Distance, Transportation and the Underpricing of IPOs

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Abstract

This paper examines the influence of the firm's location on IPO underpricing using data from the Chinese stock market. We find that geographical proximity to major metropolitan areas reduces the magnitude of IPO underpricing: the distance between the firm and the major metropolitan areas is positively related to the market-adjusted first-day return of the IPO firm. Information opacity further magnifies the geographical effects. Furthermore, we find that China's recent development of the national bullet train system mitigates the influence of geographical location on IPO underpricing. We apply an instrumental variable approach and a placebo test to address robustness issues.

Key words: distance; information costs; bullet train; IPO underpricing

JEL Classification: G10, G30

1. Introduction

Distance matters in finance. A longer distance between agents could exacerbate information asymmetry problems in financial markets, causing the agents to devote time, money, efforts and other resources to collect firm-specific soft information (Agarwal and Hauswald, 2010). A growing body of literature has documented the economic importance of geographical location in bank lending, trading behavior, investment policies, takeover activities, corporate payout policies and financing policies (Coval and Moskowitz, 2001; Petersen and Rajan, 2002; Ivkovic and Weisbenner, 2005; Kang and Kim, 2008; Kalnins and Lafontaine, 2013).

This study explores the impact of the firm's geographical location on its initial public offerings (IPO) by hypothesizing that the market will underprice firms located farther away from institutional investors due to a larger degree of asymmetric information. A closer physical distance between investors and firms enables geographically proximate investors to conveniently approach target firms for information about their operations and growth opportunities. As a result, during the IPO process, the mitigated information friction provides information advantage for firms located in large cities, which are geographically closer to investors.

To shed light on this issue, we use a dataset that consists of 929 Chinese firms that went public between 2008 and 2012. China provides an intriguing case to study geographical location and IPO underpricing. First, China features a vast geographical territory. Geographic isolation poses an important impediment to communication between agents in the market and thus intensifies the importance of transportation efficiency in the connection between institutional investors and firms during IPOs. Second, China is characterized by fast yet unequal development, with large gaps between various provinces' financial and economic resources, this may magnify the role of the firm's geographical location. Third, the government's tight control of media and the internet makes information collection more difficult in the absence of media freedom. Therefore, the "soft information" effects are especially crucial for Chinese firms. As a result, Chinese firms suffer from high information costs in the IPO process and the underpricing problem is more severe in China compared with firms in other nations (Chan, Wang and Wei, 2004).

In this paper, we find that the farther away the firms are to the financial centers, the higher is the IPO underpricing, *ceteris paribus*. An increase of 100 kilometers away from the top three cities correlates with a 5.54 percentage point increase in IPO underpricing. This effect is relatively large and economically significant. Moreover, consistent with the information collection story, the impact of geographical location is stronger when there is more uncertainty about a firm's performance, measured by the industry-level performance heterogeneity and the width of underwriter's price estimate. To address the potential endogeneity issue in firm location, we explore an instrumental variable approach. We hypothesize that an entrepreneur is more likely to start a business locally, and that his birthplace is not directly related to a firm's IPO underpricing. We thus use the distance between the birthplace of a firm's founder and the top three cities as an instrument for the distance between the firm and the top three cities. In the case of an SOE, we hypothesize that a regional government is more likely to form an SOE within or near its own jurisdiction, and we use the distance between the controlling government and the top three cities as an instrument. The IV regression generates similar results.

Perhaps most interestingly, we also find that modern transportation promotes the communication among agents from different physical locations, exerting profound influences on the capital market efficiency. The landmark establishment of the bullet train system in China marks a new era of transportation revolution and significantly reduces investors' costs to assess and monitor target firms. We find that the opening of a new bullet train route helps to mitigate the impact of geographical location. To rule out other factors that may affect both the bullet train route and IPO underpricing, we perform a placebo test. We find that would-be access to the bullet train system has no impact on the geographical effects. Because a planned bullet train station may reflect a region's economic fundamentals, but not convenience in transportation before the actual operation of the bullet train service, this suggests that missing economic factors cannot explain our findings.

