< MSc Finance Degree Thesis >

AY 2019

DOES OVERSEAS-LISTING IMPROVE CHINESE COMPANIES?
Empirical Evidence From Hong Kong Equity Market

57171515-4 ZHANG HAOCHEN
SEMINAR ON EMPIRICAL ANALYSIS OF CORPORATE FINANCE
C.E. PROF. SUZUKI KAZUNORI
D.E. PROF. LAU DAVID D.E. PROF. HIBARA NOBUHIKO

Summary

Going out of the country has been a hot idea for many of the companies from mainland Chinese for the last 20 years. Decision makers believe an IPO in a more developed economy helps their company raise equity capital at a lower cost, therefore boosts the operating performance. However, many domestic researchers doubt the presumption with empirical supports, arguing that a good number of companies have failed to present any evident improvement but deterioration in their operating performance. They contend that such performance deterioration is due to Chinese decision makers failing to fully anticipate the effects of relatively higher expenses of being listed in a developed economy, that will excessively offset the benefits.

Few studies related to the overseas-listings of Chinese firms have been done. Furthermore, most of these studies focus on the companies who are listed on both Hong Kong Stock Exchange and A-share market, known as cross-listing or dual-listing. This is due to a series of policies and programs that encourage Chinese companies, particularly the state-owned companies, to issue IPOs in both HK and the mainland by the Chinese government in the last two decades. However, I intend to employ a comparison between single-listed companies only, who are either listed in HK or the mainland but not both. I hope that the implementation of such strategy from a different perspective may complement other studies in the area to a degree.

This paper compares the operating performance of mainland Chinese firms who are listed on HKEX with the Chinese firms who are listed in Shanghai or Shenzhen as A-shares through a Propensity Score Matching. This is because the results from a traditional OLS regression will be compromised by the problem of selection bias. PSM, however, yields to a more precise comparison between the two groups of firms so to leave us a relatively pure random effects to analyze. I still choose HKEX as the target data base since most of overseas-listing Chinese companies are clustered here – in terms of both dual- and single-listing. We match and compare 956 HK listed firm-years with 11,679 A-share firm-years between 2014 and 2017, and the results show a subtle decrease in return on assets in the HK listed companies. This conclusion is actually consistent with most of the studies on cross-listing Chinese companies. I also compare the ROA according to the political background of the sample company, that is whether the company is state-owed or not. Consequently, state-owned HK-listed companies display an even worse ROA, but with an even higher total assets growth rate.

<Inside Cover>

DOES OVERSEAS-LISTING IMPROVE CHINESE COMPANIES?
Empirical Evidence From Hong Kong Equity Market

57171515-4 ZHANG HAOCHEN
SEMINAR ON EMPIRICAL ANALYSIS OF CORPORATE FINANCE
C.E. PROF. SUZUKI KAZUNORI
D.E. PROF. LAU DAVID D.E. PROF. HIBARA NOBUHIKO

Table of Contents

1. INTRODUCTION

The popularity of overseas-listings came as a result of the rapid globalization of capital markets since as early as 1970s. Stock exchanges from developed economies such as NYSE are usually the destination for cross-border listings due to their relatively advanced regulations, mature investment environments and liquid markets with larger investor bases. Such features attract a major number of enterprises particularly from emerging economies who wish to raise capital at a lower cost as well as expand their business over an international creditability. However, such advantages on developed markets usually come at a two main costs: additional reporting requirements, and higher listing and registration fees. As exciting as the idea of being listed overseas might be, it has always been a challenge for decision makers to consider the trade-off between the costs and the potential benefits. In addition, foreign companies usually find themselves facing higher initial listing requirements. For example, the adjusted pre-tax income of non-U.S. companies must exceed $100 million for last three fiscal years and $25 million for each of the two most recent years, while that of U.S. companies only needs to exceed $10 million for last three years and $2 million for each of the most recent years.[1]

It is quite obvious that China has been among the top economies (if not the top one) in the world who have been contributing as much as benefitting the most from the globalization of the marketplace for capital in the last two decades. Such economic trend has been inevitably involving a nationwide rush for local companies to go public abroad since 1993. As fast as China's economy has been growing, many Chinese companies decide to go abroad for equity financing, which implies a considerable gap between the demand and supply of capital on the equity market. Besides the rationale explained in the first paragraph, this may also be caused by particular local policies such as that companies with a foreign majority shareholder cannot be listed on either Shanghai Stock Exchange (SSE) or Shenzhen Stock Exchange (SZSE), which was the biggest reason for Alibaba Inc., whose major owners back in 2007 were Softbank and Yahoo, to turn to Hong Kong Stock Exchange (HKEX). The controls on foreign exchange and foreign investment activities on mainland Chinese stock market

[1] New York Stock Exchange (https://www.nyse.com/publicdocs/nyse/listing/NYSE_Initial_Listing_Standards_Summary.pdf)

have been encouraging local companies, among which, interestingly, a great number of state-owned enterprises, to look for alternative stock exchanges for better market liquidity. As a result of that and the geographical and cultural advantages, Hong Kong has been the most popular destination for overseas-listing for mainland Chinese companies, far followed by Singapore and U.S. On the other hand, a market cap of 3,936 billion USD (as of 30 November 2018, ranking 5th of the world)[2], and well-developed economy and regulatory system certainly put HKEX up among top stock exchanges in the world from any aspect.

As there are other options such as depositary receipt programs (DRs) and back door listings, which in fact have much longer histories, researchers nowadays appear much more interested in overseas IPOs, and so am I. Despite researcher's long-lasting debate over the effects on enterprises brought by cross-border listings at a global scope, relatively fewer literature can be used to fully explain the particular case in China, who has always been considered one with very different characteristics than other major economies. In China, however, most of the related literature focuses on cross-listing enterprises, that is, companies who are listed on both of their local and an overseas stock exchange. The situation has been nothing but enhanced by a series of incentive programs and policies laid out by the Chinese government to encourage qualified companies, especially the state-owned firms, to be listed on both HKEX and A-share market since 2000s. Yet, the fact is that the number of de facto mainland Chinese companies who are single-listed on a foreign exchange alone has long exceeded the number of the cross-listed, or dual-listing, companies. We call them de facto because even though many of these companies like Tencent and Alibaba have a foreign registered address primarily for tax purpose (with Cayman Islands being the most popular one), and often with nominal foreign major shareholders, all of their business operations are mainly based in mainland China; still they are commonly excluded from official reports since they are not technically Chinese enterprises. In order to land on a precise analysis on how much would overseas-listing affect a Chinese company's performance than ordinary domestic listing, I believe it would be useful to focus on those companies who are listed either on an overseas stock exchange or A-share market, but not on both of

[2] Monthly Reports - World Federation of Exchanges

them at the same time. When it comes to the comparison between the two groups, however, a plain OLS may appear inappropriate due to a potential problem called “selection bias”. In other words, we want to make sure the random effects we end up with are the results of the action of overseas-listing itself, instead of any other characteristics of the overseas-listing company. To solve the problem of selection bias, a Propensity Score Matching (PSM) method is suitable for such situation in which we want to conclude random effects by matching the two groups of samples according to any possible characteristics other than the location, that is the counterfactual status we want to observe, of their listing. As a result, PSM of HKEX and A-share companies between fiscal year of 2014 and 2017 leaves us with a subtly negative return on assets in the HKEX listed companies, which is actually consistent with most of the studies on cross-listing Chinese companies. I also compare the ROA according to the political background of the sample company, that is whether the company is state-owed or not. Consequently, state-owned HK-listed companies display an even worse ROA, but with an even higher total assets growth rate.

The remainder of the paper is organized as follows: Section 2 reviews the basic theories upon which this dissertation is built, as well as recent relevant studies in the area. I will then spend Section 3 on the explanation of the hypotheses, as well as the data selection and the setting of the variables. Section 4 introduces the methodology followed by the summary of the empirical results of the PSM model, and a couple of tests for the validity. Finally, Section 5 concludes my study and gives a couple of suggestions for future works based upon the limitations of this paper.

2. LITERATURE REVIEW

2.1 THEORIES

Despite the still-ongoing debate over the effects of overseas-listing on a company, the majority of international researchers agree that such action usually improves the company’s performance. Their conclusions are generally built on a couple of basic economic concepts. First of all, a rational overseas-listing expands a company’s investor base therefore lowers the risk premium, or required rate of return,

demanded by the investors. Secondly, correct positioning in multi-strata of the global capital marketplace helps the company maximize its expected cash-flow therefore improves further operation. Thirdly, a relatively developed market which provides greater protection to investors tends to bind the company with stricter corporate governance, and empirical studies show that enterprises with better corporate governance elements such as accounting responsibility and operation transparency usually will be better off in a medium to long term. Last but not least, most of the corporate securities on open capital markets like the U.S. tend to enjoy better liquidity. Many Chinese domestic studies, however, conclude that being listed abroad does not necessarily improve mainland Chinese companies in terms of operating performance because many decision makers follow the hot sound of the idea like sheep without rational analysis on the costs and benefits of an overseas IPO.

