

**MOTIVATION AND REASONING BEHIND CHINESE
ENTERPRISES OVERSEAS LISTING**

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ABSTRACT

Starting from the early 90s, the number of Chinese firms going public overseas has been increasing rapidly. By running a probit regression, this paper investigates the different factors that affect a Chinese firm's choice of listing location, either a domestic or a foreign stock exchange. Our data consists of 286 foreign listed companies and 788 domestically listed ones that went public between 2005 and the first quarter of 2011. Our results reveal that, larger firms, in terms of their pre-IPO revenue values, are more likely to go public overseas. In addition, firms in high-tech and capital-intensive industries, namely technology, financials, and real estate, are better represented in overseas markets. We also find that stock markets with lower underpricing levels are more attractive to Chinese firms, who tend to avoid capital markets with high underpricing levels as they do not want to be undervalued at their IPOs.

JEL Classification: G10; G15

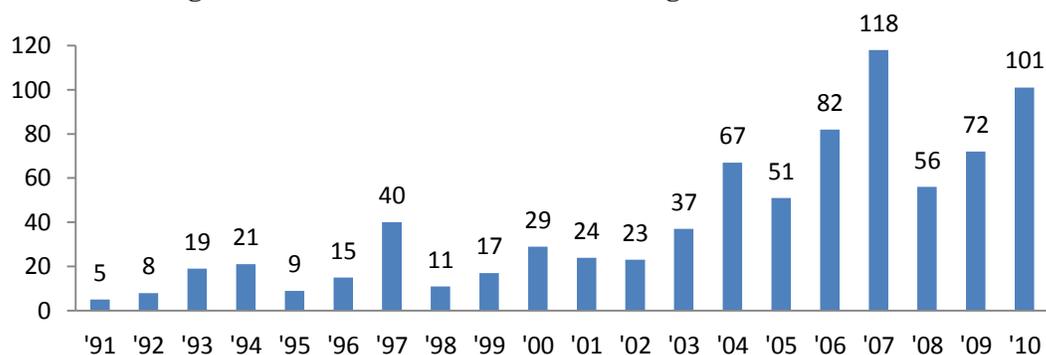
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I. INTRODUCTION

Companies today are globalizing not only their business operations but also their sources of funding. In the past two decades, hundreds of companies from emerging countries, especially Brazil, Russia, India, and China, have listed their shares on foreign exchanges. Among the four emerging countries, China is particularly interesting for us to study because of its unique domestic regulatory environment and its increasing economic power. According to Hung, Wong, and Zhang (2008), China, through the Chinese Securities Regulatory Commission (“CSRC”), sets certain requirements for firms planning to go public abroad. As Chinese firms would have to meet extra requirements in order to list their shares on foreign exchanges, their motivations to do foreign listing could be different from firms of other emerging markets.

Also, as shown in Figure 1 below, the number of Chinese firms that have chosen to list their shares on overseas exchanges has been increasing rapidly over the past two decades. Although the actual number of each year fluctuates correspondingly to the global economy, we can see a rising trend in general. In addition, according to Zhang and King (2008), as of the end of 2005, the total market value of foreign listed Chinese firms was twice as much as the domestic counterpart.

Figure 1. Number of Chinese firms listing overseas overtime



What factors motivate those Chinese firms to list their shares on overseas exchanges? Theoretically, by placing shares outside of its home market, a company can broaden its shareholder base, increase the liquidity of the company's shares, and enhance the visibility of its brand name and products in overseas markets. However, given that regulatory authorities of more developed markets tend to impose stricter disclosure and managerial requirements on public firms, foreign listing does impose extra costs on a firm and may offset some of the benefits mentioned above.

This paper analyzes what factors motivate Chinese firms to go public overseas, both from the firm and the market perspectives. Section II of the paper presents existing work, based on which we develop our hypotheses. Some studies have attempted to explain this phenomenon of foreign listing by addressing the theory of cost of capital. Accordingly, a "good" firm with high growth prospect can be benefited from listing its shares on overseas exchanges, as it could enjoy a higher valuation, a lower cost of capital, and a more sophisticated investor base. We therefore propose that firm size and growth prospect are both positively correlated with a firm's probability of going public overseas. In addition, we try to analyze if industry plays a role in a firms' overseas listing decision.

In addition, the difference among various stock exchanges definitely plays an important role in a firm's listing decision. The two Chinese domestic exchanges are still at their infancy and could therefore be comparatively inefficient. Due to its inefficiency, in China, the market price of a stock might not truly reflect the performance of the firm. Compared to the more developed overseas markets, the Chinese stock markets do experience higher volatility. As Zhang and King (2008) pointed out, on Feb.26, 2007, the Shanghai Composite Index reached

its historical high of 3040.6, but plummeted the next day by 8.84% to 2771.79. In other words, the Chinese domestic stock exchanges could still be considered as highly speculative. For issuers seeking a stable access to the long-term capital market, the two Chinese exchanges might not be the best choice for listing their shares.

Besides that, one of the most determinant market factors is a market's underpricing scale. Existing work proposed conflicting views on how this factor could influence a firm's listing decision. Some have argued that a large underpricing level of a certain exchange could reduce the capital amount that a firm can raise from its IPO, and thus, deter the firm from listing there. On the other hand, some have argued that a higher underpricing level indicates that a specific stock market is hot with rather active investor activities. Therefore, the paper also intends to find out if a specific market's underpricing degree plays a role in a firm's listing decision; if yes, in what way.

In Section IV, a probit regression with multiple repressors, addressing both the market and firm factors, is introduced. The regression is then run on a dataset of 1074 Chinese companies that went public either domestically or abroad, from 2005 to the first quarter of 2011. Our regression results are mostly consistent with our hypotheses and are analyzed and discussed in more details in Section V.

II. EXISTING WORK AND HYPOTHESES

In this section, we now present exiting work and theoretical framework, based on which we derive our hypotheses, which address that certain types of Chinese companies would be more likely to list their shares on overseas exchanges.

When going public, companies are required to disclose certain amount of financial and

management information to the public. Information disclosure could be rather costly for firms since it may prevent a firm from investing in certain profitable projects, which would only generate profits in the long term but could drag down the firm's stock price temporarily. The management team, under the pressure from its investors, may therefore give up those investment plans even if they can be beneficial in the long run.

