8-2016

Essays on the performance and earnings management of cross-listing firms

Klaus S. Beckmann
The University of Texas Rio Grande Valley

ESSAYS ON THE PERFORMANCE AND EARNINGS MANAGEMENT OF CROSS-LISTING FIRMS

A Dissertation

by

KLAUS S. BECKMANN

Submitted to the Graduate College of
The University of Texas Rio Grande Valley
In partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2016

Major Subject: Business Administration

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COMMITTEE MEMBERS

Dr. Diego Escobari
Chair of Committee

Dr. Salvador Contreras
Committee Member

Dr. Thanh Ngo
Committee Member

Dr. Sibin Wu
Committee Member

August 2016

ABSTRACT

Beckmann, Klaus S., Essays on the Performance and Earnings Management of Cross-listing Firms. Doctor of Philosophy (Ph.D.), August, 2016, 142 pp., 52. tables, 9 figures, references, 52 titles.

I investigate the performance and earnings management of firms that cross-list in foreign markets. In the first essay, I analyze and compare the underpricing and buy-and-hold abnormal returns of depositary receipt equity offerings with preceding Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs) of the same firms to identify differences and motivations of equity offerings free of any matching bias. I find that domestic equity offerings entail significantly larger underpricing than subsequent foreign equity offerings. The average buy-and-hold abnormal returns of depositary receipt equity offerings are significantly lower than the underlying firm's performance at preceding domestic equity issuances over holding periods of 1 to 5 years after the respective issuances. Furthermore, traditional matching techniques as applied in most research articles comparing the performance after IPOs and SEOs may significantly understate the degree of aftermarket performance and significantly understate the degree of underpricing. The second essay examines the existence of real and accrual-based earnings management around cross-listings in foreign markets. The results indicate that firms actively manage their earnings around cross-listing events using both, accrual and real earnings management. Real earnings management is the more favorable earnings method in comparison to accrual-based earnings management, especially for American Depositary Receipts (ADR)

cross-listed via level II and III. Finally, firms listing via a sponsoring investment bank manage their real earnings significantly more than firms listed via unsponsored ADRs.

DEDICATION

I dedicate my dissertation work to my family. A special feeling of gratitude to my loving wife, Karina, who had my back all these years. Thank you for your love, patience and support.

ACKNOWLEDGEMENTS

I am very grateful to Dr. Diego Escobari, chair of my dissertation committee and Dr. Thanh Ngo, former chair of my dissertation committee and committee member, for all their guidance, support and patience. My thanks go to my dissertation committee members: Dr. Salvador Contreras and Dr. Sibin Wu for their input and comments on my dissertation.

I would like to express my gratitude to my professors, colleagues, peers and staff who inspired and supported me over the years as well as the entire University of Texas Rio Grande Valley for providing this opportunity to me.

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CHAPTER I

DEPOSITARY RECEIPTS AND CROSS-LISTING

1. Introduction

1.1. Depositary Receipts

When investing in foreign stocks, investors can either buy the shares directly on national exchanges or invest via global depositary receipts (GDRs). A GDR is a negotiable instrument representing a specific number of underlying ordinary foreign company shares issued by a depositary bank in international markets. The underlying securities are held in custody in the country of origin by depository banks that convert dividends and other payments into the currency of the market in which they trade, oftentimes the US dollar. GDRs are generally available to investors outside and within the U.S. market. For example, a European company that desires to make its shares available in U.S. and European markets can trade as global depositary receipt on several exchanges worldwide.

American Depositary Receipts (ADRs), the U.S. component of GDRs, are denominated in dollars and can be traded like any other stock on U.S. exchanges while being subject to the U.S. listing and trading requirements. GDRs traded on European exchanges are bound to regulations of the respective European markets. Major European markets for GDRs are the London Stock Exchange (LSE) and the Luxembourg Stock Exchange (LUX).

Increasing globalization and interest in diversification strategies make depositary receipts an attractive alternative method of investment as the need for setting up foreign accounts and

cross-border transactions of foreign stocks appear relatively complex and expensive. ADR investors are able to trade foreign company shares on domestic markets without the need to observe foreign exchange market trading hours. Since depositary receipts are tradable in virtually any ratio with respect to their underlying securities, a broad investor base and liquidity can be established. Furthermore, foreign companies can gain access to new customer bases and capital raising opportunities through depositary receipts. Issuers of ADRs can become part of the largest capital market worldwide, in addition to access to U.S. capital, which in turn offers opportunities to build global corporate visibility and facilitates expansion strategies such as cross-border mergers and acquisitions once a foothold is established.

1.2. The Depositary Receipt Market

Depositary receipts facilitate the exchange of firm equity worldwide with diverse cross-listing programs. Since investors are seeking to diversify their portfolios internationally for various reasons, including speculation or reduction of portfolio risk, the market for depositary receipts plays a vital role. Additional importance derives from the size of the depositary receipt market, which has significantly increased over the last two decades.

Figure 1 exhibits the depositary receipt trading volume and values from 1991 to 2012. Over the considered period, the trading volume of depositary receipts increased from a little less than 7 billion in 1991 to about 140 billion traded DR shares in 2012. Similarly, the underlying market value of these trades increased from $118.2 billion to $2.5 trillion during the same period.

The five largest industries within the DR market in terms of trading value are Energy, Telecommunication Services, Materials, Information Technology and Financials as shown in Figure 2. From 2009 to 2011, these industries together accounted for approximately 80 percent of total DR market trading value in each year. With more than 25 percent market share, energy

firms have the largest representation in the DR market with market values ranging from $678 billion in 2009 to $914 billion in 2011. Some multinational energy firms that cross-list via depositary receipts include British Petroleum, Repsol, and Petrobras.

1.3. Cross-listing with Depositary Receipts

Before a depositary receipt can be traded on foreign markets, the potential cross-listing firm often seeks financial and legal advice. One of the central roles in issuing depositary receipts is taken by the depositary bank. The depositary bank not only helps with the decision making process for the most suitable DR program for the cross-listing firm, but also coordinates with many of the related parties such as lawyers, investment banks, and local custodians that help to bring the depositary receipts to the market. Generally, the depositary bank maintains its relationship with the cross-listing firm during the lifetime of the DR program. Major depositary banks in the DR market include Citibank, Bank of New York, JP Morgan and Deutsche Bank.

As the issuing entity for the DR program, the depositary bank holds domestic ordinary shares in custody and issues the respective depositary receipts as illustrated in Figure 3. The underlying ordinary shares remain in custody of the depositary bank until the respective depositary receipts are cancelled, i.e. the DR is returned to the depositary bank for cancellation. Oftentimes, depositary receipts represent a specific number of ordinary shares or fraction of ordinary shares to improve its tradability and liquidity.

Depositary receipts are used by an increasing number of companies to make shares available to the markets outside the home market. Figures 4 and 5 display the trading volume and value of depositary receipts by geographical area of firm origin between 2010 and 2012 and market place, respectively. In each of the years reported, firms that originate from Europe-

Middle East-Africa (EMEA) show the highest DR trading volumes and values followed by Latin American and Asian firms.