These concepts are based upon the following theories and hypotheses:

2.1.1. Market Segmentation Theory

When the capital market of an economy is isolated from the international capital market, as "is segmented", the risk of capital investments is limited onto the shoulders of domestic investors, who as a result expect higher risk premia. Errunza and Losq (1985) demonstrated the concept with a rather "mild-segmented" case but landed on a significant conclusion: higher degree of segmentation between less developed economics and U.S. than that between Europe and U.S. leads to a directly proportional price difference of assets. In other words, if country A (more segmented) can buy securities from country B (open market) but country B cannot buy securities from country A, the price of country B's securities will be closer to a global market price than that of country A's. For an enterprise from a relatively segmented economy, overseas-listing is an opportunity to cut cost of capital as larger investor base implies lower risk premium.

2.1.2. Liquidity Hypothesis

Supporters of Liquidity Hypothesis believe that higher liquidity will lead to a lower risk premium and therefore lower cost of capital. Therefore, higher liquidity is considered one of the key factors driving enterprises to turn to a developed, well-organized and international stock market.

Amihud and Mendelson's (1986) model points to a causal relationship between the pricing of an asset and its illiquidity, which is defined as the cost of immediate execution of a transaction and measured by the asset's bid-ask spread on market,: investors look forward to a higher required rate of return at an asset with lower liquidity and vice versa. When a company can be traded on a more liquid stock market, its financing cost decreases as investors' liquidity risk does.

2.1.3. Bonding Hypothesis

Some researchers believe that a developed market mechanism itself protect the interests of investors by restraining managers and large shareholders, others think managers and large shareholders are only restrained when the market mechanism is backed up by regulations and laws. This hypothesis is highlighted by Coffee (1999, 2002) and Stulz (1999) while studying cross-listing from the aspect of corporate governance. They think foreign companies from economies with relatively weak legal environments commit (bond) themselves to provide investors with better shareholder protections under stricter regulations when they come to a more developed capital market. As a response, the confidence of investors from the developed market is usually appropriate, which is one of the decisive factors for a relatively efficient market in terms of costs of capital.

2.1.4. Capital Structure Theory

Since 1958 brought up by Modigliani and Miller (1958), researchers all over the world have never stopped working on the improvement in the theory of capital structure. MM models contend that a company's capital structure has nothing to do with its valuation under ideal circumstances. Successors then started to loosen up the circumstances by adding corporate tax and bankruptcy costs. In addition, A couple of subsequent theories are built upon MM models with an extra condition – asymmetric information, including the signaling theory, the pecking order theory and the agency costs theory. Hirota (1999) and Booth et al. (2001) point out that due to the limitations of financing channels in less developed economies, the enterprises often end up with an unduly high debt ratio, which is considered a potential risk to a company's operation. It is especially the case in mainland China where there's state-owned enterprises which have better access to banks, which are also mainly state-owned,

for debt financing, driving a number of private companies to look for equity financing opportunities abroad.

2.2 EMPIRICAL FINDINGS

Under this section, I will start with an overview of past remarkable works on motives for companies going public on a foreign stock exchange. Then I will briefly discuss past studies on the effects of overseas-listing on companies' performance, which is a rich area at the global scope. It's a reminder, however, that the majority of the past works regarding the topic focus on cross-listing enterprises, that is companies listed on both a domestic (usually less developed economy) and a foreign (usually more developed economy) stock exchanges. The study on single-listed only companies may be a substantially different case, whereas I still find enormous values from these papers for the building of our own methodology and models. The review includes works from both international and Chinese domestic researchers.

2.2.1 Studies on Motives for Overseas-Listing

Most of researchers focus on three motives that believed to be the mainly reasons for overseas-listing: financial, corporate governance and marketing strategy.

(1) Financial Motivation

Major studies on the financial motivation for going public on foreign markets are done by the U.S. researchers. Lins, Strickland and Zenner (2005) show with empirical proof that companies with promising prospects tend to be willing to be listed in developed economies for a lower cost of capital. Jia, Sun and Tong (2005) study on a data sample of mainland Chinese firms listed on HKEX from 1993 to 2002 and come to a conclusion stating overseas IPOs are practically contributing to the order of domestic security market (SSE and SZSE) by helping ease off the pressure from excessive demand for equity financing, which is quite common under a relatively immature capital environment like China. Jiang (2008) compares totally over 1000 companies from A-share market as well as foreign markets and empirical results reveal obvious financing efficiency at lower costs in developed countries.

He attributes the results to stricter regulatory environments and deeper information disclosure. Chen and Wang (2007), from a different point of view, indirectly conclude that overseas-listing can effectively lower a company's financing demand by proving a systematical decrease in sensitivity to free cash-free after cross-listing on HKEX with double-listing Chinese companies' data from 2000 to 2003.

(2) Corporate Governance Motivation

The mechanism of the corporate governance motivation for foreign listing has been explained to the essence by Coffee's (1999, 2002) bonding hypothesis as covered in earlier section. To simply put, companies who believe that benefits brought by confident investors will beat the costs of higher corporate governance standards tend to go public on developed stock market, where investors' confidence are usually guaranteed by strict corporate governance. In the same year, La Porta et al. (1999) interpret the same mechanism from a rather systematical perspective: the better protection a market provides with its investors, the easier it is for a company to finance externally, and vice versa. We thus expect more companies with confidence in their corporate governance and profitable projects desperate to get into stock exchanges such as NYSE and NASDAQ. Blass and Yafeh (2001) compare Israeli companies listed in USA and Israel and find young and ambitious companies appear more willingly to commit to better corporate integrity for more cash in the USA.

(3) Strategic Motivation

Since the end of the last century, researchers and decision makers have realized that overseas-listing usually comes up with an advertising effect, contributing to an increase in global sales. Das and Saudagaran (1998) analyze 451 non-U.S. enterprises and observed an intention of expanding market shares over a global awareness through cross-listing in the U.S. Bancel and Mittoo (2002) employed a survey and the result shows a majority of managers of 305 companies from 6 European countries believe overseas-listing brings an international fame while some of them see the action as a marketing strategy instead of a financing option.

2.2.2 Studies on Effects of Overseas-Listing on Enterprise' Performance

The effects on companies' performance by cross-border listing have been a long and still ongoing debate, and researchers have done tons of empirical analyses from different perspectives. However, there still hasn't been a particular model(s) that can conclude such topic in a systematical sense which can comprehensively reflects the company's characteristics such as geography and industry. Although fewer studies have done by Chinese researchers and on Chinese enterprises, most of them conclude negative effects on overseas-listing of Chinese companies.

(1) Positive Effects

Empirical analysis done by Doidge, Karolyi and Stulz (2004) based on 715 companies from 40 countries cross-listed in the U.S. and 4080 stayed-home companies has been considered a milestone on the topic in terms of the U.S. stock market, cited by numerous successors. Their results reveal an average of 16.5% higher Tobin's q ratios of cross-listed companies than that of the stayed-home firms, leading to a statistically significant valuation difference of 37%. Doidge et al. attribute the higher valuation to better growth opportunities due to the less extent to which controlling shareholders can engage in expropriation. Khurana et al. (2007) find "a positive association between cross-listing and subsequent externally financed firm growth rates," using a sample of firms from 37 countries that are cross-listed in the U.S., even though they fail to find a function that can systematically summarize the variance of increases in externally financed firm growth after cross-listing and their home-country attributes. Ting Yang's (2002) evidence also displays a higher performance on cross-listed Japanese companies than non-cross-listed ones.

In China, Kong and Li (2010) state that a more transparent capital market will put a heavier cost on a company but also will boost its growth rate and operating performance after analyzing Chinese companies cross-listed in the U.S.

(2) Neutral and Negative Effects

Sarkissian and Schill's (2004) global data sample of 1676, from 25 countries, shows a rather transitory nature of valuation gains to overseas-listing instead of a permanent one. Furthermore, they

"find little evidence of a permanent effect on returns for firms that list abroad, even for firms' listings in markets that are more liquid, provide better legal protection, or have a larger shareholder base," such as the U.S. Some researchers, however, examine the effects of cross-listing under specific conditions and factors. Foerster and Karolyi (1993) pick the case of two "similar" economies – the U.S. and Canada – to test "weather the extent of economic and financial market integration (or segmentation) between a firm's home country and listing country influences stock price reaction." They end up with an average rise of 9.4% in risk-adjusted stock prices of cross-listed Canadian firms during the 100 days before the week of listing, followed by an additional 2% rise around the cross-listing date, but eventually land on a corresponding drop of 9.7% in the 100 days after the cross-listing. However, they find a subsample of Canadian resource firms does not exhibit these stock price effects, suggesting industry-related factors may be among the important determinants of market integration. Karolyi (1998), quoting several sources, reports a risk-adjusted decline in stock's value of 12%–19% in the year following cross-listing.