This paper makes several contributions to the literature. It incorporates the dimension of the location-specific nature of soft information in firms' financing process by providing direct evidence of the influence of geographical location in IPO pricing efficiency. We find evidence of a strong influence of firms' location on IPO underpricing, and the influence is magnified by the uncertainty of firms' performance. More importantly, this paper adds to our understanding of the importance of modern transportation in relieving information asymmetry and improving financial market efficiency.

The rest of the paper proceeds as follows. Section 2 reviews the relevant literature. Section 3 describes China's IPO market and the data. Section 4 explores the impact of firm location on IPO discounts. Section 5 studies the role of the bullet train system in alleviating the location effects. The paper concludes in Section 6.

2. Literature review

2.1. Location and information

Geographical proximity affects investors' ability to collect information, and thus they may have an informational advantage with respect to local firms. This has a profound impact on the financial market. Coval and Moskowitz (1999) show that US fund managers exhibit a strong bias toward local firms, and Coval and Moskowitz (2001) find that fund managers' local investments outperform other investments by 2.65% per year. Malloy (2005) shows that geographically proximate analysts produce more accurate earnings forecasts and have a larger impact on stock prices. Bae, Stulz and Tan (2008) find that local analysts have an informational advantage in countries other than the US. Individual investors also possess an informational advantage with respect to local firms: Ivkovic and Weisbernner (2005) show that the average US household invests 31% of its portfolio in stocks located within 259 miles, and they earn 3.2% per year more on their local investments than on their non-local investments.

Rural firms are naturally located farther away from investors than urban firms. Loughran and Schultz (2005) find that rural firms trade much less frequently, and are covered by fewer analysts than urban firms. Loughran (2008) identifies the mechanism through which geographical proximity affects financial markets. He finds that rural firms lag the returns of urban firms, and that more informed trading occurs in urban stocks. This suggests that information is uncovered more easily by nearby investors.

Geographical proximity also affects information in the credit market. Petersen and Rajan (1995, 2002) argue that the distance between banks and firms has a profound influence on the market power of banks as a result of the lower soft information accessibility costs as well as monitoring costs. Technology development reduces these costs and can, to some extent, explain the extension of distance between firms and banks over the past 25 years. Degryse and Ongena

(2005) observe an increase in interest rates with distance between firms and banks. They attribute the higher financing costs to distance. Information asymmetry, negotiation inconvenience and other risk factors make firms less likely to get credit when firms seek overseas financing, even if they are fundamentally in good conditions (Mian, 2006). Agarwal and Hauswald (2010) also note that borrower proximity promotes the collection of soft information in informationally opaque credit markets, which affects lending behavior and loan interest rates. Venture capital, as well as individual investors, exhibits a strong tendency to choose geographically close firms for higher returns (Lerner, 1995; Garmaise and Moskowitz, 2004; Hau, 2001).

2.2. Location and corporate financial activities

The information problems associated with distance also influence corporate financial activities. Loughran (2008) finds that rural firms are less likely to issue seasoned equity offerings than urban firms, and they use lower-quality underwriters when they do so. Arena and Dewally (2012) find that rural firms have a higher debt yield spread and use less prestigious bank syndicates than urban firms. Kang and Kim (2008) find that block acquirers seem to prefer geographically closer targets over remote ones, as this helps them engage in post-acquisition governance activities and on-site monitoring. Kedia, Panchapagesan and Uysal (2008) find that when both the bidder and the target firm are located within 100 km of each other, the information advantage of the bidder could generate much higher returns. Kalnins and Lafontaine (2013) find the underperformance of distant subsidiaries as a result of the increasing information friction costs and agency problems. John, Knyazeva and Knyazeva (2011) show that because of higher information costs, firms located away from major metropolitan areas have to issue higher dividends to mitigate agency conflicts.

2.3. Information and IPO underpricing

IPO underpricing has been a persistent phenomenon around the world (see Ljungqvist 2007, Ritter 2005, Ritter and Welch 2002, for a review of the empirical evidence on IPO underpricing). Asymmetric information plays an important role in IPO underpricing through various channels. Rock (1986) provides a winner's curse model in which IPOs have to be underpriced to compensate uninformed investors for their disadvantage in the allocation of new issues. Benveniste and Spindt (1989) solve a mechanism design problem and show that the investment bank uses IPO underpricing to induce investors to reveal their information. Allen and Faulhaber (1989) and Welch (1989) model IPO underpricing as a costly signal for the issuing firm to reveal their value.

