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The Benefits of China Depository Receipts Evidence From Developed Economies

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***Abstract**:*

Depositary receipts are financial instruments that enable companies to get public traded in a foreign stock market. China is under way launching such a programme with the stock market in Frankfurt. As a first step, German blue-chips companies should be allowed issuing Chinese Depositary Receipts (CDRs) on the Shanghai Stock Exchange. This paper aims to answer the question what could be the potential benefits for German companies in doing so. To answer it, we investigate the firm value and operating performance of non-U.S. companies that issued Level 2 and Level 3 ADRs as comparable peer-group. Our dataset consists of 28 companies from 9 developed countries, cross- listed on major U.S. stock exchanges during the period 2002-2018. We provide evidence that these cross-listed companies experience improvements in their firm value after the listing, relative to a non-cross-listed matched sample of companies and relative to the pre-listing period. However, there is no evidence that the operating performance has improved as well.

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1. Introduction

Cross-border investing is growing rapidly as investors purchase foreign stocks and bonds to diversify their portfolios. Depositary receipts that can be bought and sold on local exchanges in one country that represent the publicly traded shares of a foreign company—offer easy access to fast-growing markets around the world. Depositary receipts are also an important tool for corporate issuers to access global capital markets and broaden their investor base.

China is gradually opening its capital market in the past few years. In 2019, Huatai Securities raised US$1.54 billion, the first issuer to list GDRs on the London Stock Exchange under the Shanghai-London Stock Connect scheme. This year China Pacific Insurance has completed London's second largest stock listing of the year, boosting a flagship program to connect the biggest equity markets in Europe and China. The Shanghai-London Stock Connect project, which will allow Chinese companies to list on the London Stock Exchange via global depositary receipts (GDRs), and UK companies to list on the Shanghai Stock Exchange via Chinese depositary receipts (CDRs).

Following the success of the Shanghai-Hong Kong and Shanghai-London stock connect programs, China is preparing for a similar system to link its stock market with that of Germany. The plan will allow German blue-chip companies to issue Chinese depositary receipts (CDRs) on the Shanghai Stock Exchange, and support certain qualified Chinese listed companies, especially those in the manufacturing sector, to issue global depositary receipts (GDRs) on the Frankfurt Stock Exchange in order to strengthen the interconnection between Chinese and German stock markets.

The motivation of this study is to provide the potential benefits of CDRs for German companies with empirical evidence and to find some major factors. The findings of the study will have important practical implications for German companies intending to cross-list via a CDR program, as well as for Chinese stock exchanges that have been actively promoting themselves as a new cross-listing destination.

To address the aforementioned research questions, we use a sample of 28 companies from 9 developed countries (most of them are from European countries) that issued Level 2 or Level 3 ADRs during the period 2002-2018 and a country-industry-stage-size matched sample of non-cross-listed companies. Although the operating performance of cross-listed companies is not significant, we provide evidence for economically and statistically significant firm value improvements for those companies after the listing, relative to a non-cross-listed matched sample of companies and relative to the prelisting period.

This paper makes three important contributions. First, we show significant difference of firm value between cross-listed companies and non-cross-listed companies in developed countries around the cross-listing. Second, no significant difference has been observed in

operating performance around the event, which leaves further research. Finally, we find some possible factors in the firm value among the cross-listing companies.

The remainder of the paper is organized as follows: Section 2 provides background details on a variety of depository receipts. Section 3 is dedicated to the related research and hypotheses development. Section 4 discusses depositary market and details on the sample and data. Section 5 evaluates the empirical results. Concluding remarks are provided in Section 6.

2. Depositary receipt background

2.1 The category of depositary receipt

Depository receipt is a kind of certificate that can be circulated in the market and represents the ownership of non-national securities held by domestic investors. Under certain conditions, depository receipts can be regarded as a substitute for foreign securities, and domestic investors purchase the ownership of foreign securities by purchasing depository receipts.

In 1927, JP Morgan issued the first depositary receipt in order to avoid the British laws at the time to purchase British stocks. This was the first successful practice of depositary receipts. The issuance of depository receipts and the entire purchase process are mainly composed of the issuer, the depositary bank and the corresponding underwriters, investors, and custodian banks. Among them, depository banks and custodian banks are the two core institutions. From the perspective of the entire capital market, the emergence of the depository receipt system has not only provided new conveniences for overseas investors, but also promoted the process of internationalization of the local market, added new investment methods and provided investors with diverse choices. From the perspective of listed companies, the emergence of depositary receipts simplifies the equity structure of companies, while also greatly reducing the cost of issuing overseas stocks.

According to the place of issuance or transaction, depository receipts can be classified to American Depository Receipt (ADR), Global Depository Receipt (GDR), European Depository Receipt (EDR), Brazilian Depository Receipt (BDR), Hongkong Depository Receipt (HDR) etc. Currently ADRs dominate the depository receipt market across the world in terms of number of programs, trading value, trading volume and capital raising.

2.2 American depositary receipt

American depositary receipts (ADRs) are created when a broker, acting on behalf of a potential ADR investor, purchases domestic shares in a non-US company and places them in custody with a depositary bank. The depositary bank then issues US dollar denominated receipts conveying beneficial ownership of those shares. These depositary receipts are

deemed by the United States securities and Exchange Commission to be domestic U.S. securities, and they trade and settle in the United States.

ADRs provide a number of advantages for U.S. investors compared to buying foreign stocks on local markets. First, the settlements are done in accordance with the U.S. regulations and are less time-consuming and the transaction costs (such as brokerage fees) are substantially lower (Karolyi 1998). The trade failure rates are typically lower than on domestic markets (Velli 1994). Second, for some types of ADRs the issuers are required to be registered with the Securities and Exchanges Commission (SEC) and to fulfill a set of stringent requirements, resulting in lower information asymmetry for investors.

There are two basic categories of ADR: unsponsored ADR and sponsored ADR. Unsponsored ADR, which is mainly sold by depositary banks, represents the actual shares of foreign companies and does not form formal relations with foreign companies. Often, foreign companies are rarely involved in issuing unsponsored ADRs. Conversely, issuers of sponsored ADRs generally participate actively in the issuance of ADRs and proactively reach an agreement with the depositary bank. Sponsored ADRs can be further divided into four categories: privately funded ADRs with 144A rules and Level 1, Level 2 and Level 3 ADRs. The categories vary according to eligible buyers, reporting requirements, ability to raise new capital, and whether securities are listed on the U.S. exchange.

