control rights to pursue goals which benefit themselves. Anticipating this tendency, shareholders will naturally increase the required rates of return on capital (Hart and Moore 1998; Jensen 1986; Lin et al. 2011; Stulz 1990).

Institutional Environment and Corporate Governance

The literature has proposed many ways to solve, or at least mitigate, the principal–agent problem. First, more intensive monitoring of corporate managers through board of directors, security analysts, financial journalists, or institutional investors could reduce agency costs (Yermack 1996). Second, improved alignment of the interests of agents and principals may be achieved by adjusting how the profits are shared; the performance sensitive compensation contract is one example of this kind of adjustment (Bebchuk and Fried 2003). Third, increased punishment for managers engaging in opportunistic behaviors may mitigate the problem. Fourth, more effective governance mechanisms could be achieved by improving the information environments of firms; for example, requiring firms to make higher quality disclosures more frequently would improve the information environment (Bailey, Karolyi, and Salva 2006).

Well-functioning institutional environments could reduce firms' agency costs by facilitating the adoption of various corporate governance mechanisms as mentioned above. For example, well-developed financial markets generally have more experienced financial analysts, more skilled journalists, and more mature institutional investors, all of whom could help monitor firm managers more effectively. At the same time, a good legal system could increase the probability of detection and punishment for managers who commit crimes, thereby discouraging managers' opportunistic behavior. With more stringent information disclosure requirements, shareholders will be more knowledgeable about their firms and monitoring will be more effective, which also mitigates agency costs.

On the empirical side, Sun, Tong, and Wu (2013) document that listing in the more developed Hong Kong market increased mainland Chinese firms' valuations. Hornstein (2014) finds that the local institutional environment can predict Chinese firms' performance, at least shortly after their IPOs. Across domestically listed Chinese firms, corporate governance also has a significant effect on earnings management (Liu and Lu 2007) and related party transactions (Jian and Wong 2010). Although these articles have not tested how the foreign listing location affects a firm's cost of capital, they do provide insights into how the institutional environment affects a firm's corporate governance, therefore providing a foundation for our hypotheses.

Hypotheses Development

A publicly listed firm is obliged to satisfy all listing requirements, and exposes itself to continuous monitoring from various market participants. Relative to the US, Hong Kong, and Singapore, mainland China's institutional environments are weaker in terms of investor protection and information disclosure. Therefore, being listed overseas in these markets can expose Chinese firms to better institutional environments and improve their corporate governance standards, thereby reducing their costs of capital (Coffee 1999; Stulz 1999). Different overseas markets have different institutional environments and possibly also different effects on firms' costs of capital.

The aggregate size of the three markets referred to above differs dramatically. Based on data from the World Bank, as at the end of 2012, the total market capitalization of all firms listed in Hong Kong and Singapore was US$1.11 trillion and US$0.41 trillion, respectively, with a figure of US$18.67 trillion for the US market. In other words, total market capitalization of the US is 17 times that of Hong Kong and 45 times that of Singapore.[4] Additionally, although all three economies are developed, share common legal origins, and enjoy highly effective law enforcement systems, the US market is more remarkable in many dimensions.

First, the US scores higher than Hong Kong and Singapore in most institutional quality measures. (1) The US scores 10 out of 10 for rule of law, while Hong Kong and Singapore score 8.22 and 8.57, respectively (La Porta et al. 1997, 1998). Bhattacharya and Daouk (2002) found that the year during which insider trading law was first practiced and enforced in a country/economy is a good measure for insider trading regulation. The US enforced its insider trading law in 1961, while both Hong Kong and Singapore enforced against insider trading much later, in 1994 and 1978, respectively. (2) The frequency of insider trading prosecutions is much lower in Hong Kong and Singapore than in the US. (3) The US market outperforms Hong Kong and Singapore based on other widely used measures of institutional quality. For example, the risk of expropriation is lower in the US with a score of 9.98, and with scores of 8.29 and 9.30 for Hong Kong and Singapore, respectively (La Porta et al. 1997, 1998). The US has better control over corruption than Hong Kong and Singapore, with corresponding scores of 8.63, 8.52, and 8.22, respectively. In terms of political rights, the US also has a much higher score of 7.00 than Hong Kong and Singapore, with corresponding scores of 1.86 and 3.00, respectively.

Second, the three markets also differ significantly in terms of their information environments. Bhattacharya, Daouk, and Welker (2003) rank 34 countries based on their accounting transparency. The US ranks first, while the ranking for Hong Kong and Singapore are 21 and 22, respectively. In addition, the US, Hong Kong, and Singapore score 97.83, 69.57, and 63.77, respectively, in terms of the timeliness of accounting reporting (Saudagaran and Diga 2000). The average number of analysts following a firm is 30.23, 25, and 20.9 in the US, Hong Kong, and Singapore, respectively (Chang, Khanna, and Palepu 2000). The degree of media development and freedom of press could also affect how easily investors obtain access to unbiased and timely information, hence affecting a firm's information environment. The scores for freedom of press are 8.67, 6.84, and 3.50 for the US, Hong Kong, and Singapore, respectively (Qi, Roth, and Wald 2010). In terms of media development, the US scores 86.72, while Hong Kong and Singapore score 87.44 and 83.72, respectively.

Overall, US capital markets enjoy a significantly better institutional environment than do the capital markets of Hong Kong and Singapore, while the differences between the capital markets of Hong Kong and Singapore are minimal.

The above discussions lead to our first hypothesis:

Hypothesis 1 (H1): Firms listed in the US should have lower costs of capital than firms listed in Hong Kong and Singapore.

The institutional environment has differential impacts on different types of firms. Firms facing more severe information asymmetry and agency problems should domestically benefit more from listing in a market that offers a better institutional environment. Miller (1999) studied market reactions to firms cross listing their shares in the US via American Depositary Receipts (ADRs), and found that the US market reactions were more favorable for firms from countries with inferior institutional environments. In addition to testing Hypothesis 1, we further classify firms into different groups based on measures of information asymmetry and agency problems, and examine whether listing locations impact different firms in different ways:

Hypothesis 2 (H2): Firms facing higher ex ante costs of information asymmetry and agency problems should benefit more from listing in the US. In other words, US-listed Chinese firms should experience larger reductions in costs of capital compared to those listed in Hong Kong and Singapore when they have higher ex ante information asymmetry and agency problems.

Hypothesis 2 is a natural extension of Hypothesis 1. Testing Hypothesis 2 could also improve our understanding of the underlying mechanisms of listing locations on firms' costs of capital.

Measuring Cost of Capital

The traditional measure of cost of capital (expected return) is ex-post realized returns averaged over a sample period (Fama and French 1992). However, Pastor, Sinha, and Swaminathan (2008) argue that using ex-post realized returns as a proxy for expected returns results in large measurement errors, especially when the sample period is not sufficiently long. In this article, we use the implied cost of capital measures estimated by equating current stock prices to discounted future earnings. We briefly introduce each model in this section[5].

According to the dividend discount model, stock price is equal to the present value of all future expected cash flows:

$$P_t = \sum_{i=1}^{\infty} \frac{E_t(D_{t+i})}{(1+R)^i} \tag{1}$$

In model (1), P_t is stock price at time t, D_t is t period's dividend, E_t is the expectation with respect to all information up to time t, and R is the expected cost of capital at time t.

According to Gebhardt, Lee, and Swaminathan (2001), when clean surplus accounting holds, we can rewrite model (1) as follows:

$$\begin{aligned} P_t &= B_t + \sum_{i=1}^{\infty} \frac{E_t(NI_{t+i} - RB_{t+i-1})}{(1+R)^i} \\ &= B_t + \sum_{i=1}^{\infty} \frac{E_t[(ROE_{t+i} - R)B_{t+i-1}]}{(1+R)^i}, \end{aligned} \tag{2}$$

where B_t is the firm's book value of equity at time t, NI_t is net income at time t, and ROE_t is return on equity at time t.

In model (2), P_t is observable, but the future values of ROE and B are not; therefore, they must be estimated based on some forecasting methods. Models of implied cost of capital differ by their assumptions about the future ROE and B.

The Gordon and Gordon (1997) model is the simplest among all the models of estimating implied cost of capital:

$$P_t = \frac{E_t(ROE_{t+1}{}^* B_t)}{R} \tag{3}$$

This model essentially assumes that dividend growth rate in model (1) is 0, and the forecasted dividend at time $t+1$ is all we need to estimate implied cost of capital.

Gebhardt, Lee, and Swaminathan (2001) assume that the firm stops growing after 12 periods. Their model could be written as follows:

$$P_t = B_t + \sum_{i=1}^{11} \frac{E_t[(ROE_{t+i} - R)B_{t+i-1}]}{(1+R)^i} + \frac{E_t[(ROE_{12} - R)B_{t+11}]}{R(1+R)^{11}} \tag{4}$$

Claus and Thomas (2001) assume that a firm begins to maintain a constant growth rate of g starting from period 5. Their model is as follows:

$$P_t = B_t + \sum_{i=1}^{5} \frac{E_t[(ROE_{t+i} - R)B_{t+i-1}]}{(1+R)^i} + \frac{E_t[(ROE_5 - R)B_{t+11}](1+g)}{(R-g)(1+R)^5} \tag{5}$$

Ohlson and Juettner-Nauroth (2005) and Easton (2004) derive the following equation:

$$P_t = \frac{EPS_{t+1}}{R} + \frac{EPS_{T+2} + R^* DPS_{t+1} - (1+R)EPS_{t+1}}{R(R - \Delta agr)} \tag{6}$$

where EPS is the firm's earnings per share, DPS is the firm's dividend per share, and agr is the abnormal growth in earnings, which is defined as the difference between accounting earnings at time $t + 2$ and expected earnings at $t + 1$.