According to Chemmanur, He, and Fulghieri (2008), overseas exchanges with higher listing standards and disclosure requirements could be considered as more "transparent" markets. However, that also means that it would be more costly for Chinese firms to go public there. In addition, when a Chinese firm chooses to go public abroad, it normally has to pay extra to hire an internationally recognized auditing firm as its third party auditor to ensure that it meets all corresponding accounting standards. In other words, overseas listing could actually be more costly for a Chinese firm, and that could reduce the total proceeds that the firm can raise from its IPO. Why would Chinese companies still choose to go public abroad?

In her study conducted in 2008, Lan attempted to determine what kinds of Chinese firms are more likely to go public overseas. However, her study solely focused on small and medium enterprises ("SMEs") and the time period was limited to 2005-2007. Lan's study tested 6 hypotheses and our study will replicate 3 of them with our expanded dataset, which includes all Chinese firms that went public between 2005 and the first quarter of 2011. In her study, Lan (2008) suggested and proved a negative correlation between a firm's probability of going public abroad and its company size, measured by the total assets value. She explained that smaller firms would face more obstacles when trying to list domestically because of their relatively weak financial performance. For its second hypothesis, she testified a positive relationship between a firm's growth prospect and its probability of going public overseas,

arguing that foreign investors focus more on a firm's growth potential and thus companies with strong growth prospect are more encouraged to go public abroad. In addition, her paper proposed that high-tech companies are more likely to go public overseas. Compared to domestic investors in China, foreign investors in more developed countries are more likely to welcome high-tech companies, the ones with higher returns but also higher risks. In addition, high-tech companies could also be benefited by going public overseas as they can reach out to other high-tech firms in more developed countries after their foreign IPOs. Given that our dataset is quite different from Lan's, we, therefore, come up with some different hypotheses, which will be presented below with other supporting theoretical framework, especially the study by Chemmanur et al (2008).

A. GROWTH PROSPECT

As argued by Chemmanur et al (2008), when a firm goes public, its fundamental and ultimate goal is to raise funding for its future growth. Therefore, one of the main reasons for a firm to pursue a foreign rather than a domestic listing should be to reduce the cost of raising capital and to maximize the proceeds from its IPO.

Chemmanur et al (2008) presented that new shares are normally sold at a discount at a firm's IPO. Such dilution leads to a reduction in existing shareholders' wealth. If listing on a foreign exchange could somehow reduce the scale of such undervaluation, issuers could therefore choose to go public abroad. As Lan (2008) suggested and showed in her study, a firm with a strong growth story could be more highly valued if it goes public overseas than listing its shares domestically, because foreign investors would price in the company's future growth by recognizing China's robust economy growth. This applies specifically to those fast-growing but rather small companies, which might face more difficulties if financing domestically in

China because of their relatively small firm size and weak financial performance. We therefore propose a same hypothesis as Lan did in her study and will test it with our expanded dataset.

Hypothesis 1: Companies with high growth potential will be more likely to go public overseas.

B. FIRM SIZE

When making its listing decision, a company would also consider how investor base varies on different exchanges. Capital markets are characterized by asymmetric information - “corporate insiders” have private information about a firm’s true value, while “outside investors” can reduce this disadvantage by obtaining information at a cost. This information obtaining cost varies by investor types. According to Chemmanur et al (2008), there are two types of outside investors, the “high-cost” and the “low-cost” ones. Those who have the ability to reduce the cost of obtaining information, such as institutional investors, and those who have the expertise in valuing a firm, such as sell-side analysts, are referred to as low-cost investors. Those who have no such advantage, such as retail investors, are referred to as high-cost investors.

Chemmanur et al (2008) also assumed two types of companies, the “good” and the “bad” ones. As stated earlier, the ultimate goal for a firm’s IPO is to raise funding. Therefore, when going public, a “good” firm would set a higher price since it is confident that investors would be able to value its quality and be willing to invest in its shares. The situation could be more complicated for a “bad” firm. It can set a high offer price and behave like a “good” firm, and if it succeeds, it can sell its shares at an overvalued price. However, if there are enough low-cost investors in the market, the “bad” firm would be forced to scale back its offering as the investors will not buy its overvalued shares. To avoid the risk of not being able to fulfill its

financing goal, the bad firm could set a lower price which reflects its true value and allows the firm to sell as many shares as it intends to in order to raise the enough amount for its investment projects. Based on this framework, a certain proportion of “bad” firms are expected to imitate the “good” ones, attempting to sell overvalued shares. A larger base of low-cost investors could deter more “bad” firms from choosing to imitate the “good” ones. In other words, “good” firms can be benefited from the presence of low-cost investors, whose ability of valuing firms allows them to sell their shares at higher prices.

Chemmanur et al (2008) also suggested factors that determine the cost for outside investors to value a company. First, the more publicly available information there is about a firm and the more reliable the information is, the less costly it would be for outside investors to value that firm. It is easier for outside investors to put a price on Microsoft, who has a publically-known track record of profits, than to value a start-up company, who does not have much information available for the investors. Second, the more familiar the investors are with a company, the easier it is for them to value the firm. For example, Chinese investors could find it easier to value a Chinese firm than a European firm. How could this framework be applied to the issue of Chinese firms going public abroad?

Before 1980s, Chinese companies were limited to list on the two domestic exchanges; they had to accept the prices that were determined by the investors trading on those exchanges. According to the argument above, when a firm goes public in a domestic market, it could enjoy the advantage of having a larger base of low-cost investors. In this case, it seems that “good” Chinese firms will be benefited from listing on domestic exchanges as they would be able to set higher prices due to the presence of low-cost investors at its home market. However, Chemmanur et al (2008) did mention that many Chinese firms still choose to list their shares

on those more developed foreign exchanges, because their management teams believe in those markets' higher listing standards and stricter disclosure requirements, which indicate a greater level of "transparency." As an exchange's listing and disclosure requirements become more demanding, fewer companies would be accepted to go public there. More importantly, the more rigorous the listing and disclosure requirements are, the more transparent and credible the information becomes. In other words, a greater level of transparency of a specific exchange could lower the valuation cost for outside investors and it indicates a better average quality of firms that are listed there.