There are also other explanations of IPO underpricing. Loughran and Ritter (2002) provide a behavioral explanation based on prospect theory. Loughran and Ritter (2004) and Liu and Ritter (2011) argue that agency conflicts between firms and other shareholders explain part of the underpricing. While these theories substantially improve our understanding of IPO underpricing, this paper focuses on one aspect: the influence of geographical proximity. We hypothesize that the location of firms may affect the costs of information collection by potential investors and henceforth the degree of IPO underpricing.

3. Institutional background and data

3.1. Institutional background

The Chinese capital market displays a series of institutional distortions and features higher pricing inefficiencies compared with mature markets (Chan, Wang and Wei, 2004). In the secondary market, shares held by the government and institutions were not allowed to trade freely and could only be transferred at huge discount in forms of block trade (Huang and Xu, 2009). In the primary market, the government kept strict price controls, and thus the price-earnings data released by the firm became less informative (Firth et al, 2008).

Nonetheless, China has taken several important steps to liberalize its stock market in the past decade. First, the split-share reform, which started in the middle of 2005 and completed in the end of 2007, eliminated the difference between tradable and non-tradable shares. This substantially reduced a major pricing inefficiency in the secondary market.

Second, China has allowed market forces to play a larger role in the IPO market since January 2005. Prior to that, the China Securities and Regulatory Commission (CSRC) kept tight control of the IPO process by imposing official approval of the IPO price. The new procedure introduced a market-building mechanism similar to the ones in other financial markets, and it thus greatly reduced pricing inefficiencies in the primary market. Under the new procedure, the underwriter sets the issue price after collecting bids from institutional investors. Retail investors then decide whether they will take part in the IPO by allocating their funds in an online lottery system.

However, the IPO reform suffered a major setback in 2013, when the regulator put back a ceiling on both the IPO pricing and the first-day return. The IPO firm cannot have a price-earnings ratio higher than the industry-wide average. The first-day return cannot exceed 44%, which happens to be the average first-day return in the market right before 2013.

Our sample thus consists of all non-financial IPOs in the Chinese stock market between

2008 and 2012, a period when regulatory distortions on share pricing are minimized. During our sample period, Chinese firms can only allot up to 20% of offering shares to institutional investors in the book-building process, the rest 80% are distributed through an online lottery system open to all investors. Only those giant companies can allot up to 45% to institutional investors. Not surprisingly most firms allot exactly 20% to institutional investors. This suggests that uninformed investors swamp the IPO market and the extent of asymmetric information may be particularly large.

3.2. Data and methodology

We get financial data and IPO information from the CSMAR database, a widely used database of Chinese listed companies. We get a sample of 929 IPO firms and identify the address of the IPO firm's headquarters and attempt to capture the geographical factor by calculating the distance between the location of a firm's headquarters and the nearest top metropolitan areas. China has three major metropolitan areas: Beijing/Tianjin in the north, Shanghai in the middle, and Guangzhou/Shenzhen in the south. These cities not only lead in their regional GDP, but also have China's major capital markets: the country's two stock exchanges: Shanghai Stock Exchange and Shenzhen Stock Exchange; and the country's two largest markets for trading shares in unlisted companies: Beijing Equity Exchange and Tianjin Property Right Exchange. Not surprisingly, these metropolitan areas are home to China's major institutional players in the financial markets. Figure 1 shows that, among the 105 mutual fund companies in China as of 2012, 98 have headquarters in these top metropolitan areas. We hypothesize that a closer distance to institutional investors, who are most likely concentrated in major metropolitan areas, may alleviate asymmetric information problems during the IPO process.

Figure 2 depicts the geographical distribution of our sample IPO firms. We can see that a large number of IPO firms are located along China's coast and are clustered around the top metropolitan areas.