Based on model (6), Easton (2004) and Ohlson and Juettner-Nauroth (2005) propose a different model to calculate cost of capital. Specifically, Easton (2004) assumes $\Delta agr = 0$, which leads to the following equation:

$$P_t = \frac{EPS_{T+2} + R^* DPS_{t+1} - (1+R)EPS_{t+1}}{R^2} \tag{7}$$

Different from the assumption that $\Delta agr = 0$ made by Easton (2004), Ohlson and Juettner-Nauroth (2005) assume a long-run positive growth rate for firms. Derivation of model (6) based on this assumption shows the Ohlson and Juettner-Nauroth (2005) model of implied cost of capital:

$$\begin{aligned} R &= A + \sqrt{A^2 + \tfrac{EPS_{t+1}(g_2 - \Delta agr)}{P_t}} \\ A &= \tfrac{1}{2}\left[\Delta agr + \tfrac{DPS_{t+1}}{P}\right] \\ g_2 &= \tfrac{EPS_{t+2} - EPS_{t+1}}{EPS_{t+1}} \end{aligned} \tag{8}$$

To simplify analysis, we refer to the above-cited measures of cost of capital as the GG, GLS, CT, Easton, and OJ models. In applying these methods, we have to make additional assumptions. Following these studies, we also make the following standard assumptions when analyzing our data:

1. Clean surplus accounting holds.
2. We assume that firms have the same payout ratio as prior periods. If current earnings are less than 0, we use current dividends divided by 0.06 times total assets as proxy for dividend payout ratio.
3. For the GLS model, we assume a firm's forecasted ROE will mean revert to the median ROE of its industry after $t + 3$. We use the data of the Chinese firms listed in the A share market to calculate the median ROE for each industry.
4. The g in the CT model and the Δagr in the OJ model are set to a risk-free rate minus 3%. We use 5-year deposit rates in China as a proxy for the risk-free rate.
5. To ensure that all the accounting information is publicly available when we calculate cost of capital, we align accounting variables at the end of fiscal year t-1 with stock price data at the end of June in year t.

We need earnings forecasts as inputs for the model to estimate cost of capital. Most existing studies use analyst forecasted earnings as inputs. More recently, Hou, Dijk, and Zhang (2012) developed a new approach to estimating future cash flows from cross-sectional regressions. This method could eliminate some issues arising from the use of analyst forecasted earnings, such as analysts' optimism bias and their slow incorporation of new information. There are two steps in the use of this forecasting model.

In the first step, we estimate the coefficients of the following model using accounting data from the prior 10 years:

$$E_{i,t+\tau} = \alpha_{0,\tau} + \alpha_{1,\tau}A_{i,t} + \alpha_{2,\tau}D_{i,t} + \alpha_{3,\tau}DD_{i,t} + \alpha_{4,\tau}E_{i,t} + \alpha_{5,\tau}NegE_{i,t} + \alpha_{6,\tau}AC_{i,t} + \varepsilon_{i,t+\tau} \tag{9}$$

$E_{i,t+\tau}$ is the firm's earnings at year $t + \tau$. Following Hou, Dijk, and Zhang (2012), we choose $\tau \in (1, 2, 3, 4, 5)$ and estimate the five models separately. $A_{i,t}$ is the firm's total assets, $D_{i,t}$ is dividend, $DD_{i,t}$ is a dummy variable indicating positive dividend at year t, $E_{i,t}$ is earnings, measured as net income before extraordinary items, $NegE_{i,t}$ is a dummy variable indicating negative earnings, and $AC_{i,t}$ is accrual. Accrual is defined as changes in noncash current assets minus changes in current liability (excluding the current portion of long-term liability), minus depreciation and amortization expenses, and finally adding back changes from deferred taxes (Bhattacharya, Daouk, and Welker 2003).

For any given year t and forecast horizon τ, we estimate a set of coefficients from model (9). The forecasted earnings for horizon τ are follows:

$$E_t(E_{t+\tau}) = \hat{\alpha}_{0,\tau} + \hat{\alpha}_{1,\tau}A_{i,t} + \hat{\alpha}_{2,\tau}D_{i,t} + \hat{\alpha}_{3,\tau}DD_{i,t} + \hat{\alpha}_{4,\tau}E_{i,t} + \hat{\alpha}_{5,\tau}NegE_{i,t} + \hat{\alpha}_{6,\tau}AC_{i,t} \tag{10}$$

A further advantage of using Hou, Dijk, and Zhang's (2012) method to forecast future earnings is that we could increase our sample size, since this method does not require a firm to have analyst forecast data.

In total, we used five models to calculate firms' implied costs of capital, and for each model we used both analyst-based and model-based earnings forecasts as inputs for the model; therefore, we had 10 measures of cost of capital[6]. Easton and Monahan (2005) and Hou, Dijk, and Zhang (2012) argue that implied cost of capital estimated by equating stock price to discounted future cash flows has measurement errors. To reduce the impact of measurement errors on our results, we used the average value of the 10 costs of capital estimates as our main dependent variable.[7]

Sample, Research Design, and Results

Data Description

We collected the list of Chinese firms listed in the US, Hong Kong, and Singapore from Wind.[8] Wind is a widely used data vendor, specialized in collecting financial information from China's financial market, and is similar to Bloomberg, which is widely used in the Western world. We checked the Hong Kong Stock Exchange website, the Singapore Stock Exchange website, and the ADR database of JP Morgan to ensure that our list of overseas-listing Chinese firms was accurate and complete. Chinese firms are defined as those with most of their operations in mainland China at the time the firm enters the database, and which are managed by current or former Chinese citizens.[9] We obtained firms' ownership data from the Datastream/Worldscope company websites and annual reports. Since nonstate-owned firms are not comparable to state-owned firms, we removed from our sample all firms with more than 50% state ownership.[10] Cross-listed firms were also removed from our sample as they are affected by institutional factors in multiple locations. Accounting variables, stock price, and exchange rate data were downloaded from Datastream/Worldscope. Analyst forecast data used were from the Institutional Brokers' Estimate System. The sample period was from 2000 to 2012 as there were few overseas-listed Chinese firms prior to 2000, and the data coverage for that time period is also poor. We used year-end exchange rates to convert all our variables into US dollars.

Model Specification

We used the following regression model to compare the cost of capital for firms listed in Hong Kong, Singapore, and the US:

$$R_{i,t} = \beta_0 + \beta_1 US_i + \beta_2 SGX_i + \beta_3 Beta_{i,t-1} + \beta_4 Size_{i,t-1} + \beta_5 Age_{i,t-1} + \beta_6 MB_{i,t-1} + \beta_7 Leverage_{i,t-1} + \beta_8 R\ D_{i,t-1} + \beta_9 IV_{i,t-1} + \beta_{10} Runup_{i,t-1} + \beta_{11} Following_{i,t-1} + \varepsilon \quad (11)$$

$R_{i,t}$ is the estimated cost of capital for firm i at year t. We used the stock price at the end of June of year t and accounting data at the end of fiscal year $t-1$ to estimate the cost of capital. *US* and *SGX* are two dummy variables where US (SGX) is equal to 1 if the firm is listed in the US (Singapore), and is 0 otherwise. The control variables are lagged by 1 year. In regressions with control variables, firms that conducted their foreign IPOs in 2012 will not be in our sample due to missing control variables.

We also controlled for other firm characteristics that may affect firms' costs of capital.[11] *IV* is a stock's idiosyncratic volatility and *Runup* is a stock's cumulative returns. We used 12-month daily return data from July of year *t-1* to June of year *t* to calculate *Beta, IV*, and *Runup*.[12] *Size, Age, MB, Leverage*, and *R&D* are the natural logarithm of the total assets of the firm, the number of years the firm has been listed, the market-to-book ratio, the leverage ratio, and R&D expenses, respectively. Leverage is calculated as total debt divided by total assets, and R&D is calculated as R&D expenses over total assets. All five variables are calculated based on accounting data from fiscal year *t-1*. Following is the number of analysts following a firm.

After we deleted the firm-years for which we were unable to reliably estimate $R_{i,t}$ (due to missing data or nonconvergence of the model), 1043 observations remained. There were 218, 576, and 249 observations, and 64, 78, and 59 unique firms listed in the US, Hong Kong, and Singapore, respectively. The data used was a standard panel dataset. Simple OLS estimation may lead to under-estimation of standard errors of the coefficients; therefore, we followed Petersen (2009) and clustered standard errors in two dimensions: year and industry, where industry is defined at the two-digit SIC code level.

Summary Statistics

Table 1 reports the summary statistics. Firms listed in the three markets are quite similar in terms of market beta, firm size, age, and idiosyncratic volatility. For example, firms from all three markets have betas close to 1, with firms listed in the US having betas slightly above 1, and firms in Hong Kong and Singapore having betas of around 0.86. The average firm size was 14.114 for firms listed in the US, 13.704 for those in Hong Kong, and 13.063 for those in Singapore. On average, firms had been listed for 6 years in the three markets at the time of the study. Firms listed in Hong Kong had the lowest idiosyncratic volatility, with that of firms in the Singapore and US markets of around 4%.