When going public overseas, a Chinese firm may have to give up the advantage of the larger low-cost investor base at its home market. However, a large company could be benefited from the greater level of transparency that comes with a foreign exchange's higher listing and disclosure requirements. In addition, a large company is less likely to be negatively affected by the more rigorous requirements, given its rather strong financial performance. Indeed, with stricter requirements, foreign exchanges could deter "bad" firms from listing there and allow "good" or large firms to set higher prices. In addition, compared to smaller firms, larger companies are more likely to be known by foreign investors and could thus sacrifice less from the abandonment of the low-cost Chinese investor base. Based on this, we propose that larger Chinese companies are more likely to go public overseas, given that they are more likely to be known by foreign investors and less likely to be negatively affected by the stricter requirements of foreign markets; above all, those stricter requirements could indeed deter "bad" companies from listing and allow them to set higher offer prices.

However, our proposal is not consistent with Lan's finding of a negative correlation between a firm's probability of going public overseas and its size. It is nevertheless important

to keep in mind that Lan's study focused solely on Chinese SMEs, and the negative relationship could be attributed to the fact that some of the small firms in her data were not qualified to go public in China and were forced to seek go public overseas. Therefore, our hypothesis stated below is still plausible.

Hypothesis 2: Larger companies, in terms of either total assets or revenue, are more likely to go public overseas.

C. INDUSTRY

In addition to the two hypotheses above, our study will try to replicate Lan's hypothesis that high-tech companies are more likely to go public overseas. In addition, Wojcik and Burger (2010) found that some industries are better represented in overseas markets. The best represented industries include financials, technology, oil and gas, and telecommunications, while industrials and consumer goods companies are less likely to go public abroad. Firms in high-growth and capital-intensive sectors, such as technology and telecommunications, have a stronger tendency to go public overseas than those in more stable sectors, such as industrials and consumer goods. This phenomenon could be explained by the fact that capital-intensive firms are more in need of capital, and their needs could be better served by going public on foreign stock exchanges, which could provide firms with a larger amount of capital. In addition, Chemmanur et al (2008) also suggested that some industries could be more easily valued by investors of certain exchanges. For example, investors trading on the NASDAQ are in better shape to evaluate a tech company than investors normally trading on the Shanghai Stock Exchange. Therefore, we also attempt to see how the industry factor can predict if a Chinese firm will go public overseas or not, and our third hypothesis is stated as below.

Hypothesis 3: Firms in high-tech and capital-intensive industry sectors are more likely to go public overseas.

D. UNDERPRICING

All the theories stated above explain the phenomenon of Chinese companies doing their IPOs overseas from the firm perspective. We now try to explain the listing behavior from the market perspective. The difference among different exchanges definitely plays an important part in a firm's listing decision. IPO underpricing is one of the most important market factors that could be attributed to.

Work has been done to analyze the underpricing scale of the Chinese IPO market. For example, Zhou and Zhou (2009) defined underpricing as a stock's initial return. Consider IPO i goes public on day 1, the initial return is then given by,

$$R_{i,1} = \left(\frac{P_{i,1}}{P_{i,0}} \right) - 1,$$

where $P_{i,1}$ is the first day closing price of IPO i considering IPO i goes public on day 1 with an offer price $P_{i,0}$, and a first day closing price $P_{i,1}$. They then defined that the equally weighted initial return of N IPOs ("EWIR") is calculated by

$$EWIR_1 = \frac{1}{N} \sum_{i=1}^N R_{i,1}.$$

In addition, the return on a market index on the same day, $R_{m,1}$, will be calculated similarly. In that case, the market adjusted initial return for IPO i is the difference of $R_{i,1}$ and $R_{m,1}$. Aggregately, the equally weighted and market-adjusted initial return of N IPOs ("EWIRMA"), which is measured as

$$\text{EWIRMA}_1 = \frac{1}{N} \sum_{i=1}^N (R_{i,1} - R_{m,1}).$$

With a dataset of 1,380 Chinese A-share IPOs initiated on the Shanghai and Shenzhen Stock Exchanges over the period of July 1991 to June 2005, Zhou et al (2009) measured the annual EWIRMA from 1993 to 2005. They found that the scale of underpricing had been decreasing overtime, from 1993's 519.9% to 2005's 45.8%. Given the decreasing trend of underpricing level in the Chinese domestic market, it would be interesting to see how underpricing plays a role in a firm's listing decision. However, we do not know how exactly, either positively or negatively, this factor affects a firm's listing decision. Some have argued that a larger underpricing of a certain exchange would reduce the capital amount that a firm can raise, and thus, deter the firm from listing there. On the other hand, some have argued that a higher underpricing level indicates that a specific capital market is "hot" and its investors are active. We therefore present our fourth hypothesis.

Hypothesis 4: The underpricing degree of a certain stock exchange affects a firm's listing decision.

To sum up, Chinese firms might choose to list on foreign exchanges for higher valuation, better investor base, and lower cost of equity. We draw four hypotheses according to existing work: 1. Companies with high growth potential will be more likely to go public overseas. 2. Larger companies, in terms of either total assets or revenue, are more likely to go public overseas. 3. Firms in high-tech and capital-intensive industry sectors are more likely to go public overseas. 4. Underpricing degree of a certain stock exchange could affect a firm's listing decision.

III. DATA

There are two parts of our data, the Chinese companies that went public domestically on China's Shanghai and Shenzhen Stock Exchanges and the Chinese firms that listed their shares abroad. We get our data from the Chinese Stock Market and Accounting Research ("CSMAR") Series. The database provides general corporation information of the listed firms as well as their IPO and financial information. Starting from 1964, when the first Chinese firm went public overseas in Singapore, there have already been 783 Chinese firms that chose to go public overseas. There are 9 main stock exchanges that have been particularly attractive to Chinese firms: 2 in London, 2 in Singapore, 3 in the US, 1 in Germany, and 1 in Hong Kong.

Figure 2 shows the cumulative number of firms that went public abroad on different exchanges. As shown, the Hong Kong Stock Exchange ("HKEX") is the most popular choice for Chinese firms seeking financing opportunities overseas, as more than 25% of them have picked it as their listing location, probably due to its proximity both geographically and systematically. In addition, Table 1 shows that the number of Chinese firms going public in Hong Kong has been rather stable overtime, except that in 1997 when Hong Kong was returned to the PRC, the number of Chinese firms going public in Hong Kong doubled. The Singapore Stock Exchange Main Board ("SGX") is the next popular market for Chinese enterprises. In general, both the Hong Kong and the Singapore markets have maintained rather close economic ties with China and Chinese firms.