Interestingly, most of the firms that employ a cross-listing program are Asian firms (1064) followed by Western European firms (724), Eastern European firms (185), Latin American firms (190) and African firms (83) as shown in Table 1. In combination with Figure 4, one might suspect that DRs issued by firms located in Europe are traded more frequently (i.e. they have a higher depositary receipt turnover). This increased liquidity could lead to potentially higher receipt values.

1.4. Cross-listing Programs

There are four different depositary receipt programs in the United States, which offer access to the capital market, depending on purposes, trading locales, and listing requirements. There are 3 different program levels for publicly-traded ADRs, and a program for private placements. Among the 3 programs for publicly-traded ADRs, Level I and Level II programs are designed for non-equity capital raising ADRs, while Level III program is specifically for equity capital raising ADRs. In addition, a Regulation S program offers the possibility to expand into markets outside the U.S., including main European exchanges.

Level I ADRs are not listed on a stock exchange, but are available for investors to purchase and trade in the over-the-counter (OTC) market via NASDAQ's Pink Sheets. Level I ADRs are designed to help a company to develop or expand its shareholder base by establishing a foothold in the US market. Under a Level I program, the issuing company generally maintains the home market accounting standards as well as disclosure standards (i.e. firms are exempt from strict US reporting requirements). To cross-list, companies use their existing shares to satisfy investor demand by issuing and canceling ordinary shares in the issuer's home market as

described in Figure 3 above. For instance, consider an investor who places a purchase order with his U.S. broker for depositary receipts. The U.S. broker will try to purchase the depositary receipts on the U.S. market. If unavailable, the broker will place an order with a foreign broker located in the home market of the cross-listed firm. The foreign broker will then purchase the amount of underlying common firm shares and deliver these to the depositary bank of the cross-listed firm. The depositary bank will hold the shares in custody and issue the respective number of depositary receipts for delivery to the U.S. investor. Likewise, if investors seek to sell depositary receipts without a buyer available in the U.S. market, the U.S. broker may deliver the depositary receipts to the depositary bank for cancellation.

Level II ADRs are listed and traded on one of the two major U.S. market places, the New York Stock Exchange (NYSE) or the NASDAQ. Firms generally choose a Level II over a Level I program to take advantage of the increased corporate visibility. However, in order to list securities, a company must meet the listing requirements of the respective exchange. Firms that issue under the Level II ADR program must also comply with the registration provisions and the continued reporting requirements of the Securities Exchange Act of 1934 and Securities Act of 1933, which include F-6[1] and F-20[2] registration statements. This not only requires vast amounts of disclosure and reconciliation of financial statements to U.S. GAAP, but also results in high filing costs on a regular basis. Similar to Level I ADRs, Level II ADRs are created from deposits of ordinary shares in the issuer's home market.

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[1] Form F-6 is used for the registration under the Securities Act of 1933 of Depositary Shares evidenced by American Depositary Receipts issued by a depositary against the deposit of the securities of a foreign issuer.

[2] Form F-20 requires the submission of annual reports pursuant to the requirements of the Securities Exchange Act of 1934.

Level III ADRs share most characteristics of Level II ADRs. The key difference is the ability to issue new equity capital. This advantage requires additional filings for companies under the Level III program, which include registration of the underlying securities and issuance of a prospectus to inform potential investors about the equity issuance in terms of anticipated future firm performance and risk. Issuing ADRs under Level III is a process similar to US IPO issues.

The rule 144A DR program as approved in 1990 by the SEC is used for larger private placements with U.S. institutional investors that seek to invest in foreign equity. Under this program, new and restricted shares are created and then privately placed with institutional investors. Like Level I ADRs, Rule 144A ADRs are not listed on a major stock exchange or subject to strict U.S. reporting and disclosure requirements. They trade on PORTAL (a system managed by the National Association of Securities Dealers). In contrast to Level I ADRs, rule 144A DRs are not registered with the U.S. Securities and Exchange Commission, which makes this program the quickest, easiest, and most cost-effective way for firms to raise capital in the United States. However, the shares issued under this program are likely to be discounted because of lower liquidity in the private placement market.

Outside the U.S., GDRs are traded under Regulation S, by which disclosure and listing requirements largely depend on local laws and market practices. Most GDRs are listed in London, but it is also possible to list GDRs on other exchanges, such as Luxembourg or Singapore. Under Regulation S, GDRs are generally offered to institutional investors in the primary market and later traded in the secondary market among retail investors as well.

Table 2 gives an overview of GDR and ADR equity offerings between 2000 and 2012. Most ADR equity offerings occurred in 2007 and most GDR equity offerings occurred in 2006. The amount of ADR capital raised is $208 billion while the amount of GDR capital raised totals

$88.48 billion. The average equity raised per ADR offering is approximately $116 million higher than for GDR equity offerings.

Table 1 : Number of DR Firms in 2012 by Geographical Area of Firm Origin

Country	No. firms	Country	No. firms	Country	No. firms
EMEA	**992**				
Africa	83				
Bahrain	3	Turkey	28	Mexico	45
Botswana	1	Ukraine	9	Peru	4
Egypt	12	*Western Europe*	724	Venezuela	8
Jordan	1	Austria	21		
Kuwait	1	Belgium	20	**Asia**	**1064**
Lebanon	4	Denmark	17	Australia	155
Malawi	1	Finland	23	Bermuda	1
Morocco	1	France	72	Hong Kong	149
Nigeria	3	Germany	71	Japan	246
Oman	1	Greece	20	New Zealand	30
Qatar	2	Ireland	26	Singapore	57
South Africa	49	Italy	43	Bangladesh	1
Tunisia	1	Luxembourg	10	China	205
UAE	1	Malta	1	India	74
Zambia	1	Netherlands	36	Indonesia	18
Zimbabwe	1	Norway	24	Korea	34
Eastern Europe	185	Portugal	18	Malaysia	11
Bulgaria	1	Spain	35	Pakistan	7
Croatia	3	Sweden	45	Philippines	14
Cyprus	4	Switzerland	33	Sri Lanka	1
Czech Rep	2	U.K.	209	Taiwan	46
Estonia	2			Thailand	14
Georgia	1	**Latina America**	**190**	Vietnam	1
Hungary	7	Argentina	22	**Other**	
Israel	19	Bolivia	1	Cayman Islands	1
Kazakhstan	9	Brazil	81	Jamaica	1
Lithuania	1	Chile	15	Panama	1
Poland	21	Colombia	9		
Russia	78	Ecuador	2		