Notable differences in leverage, Runup, market-to-book ratio (MB), R&D, and analyst coverage exist among firms listed in the three markets. US-listed firms had the lowest leverage ratio of 35.7%, while Hong Kong-listed firms had the highest leverage ratio of 46.8%, and for firms listed in Singapore the leverage ratio was 37.9%. US-listed stocks had average Runup of 0.486, while it was 0.216 for firms listed in Hong Kong and 0.006 for firms listed in Singapore. This was mainly due to the outperformance of the US stock market over the Hong Kong and Singapore markets during our sample period. Similarly, firms listed in the US had the highest MB of 2.942, while those listed in Hong Kong and Singapore had MBs of around 1.8. US-listed firms had the highest R&D expenses at 1.735% of total assets, while this number was only 0.349% and 0.372% for firms listed in Hong Kong and Singapore, respectively. In addition, Hong Kong-listed firms attracted more analyst coverage

Table 1. Summary statistics.

	US	HK	SGX
Number of firms	64	78	59
Number of observations	218	576	249
Beta	1.167	0.860	0.866
Size	14.114	13.704	13.063
Age	6.335	5.757	6.410
IV (%)	3.963	3.367	3.949
Leverage	0.357	0.468	0.379
Runup	0.486	0.216	0.006
MB	2.942	1.773	1.751
R&D (%)	1.735	0.349	0.327
Following	1.468	1.830	0.699

This table reports the summary statistics of our sample. We report the summary statistics by firms' listing locations: the United State (US), Hong Kong (HK), and Singapore (SGX). The first two rows report the number of unique firms in each location, and the number of firm-year observations in each location. Beta is a stock's sensitivity to the market returns. We calculate it based on daily return data from July of year *t-1* to June of year *t*. IV is stock's idiosyncratic volatility and Runup is a stock's cumulative returns. Both are also calculated based on data from July of year *t-1* to June of year *t*. Size, Age, MB, Leverage, and R&D are the natural logarithm of a firm's total assets, the number of years the firm has been listed, the market-to-book ratio, the leverage ratio, and the R&D expenses, respectively. Leverage is calculated as total debt divided by total assets; R&D is R&D expenses over total assets. All five variables are calculated based on accounting data from fiscal year t-1. Following is the number of analysts following a firm. The sample period is from 2000 to 2012.

overall—1.830 analysts on average—while analyst following was only 1.468 and 0.699 for firms listed in the US and Singapore, respectively.

Overall, the firms listed in the three markets were quite similar, although some firm characteristics did differ from location to location. In our subsequent analysis, we will explain how we carefully controlled for the effect of different firm characteristics on our results.

Table 2 reports the correlation matrix of the main variables used in this article. The correlation between US, SGX, and firm characteristics are quite similar to the summary statistics reported in Table 1. Overall, we did not find particularly high correlations among the variables in Table 2. Multicollinearity has a limited impact on our results.

Univariate Analysis

Table 3 reports the univariate analysis of cost of capital for firms listed in the US, Hong Kong, and Singapore. We used five different models to estimate cost of capital and two measures of earnings forecast, so we have a total of 10 measures of cost of capital. We report the mean cost of capital estimated from each model for firms in the three markets separately, and also the cost of capital measure averaged across 10 models in Table 3. We test whether the differences in cost of capital for firms listed in the three markets are statistically significant, indicated by * in the columns of US and SGX.

From the univariate analysis, we found that US-listed Chinese firms have the lowest cost of capital, and this remained true irrespective of which model we used to estimate cost of capital. We also found that firms listed in Hong Kong tended to have lower costs of capital than those listed in Singapore, but that in the GG-analysts specification, this was reversed (although statistically insignificant). Because firms listed in the three markets are systematically different from one another in some characteristics, we next conducted multivariate regression analysis to systematically examine the relationship between firms' listing locations and costs of capital. To reduce the impact of measurement errors, we used the cost of capital measure averaged across the 10 models as the dependent variable in the regression analysis.

Table 2. Correlation matrix.

	US	SGX	Beta	Size	Age	IV	Leverage	Runup	MB	R&D	Following
US	1										
SGX	−0.29	1									
Beta	0.25	−0.07	1								
Size	0.14	−0.18	0.20	1							
Age	0.03	0.04	−0.04	0.26	1						
IV	0.10	0.11	0.09	−0.38	−0.17	1					
Leverage	−0.17	−0.12	0.03	0.28	0.13	−0.02	1				
Runup	0.14	−0.12	−0.01	0.03	0.11	0.18	0.04	1			
MB	0.22	−0.07	0.21	0.07	0.02	−0.02	0.12	0.35	1		
R&D	0.35	−0.11	0.17	−0.11	−0.02	0.04	−0.14	0.04	0.07	1	
Following	0.00	−0.16	0.02	0.15	0.08	−0.05	−0.02	0.01	−0.02	−0.01	1

This table reports the correlation matrix of the variables in our sample. US is a dummy variable which is equal to 1 for firms listed in the US and 0 otherwise. SGX is a dummy variable which is equal to 1 for firms listed in Singapore and 0 otherwise. Beta is a stock's sensitivity to market returns. We calculate it based on daily return data from July of year *t-1* to June of year *t*. IV is stock's idiosyncratic volatility and Runup is a stock's cumulative returns. Both are also calculated based on data from July of year *t-1* to June of year *t*. Size, Age, MB, Leverage, and R&D are the natural logarithm of firm's total assets, the number of years the firm has been listed, the market-to-book ratio, the leverage ratio, and the R&D expenses, respectively. Leverage is calculated as total debt divided by total assets; R&D is R&D expenses over total assets. All five variables are calculated based on accounting data from fiscal year t-1. Following is the number of analysts following a firm. The sample period is from 2000 to 2012.

Table 3. Overseas listing location and cost of capital: Univariate analysis.

Cost of capital model	Earnings forecast model	US	HK	SGX
GG	Analyst forecast	16.76***	23.62	23.00
	Hou, Dijk, and Zhang	12.76***	22.31	19.53
GLS	Analyst forecast	11.88*	16.06	17.00
	Hou, Dijk, and Zhang	9.83**	12.32	16.45**
CT	Analyst forecast	11.21	14.67	19.73**
	Hou, Dijk, and Zhang	7.56*	9.53	13.65*
EASTON	Analyst forecast	7.38	8.85	13.57**
	Hou, Dijk, and Zhang	13.17**	18.34	17.86
OJ	Analyst forecast	12.18***	21.00	29.20**
	Hou, Dijk, and Zhang	10.90	12.89	25.91***
Average		10.02***	15.04	20.14**

This table compares cost of capital for the three markets: the United State (US), Hong Kong (HK), and Singapore (SGX), respectively. We calculate cost of capital using five different models, and for each model, we have two ways to estimate future earnings. In total, we have 10 costs of capital measures. For details, please see Section 3. The * for US indicates whether it is significantly different from HK, and the * for SGX indicates whether it is significantly different from HK. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Cost of capital is reported as a percentage. The sample period is from 2000 to 2012.

Regression Analysis

Table 4 reports our main results concerning the effect of listing location on firms' costs of capital. In column (1), we only included two dummy variables, US and SGX, without any controls or industry/year fixed effects. The coefficient of US is −0.050 with a t-stat of −3.22, which is significant at the 1% level. This means that firms listed in the US have a significantly lower cost of capital than those listed

Table 4. Overseas listing location and cost of capital: Multivariate analysis.

	(1)	(2)	(3)	(4)
US	–0.050***	–0.061***	–0.056***	–0.069***
	(–3.22)	(–3.38)	(–3.05)	(–4.33)
SGX	0.051**	0.043*	0.057**	0.062**
	(2.15)	(1.95)	(2.28)	(2.32)
Beta			–0.014	–0.013
			(–1.15)	(–1.25)
Size			0.014**	0.023***
			(2.47)	(3.52)
Age			–0.003**	–0.001
			(–2.04)	(–0.75)
MB			–0.007***	–0.008***
			(–3.67)	(–3.69)
Leverage			–0.052	–0.006
			(–1.15)	(–0.12)
R&D			0.159	–0.107
			(0.73)	(–0.59)
IV			1.045***	1.324***
			(2.87)	(4.53)
Runup			–0.001	–0.005
			(–0.20)	(–0.98)
Following			0.001	0.000
			(0.44)	(0.01)
Constant	0.150***	0.202***	–0.008	–0.195**
	(12.55)	(8.40)	(–0.11)	(–2.19)
Year	No	Yes	No	Yes
Industry	No	Yes	No	Yes
Adj-R^2	0.046	0.157	0.078	0.176
N	1043	1038	945	941

This table reports the regression results. The dependent variable is cost of capital, which is the average of the 10 different costs of capital variables used in this article. For details concerning these variables, please see Section 3. US is a dummy variable which is equal to 1 for firms listed in the US and 0 otherwise. SGX is a dummy variable which is equal to 1 for firms listed in Singapore and 0 otherwise. Beta is a stock's sensitivity to market returns. We calculate it based on daily return data from July of year *t-1* to June of year *t*. IV is stock's idiosyncratic volatility and Runup is a stock's cumulative returns. Both are also calculated based on data from July of year *t-1* to June of year *t*. Size, Age, MB, Leverage, and R&D are the natural logarithm of firm's total assets, the number of years the firm has been listed, the market-to-book ratio, the leverage ratio, and the R&D expenses, respectively. Leverage is calculated as total debt divided by total assets; R&D is R&D expenses over total assets. All five variables are calculated based on accounting data from fiscal year t-1. Following is the number of analysts following a firm. The sample period is from 2000 to 2012. All the standard errors are clustered at two dimensions: industry and year. In some of the models, we also include industry and year fixed effects. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

in Hong Kong. The coefficient of SGX is 0.051 with a t-stat of 2.51, which is significant at the 5% level, meaning that firms listed in Singapore have significantly higher costs of capital than those listed in Hong Kong. The coefficient on the intercept term in column (1) is the cost of capital estimated for Hong Kong-listed firms, and this number is 0.150. The average cost of capital for firms listed in the US and Singapore could be estimated from the coefficients of US and SGX. As can be seen, the cost of capital on average is 10.0% and 20.1% for firms listed in the US and Singapore, respectively, which is consistent with what we find from the univariate analysis in Table 3.