We use the following baseline regression model to detect the influence of geographical proximity on IPO underpricing:

$$Underpricing = \alpha_0 + \beta_1 Location\ \ Indicator + \beta_2 Control + \xi \quad (1)$$

We expect a significant and positive β_1, which indicates that the greater the distance between firms and the top three cities is, or if the firm is not located in the top cities, the higher the underpricing. Following the existing literature, we define IPO underpricing as the first-day return of the firm, adjusted for market return. To account for other factors that might affect the IPO, we control for several sets of variables. We include IPO-related variables such as offer size, offer price, underwriter reputation, first-day turnover, and the length between the issuance day and the listing day. We control for market sentiment by including market performance, market volatility and average price-earning ratio before the IPO. We control for firm characteristics by including firm size, leverage and profitability. We also include a dummy variable that indicates whether the firm is controlled by the government. Finally, we include industry and year fixed effects. Standard errors are clustered at the city level. Table 1 provides a detailed description of the variables in the regressions.

Table 2 reports summary statistics of the sample. We can see from the summary statistics that Chinese firms listed between 2008 and 2012 feature significant underpricing with a mean of 42.0% and a median of 29.6%, much higher than in more developed markets. Approximately 19% of the IPO firms are located in the top three metropolitan areas. The average distance between firms and the top three metropolitan areas is 303.4 kilometers, and the median is 160.9 kilometers. S For a large country like China, these numbers suggests that IPO firms tend to cluster around major financial centers. This confirms what we see in Figure 2.

To obtain a visual sense of the likely impact of firm location on IPO underpricing, we divide the IPO firms into five equal quintiles according to their distance from the nearest top metropolitans. Table 3 reports the mean distance and mean IPO underpricing of these groups of firms. There seems to be a clear relation between location and IPO underpricing: the farther away from the financial centers, the larger the IPO underpricing. The first quintile, or the most centrally located group, has an average underpricing of 39.4%. As firms are located farther away from the major metropolitan areas, their underpricing rises. The fifth quintile, or the most remote group, has an average underpricing of 52.5%. The difference is significant at 1%.

4. Empirical results

4.1. Location and IPO underpricing

Table 4 shows the relation between geographical distance and IPO underpricing. When we include the location indicator as the only explanatory variable, it has a coefficient of 0.14 and is significant at 5%. When we control for firm and IPO characteristics, the coefficient before the location indicator is 0.011, statistically significant at 5%. By this estimate, an increase of one in the log distance between the firm and the top three metropolitan areas will produce a 1.08% increase in the magnitude of underpricing. In other words, an increase of 100 kilometers away from the top three metropolitan areas correlates with a 4.97 percentage-point increase in IPO underpricing. This effect is relatively large and economically significant and suggests that distance from top cities exerts a strong influence on the underpricing of an IPO. These results are consistent with our hypothesis. As large group of investors gather in metropolitan areas, firms closer to these areas have advantages over others in the process of releasing information.

As for the control variables, we can see from the results that the underpricing is negatively correlated to the offer proceeds and positively correlated with the turnover ratio. Market sentiment also affects underpricing as we see positive and significant coefficients before market performance and the average price-earning ratio in the market. Other firm characteristics turn out to be insignificant. Overall, these results are consistent with the existing empirical literature.

4.2. Information opacity and location effects

If geographic location affects IPO underpricing through information asymmetry, the mechanism would most likely work when information is more important. We thus hypothesize that the influence of the location factor on IPO pricing should be more pronounced if the performance of IPO firms is more uncertain. We use two proxies for information opacity: the industry-level dispersion of profitability and the underwriter's estimated price range. Specifically, to capture industry-wide uncertainty, we use the standard deviation of the ROE of firms in the same industry one year before a firm's IPO. More uniformly distributed industry-wide profitability may indicate less uncertainty, while more heterogeneous performances will make information more important to investors.

We also calculate the standardized width of the price estimates released by the underwriter:

$$Width\ of\ price\ \square\square\square\square\square\square\square\square = \frac{(Upper-Lower)}{\frac{1}{2}(Upper+Lower)} \tag{2}$$

Where Upper and Lower refer to the upper and lower boundaries of the underwriter's price estimates. These estimates are provided to investors in the primary market. A wider range of estimates may reflect the fact that the underwriter is less certain about the value of the firm, in which case investors may need more information. In our sample, the difference between the upper and lower boundary of the price estimates has a mean of 3.69 and a standard deviation of 2.11.