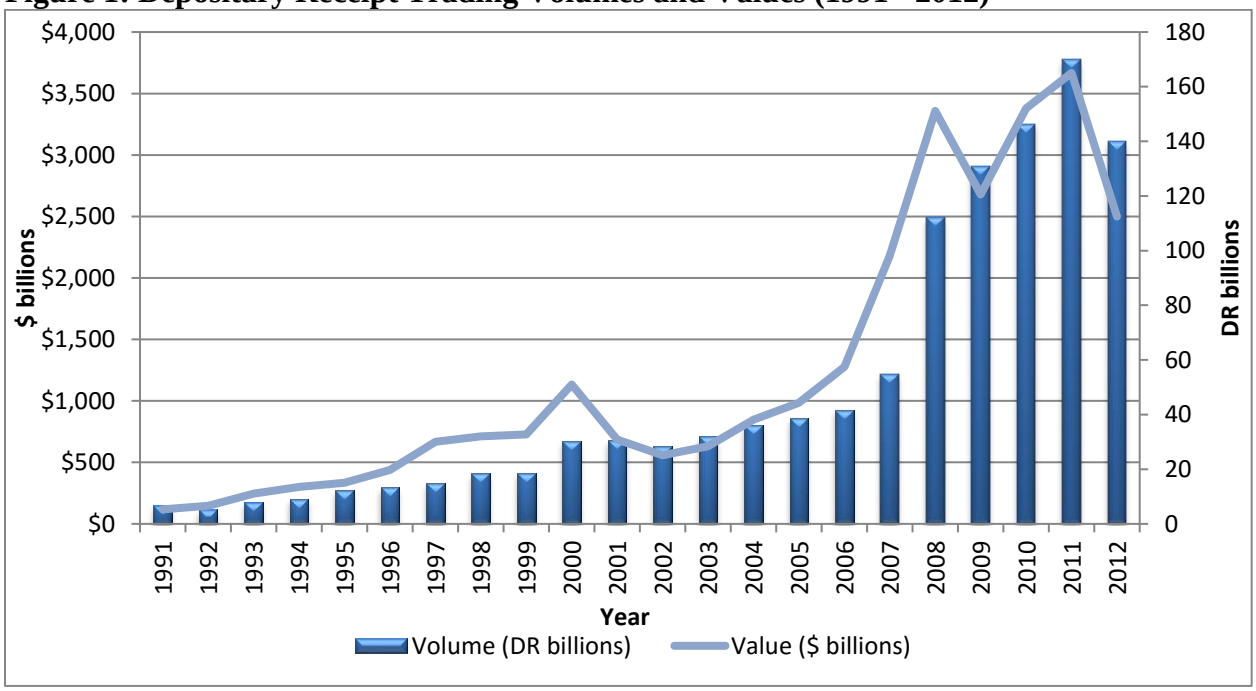
Notes: The table shows the number of firms by geographical area of firm origin that have a depositary receipts program as of 2012. All information is obtained from the Citibank Depositary Receipt database. EMEA refers to Europe, the Middle-East and Africa. (https://www.citiadr.idmanagedsolutions.com, Accessed on Apr 12, 2013)

Table 2: Depositary Receipt Equity Offerings 2000-2012

Year	No. of Capital Raisings		Total Amount of Capital Raised (USD billions)		Average Capital Raised (USD millions)	
	ADR	GDR	ADR	GDR	ADR	GDR
2000	110	20	$27.91	$1.76	$253.69	$88.21
2001	34	7	$8.51	$0.53	$250.21	$76.39
2002	28	16	$6.37	$1.97	$227.39	$123.32
2003	32	21	$7.63	$2.99	$238.39	$142.29
2004	42	25	$7.42	$2.27	$176.74	$90.66
2005	70	57	$24.10	$8.85	$344.26	$155.23
2006	71	84	$25.18	$19.48	$354.70	$231.94
2007	100	73	$36.61	$18.39	$366.15	$251.93
2008	29	20	$9.87	$3.49	$340.25	$174.37
2009	42	32	$24.68	$7.38	$587.51	$230.56
2010	59	53	$17.22	$4.50	$291.91	$84.95
2011	31	35	$6.70	$8.25	$216.23	$235.83
2012	27	17	$6.07	$8.61	$224.79	$506.76
Total / Average	675	460	$208.27	$88.48	$308.54	$192.36

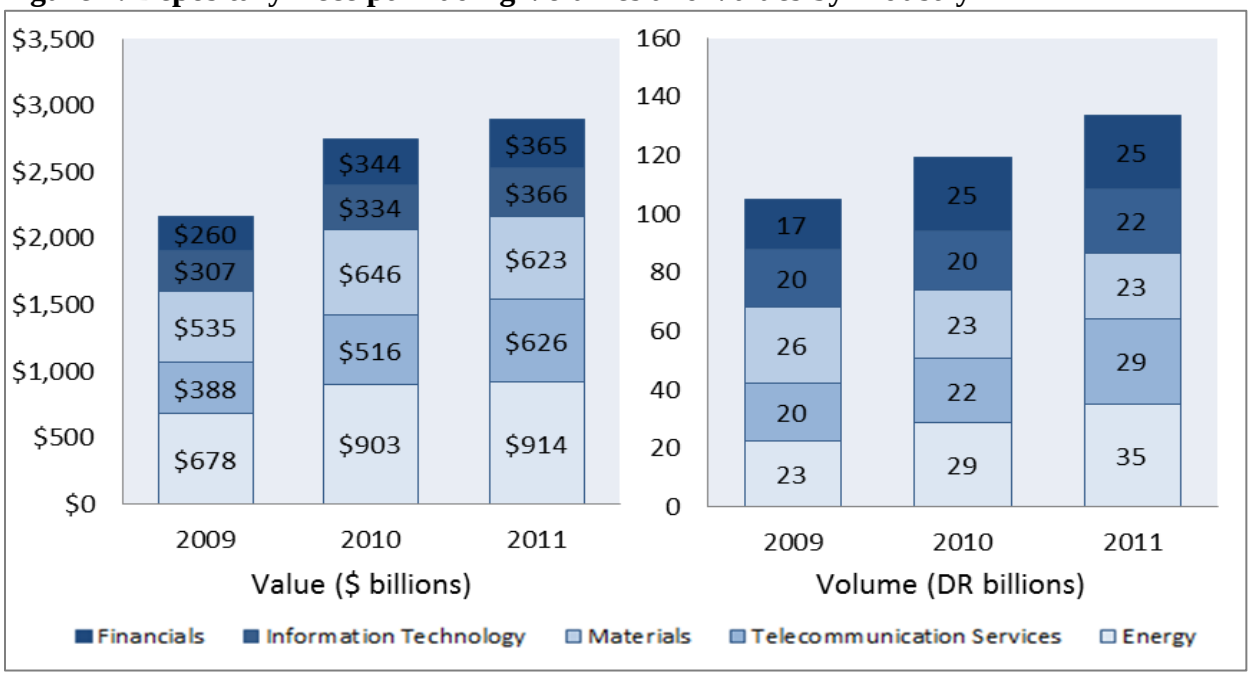
Notes: The table shows Depositary Receipt equity offerings for the period 2000-2012. American Depositary Receipts (ADRs) include Level 3 ADR programs and private placements according to SEC rule 144a. Global Depositary Receipts (GDRs) are offered on London, Luxembourg, Frankfurt and Singapore exchanges. All data is obtained from the Bank of New York Mellon database. (https:// http://www.adrbnymellon.com/dr_directory.jsp, Accessed on Apr 12, 2013)

Figure 1: Depositary Receipt Trading Volumes and Values (1991 - 2012)