In column (2), we add industry fixed effects (we use two-digit SIC codes to classify industries) and year fixed effects to control for the effects of industry differences and macroeconomic factors. The results show that the coefficient of US changes from −0.05 to −0.061 and is still significant at the 1% level, and that the coefficient of SGX changes from 0.051 to 0.043 and is significant at the 10% level. We added more control variables in columns (3) and (4), and the coefficients of US and SGX were not affected to any significant degree by these additional controls. The coefficient of MB is significantly negative in column (3) and column (4), consistent with Tang, Wu, and Zhang's (2014) findings on the US market. The coefficient of IV in column (3) and column (4) is significantly positive, supporting the view that idiosyncratic volatility tends to increases firms' information asymmetry and agency costs. The coefficient of Age in column (3) is significantly negative, suggesting that firms which have listed for a longer time have lower costs of capital. However, the coefficient of Age is no longer significant after controlling for industry and year fixed effects. We conjecture that this is due to the strong correlation between year dummies and age. In untabulated results, the coefficient of Age is −0.003 (t = −1.76) without year fixed effects. This supports our hypothesis that firms enjoy lower costs of capital when they have been listed for a longer time.

Table 1 shows that firms listed in the three markets are systematically different from one another along some dimensions. To control for this, we added these firm characteristics in Table 4. In this section, we further conduct robustness checks to rule out confounding effects of other firm characteristics on our results. Many well-known Chinese high-tech firms are listed in US markets, including Sina, Sohu, and Shanda, while there are few Chinese high-tech firms listed in Hong Kong and Singapore. To ensure that our results were not driven solely by high-tech firms, we performed regression analysis for nonhigh-tech[13] and manufacturing firms separately. The results are reported in columns (1) and (2) of Table 5, respectively. As can be seen, the coefficient of US remains significantly negative. In column (2), we find that the coefficient of SGX is 0.036 with a t-stat of 0.48 after we restricted the sample to manufacturing firms. This means that the different costs of capital among firms listed in Singapore and Hong Kong may be due to industry differences.

In the main test, we remove firms with more than 50% state ownership. In column (3), we remove firms with any reported state ownership, irrespective of how minimal. We find that the results are not sensitive to this filter. In column (4), we focus on the period after China entered the World Trade Organization (WTO). In the pre-WTO period, overseas investors might have had greater difficulty in understanding Chinese firms. This filter does not have much effect on the findings. In columns (5)–(8), we split the sample into a few subperiods: 2000–2001 (the pre-WTO period), 2002–2007 (post-WTO but before the financial crisis), 2008–2011 (the crisis period), and 2012 (the post-crisis period). Column (9) reports the results for when we include the interaction terms between all the demeaned control variables and US, as well as the interaction terms between all the demeaned control variables and SGX. In this full interaction specification, the coefficients of the control variables can vary across markets. The results show that the results are robust to these sensitivity tests.[14]

In addition to the above robustness checks, we also conducted regression analysis on a matched sample. Specifically, for every firm i listed in Hong Kong, we selected a matched firm j listed in the US and a matched firm k listed in Singapore, and we then conducted regression analysis on these matched samples. We required the matched firm j (or k) to be in the same industry and same year as firm i. In addition, we calculated a score between the two matched firms based on the following equation:

$$Min_j\ Score_{i,j,t} = \frac{\left|Size_{i,t} - Size_{j,t}\right|}{Size_{i,t}} + \frac{\left|Leverage_{i,t} - Leverage_{j,t}\right|}{Leverage_{i,t}} \tag{12}$$

For Singapore-listed firms, the score is defined by replacing subscript j with k.

To ensure that firms were comparable in the matched sample, we required the score to be less than a certain threshold. We consider Score ≤ 0.2 and Score ≤ 0.4 in Table 6. The results show that the coefficient of US is still significant under the 1% level and that the coefficient of SGX is insignificantly positive in both specifications. When we compare the matched sample results (columns (1) and

Table 5. Overseas listing location and cost of capital: Robustness checks.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Deleting Hightech	**Manufacturing firms**	**No state ownership**	**Post-WTO**	**2000–2001**	**2002–2007**	**2008–2011**	**2012**	**Full interaction**
US	–0.076***	–0.075***	–0.067***	–0.066***	–0.079***	–0.081***	–0.059**	–0.081**	–0.069***
	(–3.84)	(–7.80)	(–3.85)	(–3.28)	(–4.76)	(–3.16)	(–2.20)	(–2.07)	(–3.08)
SGX	0.063**	0.036	0.059**	0.052*	0.173**	0.023	0.061**	0.045	0.071
	(2.18)	(0.48)	(2.10)	(1.96)	(2.50)	(0.33)	(2.07)	(0.51)	(0.81)
Beta	–0.009	–0.045**	–0.013	–0.010	–0.005	0.010	–0.009	–0.089	–0.012
	(–0.59)	(–2.17)	(–1.19)	(–1.19)	(–0.05)	(0.61)	(–0.45)	(–1.04)	(–0.29)
Size	0.026***	0.032	0.024***	0.021***	0.070	0.027**	0.019***	0.014	0.070
	(2.74)	(1.56)	(3.43)	(3.39)	(1.19)	(2.39)	(3.21)	(1.20)	(1.02)
Age	–0.002	–0.001	–0.001	–0.001	–0.009	–0.001	–0.002	–0.004	–0.001
	(–1.38)	(–0.45)	(–0.49)	(–0.26)	(–1.01)	(–0.15)	(–0.62)	(–0.90)	(–0.36)
Q	–0.009***	–0.014***	–0.008***	–0.009***	–0.017	–0.008	–0.010***	0.004	–0.007**
	(–2.94)	(–2.76)	(–3.53)	(–4.14)	(–0.94)	(–1.26)	(–3.82)	(0.20)	(–2.02)
Leverage	–0.013	–0.108	0.005	0.012	–0.201	0.189*	–0.050	–0.087	0.027
	(–0.22)	(–1.07)	(0.08)	(0.19)	(–1.49)	(1.72)	(–1.21)	(–0.86)	(0.52)
R&D	–2.147	–2.646	–0.116	–0.177	–0.358	–0.114	0.110	2.322**	0.704
	(–1.28)	(–0.68)	(–1.01)	(–1.23)	(–0.09)	(–0.22)	(0.43)	(2.08)	(1.19)
IV	1.668***	2.423	1.302***	1.282***	3.041	1.086	1.221***	–0.832	0.210
	(3.24)	(1.63)	(4.19)	(3.21)	(0.82)	(1.17)	(2.65)	(–0.58)	(0.57)
Runup	–0.009*	–0.018**	–0.004	–0.004	0.010	–0.000	0.003	–0.132	–0.046
	(–1.72)	(–2.28)	(–0.80)	(–0.83)	(0.63)	(–0.06)	(0.50)	(–1.30)	(–0.10)
Following	–0.001	–0.003	–0.002	–0.002	–0.003	–0.015*	0.002	0.007	–0.017
	(–0.57)	(–0.84)	(–0.58)	(–0.59)	(–0.12)	(–1.93)	(0.63)	(0.93)	(–1.11)
Constant	0.028	–0.155	–0.016	0.004	–0.496	–0.242	–0.242**	0.030	–0.011

	(0.36)	(–0.61)	(–0.18)	(0.05)	(–0.47)	(–1.29)	(–2.01)	(0.10)	(–0.16)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R^2/Chi^2	0.166	0.111	0.173	0.163	0.217	0.185	0.160	0.101	0.231
N	789	234	854	774	80	245	529	111	941

This table reports the robustness tests of the multivariate regressions. In column (1), we remove high-tech companies where high-tech companies are defined following Loughran and Ritter (2004). In column (2), we retain only manufacturing firms. In column (3), we remove firms with any reported state ownership. In column (4), we remove the sample before 2002 and focus on the post-WTO period. Columns (5)–(8) report the subperiod analysis. Column (9) reported the results where we include the interactions terms between all the demeaned control variables and the US dummy, and also the interaction terms between all the demeaned control variables and the SGX dummy. The dependent variable is cost of capital, which is the average of the 10 different costs of capital variables used in this article. For details concerning these variables, please see Section 3. US is a dummy variable which is equal to 1 for firms listed in the US and 0 otherwise. SGX is a dummy variable which is equal to 1 for firms listed in Singapore and 0 otherwise. Other variables are defined in Table 4. Industry and year fixed effects are included but unreported. The sample period is from 2000 to 2012. All the standard errors are clustered at two dimensions: industry and year.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 6. Overseas listing location and cost of capital: Dealing with the endogeneity concerns.