We interact these two measures of information opacity with our location variables. If geographical proximity affects IPO underpricing through information costs, a higher degree of information opacity will amplify the effect of location on IPO underpricing. We should see a positive coefficient before the interaction term. The regression results are reported in Table 5 and are consistent with our predictions. The interaction terms all have positive and significant coefficients. The regression results further confirm our hypothesis that the effects of location are magnified when information is more important.

4.3. Instrumental Variable Tests

One may argue that there are some other unobservable factors that are simultaneously correlated with the geographical location and IPO pricing as well, therefore biasing the empirical results. For example, firms located near large metropolitan areas may also benefit from the advantages of more talents and a better business environment. In this subsection, we address the endogeneity problem of firm location by introducing an instrumental variable. Specifically, for the 802 private companies, we manually collect information on the founder's birthplace and calculate the minimum distance between their birthplace and the top three cities. It is reasonable to assume that people are more likely to start business locally, therefore the birthplace of the founder might be highly correlated with the firm's geographical location, and it should not be correlated to the firm's IPO underpricing. Similarly, for the 127 state-owned enterprises, we identify the location of the controlling government, and calculate the distance between the government base and the top three cities. We expect that a regional government is more likely to establish an SOE or to acquire a firm near its own jurisdiction, and this should not affect the firm's IPO underpricing. We use these distances as instruments for the actual distance between a firm and the top metropolitan areas.

Among the 929 firms in our original sample, we are able to retrieve information to calculate the instrumental variables of 808 firms. We report results from IV regressions in Table 6. The first stage results show that our instruments explain a significant part of the variations in firm locations. The F statistic is 21.81, and we can rule out the potential weak IV problem. Consistent with OLS results, the 2SLS estimate is positive and significant at the 5% level.

4.4. Excluding metropolitan firms

In our sample, there are 276 firms located in the top three metropolitan areas. One may speculate that these firms are fundamentally different from other firms and that such difference may explain most of the location effects. We would like to see if our findings merely reflect some missing characteristics of metropolitan firms that cannot be fully captured by our control variables. In Table 7, we drop firms located in the top cities and rerun our baseline regression. We find that distance towards top cities still matters: the coefficients before the log distance measures is 0.032, significant at 5%. This shows that our results are not driven by unknown differences between metropolitan firms and other firms.

4.5. Distance to industrial centers

Firms located farther away from major metropolitan areas have higher IPO discounts. This is because it is more difficult for investors to gather information about these firms, and consequently they endure more information costs. However, firms closer to economic centers may differ from other firms because of industrial agglomeration effects. Although it is not exactly clear how this may affect the firm's IPO underpricing, we would like to see if industrial agglomeration also lies behind our findings. As a robustness check, we calculate the firm's distance to the nearest provincial capital city and rerun our baseline regression using this as a main explanatory variable in Table 8. Because the provincial capital city is usually the largest city in the province with the largest industrial output, the distance to the provincial capital city could measure the likely impact of industrial agglomeration. However, this will not capture the information gathering effects since most major financial institutions are located in China's top three metropolitan areas. We do not find the distance to the nearest provincial capital city to be significant in explaining IPO discounts. Thus our previous results are most likely to be explained by information costs.

5. The Role of High-Speed Transportation Technology

5.1. Access to the bullet train system

Transportation technology may also affect investors' costs of gathering information. Easy access to high-speed transportation can facilitate information transmission by reducing investors' travel time. In this section, we investigate the role of modern transportation. In the 1990s, the average speed of Chinese trains was below 60 kilometers per hour. After a series of efforts to raise the speed and efficiency of the existing rail network, China began to build a national bullet train system. The first set of bullet train routes began to operate in April 2007, boosting the train speed to 250 km per hour. In August 2008, a new set of bullet trains operating at speeds up to 350 km per hour was put into service. By the end of 2014, China had world's largest bullet train system with total mileage of 19,370 kilometers. Figure 3 shows that during our sample period, many regions became connected by the bullet train.