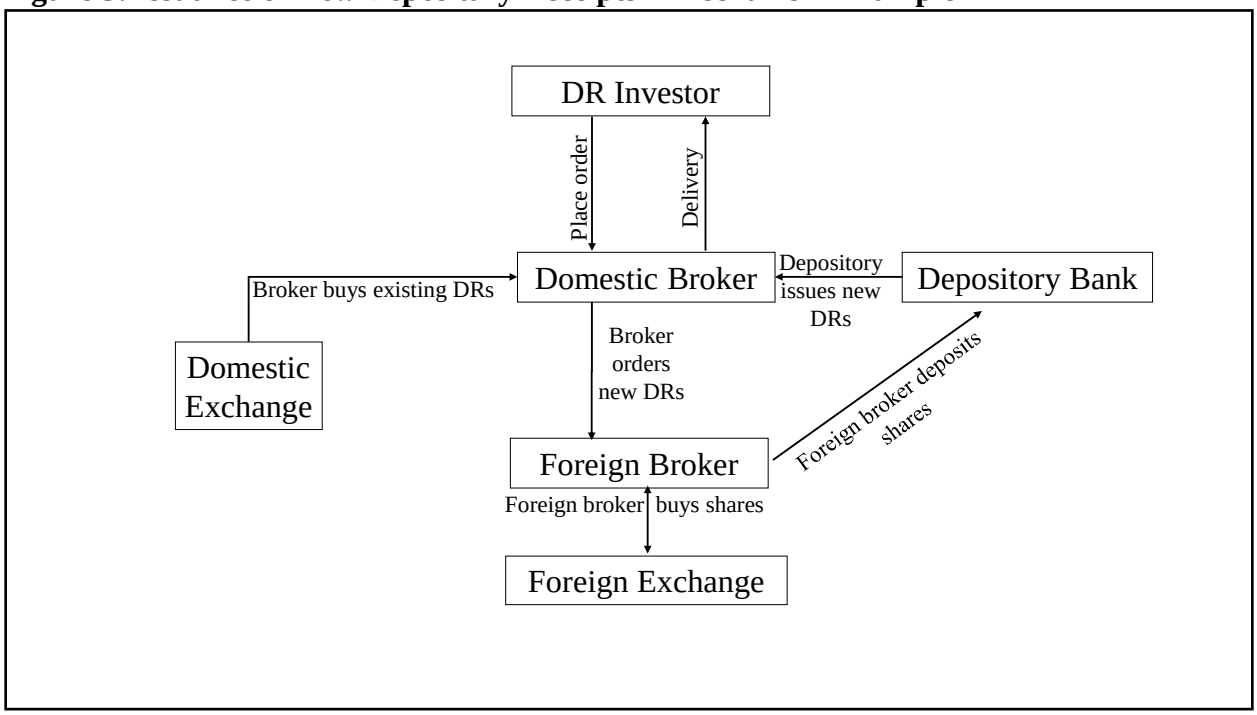
Notes: The graph shows the trading volumes and values for the universe of global depositary receipts for the period 1991 to 2012. Trading values are scaled in billions of US dollars and trading volumes are scaled in billions of traded global depositary receipts. The data are obtained from the Citibank Depositary Receipt database. (https://www.citiadr.idmanagedsolutions.com, Accessed on Apr 12, 2013)

Figure 2: Depositary Receipt Trading Volumes and Values by Industry



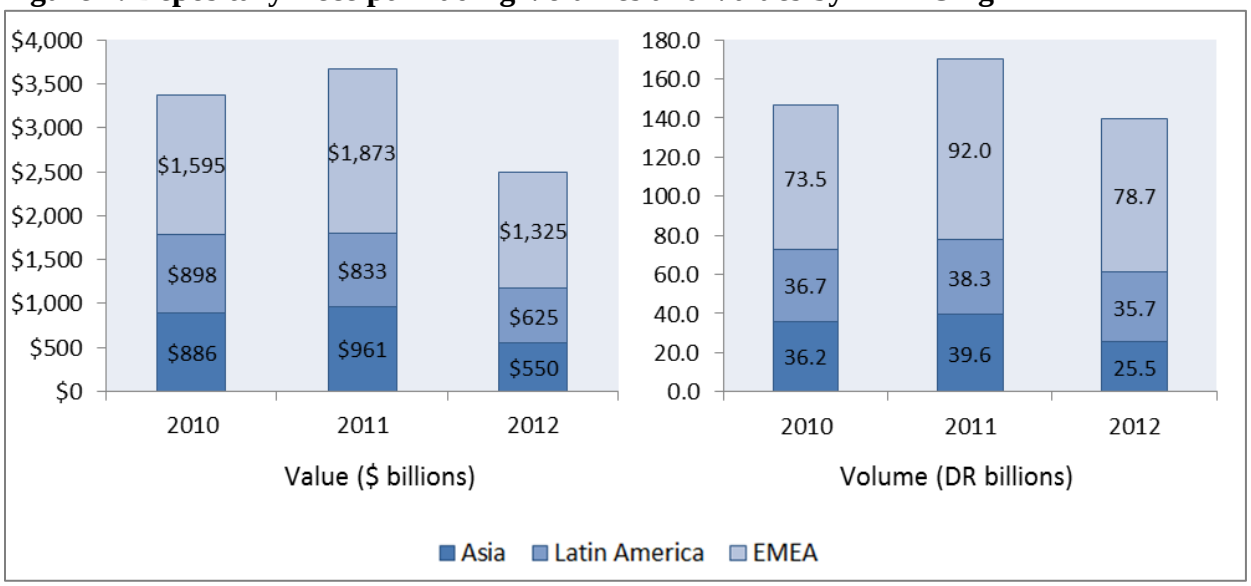
Notes: The left chart shows the global depositary receipt trading values in billions of US dollars for the five largest industries between 2009 and 2011. The right chart shows the global depositary receipt trading volumes in billions of traded global depositary receipts for the five largest industries between 2009 and 2011. The data are obtained from the Citibank Depositary Receipt database. (https://www.citiadr.idmanagedsolutions.com, Accessed on Apr 12, 2013)