Level 1 ADRs, which do not involve the raising of capital or a listing on a U.S. stock exchange, allow for increased exposure to U.S.-based investors with minimal additional reporting obligations, through trading on the U.S. over-the-counter (OTC) market.

Level 2 and Level 3 ADRs are ADR items traded on the American Stock Exchange (AMEX), the New York Stock Exchange (NYSE) or the National Securities Dealer Automated Quotation System (NASDAQ). These foreign companies have roughly the same reporting obligations to the U.S. SEC and their respective exchanges. The main difference between Level 2 ADRs and Level 3 ADRs is that Level 2 ADRs do not issue new shares. As a result, new shares of foreign companies are generally issued through Level 3 ADRs. As the Level 3 ADR program invests more directly in the U.S. security market, it has more reporting obligations to the U.S. Securities and Exchange Commission. The different types (Levels) of ADR programs are summarized in Table 1.

Table 1

American Depository Receipts (ADRs) by Type

Category	Issuance	Way of issuing	Exchange	Investor	Requirement for SEC registration
Unsponsored ADRs	Existing shares	Private placement	OTC	Qualified institutional buyers	No
Sponsored ADRs level 1	Existing shares	Private placement	OTC	US Public	Yes; F-6
Sponsored ADRs level 2	Existing shares	Public offering	NYSE, AMEX, NASDAQ	US Public	Yes; F-6, F-20
Sponsored ADRs level 3	New shares	Public offering	NYSE, AMEX, NASDAQ	US Public	Yes; F-6,F-3 or F-4
Private-placed ADRs (SEC Rule 144A)	New shares	Private placement	OTC	Qualified institutional buyers	No
ADRs (SEC Regulation S)	New shares	Private placement	Offshore	Foreign investors	No

Source: "CDR: the coming reform of Chinese securities market" by EY

2.3 Global and local depositary receipt

Global depositary receipts (GDRs) work on the same principle as ADRs, with trading and settlement taking place in Europe. GDRs are most often denominated in U.S. dollars or in Euro. They can be divided into Regulation S GDRs and Rule 144A GDRs.

Regulation S GDRs can be either listed on a European stock exchange. They may be used to raise capital. These GDRs are not generally available to U.S. resident investors.

Rule 144A GDRs are used to raise capital but are placed exclusively with Qualified Institutional Buyers (as defined by the United States Securities and Exchange Commission) in U.S. because of the sophistication of the investor base, registration and reporting requirements are minimal. They are often placed with US investors. The main difference between GDRs and ADRs are listed in Table 2.

Table 2

Comparison between ADR and GDR

Category	ADR	GDR
Relevance	Foreign companies can trade in US stock market	Foreign companies can trade in any country's stock market other than the US stock market
Issued in	United States domestic capital market	European capital market.
Listed in	NYSE or NASDAQ	Non-US Stock Exchange such as LSE or LUX
Negotiation	In America only.	All over the world
Disclosure Requirement	Onerous	Less Onerous
Market	Retail investor market	Institutional market

Notes: organized from public information

The main benefit of GDR issuance to the company is to increase visibility in the target markets, which usually increased research coverage in the new markets; a larger and more diverse shareholder base; and the ability to raise more capital in international markets.

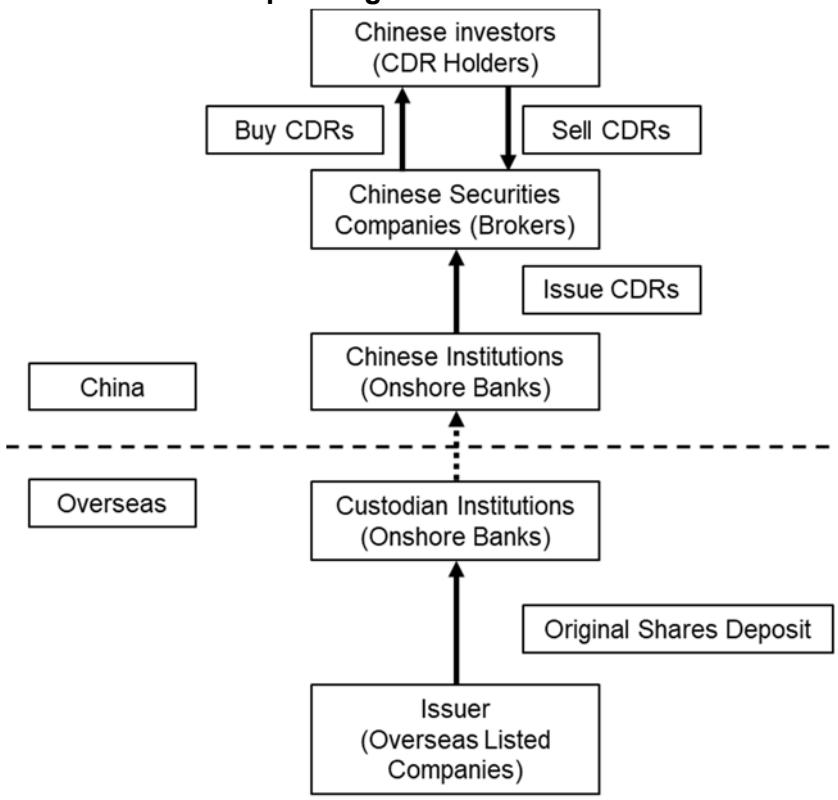
The other depositary receipts are some local DRs for example Hong Kong Depositary Receipt (HDR), Japanese Depositary Receipt (JDR), Brazilian Depositary Receipt (BDR). The relatively limited programs made them not so important so far.

2.4 Chinese depositary receipt

Chinese Depositary Receipt (CDR) is modelled on similar financial instruments such as ADRs and EDRs which enable U.S. and European investors to purchase the shares of foreign incorporated companies. CDR is a certificate issued and traded by other countries' stocks in China. As a curve stock business, the fundamental purpose of issuing depositary receipts by listed companies is to obtain commercial benefits from other countries. The main mechanism is exhibited in Figure 1.