The two US stock exchanges, the New York Stock Exchange ("NYSE") and the NASDAQ, on the other hand have become increasingly popular for Chinese firms overtime. Chinese firms started going public on these two exchanges since 1993. We can see that the number of Chinese firms going public in the US has increased dramatically since 2006,

especially on the NASDAQ. This could be potentially explained by the factor of industry. The NASDAQ is specifically attractive to tech companies, and China has experienced a rapid growth of its tech sector recently. In addition, this could be attributed to the increasing US investments in China and the strengthening economic tie between the two countries.

Figure 2. Chinese companies listed overseas (Total: 783, as of 2010)

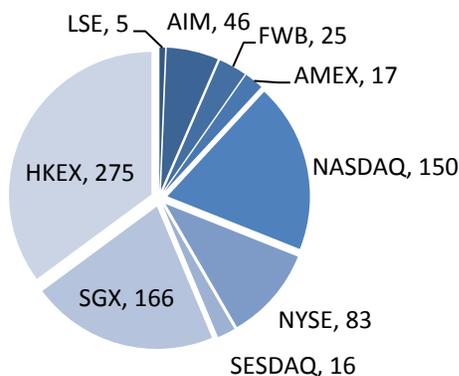


Table 1. Number of Chinese companies listed in HKEX, SGX, NYSE, and NASDAQ overtime

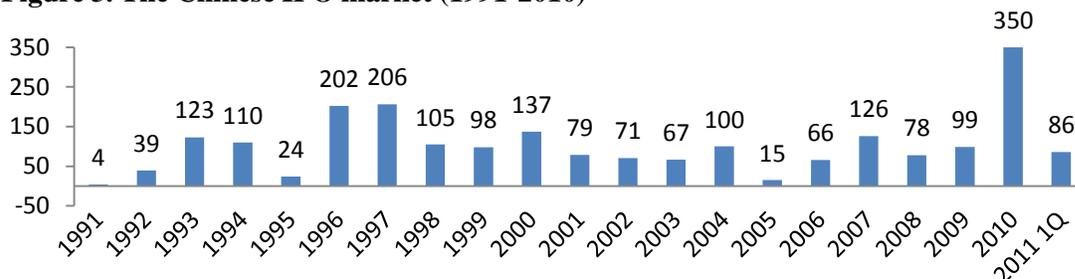
	'-90	'91-2	'93-4	'95-6	'97-8	'99-00	'01-2	'03-4	'05-6	'07-8	'09-10
HKEX	14	12	24	14	30	19	25	43	38	23	23
SGX	3	0	6	2	7	10	7	36	43	36	16
NYSE	-	-	2	1	3	4	2	3	4	23	32
NASDAQ	-	-	1	0	0	6	0	9	17	39	70

Note: data from other foreign exchanges are not included in this table.

As the second part of our dataset, there have been 2,213 Chinese A-Share IPOs listed on the Shanghai and Shenzhen Stock Exchanges over the period from 1990 to 2011. The Chinese IPO market tells a different story. As shown in Figure 3 below, the number of firms listed on the two Chinese stock exchanges does not show any consistent trend overtime; it has fluctuated greatly with the market environment. In addition, as the number of Chinese firms going public abroad has been increasing overtime, the Chinese domestic market has not experienced a decrease in its IPO activities. It is therefore rather confident for us to say that more and more Chinese firms have been seeking financing opportunities by listing their shares.

This increasing number of Chinese firms seeking IPOs makes it even more interesting to study their choices of listing locations.

Figure 3. The Chinese IPO market (1991-2010)

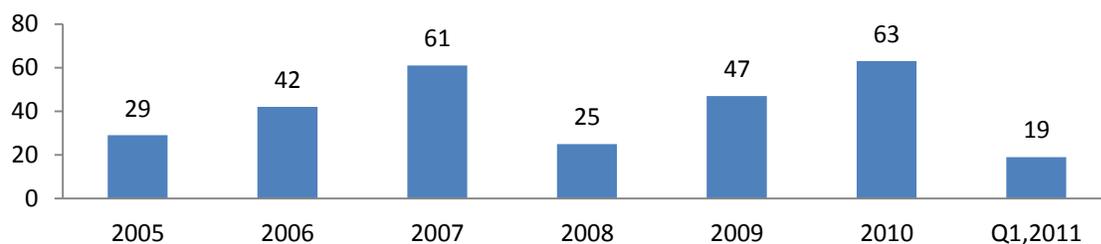


However, we are not going to include the entire dataset for our study. First, we only look at the companies that went public after 2005 and before the first quarter of 2011. Before Shenzhen Exchange launched a Small and Medium Enterprise Board (“SME Board”) in June, 2004, a lot of Chinese SMEs had chosen to go public overseas simply because they did not meet the requirements of the Main Boards of the two domestic exchanges. In other words, some of the firms were “forced” to do their listings overseas. Therefore, to make our analysis more convincing, we only include Chinese firms that went public overseas after the SME Board was established. Firms that went public after the first quarter of 2011 are also excluded due to the lack of financial information. In addition, we also exclude the companies that were not qualified to go public in China even after the establishment of the SME Board and all the companies in our dataset met the listing requirements of at least one overseas market. In this case, our firms all had a choice to decide which market, either a domestic or an overseas one, to list their shares.

Our data sample consists of 1,074 companies in total after excluding the ones that did not meet the requirements and the few ones of which we do not have complete information.