Figure 3: Issuance of New Depositary Receipts – Mechanism Example



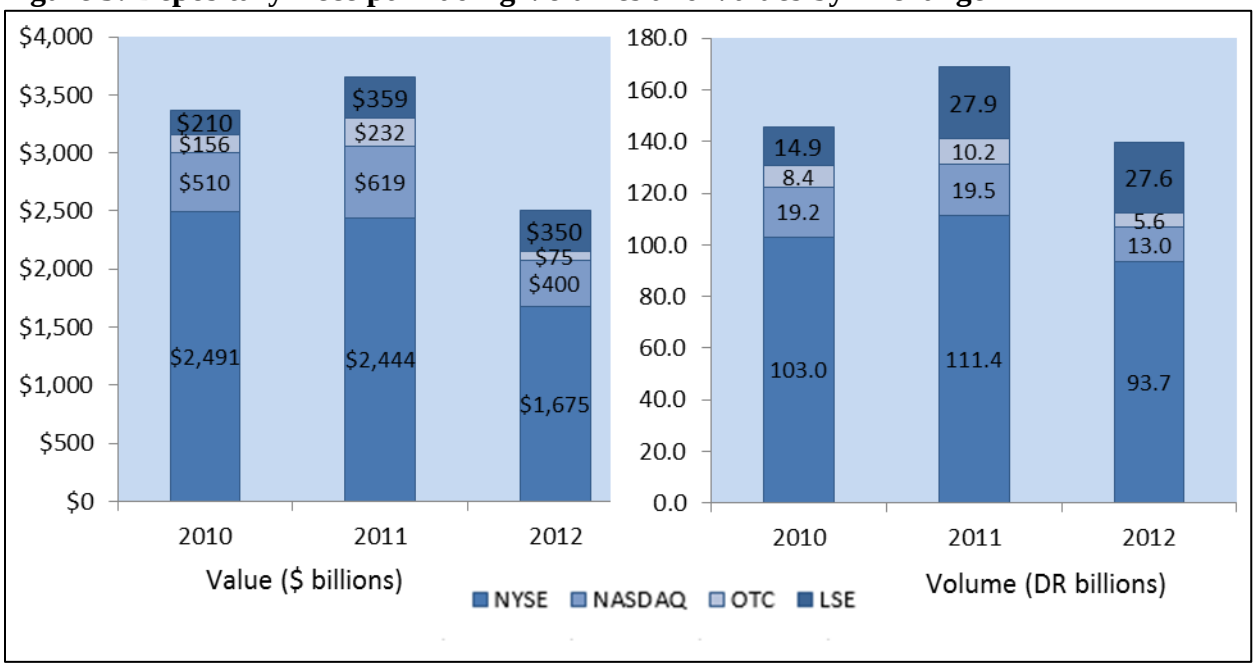
Notes: The figure illustrates the issuance mechanism of global depositary receipts via a depositary bank. Figure partially adapted from Eun and Resnick (2009).

Figure 4: Depositary Receipt Trading Volumes and Values by Firm Origin



Notes: The left chart shows the trading value of the universe of global depositary receipts in billions of US dollars broken down by geographical area of firm origin. The right chart shows the trading volume of the universe of global depositary receipts in billions of traded global depositary receipts broken down by geographical area of firm origin. All data is obtained from the Citibank Depositary Receipt database. EMEA refers to Europe, the Middle-East and Africa. (https://www.citiadr.idmanagedsolutions.com, Accessed on Apr 12, 2013)

Figure 5: Depositary Receipt Trading Volumes and Values by Exchange



Notes: The left chart shows the trading values of the universe of global depositary receipts in billions of US dollars broken down by exchange. The right chart shows the trading volume of the universe of global depositary receipts in billions of traded global depositary receipts broken down by exchange. All data is obtained from the Citibank Depositary Receipt database. (https://www.citiadr.idmanagedsolutions.com, Accessed on Apr 12, 2013)

CHAPTER II

THE PERFORMANCE OF CROSS-LISTING FIRMS

1. Introduction

1.1 Background and Motivation

Going public and selling shares to firm outsiders for the first time is one of the cornerstones of any company. Not only does it provide companies with equity capital, but it also offers access to international capital markets and thereby creates comparative advantages, prestige and growth. Another benefit of going public is the enhanced transparency through additional reporting requirements and analyst followings, especially in the U.S. market, which incites management to maximize shareholder wealth. Equity offerings through Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs) programs, both domestic and global, have received substantial research interest for many decades. Two main reasons for this interest are the short run positive and long run negative abnormal returns in the aftermath of equity issues, often referred to as the "two-part puzzle" (Copeland et al., 2004). In this regard, especially IPO literature has shown positive abnormal returns at the end of the first day of trading and negative abnormal returns in the long run, when compared to market indices and benchmark portfolios of matching firms. Although many explanations have been successful in explaining part of the puzzle, research regarding this phenomenon is ongoi

1.2. Underpricing

Underpricing, the percentage difference between the offer price and the market price at the end of the first trading day, has been found to be positive and statistically significant in the United States. Visibly, underpricing is nothing else but a loss for the pre-offering owners of a firm, since the offer price of shares and accordingly the proceeds for the owners could have been potentially higher. Loughran and Ritter (2002) report that on average owners left about $9.1 million on the table for IPOs between 1990 and 1998. Moreover, Loughran and Ritter (2004) document that the first-day return averaged 65% during the internet-bubble in 1999 and 2000, reaching up to 256% for individual firms. Several explanations have been proposed as to why firm owners leave such a large amount of money on the table; the most popular ones among which are information asymmetry, institutional reasons, control considerations, and behavioral approaches.

Information asymmetry refers to the fact that not all parties involved in an IPO share the same information about the company. Hence, different expectations or assumptions lead to different estimations about the value of a company, resulting in considerable share price reactions. For institutional reasons, companies tend to lower offer prices so as to avoid potential lawsuits from disappointed investors who pay too high offer prices and suffer an immediate wealth loss. In this regard, the IPO of Facebook underwritten by several banks including JP Morgan, Goldman Sachs and Morgan Stanley in 2013 is an excellent example of how a high offer price can cause disappointing first-day returns and invite potential lawsuits. Facebook's share price plunged by more than 19 percent over the two days following the initial public offering. The reason for the decline in share price is commonly understood to be due to lower than estimated revenues that were published after the offering. To avoid potential lawsuits

Facebook could have set a lower offer price reducing the loss of first day investors, as it is the case for the majority of IPOs.

Control theories are based on the view that going public initiates a separation of ownership and control as a consequence of selling shares to new owners. However, management and former shareholders with larger stakes in a company are often interested in retaining their private benefits. In this context, underpricing supports market demand and distribution of newly created shares; a broader investor base can be created with fewer or no accumulation of shares to single or institutional investors. As a result, no single entity will gain control and hence initiate extensive monitoring efforts to prevent managers from retaining their private benefits.

Behavioral theories explain underpricing with the presence of "irrational investors" who bid up the share price without reasonable knowledge of an underlying firm value. This theory has been supported, for example, during the internet-bubble of 1999 and 2000. During this time, investors subscribed to new shares based on historical patterns of probable high short-term profit without considering fundamental values of the firms. For instance, Ofek and Richardson (2003) analyze the underpricing of 400 pure internet-firms that issue equity between 1998 and 2000. The authors explain that upon lockup expiration that prohibits insiders from sale of their shares, the share price is brought back to its fundamental value through tremendous price declines. In other words, a price correction takes place that corrects the deviation from fundamental values caused by investors not trading based on fundamental values.

The empirical evidence with regard to any underpricing theory is mixed as many of the proposed explanations have been refuted over time using different methodological approaches and data. However, this has not diminished the interest in equity offering research.

1.3. Long-run Performance

In financial research, long-run performance is analyzed by using time frames up to 5 years after an event. With regard to equity offerings, the long-run performance of a firm is often measured from the day after the equity offering up to 5 years following the offering via the buy-and-hold return (BHR) method, i.e. the compound returns from the start till the end of the holding period. The BHR of the firm involved in equity offering is then compared to those of benchmark indices or matching portfolios of firms that do not engage in the activity, which is referred to as buy-and-hold abnormal returns. Several studies have documented stock price underperformance of equity offering firms in the long run when compared to benchmark indices and matching firm portfolios.