Figure 1

The Operating Mechanism of CDR



CDR can provide a more convenient and lower-cost channel for overseas listed companies to list on A shares without basically changing the current domestic legal framework. Some new-economy Chinese companies listed overseas mostly adopt the VIE structure (using agreement to achieve control of overseas listed entities over domestic operating entities), and there are common equity structure arrangements with the same share but different rights. Compared with backdoor listing, CDR does not need to dismantle the VIE structure, the listing procedures are simple, the issuance cycle is shortened, the cost is lower, and it has more advantages.

The more important meaning of the CDR pilot program is to promote the reform of the issuance, listing system and regulatory rules for listed companies, improving the capital market valuation system. Under appropriate institutional arrangements, the CDR valuation system and regulatory standards can provide reference for the A-share market, help improve the A-share market valuation system, strengthen the regulatory efficiency of A-share listed companies, and form the sound investment atmosphere.

The CDR helps to enrich domestic capital market products and provide two-way convenient channels for international investment and financing. At present, there is a large gap between the types of products in Chinese capital market and mature overseas markets. CDR will increase the variety of domestic capital market transactions and enrich investors'

options. Domestic investors can invest in stocks in overseas markets without setting up foreign accounts and avoid exchange risks. International companies can also issue additional stocks and convert them into CDRs to be issued on the A-share market to realize domestic financing. This will further strengthen the cooperation between Chinese capital market and overseas capital markets and enhance the level of internationalization of Chinese capital market.

In China's financial environment, the sponsored Level 2 and Level 3 DR models are relatively better solutions. The Level 1 DR cannot be listed and traded, and the private-raising DR has strict quantity restrictions, which cannot meet the urgent needs of China's securities stock market. Therefore, the introduction of CDR has also put forward higher requirements for relevant domestic financial institutions.

3. Literature review

Cross-listing refers to the listing of a company’s ordinary shares on a different exchange other than its original stock exchange. It enables companies to trade its shares in numerous time zones and multiple currencies. This increases the issuing company’s liquidity, broadens the shareholder base, and gives it more ability to raise capital. Companies seek to cross-list because they anticipate gaining from a lesser cost of capital. This arises because their stocks become more available to foreign investors. Their access to these stocks may otherwise be restricted due to international investment barriers. Cross-listing can decrease the cost of capital via improving the company’s information environment. It is associated with better media awareness which increases the quality of accounting information. In addition, it acts as a linking mechanism used by companies that are incorporated in a jurisdiction with reduced investor protection. These companies commit themselves willingly to higher standards of corporate governance. There are many theories in this area as follows.

The liquidity hypothesis believes that cross-listing can promote stocks to be traded in multiple markets, especially after listing on a more liquid exchange, the market can trade at a lower bid-ask spread, and the liquidity of stock trading increases, so the liquidity risk premium and investors expect lower returns. The company’s cost of equity capital increases the company’s value. The investor cognition hypothesis believes that incomplete information caused by market segmentation will increase the cost for investors to collect information, so investors will only invest in stocks they are familiar with. Cross-listing is conducive to expanding the investor base and increasing investors’ awareness of the company. Therefore, the increase in the number of investors in the company under other conditions equal can reduce the shadow costs and investors’ expectations due to ignorance of the stock.

Firm value is closely related to the cross-listing behavior. Market segmentation hypothesis shows that cross-listing can eliminate barriers between markets to a certain extent, reduce the

negative effects of market segmentation, thereby reducing the company's capital cost and increasing firm value.

The information disclosure hypothesis believes that the realization of cross-listing in a market with stricter supervision and better mechanisms will help improve the company's information disclosure level, improve the information environment, alleviate information asymmetry, reduce the cost of information acquisition by investors, and increase the company to a certain extent value. The investor legal protection hypothesis believes that the realization of cross-listing in a market with more complete investor legal protection can increase the protection of the interests of small and medium shareholders, curb the embezzlement of controlling shareholders, and increase the company's opportunities for external financing to enhance the firm's value.

The signal hypothesis believes that if a company dares to achieve cross-listing in the international market with a higher level of information disclosure, it is enough to reflect the company's management's confidence in the company's management quality and future profitability, which sends a positive signal to investors and makes investors The expectations of the firm's value have been raised.

The financing constraint hypothesis believes that cross-listing has improved the degree of information asymmetry between the company and investors, and the company's financing constraints have been relaxed, thereby reducing the difficulty of the company's external financing.

In recent years, a new theoretical view of the motivation of cross-listing, namely "information channels", it directly explains the relationship between cross-listing and firm value from the perspective of the signal transmission of stock prices to investment. The theory points out that cross-listing makes companies face different institutional environments and market supervision, which to a certain extent reduces the risk of information asymmetry between listed companies and external investors, and encourages investors to dig out more company-level private information and stock price information. As a result, the content has been improved, and the high share price information content on the one hand can enable the fund provider to understand more of the value of the company's projects, reduce the difficulty of new project financing, and increase the company's financing opportunities; on the other hand, it can guide managers to design more effective investment plans, to increase the effectiveness of decision-making and to increase firm value.

Most scholars researched the benefits of cross-listing including (1) the cross-listing helps to broaden or diversify investor base so that it lead to an increase in the liquidity of the stock; (2) the cross-listing enhances visibility and global presence among investors, consumers and

customers; (3) the cross-listing can increase firm value and financial performance as well as improve corporate governance and (4) the cross-listing helps to reduce the cost of capital.

3.1 Cross-listing and investor base

The initial cross listing research used event studies that focused on the market segmentation hypothesis. Among the earliest are those by Alexander et al. (1988), Jayaraman et al (1993), and Foerster and Karolyi (1993). They test the hypothesis that cross listing in a world of segmented markets enabled firms to reduce their cost of capital by reaching a wider investor base. Lins and Strickland (2000), in their study, find that the greater access to external capital markets is an important benefit of a U.S. stock market listing, especially for emerging markets firms.