	Matched sample		Heckman selection				Instrumental variable			
	Score ≤ 0.2	Score ≤ 0.4	US vs. HK	US vs. SGX	US vs. HK &SGX	HK vs. SGX	US vs. HK	US vs. SGX	US vs. HK &SGX	HK vs. SGX
	(1)	(2)	(3)	(4)	(5)	(6)	(8)	(9)	(10)	(11)
US	–0.082***	–0.087***	–0.033***	–0.073***	–0.057***		–0.070*	–0.092***	–0.091**	
	(–2.92)	(–3.54)	(–2.71)	(–3.40)	(–3.12)		(–1.92)	(–5.18)	(–1.96)	
SGX	0.051	0.042				–0.006				0.011
	(1.30)	(1.14)				(–1.60)				(0.37)
Beta	–0.013	–0.002	–0.014*	–0.004	–0.005	0.009	–0.022*	–0.014	–0.014	–0.010
	(–0.51)	(–0.07)	(–1.69)	(–0.36)	(–0.70)	(0.42)	(–1.79)	(–1.28)	(–1.09)	(–0.92)
Size	0.026**	0.030***	0.005	0.062***	0.018***	–0.010	0.004	0.047***	0.022***	0.026***
	(2.56)	(3.89)	(1.22)	(5.21)	(4.60)	(–0.47)	(1.41)	(3.40)	(5.11)	(3.05)
Age	–0.002	–0.002	0.004***	–0.001	0.000	–0.002	0.003**	–0.003*	–0.001	–0.000
	(–0.63)	(–0.60)	(3.25)	(–0.52)	(0.31)	(–0.72)	(1.99)	(–1.66)	(–0.34)	(–0.13)
MB	–0.007	–0.008**	–0.007***	–0.011***	–0.007***	–0.006	–0.008***	–0.006**	–0.007***	–0.007
	(–1.53)	(–2.00)	(–3.63)	(–3.50)	(–3.73)	(–0.95)	(–3.17)	(–2.35)	(–2.95)	(–1.52)
Leverage	0.034	0.001	0.013	–0.125*	–0.042	–0.246*	0.064	–0.045	–0.033	–0.067
	(0.39)	(0.01)	(0.32)	(–1.72)	(–1.33)	(–1.66)	(0.85)	(–0.65)	(–0.52)	(–0.92)
R&D	0.100	–0.030	–0.768**	0.922	–0.340	–1.103	–0.401*	0.517	–0.127	–0.011
	(0.26)	(–0.10)	(–2.07)	(1.40)	(–1.01)	(–0.92)	(–1.88)	(1.15)	(–0.81)	(–0.03)
IV	1.724***	1.590*	0.489	1.158***	0.844***	0.734	1.139***	0.757*	1.534***	2.377**
	(3.83)	(1.68)	(1.42)	(2.89)	(3.18)	(1.10)	(6.18)	(1.67)	(4.62)	(2.11)
Runup	–0.007	–0.004	–0.008*	–0.004	–0.010**	–0.012	–0.003	0.006	–0.008	–0.026
	(–1.11)	(–0.50)	(–1.93)	(–0.52)	(–2.28)	(–0.94)	(–0.54)	(0.53)	(–1.27)	(–1.34)
Following	–0.000	0.001	0.001	–0.005	–0.001	–0.001	0.001	0.001	–0.001	–0.003
	(–0.16)	(0.28)	(0.41)	(–0.62)	(–0.43)	(–0.21)	(0.63)	(0.27)	(–0.82)	(–0.85)
Constant	–0.250**	–0.280***	0.228**	–0.514***	0.007	0.646	0.177***	–0.402**	–0.086	–0.223

	(−2.00)	(−2.95)	(2.41)	(−3.79)	(0.07)	(1.26)	(10.72)	(−2.10)	(−1.26)	(−0.85)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R^2	0.178	0.173	629.1	312.7	594.4	120.98	0.184	0.184	0.142	0.147
N	357	419	716	421	941	716	734	410	941	738

This table reports the results for dealing with the endogeneity concerns. In columns (1) and (2), we report the matched sample regressions. For each firm-year of firms listed in HK, we find a firm in the same year that minimizes equation (12). To make sure that firms are indeed comparable, we also require Score ≤ 0.2 (column (1)) or ≤ 0.4 (column (2)). The next four columns report the Heckman selection regression results. In column (3), we compare the US-listed firms and Hong Kong-listed firms. In column (4), we compare the US-listed firms and Singapore-listed firms. In column (5), we take Hong Kong-listed and Singapore-listed firms as one group, and compare it with the US-listed firms. In column (6), we compare the Singapore-listed firms and Hong Kong-listed firms. The last four columns report the instrumental variable estimation where we use distance as the instrument variable. The dependent variable is cost of capital, which is the average of the 10 different costs of capital variables used in this article. For details concerning these variables, please see Section 3. US is a dummy variable which is equal to 1 for firms listed in the US and 0 otherwise. SGX is a dummy variable which is equal to 1 for firms listed in Singapore and 0 otherwise. Other variables are defined in Table 4. Industry and year fixed effects are included but unreported. All the standard errors are clustered at two dimensions: industry and year.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

(2) in Table 6) with the full sample results (column (4) in Table 4), our results actually become stronger.

We consider two other ways to deal with the endogeneity of firms' listing locations: the Heckman selection model and an instrumental variable approach. Results are reported in Table 6.

First, for the Heckman selection model, in the first stage we used firm size, leverage, R&D intensity, and whether the firm belongs to the high-tech industry to predict its listing location. Since we have three location choices, we performed separate analyses on the US and Hong Kong (column 3) markets, and on the US and Singapore (column 4) markets. The results show that the coefficient of US is significantly negative at the 1% level in both columns. Finally, we combined firms listed in Hong Kong and Singapore, and used the same approach to compare the costs of capital of these firms with those listed in the US. Column (5) shows that the coefficient of US is −0.057 and is significant at the 1% level. Column (6) shows the comparison between Hong Kong and Singapore, and we do not see a significant difference between these two markets.

Second, in the instrumental variable method, we used the relative distance as our instrumental variable. For example, in column (8) when we compare Hong Kong and the US, we use the log (distance to Hong Kong) minus log (distance to New York) as our instrument. The distance between a firm and an exchange is the distance between the capital city of its province and the city in which the exchange is located. In column (10), when we compare the US with Hong Kong and Singapore, we also use the log (distance to Hong Kong) minus log (distance to New York) as our instrument. The results are similar if we use the log (distance to Singapore) minus log (distance to New York) as our instrument. The instrumental variable approach gives similar estimations to the main results. Overall, we found that the US-listed firms have significantly lower costs of capital than those listed in Hong Kong and Singapore, even after controlling for the endogeneity of firms' listing locations using two-stage analysis. The difference in cost of capital between Hong Kong- and Singapore-listed firms does not seem to be robustly different from zero.

In summary, the results in Table 5 show that the lower costs of capital of US-listed firms are not due to systematic differences in firm characteristics. The results in Table 4 and Table 5 provide evidence supporting Hypothesis 1 that US-listed Chinese firms have significantly lower costs of capital than do similar firms listed in Hong Kong and Singapore.

Our hypothesis predicted that US-listed firms have lower costs of capital as a result of the better institutional environment provided by the US market. If this is true, we should expect that firms facing more asymmetric information or higher agency problems would benefit more by listing in the US market (Hypothesis 2). To test this hypothesis, we examined several measures of information asymmetry and agency costs in model (11).

We chose eight variables to measure the severity of information asymmetry and agency costs faced by firms based on the relevant literature and data availability. The results are reported in Table 7. Seven of the eight measures are firm-specific variables, including firm size, age, idiosyncratic volatility, leverage ratio, stock runup in the prior year, R&D intensity, and analyst coverage. Large firms have greater analyst coverage and higher levels of institutional ownership (Zhang 2006); older firms have more mature business and longer operating histories (Zhang 2006); firms with high levels of idiosyncratic volatility could prevent investors from detecting managerial misbehavior and thereby encourage managerial opportunistic behaviors (Altinkilic and Hansen 2000; Lee and Masulis 2009); and finally, leverage reduces firms' free cash flow and curbs the empire-building tendencies of managers (Jensen 1986; Stulz 1990).

When a firm's future prospects are positive, managers and large shareholders have less incentive to pursue private benefits (Lemmon and Lins 2003). This is because, when future prospects are good, the costs of foregoing future benefits by engaging in opportunistic behavior outweigh the one-time benefits. We used the cumulative abnormal returns from the past year for the firms (Runup) as a proxy for its future prospects. We expected agency costs to be lower among firms with higher prior year Runup. Firms with high R&D expenses face more uncertain outcomes, so we expected those firms to have more severe information asymmetry (Aboody and Lev 2002). Analysts play an important