Changes in transportation technology may have a profound impact on information collection in the financial market. Modern transportation tools such as the bullet train system provides investors with unprecedented access to the information of firms located in different areas. Investors become "local" in this sense, and the role of distance may be weakened. We identify the financial effects of the bullet train system by introducing a dummy variable indicating whether the firm is covered by the bullet train service. For each firm that goes public, we construct a dummy variable that equals one if there are bullet train stations within a radius of 50 kilometers and zero otherwise. Similar to the previous section, we use the interaction term of the dummy variable with location variables to examine whether accessibility to bullet train service will reduce location-related IPO underpricing. If we observe a significant and negative coefficient before the interaction term, we could infer that modern transportation technology boosts information transmission and alleviates location effects in IPO underpricing.

Table 9 shows that the interaction between location variables and access to the bullet train service exhibit significant and negative coefficients, which is in line with our predictions. These results suggest that the convenience of transportation, to some extent, alleviates the influence of location in IPO underpricing by reducing the cost of information gathering.

5.2. Placebo tests

Another concern with our results is the location of high-speed railway stations. One may argue that more developed cities are more likely to have high-speed railway stations, and firms located in these cities differ fundamentally from firms in other cities. A quick answer lies in the simple fact that when a railway connects two large cities, it also connects small cities along the way. Nonetheless, we perform a placebo test to explore the issue. We first delete the observations that already have a nearby (within 50 km) bullet train station in the year of the IPO. For the rest of the sample, we determine those firms located in places where there will be a bullet train station in the year following the IPO. These firms might differ from other firms because they are located in places that will be connected by the bullet train system in the near future. However, they are not connected with investors by the bullet train at the time of the IPO. We use a dummy variable to denote these firms.

Because there is actually no bullet train station in the year of the IPO, the dummy variable does not capture the effects of enhanced information access. If bullet train establishment is not correlated with some fundamental city-level factors that could also affect IPO pricing, the possibility of a bullet train station in the future cannot mitigate the effects of geographical location on IPO pricing. To examine this, we interact the dummy variable with distance variables in the regression.

Table 10 shows that the coefficients of the interaction terms are insignificant, which indicates that the would-be train station cannot generate differences in the location effects when a firm goes public. Therefore, the effect of the bullet train on location effects cannot be attributed to the fundamentals of IPO firms. The placebo tests further strengthen our findings that high-speed transportation technologies help to alleviate information problems and reduce the negative effects of distance on IPO pricing.

5.3. Access to airports

Access to airports may also have similar effects on information collection. However, China's bullet train system dominates China's domestic aviation system not only by lower costs, but also by its massive network. As of year 2014, 450 cities are connected by the bullet train system, while only 198 cities have access to air routes. As a result, China's bullet train system served over 800 million passengers in 2014, and that figure for China's domestic aviation system is 360 million. Not surprisingly, when we interact the location variable with a dummy variable that measures access to airports, we do not find a significant coefficient before the interactive term.

6. Conclusion

There is rich empirical evidence about the impact of geographical proximity in finance. The aim of this paper is to enhance our understanding of the role of firm location by linking it with the IPO market. Using the financial data and hand-collected data of firms' geographical location in China, we detect a positive link between a firm's distance to major metropolitan areas and IPO underpricing. Distance erodes the quality of information and encumbers the information release of IPO firms, producing a higher discount during IPO pricing. Furthermore, the geographical effects are significantly magnified if the firm's performance suffers from higher degrees of uncertainty. Finally, we examine the influence exerted by high-speed railways in reducing information costs. Our results identify the role of firm location in IPO pricing and indicate the importance of infrastructure construction in reducing information costs in financial markets.

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Figure 1. Geographical Distribution of China's Mutual Fund Companies

This figure graphs the distribution of China's mutual fund companies. A larger circle denotes a larger number of funds.

Figure 2. Geographical Distribution of China's IPO

This figure graphs the distribution of IPO firms in China between 2008 and 2012. A larger circle denotes a larger number of IPOs.