Pan and Dai (2008) use ROA, ROE and EVA as KPI to measure the performance mainland Chinese companies cross-listed on HKEX and come up with some good numbers for companies performance one year before cross-listing but considerable decreases in the three years after cross-listing. They believe the phenomenon is caused by company's inappropriate operations on the newly raised capital, despite an evidence of insensitivity to cashflow after the event. Pan's (2007) other paper employs a regression methodology on performance of the mainland Chinese companies who go public on HKEX before they cross-list on A-share board in SSE or SZSE then results show a general sharp fall after cross-listing. Kong, Shao and Ren (2014) compare the mechanism of the second board on both A-share and Nasdaq and contend that: (1) the more hungers a medium-size company for cash the more likely it will choose to go abroad; and (2) ownership concentration has a strong relationship with the company's performance, this is particularly the case for medium-sized firms and IT businesses.

3. HYPOTHESES, DATA AND VARIABLES

3.1. BACKGROUND AND HYPOTHESES

The very first overseas-listing of a Chinese company happened in the year of 1993, when Tsingtao Brewery Co. went on public in Shanghai and Hong Kong at the same time. Over the next twenty years, the government has published a series of regulations and policies to encourage domestic companies who are traded on A-share market to dig out more money by issuing securities in developed economies, especially HK. According to Securities Law of the People's Republic of China, any direct or indirect (ADRs) cross-listings have to be implemented with the approval from China Securities Regulatory Commission (CSRC).[3] However, since foreign registered firms are not allowed to be listed on A-share market, many de factor Chinese companies have quite often been omitted from relevant studies and analyses. This paper defines a Chinese company as an enterprise which is either registered in the mainland China or incorporated outside but headquartered and operating a majority of its business in the mainland China. Also, some foreign companies choose to be traded in the U.S. through DR programs due to their features of fast procedures and lower costs. Yet, most of Chinese companies still choose IPOs for overseas-listing.

The main purpose of the study demonstrated by this paper is to examine whether the action of overseas-listing done by a Chinese firm would have any effects on the firm's operating performance. Therefore, the first hypothesis would be set up straightforward.

Hypothesis 1: The *corporate performance of a Chinese company listed on a market of more developed economy is different from that of a Chinese company listed on the domestic market.*

Interestingly, one feature differentiates the Chinese corporate landscape from other major economies in the world is a considerable composition of state-owned enterprises. Zhang et al. (2011) analyze the political relations as well as financing and investment behaviors of Chinese public companies and the empirical results reflect a positive relationship between the company's political influence and resources of capital. We thus add one more hypothesis to our study.

Hypothesis 2: The corporate performance of a *state-owned Chinese enterprise improves better*

[3] CSRC (http://www.csrc.gov.cn/pub/shenzhen/xxfw/tzzsyd/ssgs/zh/zhxx/201504/t20150430_275948.htm)

after overseas-listing than a non-state-owned Chinese enterprise does.

3.2. DATA

I choose Hong Kong Stock Exchange as the data base for overseas-listing Chinese companies since it has been the most popular destination far better than the second – the U.S. Another advantage that can be exploited for the study from it is the lack of a cultural barrier between the mainland and Hong Kong, which is considered to be helpful in controlling the characteristics of the two markets in order to reach a precise comparison. I only select the companies who are single listed, that is, either listed on HKEX or A-share market (SSE or SZSE) but not both at the same time (known as the AH firms). The rationale behind this scheme is to extract Chinese companies' IPOs on HKEX and domestic IPOs as a quasi-counterfactual, since the real counterfactual is impossible to observe.

The sample pool of this paper comes from China Stock Market Accounting Research (CSMAR) between the fiscal year of 2014-2017 (some of the firms end on March 31, 2018), complemented by Bloomberg and HKEX database. All of the companies have gone public through an IPO. The tricky part during the data collection is the identification of the de facto Chinese companies incorporated overseas. This problem only happens to the enterprises listed on HKEX as the Chinese A-share market does not admit foreign registered companies. As a solution we only include companies who satisfy both of the two conditions: (1) headquartered in mainland China; (2) more than 50% of operating income comes from mainland China. Financial firms are excluded as they usually have a very different capital structure than other industries, as well as insolvent firms with a debt ratio greater than 100% because they are extremely unlikely to be able to repay their debts anymore. We also want to kick out A-share companies who are marked with "ST" or "PT" which indicates a suspension or restriction on the company's trade due to a significant underperformance for three consecutive years, or a series of unusual operations implying suspicious activities from the controlling shareholder. In addition, observations with missing data for the variables needed for the model (will be explained later) are taken out of the sample pool. The final sample pool ends up with 12635 firm-year observations (out of roughly 18000 before the application of screening conditions) in total, classified

into ten sectors according to Global Industry Classification Standard (GICS) as energy, materials, industrials, consumer discretionary, consumer staples, health care, financials, IT, communication services, utilities and real estate. Finally, we winsorize all numbers with replacement at the upper and lower 1 percentiles to mitigate the effect of extreme outliers and eradicate errors in the data.

3.3. VARIABLES

This paper uses ROA based on a company's fiscal year financial reports to measure its operating performance as it is one of the most explanatory and widely used financial ratios when comparing similar enterprises. I decide not to use ROE because of the reason that companies listed on different markets may have distinct capital structures so that likely to yield an unconvincing result. We use the annual growth rate of total assets as a secondary indicator to measure the effectiveness of overseas-listing as the logic that lower the costs of capital, the more cash an overseas-listing company is likely to raise, so that it will have a better chance to expand the size of business. A third financial used in this paper in terms of performance measurement would be Tobin's Q. A company with a Q ratio higher than one is earning a rate higher than its replacement cost. However, Tobin's Q has particular limitations in Chinese stock market: first, as Chinese stock market as a whole appears to be more volatile, it is difficult to separate the performance of firms from that of the market; second, many A-share companies tend to have more amount of uncirculated shares held by founders and other insiders, which as a result significantly compromises the accuracy of the Q ratio's calculation. In this paper, market prices are used during the calculation of the market values for uncirculated shares.

A list of control variables (aka, matching variables) are used to match observations from two groups of companies in order to extract random effects caused by the fact of overseas-listing. Key variables include natural logarithm of total assets, debt ratio, total assets turnover, fixed assets ratio, profit margin, whether or not state-owned enterprise, etc. A list of the definition and construction of each variable used in this study is detailed in the Appendix (A).

Table 1 Summary Statistics of Variables for Chinese Companies Listed Overseas (HK = 1)

Variable	Observations	Mean	Standard Deviation	Min	Max
ROA	956	0.041	0.067	-0.142	0.253
GROWTH	956	0.191	0.380	-0.270	2.193
SIZE	956	22.588	1.894	19.251	25.700
TOBINQ	956	1.396	2.635	0.698	15.406
LEVER	956	0.488	0.222	0.058	0.886
EM	956	2.850	1.836	1.062	8.928
TOP1	956	0.497	0.164	0.098	0.790
TANG	956	0.250	0.212	0.002	0.724
PROFM	956	0.081	0.183	-0.598	0.520
LIQUID	956	2.357	2.455	0.298	14.865
ASTURN	956	0.670	0.557	0.0634	2.532
SOE	956	0.571	0.495	0	1

Table 2 Summary Statistics of Variables for A-share Companies (HK = 0)

Variable	Observations	Mean	Standard Deviation	Min	Max
ROA	11,679	0.055	0.060	-0.142	0.253
GROWTH	11,679	0.231	0.369	-0.270	2.193
SIZE	11,679	21.842	1.242	19.251	25.70
TOBINQ	11,679	3.054	2.681	0.698	15.406
LEVER	11,679	0.410	0.201	0.058	0.886
EM	11,679	2.039	1.211	1.062	8.928
TOP1	11,679	0.361	0.155	0.098	0.790

TANG	11,679	0.210	0.159	0.002	0.724
PROFM	11,679	0.092	0.135	-0.598	0.520
LIQUID	11,679	2.482	2.308	0.298	14.865
ASTURN	11,679	0.660	0.432	0.063	2.532
SOE	11,679	0.293	0.455	0	1

We can group our sample pool into two according to the location of their stock exchange and summarize with a dummy variable called "HK". The HK will be equal to 1 if the company is listed on HKEX and 0 otherwise. From the summary statistics of the two groups, we actually find rather similar average numbers for most of the variables. The eye-catcher is that the proportion of state-owned enterprises (SOE) of HKEX listed companies are almost twice that of the ones stayed home. Companies listed on HKEX also appear to be generally bigger in terms of total assets. This implies a potential self-selection bias that bigger and/or state-owned companies tend go abroad as they are relatively easier to be approved by the regulators to go outside as well as more confident than smaller-sized firms, which is the main reason that we need to "match" the companies from the two groups to reach a more accurate comparison, instead of using traditional OLS method. On the other hand, higher TOP1 of overseas-listed firms is also likely attributed to the greater proportion of state-owned companies since they are usually highly concentrated in terms of ownership. The ROA and assets growth rate of A-share companies are slightly higher, while the Tobin's Q is a lot higher. This recalls the potential problem we discussed above: the mainland Chinese stock market is likely being overvalued if we calculate the values of all uncirculated shares at their market prices. Debt ratios of HKEX companies appear to be higher, possibly due to larger companies tend to have more access to debts from banks according to Zhang et al. (2011). Please note that the maximum and minimum numbers of each variable for the two groups are the same because we have winsorized the entire sample pool with replacement at the 99 and 1 percentiles beforehand.