3.2 Cross-listing and visibility

Merton (1987) argues that investors do not have incomplete information, and hence they invest only in those securities of which they are aware. H. Kent Baker, John R. Nofsinger, and Daniel G. Weaver (2002) show that international firms listing their shares on the NYSE or the LSE experience a significant increase in visibility, as proxied by analyst coverage and print media attention. For media visibility they find that at least part of the gain in citations is due to industry and country factors. Lang et al (2003) find that firms cross-listed in the US have on average 2.64 more analysts followings then foreign firms that do not cross-list, they also show that the Tobin Q is higher for the cross-listed firms which is related to the higher analyst following. Baker et al (2002) also find a significant increase in analysts following the firm after cross-listing

3.3 Cross-listing and company performance

As far as the relation with between cross-listing and stock return, Harvey (1995), Bekaert and Urias (1999), De Santis and Gerald (1997) and De Santis (1997) have already studied that U.S. investors can achieve higher gains by investing directly in emerging markets. Ana Paula Serra (1999) examines the effects on stock returns of cross-listed firms from emerging market, using 70 firms that cross-listed on the NYSE, NASDAQ and SEAQ-I (London) from 1991 to 1995. Her results confirm that cross-listings made the firms experience significant positive abnormal returns before listing and a significant decline in returns following listing. Miller (1999) looks at the cross-listing announcement time instead of the listing time and is therefore aligned with the goal of this study. He studies short- and long-term stock price effects after announcement. He valuates the effects of the different ADR levels and finds a significant positive stock price effect and a significant difference between countries with higher governance standards and those with lower standards. There is a significant higher announcement-day share price reaction for exchange listings then for SEC Rule 144a and OTC listings.

As far as the relation with between cross-listing and firm value, several papers found a link between the decision to cross-list and a significantly increase in the firms' market value. Foerster and Karolyi (2000) observe the long run equity performance of 333 non-US stocks that raise capital in the United States. They find that while abnormal returns are on average 20% in the year before the capital raise, there is no significant abnormal return in the 3 years following the raise. They observe that private placements and ADR capital raisings from developed countries significant outperform those from developing nations and that a relatively higher volume of U.S. trade positively influences the stock performance. Level 3 ADRs' raisings perform better then private placements which is in line with the bonding theory. Doidge et al. (2004) provide evidence that the Tobin's q ratio of the cross-listed firms on major US stock exchanges exceeds by about 37% the q ratio of firms from the same country that do not list on US stock exchanges. Nicola Cetorelli and Stavros Peristiani (2015) study that firms cross-listed in a more prestigious market enjoy significant valuation gains over the five-year period following the listing. You et al (2012) also find a positive effect of cross-listing on market value

3.4 Cross-listing and cost of capital

Foerster and Karolyi (1999) and Errunza and Miller (2000) were among the first to examine the effects of cross listings on the cost of capital. They model the returns on cross listed stocks as a function of the returns on their domestic market index and the returns on a World Index. They find that the beta for the domestic market index falls in the post listing period as does the beta for the World Index. Overall, they conclude that the cross-listing firms appear to be successful in lowering their cost of capital. Burns (2004) finds that cross-listed foreign firms acquiring U.S. companies by using equity, pay on average 10% less than non-cross-listed firms paying cash. Companies from less regulated countries have to pay significantly more than firms from more developed economies.

3.5 Cross-listing and Sarbanes-Oxley Act (SOX Act)

Although most research results show positive impact from cross-listing, the cost and regulation do influence the decision that those companies want to cross-list. The SOX Act was passed by Congress in 2002 to raise the level of governance and transparency within the U.S. framework. After the imposition of SOX Act, the U.S. still ranks highly in terms of international exchanges. Since the imposition of the SOX Act tightening corporate accounting and governance requirements, some foreign companies may have shied away from the U.S. capital markets. Additionally, foreign companies listed in the U.S. could delist voluntarily if they believed the additional costs added on via SOX Act compliance outweigh the benefits of cross-listing. The implementation of the SOX Act in 2002 has added on additional costs to doing business in the U.S.

Litvak (2007) finds that both q and market-to-book ratios of Level 2 and Level 3 ADRs decline significantly during 2002 relative to Level 1 ADRs and relative to non-cross-listed companies. Marcelo Bianconi, Richard Chen, Joe A. Yoshino (2013) study the effect of SOX Act in U.S., Hong Kong and Germany for the period 2000-2005. It has a negative impact on the market value of firms in this period. The already cross-listed firms in the U.S. in 2003 command a premium, due to the market perception of higher standards. The evidence from treatment effects confirms that SOX Act impacted negatively on the value of firms. The implementation of SOX Act in 2002 discourages firms to cross-list in the U.S. in the following year.

Based on the aforementioned discussion, it seems possible that U.S. cross-listings affect the firm's value of growth opportunities. These growth opportunities, however, are expected to affect positively the post-listing firm value and operating performance. These arguments lead us to the following hypothesis:

H1: Cross-listed firms experience improvements in their firm value and operating performance after the cross-listing.

In this study, we extend prior literature on the cross-listing operating performance by examining the relation between cross-listing performance and subsequent changes in firm value and operating performance. Specifically, we examine the main country-level and firm-level factors during the process.

4. Research design

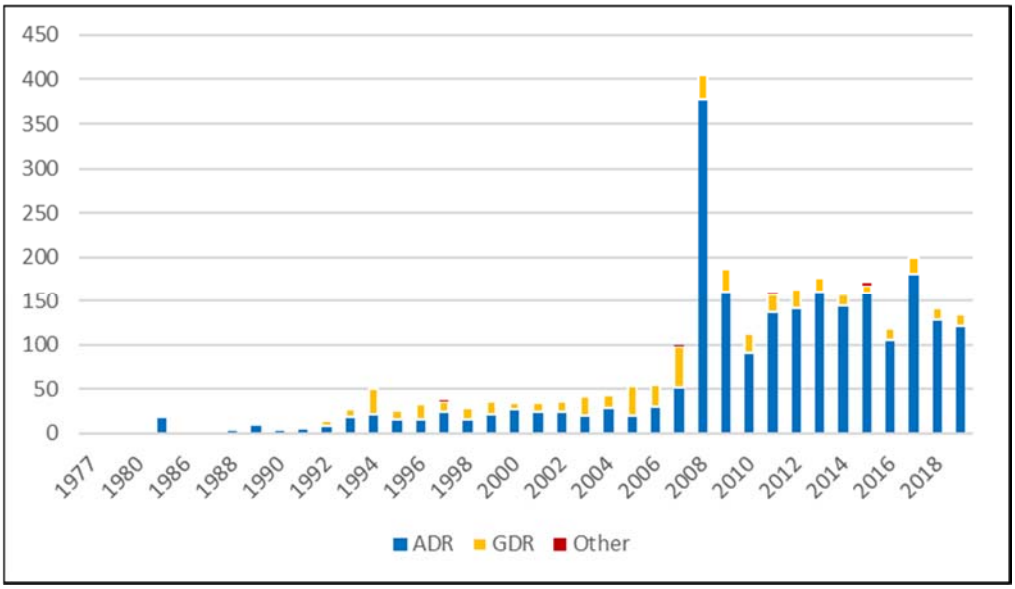
In this section we discuss the depositary receipts market, the target sample, the control sample and dataset.