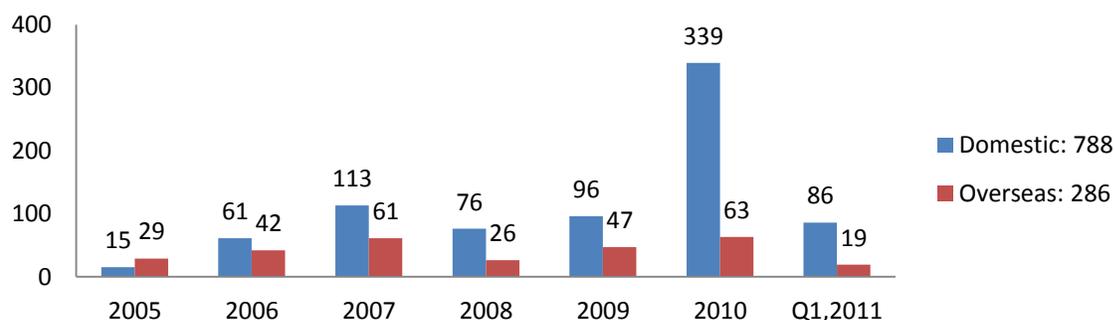
Among them, 286 went public overseas and 788 listed their shares domestically. As shown in Figure 4, the number of Chinese companies going public overseas has been increasing rapidly since 2005. This growth sustained until the global financial downturn in 2008 and 2009, but there was a robust rebound in 2010.

Figure 4. Number of firms going public overseas in our dataset (Total: 286)



As shown in Figure 5, even though there have been more companies choosing to go public overseas starting from 2005, many companies still have chosen to do it domestically in the past 6 years. The gap had been widening since 2006 and reached a peak in 2010, as 339 companies chose to go public domestically whereas only 63 companies listed their shares overseas in that year. As Chinese IPO market has been developing and becoming more matured and regulated, domestic listing has been growing more rapidly than overseas listing.

Figure 5. Number of firms listed overseas and domestically in our dataset (Total: 1074)



IV. METHODOLOGY

In terms of the empirical model, we intend to analyze how different factors can impact Chinese firms' decisions to list their shares either on the domestic exchanges or the foreign ones. We use a probit regression with multiple regressors, addressing both the market and the firm factors illustrated in the previous sections:

$$\Pr (\text{Overseas} = 1 | \text{Age}, \text{Firm Size}, \text{Industry}, \text{Underpricing Difference}, \text{Growth Rate}) = \Phi (\beta_0 + \beta_1 \text{Age} + \beta_2 \text{Firm Size} + \beta_3 \text{Industry} + \beta_4 \text{Underpricing Difference} + \beta_5 \text{Growth Rate}),$$

where Φ is the cumulative standard normal distribution function. Overseas is a binary variable, coded one (1) if the firm went public abroad and zero (0) if the firm is publicly listed in China. Therefore, by estimating the probit coefficients of the different variables, we attempt to find out which variables could more effectively explain a firm's decision to go public overseas rather than listing its shares publicly in China. An overview and description of our independent variables are shown in the table below, followed by a more detailed explanation of the variables and our rationale behind them.

Table 2. Independent variables

Variables	Descriptions
<i>Age (in years)</i>	The firm's age by the time of its IPO
<i>Industry</i>	Dummy variables with categories as below: <ul style="list-style-type: none"> • Utilities • Basic Materials • Consumer Goods • Consumer Services • Financials • Health Care • Industrials • Mining • Technology • Telecommunications • Real Estate
<i>Firm Size</i>	<ul style="list-style-type: none"> • Total Assets (in million CNY) <ul style="list-style-type: none"> ➢ Measured as the firm's total assets for the last fiscal year prior to its IPO • Revenue (in million CNY) <ul style="list-style-type: none"> ➢ Measured as the firm's total sales for the last fiscal year prior to its IPO
<i>Underpricing Difference (%)</i>	<ul style="list-style-type: none"> • Measured as the difference between the underpricing values of a certain foreign exchange and the Chinese market for the same period of time (three years previous to the IPO) • A value larger than 0% means that the corresponding foreign market has a higher underpricing value than the Chinese counterpart does, and vice versa
<i>Revenue Growth Rate (%)</i>	Measured as the three-year average growth rate for the firm's revenue prior to its IPO

We also include *Age* as one of our independent variables, because we think that a firm's age could have an impact on the firm's size and its growth rate. We are expecting to see that an older firm will be more likely to go public overseas, as it could have larger total assets and revenue values than a younger one, keeping everything else the same. For hypothesis 1 that companies with high growth prospect will be more likely to list their shares overseas, a *Growth* proxy is included and it is measured in the same way as it was in Lan's study - the average growth rate of a company's revenue value for the previous three years before its initial listing. We agree with Lan's use of the proxy because the revenue growth could effectively

capture a company's business and financial performance. *Firm Size* is included to test hypothesis 2 that larger companies are more likely to go public overseas. For each firm, we use both of its total assets and revenue values¹ separately in two regressions to see which one could better capture the picture. We expect to see a positive relationship between a company's *Firm Size* and its decision to go public overseas. Companies' industries are categorized as shown in Table 2 to test hypothesis 3. We expect that companies in high-tech and capital-intensive industries, namely technology, financials, and real estate, are more likely to go public overseas.

We also include a proxy of *Underpricing Difference* to see if underpricing degree plays a role in a firm's listing decision. For a firm that went public overseas, this proxy is measured as the difference between the underpricing levels² of the corresponding overseas exchange that the firm listed its shares on and the Chinese market. On the other hand, for a firm that was listed domestically, we take the average underpricing level of the four most popular overseas markets³ for Chinese firms, and compare this average value with the Chinese counterpart. The annual underpricing level for each exchange is measured in the same way as Zhou et al (2009) did in their study, as presented in Section II. However, as stated above, there are conflicting arguments in terms of how a market's underpricing level could affect a firm's listing decision. We attempt to find out if a firm would favor a higher or a lower underpricing level; a higher underpricing level indicates a hotter market but at the same time it might also mean that a firm could be undervalued at its IPO if it goes public there.

¹ For both total assets and revenue, we use the ones presented on the firm's annual financial report for the last fiscal year prior to its IPO.

² The underpricing level is calculated as the three-year average value prior to the firm's IPO.

³ We include the underpricing values of exchanges in the US, the UK, Singapore, and Hong Kong.

V. DISCUSSION

This section starts with descriptive analyses of the independent variables, followed by a discussion of our regression results. Table 3.1 displays the means and standard deviations of our independent variables for all of the firms in our sample. Table 3.2 and Table 3.3 then show the means and standard deviations for firms that went public domestically and abroad respectively. First, the average age of companies listed overseas is 7.42, which is slightly higher than the one for all companies (7.12) and the counterpart for the firms that went public domestically (7.02). It suggests that older firms, which could also be better established, are more likely to go public overseas.