4. METHODOLOGY AND EMPIRICAL RESULTS

4.1. PROPENSITY SCORE MATCHING

4.1.1. Introduction

In a general sense, effects of a specific action or event can usually be concluded by the difference between the status under the fact and the status under the counterfactual. However, for most of the cases in real life, any object is nearly impossible to be observed under two statuses at one particular moment. Experimental studies can build a counterfactual status through the setup of a treatment group and control group of the objects. Empirical studies, however, need to find other ways to mitigate the possibility of selection bias to the minimum. Propensity score matching is one of the methods.

The idea of propensity score is developed by Rosenbaum and Rubin (1983). Their method involves a way of selecting samples for a control group based on the values of one or more specific variables, such that the nature, other than the status we want to study, of the control group would as close to that of the treated group as possible. The score, therefore, is the metrics for the "closeness" of the two groups. In our case, the treatment group is the overseas-listed companies and the control group is the domestic-listed companies, and the status we want to study if the action of being listed overseas.

4.1.2. Propensity Score

According to Rosenbaum and Rubin, the propensity score (PS) is defined as "the conditional *probability* of receiving a treatment given pre-treatment characteristics."

$$P(X) = Pr\,[D = 1 \mid X] = E\,[D \mid X] \qquad (1)$$

In equation (1), D works as a binary indicator variable which equals to 1 if a firm implements an overseas IPO and 0 otherwise. X is the multidimensional vector of control variables upon which we create the control group. Therefore, if we can estimate the propensity score for the *i*th company, we can then end up with an average difference of the effects on the treated group and the control group, known as the Average Treatment Effect on the Treated (ATT):

$$
\begin{aligned}
ATT &= E(Y_{1i} - Y_{0i} \mid D_i = 1) \\
&= E\{E[Y_{1i} - Y_{0i} \mid D_i = 1, P(X_i)]\} \\
&= E\{E[Y_{1i} \mid D_i = 1, P(X_i)] - E[Y_{0i} \mid D_i = 0, P(X_i)] \mid D_i = 1\} \qquad (2)
\end{aligned}
$$

In equation (2), Y_{1i} and Y_{0i} represent the estimated outcomes of the companies listed on HKEX and the A-class companies respectively.

In practice, the estimation of propensity scores is usually done through a Logit or Probit models, which are designed for estimating probabilities on binary outcomes. Such method is established by Dehejia and Wahba (2002). This paper uses a Logit model:

$$P(X_i) = \Pr(D_i = 1 \mid X_i) = \frac{exp(\beta X_i)}{1 + exp(\beta X_i)} \qquad (3)$$

where $\exp(\beta Xi) / 1+ \exp(\beta Xi)$ is the cumulative distribution function outputting the probability result. X is the multidimensional vector of independent variables which may affect the likelihood, known as the so-called propensity, of companies to implement overseas-listing, and β is a coefficients vector.

4.1.3. Matching Methods

P(Xi) is a continuous variable therefore makes it impossible to land on a perfect matching pair of companies who have the exact same propensity scores. However, researchers have come up with various solutions to solve this question. Thanks to Becker and Ichino's (2002) summarization, we now know three of the most widely used matching methods are Nearest-Neighbor Matching, Radius Matching and Kernel Matching.

As the name suggests, the idea of nearest neighbor matching is to match a treated sample with a control sample such that the two propensity scores yield the smallest absolute value of difference, that is the nearest distance. Denote $C(i)$ the set of control companies that matched to the ith company from the treated group with an estimated propensity score of P_i with a propensity score of P_j, so that:

$$C(i) = \min \| P_i - P_j \| \qquad (4)$$

Radius matching, instead of finding the closest match, includes all of control companies with estimated propensity scores falling within a distance radius r:

$$C(i) = \{P_i \mid \| P_i - P_j \| < r\} \qquad (5)$$

If an overseas-listed company *i*, where $i \in T$, has N_i^C non-overseas-listed matches, $W_{ij} = 1 / N_i^C$ stands for the weight for ever *j*th non-overseas-listed company ($j \in C(i)$), otherwise $W_{ij} = 0$. Then for a treated group with N^T companies, the ATT can be estimated as:

$$\tau^M = \frac{1}{N^T}\sum_{i \in T} Y_i^T - \frac{1}{N^T}\sum_{j \in C} W_j Y_j^C \qquad (6)$$

In equation (6), *M* indicates either nearest-neighbor matching or radius matching and the weights $W_j = \sum W_{ij}$. Furthermore, if the weights are fixed and the outcomes of effects on companies' performance are independent from each other, the variances of τ^M can be calculated as:

$$Var(\tau^M) = \frac{1}{N^T} Var(Y_i^T) + \frac{1}{(N^T)^2}\sum_{j \in C}(W_j)^2 Var(Y_i^C) \qquad (7)$$

The Kernel matching involves a more complicated concept. Simply put, by implementing the kernel matching we match every *i*th treated company with all control companies, but at a weight that is inversely proportional to the distance between the propensity scores of the treated company and the *j*th control company. Then the ATT can be estimated as:

$$\tau^K = \frac{1}{N^T}\sum_{i \in T}\{ Y_i^T - \frac{\sum_{j \in C} Y_j^C G((p_j - p_i) / h_n)}{\sum_{k \in C} G((p_k - p_i) / h_n)} \qquad (8)$$

where "$G(\cdot)$ represents the Gaussian kernel function, and h_n represents bandwidth parameter. Under standard conditions on the bandwidth and kernel,

$$\frac{\sum_{j \in C} Y_j^C G((p_j - p_i) / h_n)}{\sum_{k \in C} G((p_k - p_i) / h_n)}$$

is a consistent estimator of the counterfactual outcome Y_{0i}."

4.1.4. Summary

Our study in this paper will employ the nearest-neighbor matching and the kernel matching to estimate the weighted average difference between the effects on the performance of the companies from the two groups. We will then test the validity of our matching through two methods: common support / overlap test, and covariates balance test.

Our final task would be a weighted linear regression based on the

$$Y_i = \beta_0 + \beta_{1i} HK_i + \beta_{2i} X_i$$

Where Y_i stands for the ROA of the ith company as the explained variable; HK is the dummy variable indicating whether the ith company is listed on HKEX or not; X_i represents the vector of explanatory variables.

4.2. Empirical Results

4.2.1. Control Covariates and Logit Model

The selection of control covariates for our Logit regression model based on previous studies as well as relevant economic theories. The set of our covariates is designed to analyze the effects of overseas-listing on a firm's corporate performance from different perspectives. The total assets and net fixed assets ratio tell us the size of the firm as well as the nature of its business. For example, companies in the tertiary sector or IT industry tend to have low fixed assets ratio but rather higher intangible assets. The current and debt ratios, along with the equity multiplier, reflect its capital structure. Moreover, the profit margin and total assets turnover display the company's profitability and efficiency. An intense proportion of the largest ownership may imply a potential problem on corporate governance while a state-owned firm is usually exposed to even greater risk regarding that in the mainland China. Tobin's Q, when works as a control variable, measures the growth potential. In addition to the explanatory covariates, we also include 3 dummy variables for the time horizon and 9 dummy variables to control the ten sectors according to GICS.

We start with a backward stepwise regression to screen out the variables that are not significant towards the Logit model for PSM. The first step shows that the total assets turnover appears to be an unconvincing factor in deciding the probability of a mainland Chinese company going public in foreign countries. A detailed process for the backward stepwise Logit regression is presented in the Appendix (B1-2).

We then take a look at the correlation between the variables. The results attached to the Appendix (C) suggest that the debt ratios are highly correlated with the equity multipliers. This is

likely because both of the two variables are defined as the indicator of a company's capital structure. The debt ratios also show a remarkable correlation with the current ratios. I decide to keep the debt ratio and current ratio, but exclude the equity multiplier such it only reflects much limited information.