4.1 Depositary receipts market

According to the Depositary Receipts 2019 in review by Deutsche Bank, there are currently almost 3000 depositary receipts issued by companies from more than 60 countries around the world, almost half of which are sponsored programs. From Figure 2-1, before 1990s, DR market developed slowly. Due to the deregulation of American financial control since the 1980s, ADR developed rapidly in the 1990s. Although ADRs were the most prevalent form of depositary receipts, the number of GDRs has surpassed ADRs in the period of 2005-2007 because of the lower expense and time savings in issuing GDRs, especially on the London and Luxembourg stock exchanges. In the year of 2008, the financial crisis led to the explosive demand to issue ADRs. The increasing trend continued in the 2010s.

Figure 2-1

The Number of DRs by Year

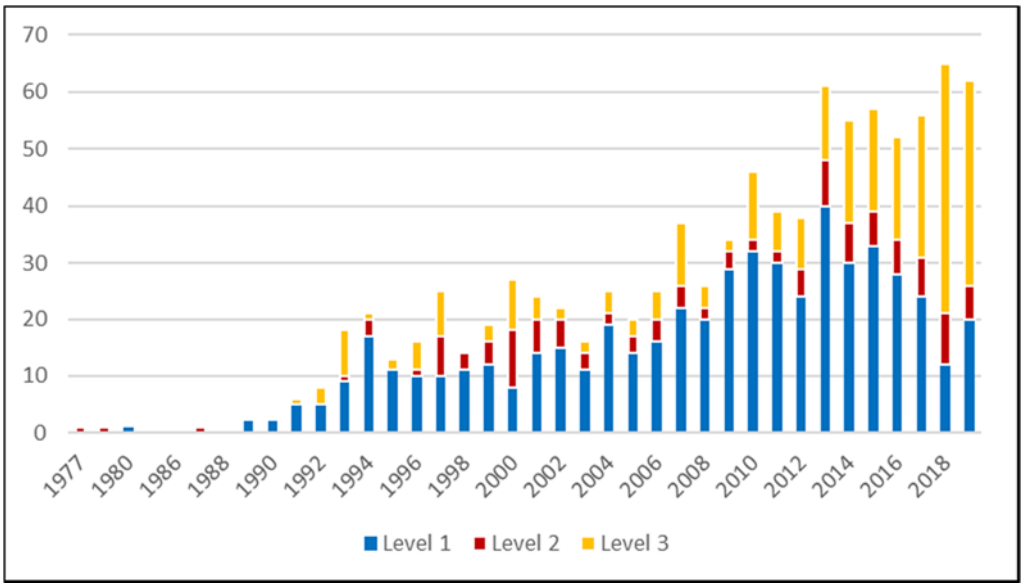


Source: Depositary Receipts 2019 in review by Deutsche Bank

It is obvious that ADRs dominate the DR market due to the attractiveness of U.S. financial market, which leads the similar growth trend like DR across the world. Figure 2-2 shows that from the type of ADRs perspective, Level 1 ADRs are the main type due to the lower fee and disclosure cost. After 2012, the Level 2 and Level 3 ADRs began to increase.

Figure 2-2

The Number of Sponsored ADRs by Year



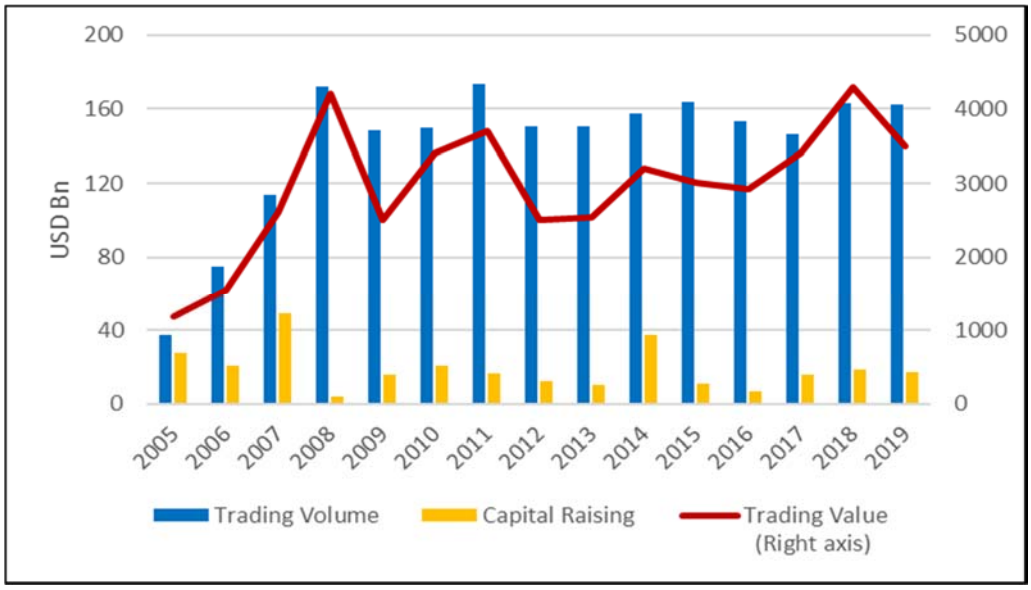
Source: Depositary Receipts 2019 in review by Deutsche Bank

According to Figure 2-3, in 2019 the trading volume of depositary receipts on the New York Stock Exchange, the American Stock Exchange and the Nasdaq Stock Market exceeded 160 billion shares, an increase of about 400% over 2005. After 2008, the trading volume

fluctuated around 160 billion shares and the trading value fluctuated between 2500 to 4200 billion. The capital raising seems to show a periodic volatility during the period of 2008-2019.