In terms of the pre-IPO revenue, the foreign listed companies have a significantly higher average of 8,098.04 million Chinese Yuan (“CNY”), comparing to the 790.76 million CNY for the domestically listed ones. This agrees with our hypothesis that larger firms, in terms of their pre-IPO revenue values, are more likely to go public overseas. We also include total assets as a proxy for *Firm Size*. As we could see, the total assets values for the foreign listed companies are also much higher in general, with an average of 101,400.90 million CNY versus the 37,411.97 million CNY for the domestic counterpart. Again, this is consistent with our hypothesis.

In addition, for the firms that went public overseas, they do have a higher pre-IPO revenue growth, with a mean of 88.40%, than the firms that went public domestically, which have an average of 61.32%. Again, this goes along well with our hypothesis that firms with high growth prospect are more likely to go public overseas. In terms of underpricing difference, the mean for the firms that went public in China is 47.54%, indicating that when

firms chose to stay in China, the overseas markets had a higher level of underpricing averagely than the Chinese exchanges did. On the other hand, for the firms that went public overseas, the mean of the variable is negative, -68.25%, indicating a lower underpricing level for the Chinese market compared to the overseas counterparts. This phenomenon suggests that firms are more likely to go public on an exchange that has a lower underpricing scale and it could be explained by the fact that firms do not want to suffer undervaluation or leave money on the table when going public, as the goal of its IPO is to raise capital.

Table 3.1. Mean & standard deviation all companies

Variable	Mean	Standard Deviation
Revenue (in million CNY)	2,736.65	18,661.30
Age (in years)	7.12	8.08
Total Assets (in million CNY)	54,451.85	541,947.90
Underpricing Difference (%)	16.71	78.25
Revenue Growth Rate (%)	68.54	1.69

Table 3.2. Mean & standard deviation of domestically listed companies

Variable	Mean	Standard Deviation
Revenue (in million CNY)	790.76	6,790.48
Age (in years)	7.01	7.83
Total Assets (in million CNY)	37,411.97	444,665.20
Underpricing Difference (%)	47.54	50.43
Revenue Growth Rate (%)	61.32	1.71

Table 3.3. Mean & standard deviation of foreign listed companies

Variable	Mean	Standard Deviation
Revenue (in million CNY)	8,098.04	33,829.92
Age (in years)	7.42	8.74
Total Assets (in million CNY)	101,400.90	746,166.10
Underpricing Difference (%)	-68.25	78.48
Revenue Growth Rate (%)	88.40	1.59

In addition to the general trends presented above, the characteristic regarding the element of industry is separately studied. Given what Wojcik et al (2010) found in their study

that some industries are better represented in overseas markets, we repeat what they did but with an expanded dataset and time period. We include all the Chinese firms that went public overseas from 2005 to the first quarter of 2011. Our sample consists of 534⁴ foreign listed firms and 788 domestically listed ones. The percentages in Table 4 below show how well a certain industry is represented in overseas and domestic markets. If the percentage of an industry is higher in overseas markets than its counterpart in the Chinese market, then that industry sector is considered to be better represented in overseas markets. The last column shows the difference between the two percentages of each industry; a positive number indicates an industry that is better represented in foreign markets, and vice versa.

Table 4. Industry sectors in overseas and domestic markets

Industry	% of Foreign Listed	% of Domestic Listed	Difference (%)
Utilities	9.55	8.63	0.92
Basic Materials	5.81	2.28	0.52
Consumer goods	2.81	9.26	-3.46
Consumer services	2.62	4.44	-1.82
Financials	7.49	2.28	5.21
Health Care	8.80	5.84	2.96
Industrials	28.84	26.65	2.19
Oil and gas	5.99	19.8	-13.80
Technology	19.48	14.47	5.01
Telecom	4.12	5.46	-1.34
Real Estate	4.31	0.89	3.42

As shown above, while utilities (0.92%) and basic materials (0.52%) are slightly better represented in overseas markets, firms in financials (5.21%), technology (5.01%), and real estate (3.42%) all demonstrate a significant preference to go public overseas. On the other hand, oil and gas and consumer goods are significantly less represented in overseas markets,

⁴ For this analysis, we keep all overseas listed companies, regardless of whether they met the listing requirements for the Chinese market or not.

with negative 13.8% and negative 3.46% respectively. Our sample yields a consistent result with what Wojcik et al (2010) found, and it is also consistent with our hypothesis that firms in high-tech and capital-intensive industry sectors are more likely to go public overseas. This hypothesis would be further tested with our regression model.

In terms of the correlations among our independent variables, as Table 5 indicates below, the correlation between *Revenue* and *Total Assets* is 0.4065; this positive correlation suggests that firms with larger revenue amount tend to have more assets, which is not surprising. In addition, as we do not use these two proxies of *Company Size* together in one regression, this would not be a problem for our model. Other than this, our variables do not have large correlations with each other and as a result, correlation is not a problem for our model and study.

Table 5. Correlation between Independent Variables

Independent Variables	Correlation
Total Assets and Revenue	0.4065
Total Assets and Underpricing Difference	0.0026
Total Assets and Growth Rate	-0.0173
Total Assets and Age	-0.0217
Age and Revenue	-0.0027
Age and Underpricing Difference	-0.0022
Age and Growth Rate	-0.0283
Growth Rate and Revenue	-0.0357
Growth Rate and Underpricing Difference	-0.0912
Revenue and Underpricing Difference	-0.0037

To estimate our probit regression model of *Overseas* against our independent variables, we use the probit command. In terms of the independent variables measuring *Company Size*, we use *Total Assets* and *Revenue* separately in two regressions, with regression 1 using *Total Assets* and regression 2 using *Revenue*, while keeping all other variables the same. Results are shown in Table 6 below. To analyze the significance of our results, we use the significance

levels of 1%, 5%, and 10%, a p-value smaller than which will indicate that the corresponding coefficient can reject the null hypothesis that the coefficient is equal to 0 and is thus statistically significant. As demonstrated by Table 6, the likelihood ratios of chi-square are 672.78 and 722.23 respectively with both p-values smaller than 0.0001, indicating that both of our models are generally significant.