Table 3 The Estimation Results of Logit Model (HK)

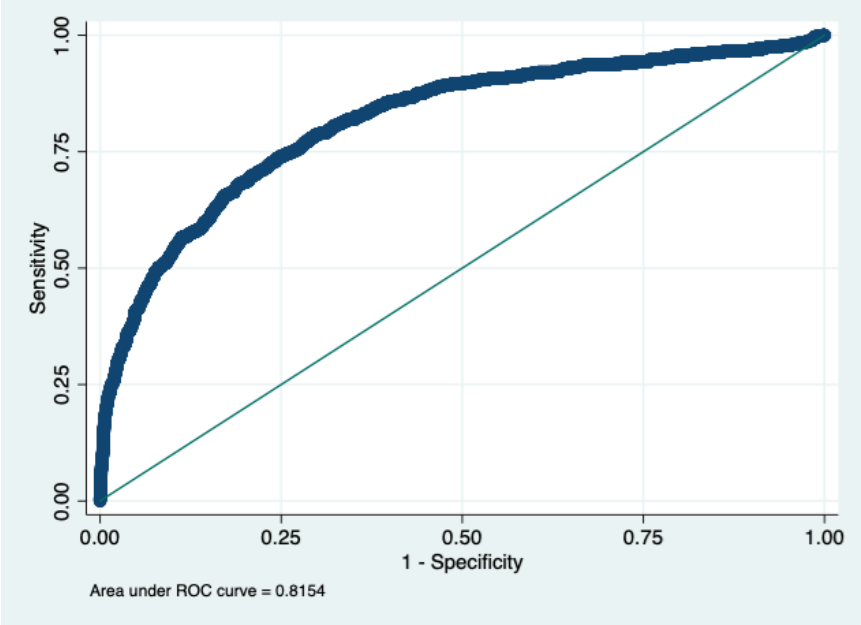
Logistic regression — Number of obs = 12,635
LR chi2(20) = 1306.15
Prob > chi2 = 0.0000
Log likelihood = -2733.692 — Pseudo R2 = 0.1928

HK	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SIZE	.1321338	.031327	4.22	0.000	.070734	.1935337
LEVER	.9353648	.2730479	3.43	0.001	.4002007	1.470529
TOBINQ	-.4024492	.0300642	-13.39	0.000	-.4613738	-.3435245
TOP1	4.118329	.2306775	17.85	0.000	3.666209	4.570448
LIQUID	.2269867	.0208254	10.90	0.000	.1861697	.2678038
TANG	1.228025	.2409395	5.10	0.000	.7557925	1.700258
PROFM	-1.28983	.2914274	-4.43	0.000	-1.861017	-.7186427
SOE	.6088179	.0843079	7.22	0.000	.4435774	.7740583
year_2	.4365208	.1138361	3.83	0.000	.2134062	.6596355
year_3	.5739879	.1090728	5.26	0.000	.3602092	.7877667
year_4	.5497031	.1087218	5.06	0.000	.3366123	.762794
ind1	.0605816	.2118286	0.29	0.775	-.3545947	.475758
ind2	.3360552	.2340594	1.44	0.151	-.1226929	.7948032
ind3	-.7226639	.312939	-2.31	0.021	-1.336013	-.1093147
ind4	.4306126	.227294	1.89	0.058	-.0148755	.8761007
ind5	-.0271645	.2026742	-0.13	0.893	-.4243986	.3700695
ind6	.2489122	.2173354	1.15	0.252	-.1770574	.6748818
ind7	-.8114886	.2255603	-3.60	0.000	-1.253579	-.3693986
ind8	.2123289	.2349519	0.90	0.366	-.2481684	.6728262
ind9	-.2435516	.2550779	-0.95	0.340	-.7434951	.2563918
_cons	-8.169093	.695827	-11.74	0.000	-9.532888	-6.805297

Table 3 presents the estimated results of our logistic regression model for the future PSM. Note that companies from particular industry sectors are apparently more inclined to be listed overseas than others. A pseudo R-squared of 0.1928 reports in rather moderate effectiveness of our Logit model. A more important metrics, however, that evaluates the performance of a binary outcomes regression model is the area under a Receiver Operating Characteristics (ROC) curve, as one of 0.8154 illustrated

by our Fig1. The closer to 1 the area, the better the Logit model is at predicting 0s as 0s and 1s as 1s.[4] Together the two diagnostic proxies suggest that our Logit model is a healthy one.

Fig. 1 Area Under the ROC curve



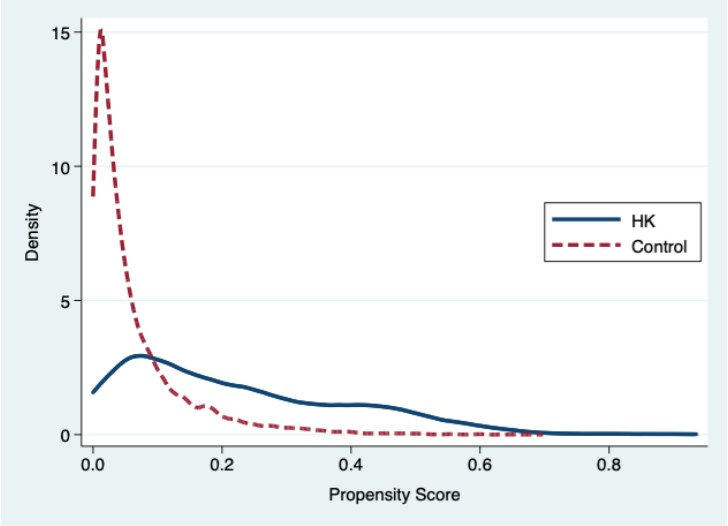
4.2.2 Matching Test

(1) Common Support / Overlap Test

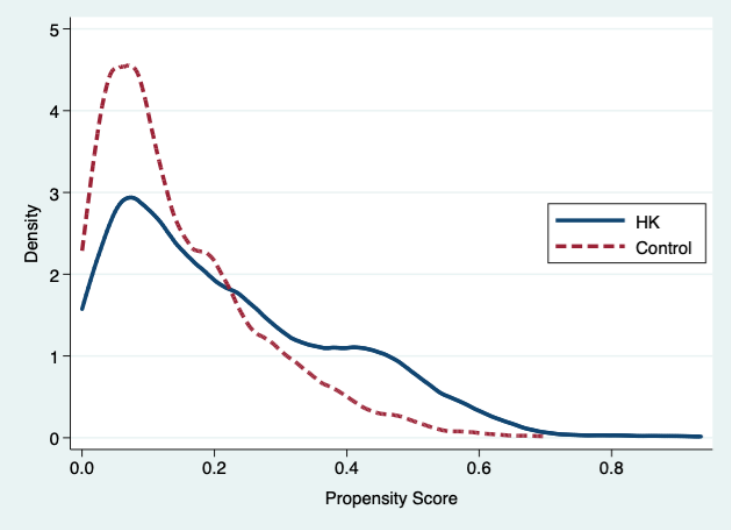
Fig. 2 compares the kernel density of propensity scores from both the treated companies and control companies before and after the matching. (a) shows a substantial difference between the distribution of PS of the two groups, indicating their significantly different characteristics on general average, which is why a matching is needed. (b) thereafter shows a wide common area overlapped by the two groups' kernel density functions after implementation of the matching. In other words, we now compare two groups of firms who share much similar characteristics.

[4] Fawcett (2006) demonstrated a comprehensive use of ROC analysis.

Fig. 2 Kernel Density of the Propensity Score



(a) Before Matching



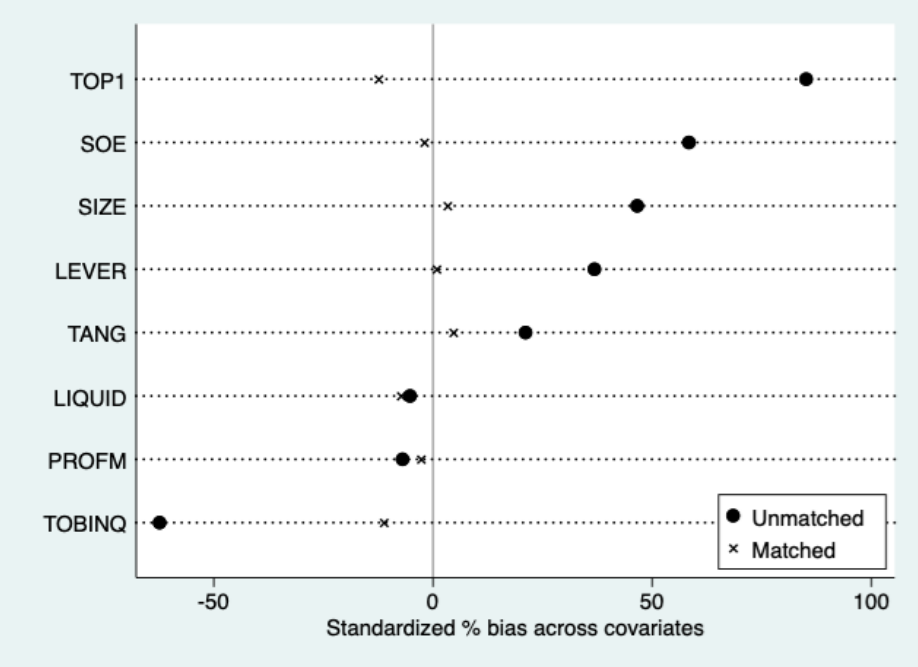
(b) After Matching

(2) Covariates Balance Test

In a more straightforward sense, the validity and effectiveness of a PSM process are based on the extent to which the differences of the characteristics in interest, that is the control variables, are decreased to a minimum level, and as a result so is that of the bias. A matching is proved to be successful if the process to a significant degree reduces the absolute average value of the proportions of standardized bias across covariates: the closer they are to zero, the better the matching is. In our

case, all covariates have been improved to a large scale as shown in our Fig. 3 except for the current ratio, which is still healthy as the post-matching absolute value is smaller than 10. Thus, our matching is considered successful. A table of bias reduction in detailed numbers is provided in Appendix D.