Figure 2-3

The Trading Value, Volume and Capital Raising of ADRs by Year



Source: Citi Depositary Receipts Year-End Report

According the report by McKinsey & Company in 2008, companies from developed economies derive no benefit from second listings in foreign equity markets. It shows some evidence that from 1998 to 2008, the number of cross-listings from companies based in developed markets is decreasing. The trading volumes of the cross-listed shares (ADRs) of European companies in the United States typically account for less than 3 percent of these companies' total trading volumes. For Australian and Japanese companies, the percentage is even lower. They also find that cross-listed European companies are covered by only about 2 more analysts than those that are not cross-listed—a very modest difference, since the average number of analysts covering the 300 largest European companies is 20 after correcting for the impact of size. In addition, as capital markets become increasingly global, institutional investors typically invest in stocks they find attractive, no matter where those stocks are listed. The developed economies in Europe, have radically improved their own corporate-governance requirements. As a result, the governance advantages once derived from cross-listing in the U.K. or the U.S. hardly exist today for companies based in developed countries. The possible reasons may be due to more liquid capital markets and integrated, or more liquid investors.

4.2 Target sample

The ideal proxy for the research is to find German companies as the target sample. Due to very limited sample (no more than 10 companies), we consider using those companies that

issued DRs in developed countries. The data of developed countries comes from United Nations. Based on the analysis of DR market structure and character of DR, we choose Level 2 and Level 3 ADRs as our conditions. Considering the impact of SOX Act in 2002, we restrict the period from 2002 to 2018. In conclusion, the target companies are from non-U.S. companies cross-listed on major U.S. stock exchanges issuing Level 2 or Level 3 DRs during the period 2002–2018. These companies were obtained from depository receipt service banks of JPMorgan Chase, Citibank, and Deutsche Bank.

The initial sample of Level 2 and Level 3 cross-listed companies in developed countries consists of 106 companies. From this sample we restricted the period between 2002 and 2018, focusing on the mixture impact of cross-listing and SOX Act. The number of companies has been reduced to 50. Then we excluded 5 companies that belong to the financial sector since their characteristics differ substantially from those of non-financial companies. 15 companies without sufficient financial data available in DataStream, Bloomberg or Fact set. 2 companies that cannot be matched at least on the same industry. These restrictions lead us to a model sample of 28 companies. There are 9 companies cross-list on U.S. stock exchanges using Level 2 DR program and 19 companies cross-list on U.S. stock exchanges using Level 3 DR program. For these companies, we define the fiscal year that cross-listing took place as the event year. Then we collected data for the three-year period around the event year.

In Table 3-1, Table 3-2 and Table 3-3, we present descriptive statistics for the final sample of cross-listed companies. Results are presented by country, industry and year. Table 3-1 presents descriptive statistics by country. Our sample consists of cross-listed companies from 9 countries. Most of them come from Europe which can be an appropriate proxy of German companies. Moreover, we do not generally observe temporal concentration of the sample firms in any country, having the largest occurrence of cross-listings from the U.K. (8 companies or 28.57% of the sample) and France (6 companies or 21.43% of the sample). The diversity of country of cross-listed companies suggests that country is not a factor that might affect our results. In Table 3-2 we present descriptive statistics by industry. The majority of sample companies comes from health care industry (17 companies or 60.71% of the sample) and most of them choose to issue a Level 3 ADR (12 companies or 70.59% of the health care industry sample). Table 3-3 shows a classification of the sample based on the year of listing. Most companies cross list in the years 2015 and 2018 (5 companies or 26.32% of the sample and 6 companies or 21.43% of the sample, respectively).

Table 3-1

Cross-Listed Companies by Country

No	Country	Level 2	%	Level 3	%
1	Australia	2	22.22	0	0.00
2	Belgium	0	0.00	3	15.79
3	Denmark	0	0.00	2	10.53
4	France	1	11.11	5	26.32
5	Germany	1	11.11	0	0.00
6	Ireland	1	11.11	0	0.00
7	Netherlands	2	22.22	1	5.26
8	Norway	0	0.00	2	10.53
9	United Kingdom	2	22.22	6	31.58
	Total	**9**	**100.00**	**19**	**100.00**

Table 3-2

Cross-Listed Companies by Industry

No	Industry	Level 2	%	Level 3	%
1	Consumer Services	1	11.11	0	0.00
2	Health Care	5	55.56	12	63.16
3	Oil & Gas	1	11.11	1	5.26
4	Semiconductors	0	0.00	1	5.26
5	Technology	1	11.11	5	26.32
6	Telecommunications	1	11.11	0	0.00
	Total	**9**	**100.00**	**19**	**100.00**

Table 3-3

Cross-Listed Companies by Year of Listing

No	Year	Level 2	%	Level 3	%
1	2002	2	22.22	0	0.00
2	2003	1	11.11	0	0.00
3	2005	2	22.22	0	0.00
4	2008	0	0.00	1	5.26
5	2010	1	11.11	0	0.00
6	2011	0	0.00	1	5.26
7	2013	1	11.11	1	5.26
8	2014	1	11.11	2	10.53
9	2015	0	0.00	5	26.32
10	2016	0	0.00	1	5.26
11	2017	0	0.00	3	15.79
12	2018	1	11.11	5	26.32
	Total	**9**	**100.00**	**19**	**100.00**

4.3 Control sample

Mainly consistent with prior literature, as a benchmark against which we compare changes in firm value and operating performance around the cross-listing we construct a control sample of companies as follows: for each cross-listed companies in the year prior to

the listing, we select all the non-cross-listed companies for the corresponding year that are in the same industry and belong to the same home country. Among those companies, we select one matched company that has the closest total assets with the cross-listed company's total assets during the corresponding year. In addition, we try to find the peer company that has the closest listing year with the target companies, which means they are in the similar development stage.

From this approach we collect 28 control companies. For this sample we collect data for the three-year period around the event year. We select these control companies from DataStream, which allows us to distinguish and match foreign listings using company ISIN or SEDOL numbers.

4.4 The dataset

To examine the firm value and operating performance of cross-listed companies and their peers, we also use data from DataStream. The missing data has been supplemented from Bloomberg and Fact set.

5. Empirical results

In this section, we examine the firm value and operating performance and changes of cross-listed companies around the cross-listing event. Moreover, we try to investigate the factors behind those companies.

5.1 Levels of company performance measures

Similar to Loughran and Ritter (1997) and Papaioannou et al. (2003) we measure operating performance by focusing on operating return plus depreciation on assets/sales and on operating return on assets/sales. In addition, we examine performance with respect to capital expenditures to assets. Furthermore, cross-listed companies' operating performance may be affected from changes in companies' efficiency or from changes in their sales. To shed more light on whether cross-listing affects companies' efficiency or facilitates changes in sales we also report total sales and total operating cash flows.