Table 6. Results for regressions 1 and 2

Regression 1 with Assets			Regression 2 with Revenue	
Summary Statistics				
Number of observations	1074		1074	
Prob>chi-Squared	0.000		0.000	
Likelihood Ratio	672.78		722.23	
Pseudo R-Square	0.5405		0.5802	
Variable	Coefficient	Pr> z	Coefficient	Pr> z
Constant	-0.9052427	0.000*	-0.9052427	0.000*
Age	0.0074463	0.275	0.0074463	0.275
Underpricing	-0.0362278	0.000*	-0.0362278	0.000*
Growth Rate	0.0186655	0.516	0.0131923	0.677
Assets	9.72e-8	0.192	-	-
Revenue	-	-	0.0000353	0.000*
<u>Industry Variables:</u>				
Utilities	0.1279364	0.610	0.1747352	0.501
Basic Materials	-0.3238248	0.542	-0.1989919	0.713
Consumer Goods	-0.2558348	0.313	-0.1489048	0.566
Consumer Services	0.4583865	0.103	0.581439	0.042**
Financials	1.150302	0.000*	0.9982479	0.002*
Health Care	0.2805676	0.245	0.2408655	0.347
Real Estate	2.246352	0.000*	2.472103	0.000*
Telecommunications	-0.0795632	0.792	-0.1792405	0.591
Technology	0.4836992	0.005*	0.5642875	0.002*
Mining	-0.2646621	0.191	-0.2328344	0.273
Industrials	(omitted)		(omitted)	

Note: * indicates the variable to be significant at the 1% level; ** significant at 5%; ***significant at 10%

To determine which model to be used for the rest of our analysis, we analyze how the coefficients and p-values of other independent variables are different in the two models. As shown in Table 6, all coefficients share the same signs and rather similar values in both models, except for *Growth Rate*, which is insignificant in both models anyways. In other

words, the use of either one of the two *Company Size* proxies would not alter the results of other independent variables in any significant way. The p-values are also rather similar, but *Total Assets* is not significant whereas *Revenue* is. In addition, even though we cannot independently interpret the pseudo R-squareds as we would be able to with an R-squared of an OLS regression, they are indeed valid and useful in evaluating multiple models predicting the same outcome on the same dataset. As the regression with *Revenue* generates a higher pseudo R-squared of 0.5802, compared to the 0.5405 for the one with *Total Assets*, the model with *Revenue* as an indicator of *Company Size* can better predict the outcome. As a result, we decide to use Regression 2 with *Revenue* as an indicator of *Company Size* for the rest of our analysis.

In terms of individual independent variables, both *Growth Rate* and *Age* are not statistically different from 0, as shown in Table 6. In addition, as we can see in Table 6, even though some industries are not statistically significant, certain industries are significant even at the 1% level, such as financials, real estate, and technology. To testify the overall effect of *Industry* on our model, we run an f-test and the result is shown as below in Table 7. *Industry*'s overall effect on a firm's decision of going public overseas is statistically different from 0. However, certain sectors are not significant, and we run an f-test to see if the non-significant ones have a general effect on the overall regression result, as shown in Table 8. As we can see, the non-significant industry sectors do not have a statistically significant effect on the overall result.

Table 7. Results for overall effect of all *Industry*

Summary Statistics	
Chi-Square (10)	45.32
Prob>chi-Square	0.0000

Table 8. Results for overall effect of the non-significant *Industry* sectors

Summary Statistics	
Chi-Square (7)	9.50
Prob>chi-Square	0.2190

Therefore, a new model without the variables of *Growth Rate*, *Year*, and the non-significant industry sectors is run, and the results are shown and compared with the original results in Table 9 below. As we can see, taking out those variables does not affect the values or signs of the coefficients of other variables in any significant way. Therefore, the rest of the analysis will be based on the model without *Growth Rate*, *Year*, and the non-significant industry sectors. In addition, the statistical insignificance of *Growth Rate* fails to prove our first hypothesis that firms with higher growth prospect are more likely to go public overseas.

Table 9. Comparison of independent variables for regressions with and without *Growth Rate*, *Year*

	New Regression		Original Regression	
Summary Statistics				
Number of observations	1074		1074	
Prob>chi-Squared	0.000		0.000	
Likelihood Ratio	711.81		722.23	
Pseudo R-Square	0.5718		0.5802	
Variable	Coefficient	Pr> z 	Coefficient	Pr> z
Constant	-0.8237498	0.000*	-0.9052427	0.000*
Underpricing	-0.0363715	0.000*	-0.0362278	0.000*
Revenue	0.0000348	0.000*	0.0000353	0.000*
Industry Variables:				
Financials	0.9939472	0.001*	0.9982479	0.002*
Real Estate	2.432693	0.000*	2.472103	0.000*
Technology	0.5548607	0.000*	0.5642875	0.002*

Note: * indicates the variable to be significant at the 1% level; ** significant at 5%; ***significant at 10%

In addition, after taking out the non-significant industry sectors, the rest remains significant. This is significantly consistent with our third hypothesis and what Lan (2008) and Wojcik et al (2010) suggested that firms in high-tech and capital-intensive industry sectors, namely technology, financials, and real estate, are more likely to go public overseas. In addition, this agrees with our descriptive analysis shown in Table 4. As a result, the “significant” industry sectors will not be excluded from our following analysis. In summary, the model we use for the rest of our analysis is shown as below:

$$\Pr(\text{Overseas} = 1 | \text{Firm Size-Revenue, Underpricing Difference, Industry-Technology, Industry-Real Estate, Industry-Financials}) = \Phi(\beta_0 + \beta_1 \text{Firm Size-Revenue} + \beta_2 \text{Underpricing Difference} + \beta_3 \text{Industry-Technology} + \beta_4 \text{Industry-Real Estate} + \beta_5 \text{Industry-Financials}).$$

The results of our new probit model are presented in Table 10 below.

Table 10. Results for the revised probit model

Summary Statistics		
Number of observations		1074
Prob>chi-Squared		0.000
Likelihood Ratio		711.81
Pseudo R-Square		0.5718
Variable	Coefficient	Pr> z
Constant	-0.8237498	0.000*
Underpricing	-0.0363715	0.000*
Revenue	0.0000348	0.000*
<u>Industry Variables:</u>		
Financials	0.9939472	0.001*
Real Estate	2.432693	0.000*
Technology	0.5548607	0.000*

Note: * indicates the variable to be significant at the 1% level; ** significant at 5%; ***significant at 10%

To analyze the effects of individual independent variables separately, we first run a logit model with the same independent and dependent variables to get the odds ratio for each independent variable, and the results are shown in Table 11 below.