Figure 3. China's bullet trains system

Figure 3a

The bullet train system by the end of 2008

Figure 3b

The bullet train system by the end of 2012

Table 1. Variables and definitions

This table provides definition for all the variables used in the paper.

	Variables	Definition and description
Dependent variable	Underpricing	The market-adjusted first-day return of the IPO firm
Location indicator	Distance	The geographical distance between firms and top three metropolitan areas cities (in kms)
Control variables	Turnover	The turnover ratio on the IPO day
	Offer proceeds	The total offer proceeds (in millions)
	Offer size	The number of shares issued during IPO (in millions)
	Offer price	The offer price of the IPO firm
	Length	The number of days between the date of issuance and listing divided by 365 days
	Leverage (%)	The leverage ratio of the firm prior to IPO (book value of debt over book value of assets)
	ROE	The return on equity of the firm prior to IPO
	Firm size	The logarithm of the total assets of the firm prior to IPO
	Market Performance (%)	The accumulated market return three calendar months preceding the issue
	Market Volatility (%)	The standard deviation of market return one calendar month preceding a particular issue
	Market PE	The average market price-to-earning ratio on the issue day
	SOE	Binary variable that is one if the largest shareholder is the government and zero otherwise
	Underwriter reputation	Binary variable that is one if the underwriter is among the top 10 investment banks in China and zero otherwise

Table 2. Summary statistics

This table reports the mean, median and standard deviation of all variables used in the paper. The sample consists of 929 firms undergoing IPO in China from 2008 to 2012. Definitions of all the variables are provided in Table 1.

Variable	Obs	Mean	Median	Std. Dev.
Underpricing	929	0.420	0.296	0.485
Distance	929	303.446	160.936	381.646
Turnover	929	0.713	0.770	0.209
Offer proceeds	929	1088.784	638.000	2393.172
Offer size	929	85.998	27.600	474.951
Offer price	929	25.026	22.000	14.943
Length	929	0.032	0.030	0.011
Market Performance	929	-0.002	-0.001	0.016
Market PE	929	52.612	54.671	9.547
Market Volatility	929	0.015	0.014	0.006
Leverage	929	45.968	46.466	16.775
ROE	929	27.262	25.690	10.273
Firm size	929	20.241	20.012	1.127
Underwriter reputation	929	0.448	0.000	0.248
SOE	929	0.137	0.000	0.344

Table 3. Location and IPO discount: univariate evidence

This table divides the sample into five quintiles according to the firm's distance to the top 3 metropolitan areas. We present the average market-adjusted first-day return of the IPO firm within each quintile.

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
Distance	3.04	48.562	183.793	384.685	904.034
Underpricing	0.394	0.403	0.367	0.418	0.525
5th minus 1st					0.131***
T-statistics					(2.61)

Table 4. Location and IPO discount: regression results

This table presents regression results on the effect of firm location on IPO underpricing. The dependent variable is the market-adjusted first-day return. All variables are defined in Table 1. Standard errors are clustered at city level. T-stats are in parentheses, *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Dependent variable: Underpricing	(1)	(2)
Log distance	0.014**	0.011**
	(2.206)	(2.066)
Log turnover		0.412***
		(13.442)
Log offer proceeds		-0.317***
		(-2.830)
Offer price		0.003
		(1.380)
Length		3.888***
		(3.288)
Log offer size		0.121
		(1.493)
Market Performance		2.568**
		(2.116)
Market Volatility		-18.277***
		(-4.569)
Market PE		0.012***
		(4.944)
Underwriter Reputation		0.009
		(0.439)
Leverage		-0.143
		(-1.344)
ROE		-0.160
		(-1.226)
Firm size		2.986
		(0.855)
SOE		0.013
		(0.367)
Year Dummy	No	Yes
Industry Dummy	No	Yes
N	929	929
adj. R-sq	0.004	0.521