Besides, we add the firm value proxy. Following Kaplan and Zingales (1997) and Gompers et al. (2003), we define the firm value as a proxy of Tobin's Q, which is computed as the market value of total assets divided by their book value. We regard firm value and operating performance as proxies of company performance. These measures are listed in Table 4.

Table 4

A Series of Proxies as Company Performance

Variables	Definition
Q	Tobin's Q: Total market value of firm / Total asset value
ORDA	Operating Return plus Depreciation on Assets
ORDS	Operating Return plus Depreciation on Sales
ORA	Operating Return on Assets
ORS	Operating Return on Sales
CEA	Capital Expenditures on Assets
SALES	Annul sales
OCF	Operating Cash Flows

5.2 Matched-pair T-test and Wilcoxon matched-pair signed-ranks test

In Table 5 we report yearly mean company performance measures for the cross-listed companies, the non-cross-listed matched companies (control firms), as well as matched-adjusted company performance measures defined as the difference between cross-listed and control companies' measures. Hypothesis 1 suggests that a positive trend in company performance measures should be observed from the pre-listing period to the post-listing period. In consistent with hypothesis 1, significant positive trend in firm value is observed after the cross-listing event. Specifically, in the both pre-listing (year -1 to year 0) period the Q difference between cross-listed companies and control companies are negative while after the listing (year +1 to year +3) it shows positive. After the listing, the Q shows the greatest in year +1 which means it enjoys the most the valuation premium after cross-listing. In the next two years, the premium tends to reduce gradually.

With regard to the operating performance, the trend is not so obvious as firm value while we can also see some difference between pre-listing and post-listing period. Significant differences between the cross-listed and control firm's operating performance measures emerge from year −1 to year +2. During that period, the mean matched-adjusted ORDA and ORA ranges from -0.185 to -0.071 (-0.219 to 0.117). Most of these figures are significant at conventional levels suggesting that cross-listed companies are more profitable relative to the control sample during each of the year's −1 to +2.

In contrast, the mean matched-adjusted ORDS and ORS ranges from -5.536 to -1.302 (-5.711 to -1.467). Although most of these figures are significant at conventional levels, cross-listed companies are not more profitable relative to the control sample during each of the year's −1 to +2.

Furthermore, both cross-listed and control companies have positive CEA during the period under examination. The mean matched-adjusted CEA are positive and significant for

the whole period. Finally, cross-listed companies have higher SALES and OCF in each of the years under examination but show no significance.

Overall, the results suggest that only some of indicators can reflect the improvement in operating performance for cross-listed companies, but the valuation indicator shows significant improvement after the listing period.

Table 5

Company Performance Measures per Year around the Listing, 2002-2018

		Q	ORDA	ORDS	ORA	ORS	CEA	SALES	OCF
Year -3	Cross-Listed	1.597	0.055	-0.441	-0.015	-0.565	0.076	15542.960	2239.494
	Control	2.303	-0.186	-1.397	-0.190	-1.477	0.043	181.132	41.368
	Difference	-0.705	0.240	0.957	0.176	0.911	0.033***	15361.828***	2198.126
	No	15	15	15	15	15	15	15	15
Year -2	Cross-Listed	1.974	-0.482	-2.299	-0.540	-3.224	0.052	11678.320	1351.576
	Control	1.780	-0.187	-2.430	-0.216	-2.547	0.042	163.748	41.337
	Difference	0.194	-0.295	0.131	-0.324	-0.677**	0.010***	11514.572***	1310.239
	No	23	23	23	23	23	23	23	23
Year -1	Cross-Listed	2.360	-0.127	-1.791	-0.168	-2.044	0.036	14030.580	1684.103
	Control	3.119	-0.185	-3.254	-0.219	-3.409	0.038	221.074	85.308
	Difference	-0.759***	0.058	1.463	0.050**	1.365*	-0.002***	13809.506***	1598.795*
	No	26	26	26	26	26	26	26	26
Year 0	Cross-Listed	2.713	-0.121	-1.302	-0.166	-1.467	0.045	17928.840	2342.370
	Control	2.738	-0.134	-4.572	-0.196	-5.089	0.039	330.181	172.502
	Difference	-0.025***	0.013	3.271	0.030**	3.621*	0.006***	17598.659***	2169.868
	No	24	24	24	24	24	24	24	24
Year +1	Cross-Listed	3.462	-0.071	-5.082	-0.107	-5.254	0.021	16231.520	2100.089
	Control	2.665	-0.142	-3.225	-0.160	-3.304	0.065	325.300	90.033
	Difference	0.797***	0.071	-1.858*	0.053**	-1.950**	-0.043***	15906.220***	2010.056
	No	25	25	25	25	25	25	25	25
Year +2	Cross-Listed	3.139	-0.184	-5.211	-0.218	-5.368	0.020	19446.550	2131.256
	Control	2.503	-0.139	-5.536	-0.153	-5.711	0.051	204.992	37.310
	Difference	0.636***	-0.044***	0.325**	-0.065***	0.343***	-0.031**	19241.558***	2093.946
	No	20	20	20	20	20	20	20	20
Year +3	Cross-Listed	2.369	-0.181	-3.716	-0.241	-3.898	0.024	30885.570	3399.251
	Control	2.066	-0.116	-1.279	-0.130	-1.295	0.056	316.756	64.307
	Difference	0.303***	-0.065**	-2.438*	-0.111***	-2.603***	-0.032*	30568.814***	3334.944
	No	17	17	17	17	17	17	17	17

Notes: Significance is designated by ∗∗∗ at 1%, ∗∗ at 5% and ∗ at 10%.

5.3 Multivariate analysis

In the previous subsection we provided evidence that cross-listed companies experienced improvements in firm value whereas no such improvements were observed significantly for operating performance. To further test this hypothesis, that the firm value for cross-listed companies get improvement relative to non-cross-listed companies, we employ a multivariate

regression model. In this model we control for differences between cross-listed and non-cross-listed companies due to the matched character of the sample i.e. company characteristics and for differences with respect to companies' country characteristics and the industry. Specifically, we run various specifications of the following model:

$$CPM = \beta 0 + \beta 1 Listing_t + \beta 2 AR + \beta 3 JS + \beta 4 AS + \beta 5 Industry + \beta 6 Size_t + \beta 7 Growth_t + \beta 8 Leverage_t + \varepsilon, \quad t = -3, \ldots, +3,$$

where 'CPM' are various matched-adjusted company performance measures defined as the difference in company performance measure between cross-listed and non-cross-listed matched companies (control companies). The measures are exhibited in Table 6-1.