One of the proposed explanations for the well-documented post-issue underperformance is the agency problem as introduced by Jensen and Meckling (1976). As a result of the heightened conflict of interest between initial owners and shareholders, the performance of the firm could suffer as managers have incentives to increase perquisite consumption and fail to act in the best interest of their shareholders (Ritter and Welch, 2002). Window-dressing activities by managers prior to equity offerings are often cited as a second possible reason for the subsequent underperformance (Jain and Kini, 1994; Rangan, 1998). Such activities would lead to overstatement of pre-offering performance that ultimately is reversed in the post-offering period. Finally, another potential justification for post-issue underperformance is the timing of equity offerings. According to this theory, managers time their issues to coincide with periods of unusually good performance levels, which they know cannot be sustained in the future (Schultz, 2003).

1.4. Methodology Issues

When analyzing short and long run performance of equity issuing firms, the vast majority of research uses matching techniques to compare the issuing firms with non-issuing firms with otherwise similar characteristics. The purpose of this simulation is to identify the effects that equity issues have on firm performance, holding other firm characteristics to be similar between the issuing firms and non-issuing firms. Several different matching techniques have been developed over the time, ranging from traditional matching techniques (e.g. finding matching firms closest in size, book-to-market and growth) to more recent techniques such as propensity score matching (e.g. finding matching firms that have as much propensity to issue new equity but choose not to issue). Despite these developments in research, the results have been inconclusive as different techniques yield different results. Criticisms remain on whether a matching non-issuing firm is truly similar to an issuing firm on all aspects, except for the decision to issue, which is critical to detect any effects on the firm performance possibly attributed solely to the issue.

In this chapter, I reexamine the effects of DR equity offerings on firm performance by analyzing a sample of firms that cross-list and raise equity in foreign markets after their preceding equity issues in their respective home markets. In particular, I compare and contrast the underpricing and buy-and-hold abnormal returns of depositary receipt equity offerings with those of preceding IPOs and SEOs of the same firms to identify differences and motivations for cross-listings and domestic equity offerings. In contrast to previous literature, this comparison is free of any matching bias since it involves the same firm at different points in time. I contribute to the two different strands of existing literature on equity offerings and on matching techniques with this research topic. Moreover, by comparing the performance of a firm upon its DR offering

with its performance upon its preceding domestic equity offerings, I hope to shed more light and draw clearer conclusions on the impact of DR offerings on firm performance. At the same time, I hope to extend the existing literature on detecting abnormal performance with a new matching technique.

2. Literature Review

2.1. Equity Offerings

There exists a vast amount of literature on the short and long run performance of firms around equity issues. The following gives an overview of the results in research with respect to IPO and SEO performances for both domestic and international firms.

2.2. IPO Short-Run Performance

Ibbotson (1975) is the first to document large underpricing of initial public offerings. In his paper, "Price Performance of Common Stock New Issues", the author studies the initial performance on newly issued common stocks offered to the public during the 1960s. While his results show an average initial underpricing of 11.4 percent, the author fails to adequately explain the source of this phenomenon. Welch (1989) presents a model in which firms underprice at the initial public offering in order to obtain a higher price at subsequent seasoned offerings. Using a sample of 1,082 IPO firms from 1977 – 1982, the author documents an average underpricing of 26%.

Megginson and Weiss (1991) analyze a sample of 320 venture capitalist backed IPOs. In particular, the authors compare the short-run performance of their sample with the performance of a matching portfolio of non-venture capitalist backed IPOs. The results suggest that on average 61.2% of VC backed firms and 60.3% of non-VC backed issues experience positive

returns on the first trading day. Further, the mean initial return of 7.1% for the VC backed issues is significantly lower than for the matching portfolio. The authors attribute this difference to the increase in the quality of the issue through the investment of financial and reputational capital of venture capitalists.

Booth and Chua (1996) investigate a sample of 2,151 IPOs in the period 1977-1988 and document an average underpricing of 13.1 percent. The authors argue that this underpricing is motivated by oversubscription and ultimate ownership dispersion. Since oversubscription (e.g. investors demand more shares than are supplied through the offering) allows broader initial ownership dispersion, a liquid secondary market can be established that results in higher issue proceeds. Additionally, the authors show that issuing firms using well-known underwriters have on average less underpricing.

Similar magnitudes of underpricing are presented by Beatty and Welch (1996). The authors examine a sample of 823 firm-commitment offerings from 1992 to 1994, and report an average underpricing of 11.7%. Further analysis reveals that the underpricing is inversely related to underwriter quality. This result is supported by Carter et al. (1998) and Gompers and Lerner (1999), who also find lower underpricing for IPOs managed by more reputable underwriters.

Lowry and Shu (2002) examine a sample of 1,841 IPOs from 1988 to 1995. The initial results indicate average underpricing of more than 14%. Consistent with the results by Carter et al. (1998), Lowry and Shu (2002) find an inverse relationship between underpricing and underwriter reputation. Moreover, the authors investigate the extent to which firms underprice their IPOs as a form of insurance and whether underpricing is effective in deterring litigation. The authors show that initial positive returns are larger for firms without subsequent litigations, confirming their hypotheses that firms with higher litigation risk underprice their IPOs by a

greater amount as a form of insurance, and that higher underpricing lowers expected litigation costs.

Additional evidence on IPO underpricing is provided by Lowry and Schwert (2002) who study a sample of 3,976 IPOs between 1985 and 1997. The authors suggest that underwriters fail to account for the market's valuation of recent IPOs in their pricing of new offerings, resulting in avoidable high first-day return bubbles. Further, the observation that more companies file IPOs following periods of high underpricing suggests that the initial returns of recent IPOs contain information on the market's valuation of future IPOs.

Habib and Ljungqvist (2001) investigate why some initial public offerings are more underpriced than others. The authors suggest that the difference in underpricing is related to the wealth effect on owners of the firm. In particular, the extent to which owners care about underpricing depends on the proportion of firm shares offered at the IPO. In other words, owners who sell very few shares suffer only marginally from underpricing; the more shares are sold, the greater the incentive to decrease underpricing. The sample used in this study is comprised of 1,376 companies that go public between 1991 and 1995. The average underpricing of the analyzed sample is 13.8%.

Loughran and Ritter (2002) try to answer the question, "Why Don't Issuers Get Upset about Leaving Money on the Table in IPOs?" This question is of special importance since the authors estimate a potential $9.1 million that could have been collected by prior owners of the firm. Their proposed answer is related to the prospect theory introduced by Kahneman and Tversky (1979). In particular, the authors argue that the immense wealth increase of prior owners at IPOs makes the amount of potential lost proceeds less important. Ritter and Welch (2002) expand that IPO performances are a changing phenomenon and most of the rationale behind

underpricing is related to share allocation, irrational investor behavior and agency conflict. Overall, they dismiss asymmetric information as the primary reason.

Ljungqvist and Wilhelm (2003) compare a sample of IPO firms that issue during the "dot-com bubble" in 1999 and 2000 with a sample of preceding issues from 1996 to 1998. The analyzed sample includes 2,178 IPOs. Initial returns average 35.7%, with more than 70% for issues in 1999. The authors explain that firm characteristics in terms of pre-IPO ownership structure and insider selling behavior are unique in the "dot-com bubble", which in turn influence the pricing behaviors of these IPOs. In particular, equity stakes held by venture capitalists, institutional investors and CEOs declined during the analyzed period resulting in more widespread ownership. Consequently, insider trading declined in the secondary market leading to more trades of uninformed investors who trade prices up. The authors also show that "direct share programs", which give insiders preferred access to shares at the offer price, generate incentives to underprice.