Table 7. Overseas listing location and cost of capital: Cross-sectional heterogeneity.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Type =	**Size**	**Age**	**IV**	**Leverage**	**Runup**	**R&D**	**Following**	**Crisis**	**PC**
US*Type Predicted sign	**positive**	**positive**	**positive**	**positive**	**positive**	**negative**	**positive**	**negative**	**positive**
US	–0.095	–0.104***	–0.013	–0.050	–0.079***	–0.070***	–0.078***	–0.055***	–0.168***
	(–1.33)	(–6.19)	(–0.38)	(–1.12)	(–5.70)	(–4.27)	(–4.49)	(–3.08)	(–3.47)
SGX	–0.585***	0.092**	0.132**	0.105**	0.062**	0.055	0.070**	0.049	0.017
	(–2.70)	(2.37)	(2.19)	(2.49)	(2.29)	(1.62)	(2.19)	(1.55)	(0.22)
US*Type	0.002	0.005***	–1.668	–0.038	0.019*	0.382	0.007**	(–0.052)**	0.008***
	(0.56)	(3.02)	(–1.46)	(–0.40)	(1.67)	(1.00)	(2.48)	(–1.99)	(3.23)
SGX*Type	0.049***	–0.004	–2.034	–0.100	–0.024	1.680	–0.013	0.043	0.004
	(2.71)	(–1.30)	(–1.26)	(–0.80)	(–1.33)	(0.89)	(–0.88)	(1.03)	(0.65)
Beta	0.001	–0.017*	–0.012	–0.015	–0.009	–0.014	–0.015	–0.010	–0.012
	(0.06)	(–1.72)	(–1.09)	(–1.58)	(–0.92)	(–1.34)	(–1.39)	(–0.93)	(–1.25)
Size	0.006**	0.026***	0.023***	0.023***	0.024***	0.024***	0.024***	0.023***	0.021***
	(2.03)	(3.47)	(3.57)	(3.43)	(3.52)	(3.14)	(3.61)	(3.45)	(3.08)
Age	–0.004*	–0.000	–0.002	–0.001	–0.001	–0.001	–0.001	–0.001	–0.003
	(–1.96)	(–0.19)	(–0.88)	(–0.57)	(–0.74)	(–0.59)	(–0.49)	(–0.83)	(–1.24)
Q	–0.009***	–0.007***	–0.009***	–0.008***	–0.008***	–0.008***	–0.008***	–0.009***	–0.008***
	(–4.81)	(–3.24)	(–3.50)	(–3.71)	(–3.81)	(–3.64)	(–3.84)	(–3.78)	(–4.21)
Leverage	0.032	–0.007	–0.005	0.033	–0.006	–0.006	–0.006	–0.007	–0.003
	(0.59)	(–0.13)	(–0.09)	(0.43)	(–0.11)	(–0.11)	(–0.12)	(–0.13)	(–0.06)
R&D	–0.291**	–0.090	–0.051	–0.087	–0.038	–0.598*	–0.172	–0.210	–0.062
	(–2.09)	(–1.58)	(–0.49)	(–0.56)	(–0.46)	(–1.83)	(–1.02)	(–0.87)	(–1.37)
IV	1.163***	1.485***	2.773***	1.338***	1.238***	1.353***	1.344***	1.352***	1.384***
	(3.80)	(3.71)	(2.61)	(4.74)	(3.80)	(4.13)	(4.67)	(3.93)	(4.09)
Runup	–0.004	–0.007	–0.006	–0.005	–0.013***	–0.005	–0.005	–0.005	–0.004
	(–0.77)	(–1.39)	(–0.96)	(–1.07)	(–2.62)	(–1.15)	(–1.04)	(–1.15)	(–0.90)
Following	0.001	–0.001	0.000	0.000	–0.000	0.000	–0.001	0.000	–0.000
	(0.79)	(–0.48)	(0.05)	(0.04)	(–0.17)	(0.00)	(–0.38)	(0.22)	(–0.19)
Constant	0.010	–0.217**	–0.234**	–0.200**	–0.201**	–0.200*	–0.202**	–0.194***	–0.175*
	(0.41)	(–2.39)	(–2.18)	(–2.28)	(–2.25)	(–1.91)	(–2.32)	(–2.17)	(–1.90)

(*Continued*)

Table 7. Overseas listing location and cost of capital: Cross-sectional heterogeneity. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Type =	**Size**	**Age**	**IV**	**Leverage**	**Runup**	**R&D**	**Following**	**Crisis**	**PC**
US*Type Predicted sign	**positive**	**positive**	**positive**	**positive**	**positive**	**negative**	**positive**	**negative**	**positive**
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R^2	0.206	0.180	0.180	0.176	0.180	0.176	0.176	0.182	0.176
N	941	941	941	941	941	941	941	941	941

This table reports the results of cross-sectional heterogeneity: whether being listed in the US has different effects for different types of firms. The dependent variable is cost of capital, which is the average of the 10 different costs of capital variables used in this article. For details concerning these variables, please see Section 3. US is a dummy variable which is equal to 1 for firms listed in the US and 0 otherwise. SGX is a dummy variable which is equal to 1 for firms listed in Singapore and 0 otherwise. Beta is a stock's sensitivity to the market returns. We calculate it based on daily return data from July of year *t-1* to June of year *t*. IV is stock's idiosyncratic volatility; Runup is a stock's cumulative returns. Both are also calculated based on data from July of year *t-1* to June of year *t*. Size, Age, MB, Leverage, and R&D are the natural logarithm of firm's total assets, the number of years the firm has been listed, the market-to-book ratio, the leverage ratio, and the R&D expenses, respectively. Leverage is calculated as total debt divided by total assets; R&D is R&D expenses over total assets. All five variables are calculated based on accounting data from fiscal year t-1. Following is the number of analysts following a firm. Crisis is a dummy variable which is equal to 1 for 2007 and 2008, and 0 otherwise. PC is the first principal component of the eight variables from columns (1) to (8). Industry and year fixed effects are included but unreported. The sample period is from 2000 to 2012. All the standard errors are clustered at two dimensions: industry and year.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

role in information discovery and processing, so we expected firms with greater analyst coverage to have better information environments (Mukherjee 2012).

In addition, we conjectured that managers and large shareholders engage in more opportunistic behavior during periods of financial crisis (Lemmon and Lins 2003), so we also compared firms' costs of capital in financial crisis periods with costs of capital in other periods. With fewer investment opportunities in times of financial crisis, managers and large shareholders have stronger incentives to obtain private benefits (Lemmon and Lins 2003). If financial crisis indeed encourages more opportunistic behavior among managers and larger shareholders, we would expect firms listed in the US, which enjoy better institutional environments, to be less affected by financial crisis. We defined 2007 and 2008 as the financial crisis period in question (indicated by a crisis dummy variable) and reported the corresponding results in column (8) of Table 7.[15] For simplicity of reporting, we grouped all eight variables in Table 7, even though crisis is not a firm characteristic. Finally, to reduce the noise arising from using these imperfect measures of information asymmetry and agency costs, we used the first principal component of the eight variables as the proxy for information asymmetry. Using principal component analysis, we found that the relationship between the first principle component (PC) and the eight variables was as follows:

$$\begin{aligned}PC = {} & 0.612^{*}\text{Size} + 0.409^{*}\text{Age} - 0.443^{*}\text{IV} + 0.440^{*}\text{Leverage} - 0.010^{*}\text{Runup} - 0.222^{*}\text{R D} \\ & +0.137^{*}\text{Following} + 0.020^{*}\text{Crisis}\end{aligned}$$

Generally speaking, the measures that are positively correlated with information asymmetry (IV and R&D) have negative coefficients, and the measures that are negatively correlated with information asymmetry (size, age, leverage, and following) have positive coefficients. Therefore, the higher the PC is, the less the information asymmetry is.

The interaction between US and SGX with the variables representing firm characteristics tells us whether firms' listing locations have differential impacts on the costs of capital for firms with different characteristics. We predict that if US listing reduces the cost of capital to a greater degree for firms facing higher ex ante information asymmetry and agency costs, the coefficients of the interactions between US and firm type should read from column (1) to column (9) as follows: positive, positive, negative, positive, positive, negative, positive, negative, positive. The results show that when we use leverage and R&D to group firms into different types, the coefficient of the interaction term is opposite to our prediction, although the results are not significant. The coefficients of the interaction term using all other six measures for age, Runup, following, and crisis were consistent with our predictions and statistically significant. Information asymmetry and agency costs are not directly observable and each of our measures is, at best, a noisy proxy. In the last column, we used the first principal component and interacted it with the location dummy, and we found the coefficient is 0.008 (t = 3.23), and significant under the 1% level.

We examined the robustness of our results reported in Table 7 using a matching sample and two-stage regression analysis. These results are reported in Panel A and Panel B of Table 8, respectively. To save space, we only reported the coefficient of the interaction between US and Type. We used the same matching procedure as in Table 6 and reported the results in Panel A. For the sake of brevity, we only reported results with Score ≤ 0.4, but we obtain similar results with Score ≤ 0.2. In Panel B, we used the same two-stage regression model as in Table 6, and grouped Hong Kong- and Singapore-listed firms together.

Our results are robust if we compare US-listed firms with Hong Kong- or Singapore-listed firms separately. As can be seen, the results become stronger in terms of our prediction when we use the matched sample and two-stage regression analysis. Specifically, only age, Runup, following, crisis, and PC have significant coefficients when interacted with the US dummy in Table 7. When we used the matched sample, we found almost all interaction terms, except for leverage ratio and Runup, were significant. For two-stage regression, all were significant except for leverage ratio, which also had the expected sign. Taking into account the measurement errors associated with each proxy, we argue that the results in Table 7 and Table 8 strongly support our Hypothesis 2 that US-listed firms experience a more pronounced reduction in costs of capital when they face higher information asymmetry and agency costs.