Table 6-1

Dependent Variables of Specification

Dependent Variables	Definition
Q	Tobin's Q: Total market value of firm / Total asset value
ORDA	Operating Return plus Depreciation on Assets
ORDS	Operating Return plus Depreciation on Sales
ORA	Operating Return on Assets
ORS	Operating Return on Sales

The independent variables are as follows: Listing is a dummy variable that equals 1 if the observation is for the years after the listing and 0 otherwise. To the extent that cross-listing enhance company performance, the coefficient of the variable Listing is expected to be positive.

It is important to control for the various country, industry and firm-specific variables in the sample. First, we use country-level variables taken from La Porta et al. (1998), to control for possible variation between cross-listed and non-cross-listed companies with respect to the degree of anti-director rights AR, the efficiency of the judicial system JS and the quality of the accounting standards AS. Then, we also control for industry effect using dummy variables for certain industries i.e. health care industry.

Finally, we control for imperfect matching with respect to the growth opportunities, the size of the companies and financial leverage using the variables Size defined as the matched-adjusted size (i.e. the difference in logarithmic total assets between cross-listed and control companies), Growth defined as the matched-adjusted growth ratio (i.e. the difference in the growth ratios between cross-listed and control companies) and Leverage defined as matched-

adjusted debt ratio (i.e. the difference in the debt ratios between cross-listed and control companies). The independent variables are exhibited in Table 6-2.

Table 6-2

Independent Variables of Specification

Independent variables	Definition
Listing	A dummy variable that equals 1 if the observation is for the years after the listing and 0 otherwise.
AR	Anti-director rights (AR) is an index that aggregates six different shareholder rights.
JS	Efficiency of the judicial system (JS) is an assessment of the efficiency and integrity of the legal environment as it affects business.
AS	The accounting standards (AS) rating is an index, created by examining and rating companies' annual reports for their inclusion or exclusion of 90 items.
Industry	Industry Dummies are dummy variables that equal 1 for certain industries (i.e. health care) and 0 otherwise.
Size	Logarithmic total assets.
Growth	The annual percentage growth rate in sales.
Leverage	Total debt / Total assets.

Table 7 presents the results of the regression. Listing is positive and significant ($\rho = 0.01$) for Q suggesting that after controlling for imperfect matching, country characteristics and industry effect, cross-listing helps to increase firm value, which is consistent with the hypothesis. But it is not significant when the dependent variables are the matched-adjusted ORDA, ORDS, ORA and ORS.

As far as the control variables are concerned, there is also a negative relation between Q and company size which shows less assets a cross-listed company has, higher market value it gains. AR, JS and AS are significant in Q-regression model. AS is positively related with matched-adjusted Q ($\rho = 0.01$), whereas AR and JS are negatively related with matched-adjusted Q ($\rho = 0.05$, $\rho = 0.01$, respectively). These results suggest that country characteristics significantly affect companies' firm value. More specifically, matched-adjusted firm value is higher, the better the accounting standards is whereas the worser the anti-directors rights and efficiency of the judicial system are. These results may suggest that cross-listing effects may not affect in the same manner all exchange-listed companies.

Table 7
Results of Regression of Matched-Adjusted Company Performance Measures Relative to the Listing, 2002-2018

Variables	Matched-Adjusted Q	Matched-Adjusted ORDA	Matched-Adjusted ORDS	Matched-Adjusted ORA	Matched-Adjusted ORS
AR	-1.508**	0.040	1.443	-0.081	1.677
JS	-1.207***	0.052	1.803	0.012	1.754
AS	0.550***	-0.050	-0.469	-0.015	-0.524
Listing	1.822***	-0.014	-2.180	-0.032	-1.965
Size	-0.155	0.192*	-2.067	0.213**	-2.319
Growth	0.063	0.020	-0.053	0.021	-0.074
Leverage	0.026	0.007	-0.070	0.006	-0.052
Intercept	-23.730*	2.711	14.470	0.948	18.230
Industry	Yes	Yes	Yes	Yes	Yes
No of Obs	143	143	143	143	143
F-Statistic	3.596***	2.562***	0.732	2.139**	0.691
Adjusted R^2	0.177	0.133	0.042	0.113	0.040

Notes: Significance is designated by ∗∗∗ at 1%, ∗∗ at 5% and ∗ at 10%.

Overall, the results in this subsection further support the original hypothesis. That is, the market expectations due to the cross-listing reflects post-listing changes in companies' firm value. The results add insight into where the revaluation effect of cross-listings may come from.

6. Concluding remarks

This study addresses two research questions: (1) Does the post-listing firm value and operating performance of cross-listed firms increase relative to non-cross-listed matched companies, and relative to its pre-listing operating performance? (2) What are the main factors influencing the firm value and operating performance? To address these research questions, we used a sample of cross-listed companies that were issued ADRs on U.S. stock exchanges during the period 2002–2018 and a country-industry-stage-size matched sample of non-cross-listed companies.

Not completely consistent with our expectations and hypotheses, we provide evidence for economically and statistically significant firm value improvements only for those Level 2 and Level 3 companies after the listing, relative to non-cross-listed matched sample of firms, and relative to the pre-listing period, after controlling for country, industry and firm characteristics. But we cannot find strong evidence to show there is operating performance improvement.

From the research analysis, we investigate that country-characteristics affect significantly firm value. It is showed that firm value is higher, the better the accounting standards, the worse the anti-directors rights and efficiency of the judicial system.

Overall, the results of this study are potentially useful to managers and shareholders, For high growth companies, the results suggest that a cross-listing on U.S. stock exchanges potentially helps them to support their growth opportunities, resulting in firm value improvements after the listing.

Although the study shows the significance of firm value premium around the cross-listing period, the conclusions in this paper have to be taken with caution due to relatively small size sample.

Further research could try to find the difference of companies between developed and developing countries after cross-listing. More detailed factors that better explain the firm value improvement could also be investigated. It is also worthwhile to research companies in health care industry around the cross-listing period in a long term.

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