Fig. 3 Covariates Balance Test



4.2.3 ATT Results

Table 4 Results from Nearest-Neighbor Matching

Variable	Sample	Treated	Controls	ATT	t-value
ROA	Pre-Matching	0.04065	0.05516	-0.01451	-7.07***
	Post-Matching	0.04065	0.05121	-0.01056	-3.59***
GROWTH	Pre-Matching	0.19123	0.23125	-0.04003	-3.22***
	Post-Matching	0.19123	0.15418	0.03704	2.30**

TOBINQ	Pre-Matching	1.39614	3.05395	-1.65781	-18.41***
	Post-Matching	1.39614	1.69385	-0.29771	-2.70***

Note: (1) "Pre-matching" refers to the sample without matching the Treated companies with the Controls, and "Post-matching" refers the groups after matching.
(2) "Treated" and "Controls" respectively refer to firms listed on HKEX and A-share market.
(3) ***, ** and * represents significance at level of 1%, 5% and %10 respectively

Table 5 Results from Kernel Matching

Variable	Sample	Treated	Controls	ATT	t-value
ROA	Pre-Matching	0.04065	0.05516	-0.01451	-7.07***
	Post-Matching	0.04101	0.05238	-0.01137	-4.42***
GROWTH	Pre-Matching	0.19123	0.23125	-0.04003	-3.22***
	Post-Matching	0.19237	0.15635	0.03602	2.40**
TOBINQ	Pre-Matching	1.39614	3.05395	-1.65781	-18.41***
	Post-Matching	1.39947	1.69185	-0.29238	-2.77***

***, ** and * represents significance at level of 1%, 5% and %10 respectively

4 of the 956 treated firm-years are unable to find a match Control under kernel matching, while all of them are successful matched under nearest-neighbor matching (Appendix E1-2). As fairly consistent results from the two matching approaches present us significant effects on companies' corporate performance after an IPO issuance on HKEX, we can conclude the first hypothesis by stating, with a minimum worry about selection bias, that an overseas-listing on an more developed market does have significantly different effects on a Chinese firm's performance than listing on the A-share market. The decreases in both ROA and Tobin's Q (of 0.01137 and 0.29238 respectively) are possibly due to the lower (post-matching) profit margin as shown in Appendix D. One of the reasons for this might be the higher costs of corporate governance, audit and/or listing on HKEX. The difference in Tobin's Q may also suggest an overall overvaluation for the A-share market. However, an increase in

assets growth rate (0.03602) is reported by the PSM, implying the company's ability of raising more money at a lower cost abroad. On the other hand, both of the three variables from pre-matching sample pool report worse results than post-matching, due to the effect of selection bias.

4.2.4. State-Owned Enterprises

Many Chinese state-owned companies have very different characteristics in terms of management, corporate governance, capital structure and operating environments than private companies. In additional, the dummy variable of state-owned enterprise works as a significant factor in deciding an overseas-listing action. Therefore, we take a closer look at the post-matching results under the two types of enterprises and see if different conclusions can be drawn from their post-listing performance.

Table 6 Panel Results of State-owned and Non-state-owned Enterprises

	All Samples		SOE		Non-SOE	
Variable	ATT	t-value	ATT	t-value	ATT	t-value
Nearest-Neighbor Matching						
ROA	-0.01056	-3.59***	-0.02661	-5.79***	-0.01095	-2.41**
GROWTH	0.03704	2.30**	0.05666	2.40**	0.00470	0.19
TOBINQ	-0.29771	-2.70***	-0.37647	-2.09**	-.02320	-0.14
Kernel Matching						
ROA	-0.01137	-4.42***	-0.02859	-7.29***	-0.00807	-1.94*
GROWTH	0.03602	2.40**	0.05635	2.63***	0.00677	0.30
TOBINQ	-0.29238	-2.77***	-0.16513	-1.06	-0.35635	-2.18**

***, ** and * represents significance at level of 1%, 5% and %10 respectively

The panel of Table 6 presents the ATT results for both of the two types of companies according to the matching approaches. State-owned companies appear to have more intense effects than all

samples average and private companies with strong significance under both matching approaches except kernel matching Tobin's Q. Better assets growth rate agrees with the hypothesis that companies with political influence tend to have better opportunities to overseas funds access under a variety of encouraging programs and policies by the governance. However, worse ROAs suggest absence of reasonable decisions regarding the action compared to private companies. We thus can conclude our second hypothesis with rejection: state-owned Chinese firms do *not* display better corporate performance through overseas-listing than private Chinese firms. The results of private companies, on the other hand, appear to be relatively less significant.

4.2.5. Post-Matching Linear Regression

Table 7 Weighted Linear Regression on ROA

ROA				
	Pre-Matching		Post-Matching	
	Coef.	t	Coef.	t
HK	-0.0079125	-4.86***	-0.0080514	-4.58**
SIZE	-0.0066204	-17.00***	-0.0070967	-8.94**
LEVER	-0.0227884	-7.88***	-0.0178075	-2.7**
TOBINQ	-0.0015182	-7.51***	-0.0007769	-1.41
TOP1	0.0523125	22.00***	0.0366275	6.76***
LIQUID	-0.0013076	-5.16***	-0.0020288	-3.51***
TANG	-0.0257652	-10.01***	-0.0347076	-6.09***
PROFM	0.3028508	67.39***	0.2710345	31.22***
SOE	-0.0112223	-14.72***	-0.0126912	-6.23***
year_2	-0.0009822	-0.95	0.00002	0.01
year_3	-0.00161	-1.62	-0.0053149	-1.87**
year_4	-0.0042161	-4.27***	-0.0113755	-3.92***
ind1	0.0057904	2.60***	0.0032436	0.71
ind2	0.0078568	2.94***	0.014594	2.58**
ind3	-0.0098271	-3.21***	-0.0179714	-2.3**
ind4	0.0108399	4.61***	0.0074822	1.63
ind5	-0.0042448	-2.01**	-0.008846	-2.28**

ind6	0.0033206	1.51	-0.0006531	-0.16
ind7	0.0007357	0.33	-0.0070552	-1.6
ind8	-0.0248843	-9.16***	-0.025913	-5.33***
ind9	-0.0078382	-2.93***	-0.0076621	-1.7*
_cons	0.1803884	20.71***	0.2088635	12.19***
N	12,635		2,766	

***, ** and * represents significance at level of 1%, 5% and %10 respectively

We now implement a weighted linear regression on ROA with covariates we have used for PSM. The weights of samples in the post-matching regression are set according to the numbers of matchings they have involved during our PSM process. We can see from Table 7 that, despite the slightness of the difference, Pre-Matching model underestimates the degree of HK's negative effect on the company's ROA.

Table 8 Weighted Linear Regression on Assets Growth Rate

GROWTH				
	Pre-Matching		Post-Matching	
	Coef.	t	Coef.	t
HK	0.038217	2.99***	0.0474068	3.4***
SIZE	0.0218897	7.35***	0.0009445	0.14
LEVER	0.1127669	3.77***	0.1487588	2.34**
TOBINQ	0.0188834	11.2***	0.0273448	4.48***
TOP1	-0.0680469	-3.57***	-0.0833254	-2.05**
LIQUID	0.0007185	0.27	0.0063234	1.23
TANG	-0.4124345	-19.21***	-0.2404216	-5.28***
PROFM	0.5608679	19.24***	0.4293091	6.54***
SOE	-0.1228036	-19.29***	-0.0764882	-4.64***
year_2	0.0150662	1.76*	-0.0144408	-0.66
year_3	0.0264101	3.19***	-0.0014656	-0.07
year_4	0.0324898	3.96***	0.0415577	1.98**
ind1	-0.0645822	-2.69***	-0.0109405	-0.38
ind2	-0.083818	-3.36***	0.006458	0.17
ind3	-0.0747715	-2.64***	-0.0310371	-0.79

ind4	-0.0587527	-2.3**	0.0364557	0.91
ind5	-0.0719484	-3.07***	-0.0147268	-0.54
ind6	-0.0241218	-0.98	-0.0137051	-0.42
ind7	-0.0564432	-2.38**	-0.0043471	-0.13
ind8	-0.1961536	-7.31***	-0.021038	-0.57
ind9	-0.0083406	-0.3	0.0676205	1.65*
_cons	-0.2152389	-3.39	0.0994006	0.72
N	12,635		2,766	

***, ** and * represents significance at level of 1%, 5% and %10 respectively

Similar situation happens to the total assets growth rate, only this time the degree of a positive effect from treatment variable HK is underestimated. In other words, HKEX listed Chinese companies are more likely to expand the size of their businesses.