Table 8. Cross-sectional heterogeneity: Robustness checks.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Type =	**Size**	**Age**	**IV**	**Leverage**	**Runup**	**R&D**	**Following**	**Crisis**	**PC**
US*Type Predicted sign	**positive**	**positive**	**negative**	**positive**	**positive**	**negative**	**positive**	**negative**	**positive**
Panel A. Matching sample									
US*Type	0.014*	0.008**	–1.273*	–0.017	0.020	–1.235*	0.009*	–0.054**	–0.005***
	(1.78)	(2.29)	(–1.69)	(–0.16)	(1.43)	(–1.89)	(1.75)	(–2.53)	(–3.15)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj-R^2	0.167	0.171	0.168	0.164	0.167	0.168	0.166	0.168	0.170
N	419	419	419	419	419	419	419	419	419
Panel B. Heckman selection model									
US*Type	0.010*	0.006**	–0.783*	0.024	0.026**	–0.376**	0.008*	–0.072***	–0.002***
	(1.67)	(2.01)	(–1.74)	(0.33)	(2.56)	(–2.54)	(1.68)	(–2.76)	(–4.30)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chi^2	364.52	367.57	364.22	362.70	370.60	362.95	364.63	371.97	307.10
N	941	941	941	941	941	941	941	941	941

This table reports the results of matching sample analysis (Panel A) and two-stage regression analysis (Panel B). The specifications of this table are the same as Table 7, except that we use a different sample for Panel A (only matched firm-years), and a different method for Panel B (Heckman selection). The dependent variable is cost of capital. All control variables are included but not reported. For the list of control variables, please see Table 4.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Discussion and Conclusions

Foreign capital markets provide one of the most important sources of external equity for nonstate-owned Chinese firms, as these firms cannot easily access the domestic equity market for institutional reasons. This article examines the differences of three location choices—the US, Hong Kong, and Singapore—from the perspective of cost of equity capital. Our study shows that US-listed firms have the lowest costs of capital, when compared to those listed in Hong Kong and Singapore. We also found that Hong Kong-listed firms have lower costs of capital than Singapore-listed firms, although this difference disappears after we control for industry and firm characteristics. We hypothesized that the lower cost of capital for US-listed firms is due to the better institutional environment of the US market. Additional empirical evidence shows that US listing has a greater effect on the cost of capital of firms facing higher information asymmetry and agency costs, further supporting our hypothesis.

Our article contributes to the literature in two important ways. First, there is currently no consensus on the relationship between the institutional environment and cost of capital, despite fairly extensive new research contributing to the knowledge of this issue (see, for example, Hail and Leuz 2006; Qi, Roth, and Wald 2010). Our article provides evidence supporting the view that the institutional environment has a first-order effect on firms' costs of capital, based on a sample of nonstate-owned Chinese firms listed on foreign stock markets. Since firms in our sample are from a single country, we were able to control for the differences brought about by firms' countries of origin. Second, the current research on overseas listing mostly focuses on cross-listed firms, while our sample of overseas-listed Chinese firms are all listed in a single market. The results from these cross-listed firms may not extend to our sample, and hence our study complements the existing literature on overseas listing.

More than 600 nonstate-owned Chinese firms were listed in foreign stock markets as at the end of 2010, which is comparable to the number of nonstate-owned firms listed in the Chinese A share market in the same time period. With the emergence of the Small and Medium Enterprise Board and Growth Enterprise Board in the Chinese market, it has become less difficult for nonstate-owned firms to list in the domestic market over time. Still, we expect that a sizeable number of nonstate-owned Chinese firms will continue to choose to list publicly in foreign stock markets, and this expectation is confirmed by the data from 2011 and 2012. One of the most important motivations for these firms to list in overseas markets is the ability to raise external capital at lower costs. Our article identifies the impact of the institutional environment on a firm's listing location choice and could help Chinese firms better select their listing locations.

We use various methods to control for the systematic differences among firms listed in different markets, although our results could still be driven by unobservable factors that simultaneously affect firms' listing locations and costs of capital. We hope to acquire more detailed data and conduct a more thorough analysis to more effectively address the endogeneity of firms' listing locations in future studies.

We expect that firms' foreign listing locations will affect not only their costs of capital but also other firm behaviors, such as earnings management, related party transactions, and performance. Sun, Tong, and Wu (2013) and Hornstein (2014) study the performance of Chinese foreign-listed firms. Liu and Lu (2007) and Jian and Wong (2010), both using only domestically listed Chinese firms, document the significant effect of corporate governance on earnings management and related party transactions. We leave the matter of how foreign listing locations can affect firms' other behaviors to future research.

Funding

This work was supported by the National Natural Science Foundation of China (Ref. No. 71302127 and 71772196); the Special Research Fund for the Doctoral Program of Ministry of Education (Ref. No. 20130016120001); the Ministry of Education of Humanities and Social Science Project (Ref. No. 17YJC630062); the Young Elite Teacher Project of Central University of Finance and Economics (Ref. No. QYP1606); the Fundamental Research Funds for the Central Universities; the Program for Innovation Research in Central University of Finance and Economics.

Notes

1. In this article, we use "domestic market" interchangeably with "Chinese market". One caveat is that some of our sample firms may have significant international presence. For these firms, there may not be a clear definition of "domestic market". We use this term to be consistent with the literature.
2. This number only includes ADR Level II and ADR Level III US-listed firms which are exchange-traded stocks. Stocks with other listing types are traded over the counter.
3. We will discuss the details of these models in Section 3.
4. Given that the US market is so much larger, not surprisingly, the ratio of total market capitalization of Chinese firms to the total market capitalization is much lower for the US (2.3%) than the other two markets (43% for Hong Kong and 24% for Singapore). However, the total market capitalization of Chinese firms is comparable between the US and Hong Kong (US$0.49 trillion and US$0.38 trillion), both of which are larger than Singapore (US$0.18 trillion). In addition, the average size of US-listed Chinese firms in our sample is much larger than that of the other two countries and many well-known Chinese firms are listed in the US, such as Sina, Sohu, and Shanda. These results may suggest that an average US investor is less aware of an average Hong Kong or Singapore investor. However, what matters for cost of capital is the aggregated market-level investor awareness. It remains unclear how these three markets differ in this dimension.
5. Detailed discussion on the implied cost of capital method can be found at Gebhardt, Lee, and Swaminathan (2001); Ohlson and Juettner-Nauroth (2005); Easton (2004); and Hou, Dijk, and Zhang (2012).

6. Calculations based on the GG and OJ models are relatively simple, but for the other three models, we need to solve nonlinear equations. Some models are quite sensitive to the input of initial value, so we tried setting initial R equal to 0.05, 0.10, and 0.15. We delete a firm-year observation if the model never converges.

7. We may not get all 10 estimates of cost of capital for some firm-year observations due to missing data or model nonconvergence. We only consider the samples with complete data and model convergence when calculating average cost of capital.

8. The fourth largest market by the number of Chinese firms it attracts was the UK. Our sample includes 38 Chinese firms which were listed in the UK, and we can obtain accounting data and estimate the cost of capital measure for 24 of these firms. We deleted these UK-listed firms from our analysis due to the small sample problem. In addition, we find that these firms are much smaller than Chinese firms listed in the other three markets, which makes it more difficult to draw a meaningful comparison between the UK market and the other three markets examined in this article.

9. This definition is the same as the definition used in the industry, e.g., the definition used by Wind. Typically, this definition identifies Chinese firms clearly.

10. Our results are robust if we remove all firms whose largest shareholder is the government, or if we remove all firms with any reported state ownership.

11. We followed Gebhardt, Lee, and Swaminathan (2001) when choosing control variables.

12. The index return of the listing exchanges served as proxy for market return. We used the S&P 500 Index, the Hang Seng Index, and the Straits Times Index for US, Hong Kong, and Singapore markets, respectively.

13. We follow Loughran and Ritter (2004) in defining high-tech firms.

14. We appreciate one of our referees in suggesting the subperiod tests and the full interaction test.

15. Our results are not affected if we also include 2009 as a financial crisis year.

References

Aboody, D., and B. Lev. 2002. Information asymmetry, R&D, and insider gains. *Journal of Finance* 55 (6):2747–66. doi:10.1111/0022-1082.00305.

Allen, F., J. Qian, and M. Qian. 2005. Law, finance, and economic growth in China. *Journal of Financial Economics* 77 (1):57–116. doi:10.1016/j.jfineco.2004.06.010.

Altinkilic, O., and R. Hansen. 2000. Are there economies of scale in underwriting fees? Evidence of rising external financing costs. *Review of Financial Studies* 13 (1):191–208. doi:10.1093/rfs/13.1.191.

Bailey, W., A. Karolyi, and C. Salva. 2006. The economic consequences of increased disclosure: Evidence from international cross-listings. *Journal of Financial Economics* 81 (1):175–213. doi:10.1016/j.jfineco.2005.06.002.

Bebchuk, L., and J. Fried. 2003. Executive compensation as an agency problem. *Journal of Economic Perspectives* 17 (3):71–92. doi:10.1257/089533003769204362.

Bertrand, M., and S. Mullainathan. 2003. Enjoying the quiet life? corporate governance and managerial preferences. *Journal of Political Economy* 111 (5):1043–75. doi:10.1086/376950.

Bhattacharya, U., and H. Daouk. 2002. The world price of insider trading. *Journal of Finance* 57 (1):75–108. doi:10.1111/1540-6261.00416.

Bhattacharya, U., H. Daouk, and M. Welker. 2003. The world price of earnings opacity. *Accounting Review* 78 (3):641–78. doi:10.2308/accr.2003.78.3.641.

Blanchard, O., F. Lopez-de-Silanes, and A. Shleifer. 1994. What do firms do with cash windfalls. *Journal of Financial Economics* 36 (3):337–60. doi:10.1016/0304-405X(94)90009-4.

Blass, A., and Y. Yafeh. 2001. Vagabond shoes longing to stray: Why foreign firms list in the United States. *Journal of Banking and Finance* 25 (3):555–72. doi:10.1016/S0378-4266(00)00090-X.

Brandt, L., and H. Li. 2003. Bank discrimination in transition economies: Ideology, information, or incentives? *Journal of Comparative Economics* 31 (3):387–413. doi:10.1016/S0147-5967(03)00080-5.

Chan, K., A. Menkveld, and Z. Yang. 2007. The informativeness of domestic and foreign investors' stock trades: Evidence from the perfectly segmented Chinese market. *Journal of Financial Markets* 10 (4):391–415. doi:10.1016/j.finmar.2007.07.001.

Chan, K., A. Menkveld, and Z. Yang. 2008. Information asymmetry and asset prices: Evidence from the China foreign share discount. *Journal of Finance* 63 (1):159–63. doi:10.1111/j.1540-6261.2008.01313.x.