Table 5. The role of information opacity

This table presents results from regressions with interaction terms between locations indicators and information opacity. Information opacity is measured by two proxies: the industry-wide standard deviation of ROE prior to IPO, and the width of the underwriter's estimated price range. We include, but do not report, all other variables as in column 2 of Table 4. Standard errors are clustered at city level. Definitions of all the other variables are reported in Table 1. T-stats are in parentheses, *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Dependent Variable: Underpricing	(1)	(2)
Log distance	0.006	-0.038**
	(1.012)	(-2.122)
Log distance *Industry ROE dispersion	0.008***	
	(2.833)	
Log distance * Estimated Price Range		0.359**
		(2.567)
Industry ROE volatility	-0.043*	
	(-1.795)	
Target Price Range		-1.268**
		(-2.479)
Control Variables	Yes	Yes
Year Dummy	Yes	Yes
Industry Dummy	Yes	Yes
N	929	924
adj. R-sq	0.536	0.535

Table 6. IV regression

This table presents results from the IV regression. We use the distance between the company founder's hometown and the nearest top 3 metropolitan areas as instrument for the distance between the firm and the nearest top 3 metropolitan areas. In the case of an SEO, we use the distance between the controlling government and the nearest top 3 metropolitan areas as instrument for the distance between the firm and the nearest top 3 metropolitan areas. We include, but do not report, all control variables as in column 2 of Table 4. Standard errors are clustered at city level. T-stats are in parentheses, *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Panel A: second stage results of the IV estimation

Dependent variable: Underpricing	(1)
Log Distance	0.018**
	(2.416)
Control Variables	Yes
Year Dummy	Yes
Industry Dummy	Yes
N	808
adj. R-sq	0.541

Panel B: first stage results of IV estimation

Dependent variable:	(1)
IV Distance (log)	0.563***
	(15.650)
Control Variables	Yes
Year Dummy	Yes
Industry Dummy	Yes
N	808
adj. R-sq	0.349
F-stat	21.81

Table 7. Excluding metropolitan firms

This table presents regression results on the effect of firm location on IPO underpricing after dropping firms located in the top 3 metropolitan areas. The dependent variable is the market-adjusted first-day return. All explanatory variables are the same as in column 2 of Table 4. Standard errors are clustered at city level. T-stats are in parentheses, *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Dependent variable: Underpricing	(1)
Log Distance	0.032**
	(2.276)
Control Variables	Yes
Year Dummy	Yes
Industry Dummy	Yes
N	653
adj. R-sq	0.553

Table 8: Distance to Industrial Centers

This table presents regression results on the effect of industrial agglomeration on IPO underpricing. The dependent variable is the market-adjusted first-day return. Distance_Capital measures the distance between the firm and the nearest provincial capital city. All control variables are the same as in column 2 of Table 4. Standard errors are clustered at city level. T-stats are in parentheses, *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Dependent variable: Underpricing	(1)
Log Distance_Capital	0.0004
	(0.071)
Control Variables	Yes
Year Dummy	Yes
Industry Dummy	Yes
N	653
adj. R-sq	0.519

Table 9. The role of the bullet train system

This table provides results from regressions with interaction terms between location indicators and access to the bullet train system. Train equals one if the firm is located within 50 km of radius of a bullet train station during the time of IPO, zero otherwise. We include, but do not report, all other variables as in column 2 of Table 4. Standard errors are clustered at city level. T-stats are in parentheses, *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Dependent variable: Underpricing	(1)
Log distance	0.018***
	(2.749)
Log distance *Train	-0.012*
	(-1.771)
Train	0.054
	(1.470)
Control Variables	Yes
Year Dummy	Yes
Industry Dummy	Yes
N	929
adj. R-sq	0.535

Table 10. Placebo test

This table reports the regression results of placebo tests. The tests are restricted to firms that have no nearby accessibility to bullet trains in the year of IPO. Placebo Train equals one if there is going to be a nearby bullet-train station within one year after IPO, and zero if not. We include, but not report, all control variables as in column 2 of Table 4. Standard errors are clustered at city level. T-stats are in parentheses, *, **, and *** denote significance at the 10%, 5%, and 1% level respectively.

Dependent variable: Underpricing	(1)
Log Distance	0.011
	(0.861)
Log Distance *Placebo Train	-0.017
	(-1.071)
Placebo Train	0.076
	(0.946)
Control Variables	Yes
Year Dummy	Yes
Industry Dummy	Yes
N	431
adj. R-sq	0.561