5. CONCLUSION

The goal of our study is to analyze the difference between the performance of Chinese companies listed on more developed equity markets and that if they were listed on the A-share market. Theoretically, random effects on the same empirical data sample under contradictory conditions are impossible to observe in real life. This means empirical data from both conditions is needed, yet a direct analysis on the average results between the companies from different stock exchanges might be remarkably compromised by selection bias. Propensity Score Matching method, however, enables us to compare the observations under such contradictory conditions by matching up the units from two different sample groups according to their characteristics that we want to control.

We choose Chinese companies from Hong Kong Stock Exchange as our treated sample pool due to the sufficient number samples and the desirable market characteristics. HKEX is widely agreed upon as one of the most well-developed equity markets in the world in terms of both regulations, transaction liquidity and size of capitalization. Yet what makes it even more ideal to our empirical analysis is the geographic and cultural advantages when linking it with SSE and SSZE. After controlling decisive variables such as company size, debt ratios and current ratios, we observe an

increase in assets growth rate but a decrease in the return on assets of HKEX listed companies. This confirms our first hypothesis that being listed on HKEX does make a difference on the performance than being listed as an A-share, which is consistent with past Chinese cross-listing studies. Companies tend to raise more money and become aggressive in expanding their business, but operating performance deteriorates due to heavier expenses for keeping high standards of corporate governance such as audit, as well as listing fees for the stock exchange. Moreover, we observe such pattern in a greater intensity in the state-owned companies: they appear to be even more aggressive in expanding their businesses but doing worse in terms of profiting. This phenomenon can be attributed to various subsidy and exemption programs imposed by the Chinese government, which evidently do not improve the profitability of the state-owned enterprises. We thus reject our second hypothesis regarding better improvement on companies with political backgrounds. Based on our empirical findings, we conclude a general negative effect on corporate performance for the Chinese enterprise if it be listed in a more developed economy instead of mainland China, and hereby recommend deeper considerations to potential overseas-listed Chinese enterprises.

Further analysis, however, is encouraged to be implemented on the subject as it's still a relatively new area yet to be extended. The extent to which the application of the results from the evidence we find on Hong Kong market on other developed equity markets remains unclear. Despite the similarity of Hong Kong market to the Western countries in terms of regulations and systems, it shares a lot of things in common, especially cultural, with mainland China that the Western countries such as the U.S. do not. We also want to keep a skeptical mind with the data for the A-share companies because of the potential corporate financial publication fraud, which is usually due to insufficient enforcement of regulations. On the other side, the high dynamic feature of Chinese market disrupts the constancy of our conclusion and it requires continual updates on the study of the subject in terms of corporate data. I would also suggest a difference-in-differences analysis on sample companies' financial contents before and after the IPO issuance after the PSM process to get a better view. This is hard to practice for our data period as accurate information before listing has usually been unavailable for A-share companies. However, the implementation of the strategy would be feasible in the future

as the Chinese government has been continuously working towards a better market environment including more requirements on disclosure of corporate information.

REFERENCES

[1] Amihud Y. & Mendelson H. (1986). “Asset Pricing and the Bid-Ask Spread”, Journal of Financial Economics Volume 17, Issue 2, Dec. 1986, 223-249

[2] Barncel F. & Mittoo U.R. (2002). “The Determinants of Capital Structure Choice: A Survey of European Firms”

[3] Blass A. & Yafeh Y. (2001). “Vagabond Shoes Longing to Stray: Why Foreign Firms List in the United States”, Journal of Banking & Finance, 25 (2001), 555–572.

[4] Booth L., Aivazian V.A., Demirguc-Kunt A.L.R. & Maksimovic V. (2001). “Capital Structures in Developing Countries”, The Journal of Finance,2001,56(1), 87-130.

[5] Errunza V. & Losq E. (1985). “International Asset Pricing under Mild Segmentation: Theory and Test”, Journal of Finance, 1985, Vol. 40, Issue 1, 105-124.

[6] Chen Guojin & Wang Lei. (2007). “How Overseas-Listing Affect Financing Restraints – Empirical Evidence from H-Share Companies”, in Chinese (to appear), Journal of Contemporary Finance & Economics. Sept. 2007.

[7] Coffee J.C. (1999). “The Future as History: The Prospects for Global Convergence in Corporate Governance and Its Implications”, Northwestern University Law Review 93(3), 641–708.

[8] Coffee J.C. (2002). “Racing Towards the Top? The Impact of Cross-Listings and Stock Market Competition on International Corporate Governance”, Columbia University Center for Law and Economic Studies Working Paper No. 205.

[9] Das S. & Saudagaran S.M. (1998). “Accuracy, Bias, and Dispersion in Analysts' Earnings Forecasts: The Case of Cross-Listed Foreign Firms”, Journal of International Financial Management & Accounting, Vol. 9, Issue 1, Feb. 1998, 16-33.

[10] Dehejia R.H. & Wahba S. (2002). “Propensity Score-Matching Method for Non-experimental Causal Studies”.

[11] Doidge C.G., Karolyi A. & Stulz R.M. (2004) “Why are Foreign Firms Listed in the U.S. Worth More?”, The Journal of Finance, 71(2), 205-238.

[12] Fawcett T. (2006). “An Introduction to ROC Analysis”, Pattern Recognition Letters, 27(8), 861–874.

[13] Foerster S.R. & Karolyi G. (1993). “International Listings of Stocks: The Case of Canada and the U.S.”, Journal of International Business Studies, 1993, Vol. 24, Issue 4, 763-784.

[14] Hirota G. (1999). “The impact of capital structure on the performance of microfinance institutions”, Journal of Risk Finance,1999, 8(1), 56-71.

[15] Jin Jia, Qian Sun & Wilson H.S Tong. (2005). “Privatization Through an Overseas Listing: Evidence from China’s H-Share Firms”, Financial Management, 2005, Vol. 34, Issue 3

[16] Jiang Bo. (2008). “Motivations and Effects Behind the Cross-Listings of Chinese Enterprises”, in Chinese (to appear), Journal of Special Zone Economy, Oct. 2008.

[17] Karolyi G. (1998). “Why Do Companies List Shares Abroad? A Survey of the Evidence and Its Managerial Implications”.

[18] Khurana I.K., Martin X.X. & Periera R. (2007) “Cross-Listing and Firm Growth”, Review of Finance, 12(2), 293-322.

[19] Kong Lingyi, Shao Huijuan & Ren Ting. (2014). “Equity Structure, Location of Lisitng and Operating Performance after IPO – Examples from Chinese Startups”, in Chinese (to appear), Journal of Modern Economic Science, 2014(4).

[20] Kong Ningning & Li Shuchao. (2010). “Does Overseas-Listing Help companies Grow? – Empirical Evidence from Chinese Companies Listed in the U.S.”, in Chinese (to appear), Research on Economics and Management, 2010(10).

[21] La Porta R., Lopez-de-Silanes F., Shleifer A. & Vishny R.W. (1999). “Investor Protection Origins, Consequences, Reform”, Journal of Political Economy, Oct. 2000.

[22] Lins K.V., Strickland D. & Zenner M. (2005). “Do Non-U.S. Firms Issue Equity on U.S. Stock Exchanges to Relax Capital Constraints?”, Journal of Financial and Quantitative Analysis, 2005, Vol. 40, Issue 01, 109-133.

[23] Modigliani F. & Miller M.H. (1958). “The Cost of Capital, Corporation Finance and the Theory of Investment”, The American Economic Review, Vol. 48, No. 3, Jun. 1958, 261-297.
[24] Pan Yue. (2007). “A Behavioral Study on Chinese Cross-Listing Companies”, in Chinese (to appear).
[25] Pan Yue & Dai Yiyi. (2008). “Cross-Listing and Financing Restraints – Empirical Evidence from Chinese A+H Companies”, in Chinese (to appear), Journal of Financial Research, 2009(7).
[26] Rosenbaum P.R. & Rubin D.B. (1983). “The Central Role of the Propensity Score in Observational Studies for Causal Effects”.
[27] Sarkissian S. & Schill M.J. (2004). “Are There Permanent Valuation Gains to Overseas Listings?”
[28] Stulz R.M. (1999). “Globalization, Corporate Finance, and the Cost of Capital”, Journal of Applied Corporate Finance, 26, 3–28.
[29] Ting Yang. (2002). “Cross-Listing and Firm Value: What Can Explain the Cross-Listing Premium? Evidence from Japan”.
[30] Zhang Zhaoguo, Zeng Mu & Liu Yongli. (2011). “Political Relation, Debt Financing and Corporte Investment Behaviors – Empirical Evidence from Chinese Public Firms”, in Chinese (to appear), China Soft Science Magazine, 2011(5), 106-121.