Loughran and Ritter (2004) report that in the 1980s, the average underpricing on IPOs was 7%, which increased to 15% during 1990 – 1998 and reached its peak of 65% during the internet bubble in the years 1999-2000. The authors suggest that the change in underpricing is related to a change in issuer objectives. Specifically, issuers in the high underpricing periods focused less on maximizing issuer proceeds and sought for underwriters known for large underpricing in IPOs.

Controversial results with regard to IPO underpricing are presented by Purnanandam and Swaminathan (2004). The authors analyze a sample of more than 2,000 IPOs between 1980 and 1997 and find that the median IPO during the period was significantly overvalued at the offer price. To arrive at this finding, the authors employ an alternative measure of IPO underpricing

taking into account different matching criteria. Zheng (2007) revisits the overpricing argument by Purnanandam and Swaminathan (2004) and suggests modifications to the matching criteria. The author suggests that when new primary shares are excluded and cash holdings and leverage are adjusted when calculating the IPO firm price to be consistent with accounting variables, IPO firms are not overpriced anymore. Overall, the results of Zheng (2007) support that IPOs are underpriced.

2.3. IPO Long-Run Performance

Many studies find that stocks produce relatively low returns over holding periods of up to 5 years after equity issuances. Ritter (1991) analyzes a sample of 1,526 IPOs in the U.S. between 1975 and 1984. In the three-year period after the equity issuances, these firms underperform a set of comparable firms matched by size and industry by more than 26%. The author attributes the underperformance to market-timing, in which managers decide to issue equity when share prices peak and are overvalued. Consequently, share prices drop to a more appropriate equilibrium in the aftermath of the issuance to correct the overvaluation. Similar results and rationale are presented by Loughran and Ritter (1995) who report that equity issued via IPOs represents a poor long-run investment because firms take advantage of time periods of firm overvaluation. Lerner (1994) explains that companies go public when equity valuations are high and use internal cash flows when values are lower.

Jain and Kini (1994) study the change in operating performance of 682 firms issuing equity to the public for the first time between 1976 and 1988. They show that operating performances of these firms decline in the 3 years after the initial equity issuance, even on an industry adjusted basis. This finding supports that firms not only issue when their stocks are overvalued as suggested by Loughran and Ritter (1995), but also when their operating

performance peaks. Further, the authors argue that managers "window-dress" their accounting figures, i.e. they overstate the true performance of the firm, which is corrected *ex-post*.

Brav and Gompers (1997) investigate the long-run underperformance of IPO firms in the period 1972-1992. Their initial results indicate that IPO firms underperform a series of benchmarks such as S&P500 and NASDAQ composite using equal and value weighted buy-and-hold returns. However, comparing their sample of IPO firms to firms of similar size and book-to-market does not display long-run underperformance. Moreover, when distinguishing between venture-backed IPOs and non-venture-backed IPOs, the authors find that venture-backed IPOs outperform non-venture-backed IPOs. This finding suggests that the often observed long-run underperformance comes primarily from small, non-venture-backed IPO firms.

Teoh et al. (1998) confirm the finding that initial public offerings underperform after the issue using a sample of 1,649 IPOs from the 1980-1992 period. The authors extend the paper by Ritter (1991) and find that underperformance is higher for firms with very aggressive earnings management as measured by discretionary current accruals.

Eckbo and Norli (2005) find underperformance of IPO firms of up to 28.8% for 6,139 firms going public between 1972 and 1998. Further analysis reveals that the degree of underperformance is impacted by the level of firm liquidity and leverage. In particular, IPO firms display statistically significant greater liquidity and lower leverage ratios than a portfolio of matching firms of equal size and book-to-market.

Gompers and Lerner (2003) examine the performance for five years after listing of 3,661 U.S. IPOs from 1935 to 1972. In particular, the authors investigate the impact of methodology selection on long-run underperformance. The results indicate that their sample displays underperformance when event-time buy –and-hold abnormal returns are used and no

underperformance when cumulative abnormal returns are utilized. This result confirms the findings by Ritter (1991) and Loughran and Ritter (1995), but challenges the overall validity of the findings. Hence, it is important to note that the method of data analysis can have a significant impact when studying long-run IPO aftermarket performance.

2.4. Seasoned Equity Offering

There are several ways of measuring the short-run performance of equity issues. Underpricing is often measured as the change of the asset price on the first trading day relative to its offer price. With regard to SEOs, additional comparisons are possible since trading history for issuing firms is generally available. Some of the rationales behind underpricing for initial public offerings, such as information asymmetry between owner and investor, seem to be less valid as more information about the firm should be available at the time of a secondary offering. Nevertheless, literature has provided much evidence for underpricing and long run underperformance after secondary issues.

2.5. SEO Short-Run Performance

Safieddine and Wilhelm (1996) investigate the short-run performance of secondary issues for sample of 474 exchange listed U.S. firms between 1980 and 1991. The authors divide their sample into pre- and post-periods following the adoption of Rule 10b-21. In particular, they find that after the passage of this rule, underpricing is significantly increased. Confirming results are provided by Kim and Shin (2004). The authors use a sample of over 3,000 seasoned equity offerings from 1983 to 1998 to test the hypothesis that the U.S. Securities and Exchange Commission's Rule 10b-21 makes pre-offer stock prices less informative by disallowing the covering of short positions with newly issued SEOs, which in turn causes the new seasoned equity to be priced at a discount.

Additional determinants for the underpricing of seasoned equity offers are provided by Corwin (2003). The author analyses 4,454 seasoned equity offers between 1980 and 1998. Consistent with previous studies, SEOs are underpriced with average returns of 2.3 percent on the first trading day. Furthermore, the author finds that issues listed on the NYSE are less underpriced than issues listed on the NASDAQ, and that underpricing has increased over the time of the sample period. Additionally, underpricing seems to be positively related to relative offer size of the issue.

Eckbo and Masulis (1992) analyze underpricing for industrial and utility issuers that list on the NYSE and AMEX for the time period 1963-1981. The authors find that offer prices for firm commitments are on average underpriced by less than 0.5 percent. Altınkılıç and Hansen (2003) suggest that discounting in seasoned equity issues is a cost of uncertainty about firm value and acquiring information for the investor. Their sample of 590 seasoned equity offerings reveals average underpricing of 1.78 percent. The sample is comprised by firm-underwritten, non-shelf offers by listed industrial firms from 1990 to 1997.

Another analysis by Mola and Loughran (2004) studies the underpricing of 4,814 SEOs during 1986-1999. The results of the investigation suggest that on average the new shares are priced at a discount of 3% measured from the closing price on the day before the issue. Like previous studies, the authors report that SEO underpricing has increased over time. Adjusting for additional factors, the authors also find that underwriter reputation is positively related to the discount, and that many offers price shares at integers, which is also positively related to the underpricing.