Table 11. Odds Ratio for Independent Variables

Variables	Odds Ratio	Std.Error	z Value	Pr> z
Underpricing	0.9253273	0.008127	-8.84	0.000
Revenue	1.000075	0.0000158	4.77	0.000
<u>Industry</u>				
Financials	6.846883	3.814519	3.45	0.001
Real Estate	7.329335	157.4845	4.43	0.000
Technology	2.727314	0.7019731	3.90	0.000

As we can see in Table 11, for a one unit increase in *Underpricing Difference*, the odds of going public overseas increase by a factor of 0.9253273. In other words, a 1% increase in the underpricing level of a foreign market would decrease a firm's probability of listing there by around 8%. This suggests that an overseas market with a higher underpricing level, compared to the Chinese counterpart, is less likely to attract a Chinese firm to go public there. This finding agrees with the negative coefficient value of *Underpricing Difference* in our model, as shown in Table 10. This result could be explained as that firms are reluctant to go public on exchanges with high underpricing levels, as their shares could be undervalued there.

In addition, a one unit increase in a firm's *Revenue* predicts that the odds for that firm to go public overseas increase by a factor of around 1, which suggests that a one unit increase in *Revenue*, which is one million CNY in this case, barely affects a firm's decision of going public overseas or domestically. However, this could be due to the general large scale of firms' revenue values, and the effect of a one unit increase could be easily neglected. As shown in Tables 3.1-3.3, the standard deviation of *Revenue* could be as large as 18,661.30 million CNY; in other words, firms in our sample set have a wide range of variance in terms of their revenue values. For a firm that really deviates from the mean, the factor of *Revenue* could have a significant effect on its odds of going public abroad.

In addition, a margin test is run to calculate the predicted probability for a firm to go public overseas at different ranges of *Revenue*. The test is run on *Revenue* from 5 million CNY to 339,235 million CNY in increments of 50,000 million CNY, as shown in Table 12 below.

Table 12. Marginal effects of *Revenue*

<i>Revenue</i> Range (in million CNY)	Margin	Pr> z
5-50,005	0.2546621	<0.0001
50,005-100,005	0.5710417	<0.0001
100,005-150,005	0.8793031	<0.0001
150,005-200,005	0.9865573	<0.0001
200,005-250,005	0.9994507	<0.0001
250,005-300,005	0.9999917	<0.0001
>300,005	1	<0.0001

In the table above, we can see that the margins of all *Revenue* ranges are statistically significant. There is indeed a trend that we can tell from these marginal effects - a larger firm, in terms of its revenue value, is more likely to go public overseas. This shows that as a firm's size goes up and as it deviates away from the mean revenue value of 2,736.65 million CNY, the variable of *Firm Size* begins to have a significant impact on the firm's decision of going public abroad. For example, the mean predicted probability of going public overseas increases to around 98.66% for firms whose revenues were between 150,005 and 200,005 million CNY, compared to the mean probability of 25.47% for firms whose revenues were less than 50,005 million CNY, where the mean falls. Again, this finding agrees with our hypothesis that a larger firm is more likely to go public overseas. However, it is against Lan's hypothesis that smaller companies would prefer overseas markets, as they could face more difficulties to finance domestically from either banks or the capital market, both of which prefer larger firms who are less risky to fail. Nevertheless, this paradox could be explained by the fact that we exclude the

firms that were not qualified to go public in China and these are the firms that tend to have small revenues and were then “forced” to go public overseas.

For the 3 dummy variables of *Industry* that are significant in our model, their effects are more detectable. For a firm that is in the real estate sector, its odds of going public overseas increase by a factor of around 7.33. For example, while keeping everything else the same, a firm that is in the real estate sector is more than 7 times more likely to go public overseas, compared to a firm that is not in this sector. Similarly, the odds of going public overseas increase by factors of around 6.84 and 2.72 respectively for a firm that is in the sectors of financials and technology. This finding does agree with our hypothesis that firms in high-tech and capital-intensive industry sectors are more likely to go public overseas. In addition, this finding is consistent with what Lan (2008) and Wojcik et al (2010) found in their studies.

VI. CONCLUSION

According to our regression results, larger companies, in terms of their revenue values, are indeed more likely to go public overseas. A one million CNY increase in revenue value does not affect a firm’s probability of going public overseas in any significant way. However, given that firms in our dataset have a wide range of revenue values, when a firm’s revenue goes up and deviates away from the mean value, its probability of going public can really increase by a significant amount, as shown in Table 12 of the margin test. This phenomenon could be attributed to the fact that larger firms could be benefited from the greater level of transparency that comes with the stricter listing and disclosure requirements of overseas markets. They are also more likely to be known by foreign investors and less likely to be negatively affected by the more demanding listing requirements of foreign exchanges. In

addition, they could be benefited as more developed markets could deter more “bad” companies from listing there and thus enable them to set higher offer prices for their IPOs.

In terms of *Industry*, our results are consistent with our hypothesis that firms in high-tech and capital-intensive industry sectors are more likely to go public abroad, especially for firms in the sectors of financials, technology, and real estate. Indeed, they have rather detectable effects on firms’ probability of going public overseas, as shown in table 11. For a firm to be in one of the three sectors, it could be as much as 7 times more likely to go public overseas than a firm that is not in one of those three sectors, assuming everything else the same. In addition, the negative correlation between *Underpricing Difference* and a firm’s probability of going public overseas indicates that firms prefer exchanges with lower underpricing scales. In order to raise as much funding as possible, firms tend to avoid being undervalued by investors trading on exchanges with large underpricing levels.

However, even though our results are consistent with three of our four hypotheses, there are things that we could improve. First of all, our measurement of the proxy of *Underpricing Difference* is not as accurate as it could be, as we did not come up with a better way to measure the difference between the underpricing levels of the Chinese and overseas markets. This is something that future study could improve on. In addition, it would be interesting for future study to look at how top-notch firms would perform differently from marginal firms in terms of their listing decisions. Top-notch firms could be more likely to go public overseas as they could be benefited from the more demanding listing requirements of foreign exchanges. On the other hand, marginal firms, especially the high-growth ones, could also be attracted by overseas markets, as they could face more obstacles when trying to finance in China.

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