Chan, K., B. Wang, and Z. Yang, 2013. Why investors do not buy cheaper securities? Evidence from a natural experiment. Working paper, Chinese University of Hong Kong and Fordham University.

Chang, J., T. Khanna, and K. Palepu. 2000. Analyst activity around the world. Working paper, Harvard University Business School, Boston, MA, USA.

Chen, K., T. Chen, and K. Hui. 2009. CEO perquisites and family firms. Working paper, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong.

Cheung, Y., P. Rau, and A. Stouraitis. 2006. Tunneling, propping, and expropriation: Evidence from connected party transactions in Hong Kong. *Journal of Financial Economics* 82 (2):343–86. doi:10.1016/j.jfineco.2004.08.012.

Claus, J., and J. Thomas. 2001. Equity premia as low as three percent? *Journal of Finance* 56 (5):1629–66. doi:10.1111/0022-1082.00384.

Coffee, J. 1999. The future as history: The prospects for global convergence in corporate governance and its implications. *Northwestern University Law Review* 93 (3):641–708.

Doidge, C., A. Karolyi, and R. Stulz. 2004. Why are foreign firms listed in the U.S. worth more? *Journal of Finance Economics* 71 (2):205–38. doi:10.1016/S0304-405X(03)00183-1.
Easton, P. 2004. PE Ratios, PEG Ratios, and estimating the implied expected rate of return on equity capital. *Accounting Review* 79 (1):73–95. doi:10.2308/accr.2004.79.1.73.
Easton, P., and S. Monahan. 2005. An evaluation of accounting-based measures of expected returns. *Accounting Review* 80 (2):501–38. doi:10.2308/accr.2005.80.2.501.
Fama, E., and K. French. 1992. The cross-section of expected stock returns. *Journal of Finance* 47 (2):427–65. doi:10.1111/j.1540-6261.1992.tb04398.x.
Fama, E., and M. Jensen. 1983. Separation of ownership and control. *Journal of Law and Economics* 26 (2):301–25. doi:10.1086/467037.
Gabaix, X., and A. Landier. 2008. Why has CEO pay increased so much? *Quarterly. Journal of Economics* 123 (1):49–100.
Gagnon, L., and A. Karolyi. 2010. Multi-market trading and arbitrage. *Journal of Financial Economics* 97 (1):53–80. doi:10.1016/j.jfineco.2010.03.005.
Gebhardt, W., C. Lee, and B. Swaminathan. 2001. Toward an Implied Cost of Capital. *Journal of Accounting Research* 39 (1):135–76. doi:10.1111/1475-679X.00007.
Gordon, W., and M. Gordon. 1997. The finite horizon expected return model. *Financial Analysts Journal* 53 (3):52–61. doi:10.2469/faj.v53.n3.2084.
Guay, W., S. Kothari, and S. Shu. 2011. Properties of implied cost of capital using analysts' forecasts. *Australian Journal of Management* 36 (2):125–49. doi:10.1177/0312896211408624.
Hail, L., and C. Leuz. 2006. International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *Journal of Accounting Research* 44 (3):485–531. doi:10.1111/j.1475-679X.2006.00209.x.
Hart, O. 1995. *Firm, Contracts, and Financial Structure*. London, UK: Oxford University Press.
Hart, O., and J. Moore. 1998. Default and renegotiation: A dynamic model of debt. *Quarterly Journal of Economics* 113 (1):1–41. doi:10.1162/003355398555496.
Hornstein, A. 2014. The impact of local governance institutions on foreign market listings: The case of Chinese firms. *China Economic Review* 29:46–67. doi:10.1016/j.chieco.2014.02.003.
Hou, K., M. Dijk, and Y. Zhang. 2012. The implied cost of capital: A new approach. *Journal of Accounting and Economics* 53 (3):504–26. doi:10.1016/j.jacceco.2011.12.001.
Jensen, M. 1986. Agency costs of free cash flow, corporate finance, and takeover. *American Economic Review* 76 (2):323–29.
Jian, M., and T. J. Wong. 2010. Propping through related party transactions. *Review of Accounting Studies* 15 (1):70–105. doi:10.1007/s11142-008-9081-4.
Johnson, S., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer. 2000. Tunneling. *American Economic Review* 90 (2):22–27. doi:10.1257/aer.90.2.22.
Karolyi, A. 1998. Why do companies list shares abroad? A survey of the evidence and its managerial implications. *Financial Markets, Institutions and Instruments* 7 (1):1–60. doi:10.1111/1468-0416.00018.
Karolyi, A. 2006. The world of cross-listings and cross-listings of the World: Challenging conventional wisdom. *Review of Finance* 10 (1):73–115. doi:10.1007/s10679-006-6980-8.
La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1997. Legal determinants of external finance. *Journal of Finance* 52 (2):1131–50. doi:10.1111/j.1540-6261.1997.tb02727.x.
La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1998. Law and finance. *Journal of Political Economy* 106 (6):1113–55. doi:10.1086/250042.
Lee, G., and R. Masulis. 2009. Seasoned equity offerings: Quality of accounting information and expected floating costs. *Journal of Financial Economics* 92 (3):443–69. doi:10.1016/j.jfineco.2008.04.010.
Lemmon, M., and K. Lins. 2003. Ownership structure, corporate governance, and firm value: Evidence from the East Asian financial crisis. *Journal of Finance* 58 (4):1445–68. doi:10.1111/1540-6261.00573.
Li, P., F. Li, Y. Chen, and B. Wang. 2013. Overseas single listing, information costs and stock price: Theoretical and empirical analysis. *Journal of Management Sciences in China* 16 (12):79–92.
Li, P., W. Xie, and B. Wang. 2012. Overseas Listing Location and Firm Investment. *Nankai Management Review* 15 (2):81–91.
Lin, C., Y. Ma, P. Malatesta, and Y. Xuan. 2011. Ownership structure and the cost of corporate borrowing. *Journal of Financial Economics* 100 (1):1–23. doi:10.1016/j.jfineco.2010.10.012.
Liu, C., and B. Wang. 2018. Do demand curves for stocks slope down in the long run? Working paper, Fordham University and Tsinghua University.
Liu, Q., and Z. Lu. 2007. Corporate governance and earnings management in the Chinese listed companies: A tunneling perspective. *Journal of Corporate Finance* 13 (5):881–906. doi:10.1016/j.jcorpfin.2007.07.003.
Loughran, T., and J. Ritter. 2004. Why has IPO underpricing changed over time? *Financial Management* 33 (3):5–37.
Miller, D. 1999. The market reaction to international cross-listings: Evidence from depositary receipts. *Journal of Financial Economics* 51 (1):103–23. doi:10.1016/S0304-405X(98)00045-2.
Modigliani, F., and M. Miller. 1958. The cost of capital, corporation finance and the theory of investment. *American Economic Review* 48 (3):261–97.
Mukherjee, A. 2012. Are control rights less valuable when shareholders lack information? Hong Kong university of science and technology Working paper, Clear Water Bay, Hong Kong.
Ohlson, J., and B. Juettner-Nauroth. 2005. Expected EPS and EPS growth as determinants of value. *Review of Accounting Studies* 10 (2–3):349–65. doi:10.1007/s11142-005-1535-3.
Pastor, L., M. Sinha, and B. Swaminathan. 2008. Estimating the intertemporal risk-return tradeoff using the implied cost of capital. *Journal of Finance* 63 (6):2859–97. doi:10.1111/j.1540-6261.2008.01415.x.
Petersen, M. 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies* 22 (1):435–80. doi:10.1093/rfs/hhn053.

Qi, Y., L. Roth, and J. Wald. 2010. Political rights and the costs of debt. *Journal of Financial Economics* 95 (2):202–26. doi:10.1016/j.jfineco.2009.10.004.

Sarkissian, S., and M. Schill. 2009. Are There Permanent Valuation Gains To Overseas Listing? *Review of Financial Studies* 22 (1):371–412. doi:10.1093/rfs/hhn003.

Saudagaran, S., and J. Diga. 2000. The institutional environment of financial reporting regulation in ASEAN. *The International Journal of Accounting* 35 (1):1–26. doi:10.1016/S0020-7063(99)00046-1.

Stulz, R. 1990. Managerial discretion and optimal capital structure. *Journal of Financial Economics* 26 (1):3–29. doi:10.1016/0304-405X(90)90011-N.

Stulz, R. 1999. Globalization, corporate finance, and the cost of capital. *Journal of Applied Corporate Finance* 12 (3):8–25. doi:10.1111/j.1745-6622.1999.tb00027.x.

Sun, Q., W. Tong, and Y. Wu. 2013. Overseas listing as a policy tool: Evidence from China's H-Shares. *Journal of Banking and Finance* 37 (5):1460–74. doi:10.1016/j.jbankfin.2012.05.013.

Tang, Y., J. Wu, and L. Zhang. 2014. Do anomalies exist ex ante? *Review of Finance* 18 (3):843–75. doi:10.1093/rof/rft026.

Yermack, D. 1996. Higher market valuation of companies with a small board of directors. *Journal of Financial Economics* 40 (2):185–211. doi:10.1016/0304-405X(95)00844-5.

Zhang, X. 2006. Information uncertainty and stock returns. *Journal of Finance* 61 (1):105–37. doi:10.1111/j.1540-6261.2006.00831.x.

Zingales, L. 1994. The value of the voting right: A study of the Milan stock exchange experience. *Review of Financial Studies* 7 (1):125–48. doi:10.1093/rfs/7.1.125.