APPENDIX

Appendix A Variable Definitions

Variable	Full Name	Definition / Assignment
ROA	ROA	Net Income / Total Assets
GROWTH	Assets Growth Rate	(Assets – Last Period Assets) / Last Period Assets
HK	Overseas-Listing	Yes = 1; No = 0
SIZE	Size	Natural Logarithm of Total Assets
LEVER	Debt Ratio	Debts / Total Assets
TOBINQ	Tobin's Q	Market Value / Book Value
TOP1	Top One Ownership	The Proportion of the Biggest Shareholder's Ownership
LIQUID	Current Ratio	Current Assets / Current Debts
EM	Equity Multiplier	Total Assets / Shareholder's Equity
PROFM	Profit Margin	Net Income / Revenue
ASTURN	Assets Turnover	Revenue / ((Beginning Assets + Ending Assets) /2)
TANG	Fixed Assets Rate	Net Fixed Assets / Total Assets
year_2~4	Fiscal Years	Dummy Variables for 4 Fiscal Years
ind1~9	Industry	Dummy Variables for 10 Sectors according to GICS

Appendix B-1 Backward Stepwise Logistic Regression: Step One

Logistic regression

Number of obs	=	12,635	
LR chi2(22)	=	1393.13	
Prob > chi2	=	0.0000	
Log likelihood = -2690.2044	Pseudo R2	=	0.2057

HK	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SIZE	.1189627	.0317559	3.75	0.000	.0567223	.1812031
LEVER	-1.902287	.4083472	-4.66	0.000	-2.702633	-1.101941
TOBINQ	-.391704	.0293458	-13.35	0.000	-.4492208	-.3341873
LIQUID	.1574603	.022595	6.97	0.000	.113175	.2017456
TOP1	4.086118	.2356225	17.34	0.000	3.624306	4.54793
TANG	1.210173	.2481079	4.88	0.000	.723891	1.696456
EM	.3840137	.0404347	9.50	0.000	.3047632	.4632643
ASTURN	.0932722	.0883159	1.06	0.291	-.0798237	.2663682
PROFM	-1.062458	.2925264	-3.63	0.000	-1.635799	-.4891169
SOE	.6247995	.0854575	7.31	0.000	.457306	.7922931
year_2	.4399875	.1149585	3.83	0.000	.2146731	.665302
year_3	.5865867	.1102001	5.32	0.000	.3705984	.802575
year_4	.5596867	.1098324	5.10	0.000	.3444193	.7749542
ind1	.0588587	.2117531	0.28	0.781	-.3561698	.4738871
ind2	.2917693	.2351109	1.24	0.215	-.1690397	.7525783
ind3	-.7089271	.3146516	-2.25	0.024	-1.325633	-.0922213
ind4	.33426	.2268818	1.47	0.141	-.1104202	.7789401
ind5	-.0520032	.2016011	-0.26	0.796	-.4471341	.3431277
ind6	.2194465	.2165378	1.01	0.311	-.2049598	.6438529
ind7	-.8733137	.2261701	-3.86	0.000	-1.316599	-.4300284
ind8	.07962	.2421603	0.33	0.742	-.3950054	.5542454
ind9	-.1858132	.2553387	-0.73	0.467	-.6862679	.3146416
_cons	-7.406681	.7181612	-10.31	0.000	-8.814251	-5.99911

Appendix B-2 Backward Stepwise Logistic Regression: Final Step

Logistic regression

Number of obs	=	12,635	
LR chi2(21)	=	1392.03	
Prob > chi2	=	0.0000	
Log likelihood = -2690.7557	Pseudo R2	=	0.2055

HK	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
SIZE	.1145707	.0314883	3.64	0.000	.0528547	.1762868
LEVER	-1.845897	.4043647	-4.56	0.000	-2.638437	-1.053357
TOBINQ	-.3942926	.0292907	-13.46	0.000	-.4517014	-.3368838
LIQUID	.1557524	.0225236	6.92	0.000	.1116071	.1998978
TOP1	4.121724	.2332894	17.67	0.000	3.664485	4.578963
TANG	1.154112	.2419006	4.77	0.000	.679995	1.628228
EM	.3812715	.0403238	9.46	0.000	.3022383	.4603047
PROFM	-1.074074	.2900868	-3.70	0.000	-1.642633	-.5055141
SOE	.6213743	.0853726	7.28	0.000	.454047	.7887016
year_2	.4372824	.1149276	3.80	0.000	.2120285	.6625363
year_3	.5815475	.1100879	5.28	0.000	.3657792	.7973158
year_4	.5538849	.1096874	5.05	0.000	.3389016	.7688683
ind1	.0816407	.2107806	0.39	0.699	-.3314816	.494763
ind2	.324793	.2329805	1.39	0.163	-.1318403	.7814263
ind3	-.7063946	.3145988	-2.25	0.025	-1.322997	-.0897923
ind4	.3504498	.2264451	1.55	0.122	-.0933744	.794274
ind5	-.0493313	.2017018	-0.24	0.807	-.4446596	.3459971
ind6	.2321803	.2163	1.07	0.283	-.19176	.6561206
ind7	-.8536139	.225407	-3.79	0.000	-1.295404	-.4118242
ind8	.0320002	.2380059	0.13	0.893	-.4344828	.4984833
ind9	-.1987446	.2550742	-0.78	0.436	-.6986809	.3011917
_cons	-7.259803	.7048792	-10.30	0.000	-8.641341	-5.878266

Appendix C Correlation Matrix

	SIZE	LEVER	TOBINQ	LIQUID	TOP1	TANG	EM	PROFM	SOE
SIZE	**1.0000**								
LEVER	**0.4771**	**1.0000**							
TOBINQ	**-0.3707**	**-0.3617**	**1.0000**						
LIQUID	**-0.3211**	**-0.6496**	**0.3298**	**1.0000**					
TOP1	**0.0925**	**0.0804**	**-0.1782**	**-0.0363**	**1.0000**				
TANG	**0.1029**	**0.0774**	**-0.1587**	**-0.2480**	**0.1129**	**1.0000**			
EM	**0.4161**	**0.8278**	**-0.2411**	**-0.3800**	**0.0775**	**0.0197**	**1.0000**		
PROFM	**-0.0380**	**-0.3218**	**0.0790**	**0.2601**	**0.1040**	**-0.1015**	**-0.2759**	**1.0000**	
SOE	**0.3828**	**0.2736**	**-0.2070**	**-0.1836**	**0.1593**	**0.2010**	**0.2447**	**-0.1169**	**1.0000**

Appendix D Effectiveness of the PSM

Variable	Unmatched / Matched	Mean Treated	Mean Control	%bias	%reduct |bias|	t-test t	t-test p>|t|	V(T)/ V(C)
SIZE	U	22.588	21.842	46.6		17.03	0.000	2.33*
	M	22.588	22.535	3.3	92.9	0.66	0.509	1.41*
LEVER	U	.48823	.41022	36.8		11.45	0.000	1.22*
	M	.48823	.48649	0.8	97.8	0.17	0.866	0.92
TOBINQ	U	1.3961	3.054	-62.4		-18.41	0.000	0.97
	M	1.3961	1.6939	-11.2	82.0	-2.83	0.005	1.93*
TOP1	U	.4966	.36066	85.1		25.96	0.000	1.12
	M	.4966	.51644	-12.4	85.4	-2.50	0.013	0.81*
LIQUID	U	2.3574	2.4821	-5.2		-1.60	0.110	1.13
	M	2.3574	2.5319	-7.3	-40.0	-1.40	0.162	0.68*
TANG	U	.24962	.21005	21.1		7.18	0.000	1.77*
	M	.24962	.2409	4.7	78.0	0.93	0.354	1.13
PROFM	U	.08093	.09209	-6.9		-2.39	0.017	1.85*
	M	.08093	.08531	-2.7	60.7	-0.59	0.555	1.76*
SOE	U	.57113	.29335	58.4		18.01	0.000	.
	M	.57113	.58054	-2.0	96.6	-0.42	0.677	.

* if variance ratio outside [0.88; 1.14] for U and [0.88; 1.14] for M

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.164	1112.23	0.000	40.3	41.7	114.5*	0.98	57
Matched	0.007	19.64	0.012	5.6	4.0	20.5	1.76	71

Appendix E-1 Number of Successful Matchings – Nearest-Neighbor Matching

psmatch2: Treatment assignment	psmatch2: Common support On suppor	Total
Untreated	**11,679**	**11,679**
Treated	**956**	**956**
Total	**12,635**	**12,635**

Appendix E-2 Number of Successful Matchings – Kernel Matching

psmatch2: Treatment assignment	psmatch2: Common support Off suppo	On suppor	Total
Untreated	**0**	**11,679**	**11,679**
Treated	**4**	**952**	**956**
Total	**4**	**12,631**	**12,635**