2.6. SEO Long-Run Performance

Loughran and Ritter (1995) report that the widespread phenomenon of poor IPO long-run performance is not unique to first-time issuers. According to their results, investors have received only 7 percent per year for companies conducting a seasoned equity offer. The authors suggest that this represents a significant underperformance compared to non-issuing firms and that the magnitude of the underperformance is economically important. Further, the authors suggest that the reason for this underperformance is related to overvaluation, i.e. the market does not value the stock appropriately. Similar results and conclusion are presented by Spiess and Affleck-Graves (1995) who document that firms offering seasoned equity during 1975-1989 substantially underperform a sample of non-issuing firms matched by industry and size.

Loughran and Ritter (1997) document a substantial improvement in operating performance prior to seasoned equity offerings for their sample of 1,338 SEOs between 1979 and 1989. The authors argue that some issuing firms intentionally mislead investors, as the operating performance cannot be sustained in the aftermath of the issue. This is confirmed by Rangan (1998), who explains the poor SEO earnings performance in the post-offering period with the existence of earnings management. In particular, the author investigates whether earnings management around the time of the offering can explain a portion of the poor aftermarket performance in his sample of 230 SEOs. His findings suggest that discretionary accounting accruals during the year around the offering predicts part of the poor performance.

Eckbo et al. (2000) try to shed light into the ‘new issues puzzle’ by Loughran and Ritter (1995). The authors suggest that issuer underperformance reflects lower systematic risk exposure for issuing firms relative to the matches due to lower leverage after the issue. As a consequence of reduced risk, asset return expectations decrease relative to matching firms. In essence, the

authors point out that the matching technique employed by Loughran and Ritter (1995) is short of proper risk control in the control sample that causes illusion of underperformance. Additional evidence of erroneous matching in prior studies that find underperformance in seasoned equity issuing firm is provided by Li and Zhao (2006). The authors reexamine underperformance using the propensity score matching on a sample of about 2,000 offerings between 1986 and 1998. Their results indicate that the underperformance is economically and statistically insignificant when issuers and non-issuers are matched by propensity scores.

Autore et al. (2009) investigate the relation between seasoned equity issuers' stated intended use of proceeds and their subsequent long-run and operating performance. The authors analyze a sample of 880 seasoned issuers between 1997 and 2003 and report average buy-and-hold abnormal returns of -12.61 percent for a 36-month horizon following the SEO. Further, the analysis suggests that firms stating an intended use for investment purposes experience the lowest long-run underperformance as compared to a portfolio consisting of non-issuing firms matched by size, pre-issue stock performance, and market-to-book ratio.

2.7. Global Equity Offerings

Callaghan et al. (1999) analyze the performance of 66 ADR equity offerings, 41 SEOs (companies that had prior issuance in their respective home markets) and 25 IPOs (no prior issuance anywhere in the world). Overall, their results indicate an underpricing (i.e. they display positive market-adjusted returns on the first trading day) of ADR IPOs and SEOs. The aftermarket return performance, in contrast to empirical research on US IPOs and SEOs, for the combined sample of ADR IPOs and SEOs shows statistically significant positive abnormal returns for ADRs listed on the NYSE and significantly negative abnormal returns for ADRs listed on NASDAQ and AMEX. ADR IPOs have statistically significant positive cumulative

abnormal market-adjusted returns over the 10-month period subsequently to the issuance. The performance of ADR SEOs exhibits significantly positive cumulative market-adjusted returns over the 1-year period subsequent to the issue. ADRs from emerging markets outperform those originating from developed countries.

Foerster and Karolyi (2000) analyze the performance of 333 non-US firms that raise equity capital on the U.S. market in the period 1982-1996. The results indicate that on average, foreign equity offerings underperform home market benchmarks of comparable firms by 8%-15% over the three years following the issuance. Further, they report that firms that issue equity in major public exchanges in the U.S. modestly outperform their benchmark.

Bancel et al. (2009) examine several cross-listing theories employing a sample of 253 ADRs from 19 European countries during the 1970–2002 period. The authors find that Level II and III listings underperform 3 years in the aftermarket of the issue as compared to several benchmarks including US and European industry indices.

Kadiyala and Subrahmanyam (2002) analyze a sample of 112 foreign firms issuing equity in the U.S. to determine the factors that affect IPO and SEO pricing. Specifically, their sample consists of 79 ADR IPOs and 33 ADR SEOs between 1996 and 2000. The authors find that ADR IPO discounts average 21.5% and ADR SEO discounts average 2.07%. SEO discounts are lower for firms listed in the NYSE and AMEX.

Burch and Fauver (2003) investigate the pricing of U.S. IPOs by seasoned foreign firms, i.e. firms that are already listed on their home market. Their sample is comprised of 50 foreign firms that cross-list between 1989 and 2001.The authors find an average first-day return of 12.7% for firms from countries that impose foreign ownership restrictions and capital controls. The authors suggest that this underpricing stems in part from the underwriter's failure to

appropriately price the issue. Firms without ownership restrictions do not seem to be underpriced. Francis et al. (2010) analyze a sample of 413 foreign IPOs and 70 SEOs of which 151 are identified as ADRs. The authors report an average underpricing for the IPO sample firms of 10.1% and a negative average abnormal return for the SEO sample.

Schaub and Highfield (2004) examine the short-term and long-term performance of IPOs and SEOs traded as ADRs in the U.S. In particular, their sample is divided into offerings of firms that issue equity for the first time (IPOs) and offerings of firms that have issued equity before (SEOs). Furthermore, their result is split into two subsamples prior and after June 1998 to capture bear market effects after 9/11. Their results with regard to short-term and long-term performance suggest that ADRs issued prior to June 1998 underperform the S&P500 and issues after June 1998 outperform the benchmark. The authors conclude that non-negative and even positive significant cumulative wealth effects associated with stock market timing may exist for ADR IPOs and SEOs trading during holding periods in bear markets.

Ejara and Ghosh (2004) analyze the performance of 284 ADR IPOs in the time period 1990-2001. Their results indicate underpricing of ADR IPOs by an average of 12.34%. Their sample contains 83 ADRs from companies with prior trading in the domestic market. Excluding these ADRs in the sample the average underpricing increases to 16.59%. This implies that cross-listed firms with prior trading on the domestic market should have on average lower underpricing when compared to cross-listed firms without prior trading history. This supports the theory that there is more information available through a trading history and therefore the risk of cross-listed firms with prior trading history should be lower as well as the underpricing. Callaghan et al. (1999) the authors find that ADR IPOs from emerging markets outperform those from developed countries in the aftermarket performance. Overall, the authors find that US IPOs outperform

ADR IPOs in the long-run. The authors use the S&P500 index as market benchmark which outperforms ADR IPOs initially and in all periods analyzed. The S&P 500 also outperforms US IPOs in the periods one year after the issuance. The authors did not test the aftermarket performance for ADR equity offerings with prior trading in the domestic market. Since these have estimated lower underpricing, the aftermarket performance should be even lower. Similar results are presented by Zhang and King (2010), who find that stock returns after listing events are generally negative for ADRs and underperform the market in the post-event window up to 3 years.

3. Hypotheses

The recognition hypothesis introduced by Merton (1987) implies that a cross-listed firm's valuation increases with the broadening of its U.S. investor base and the greater visibility of the firm. Hence, cross-listing firms issuing equity in the U.S. should experience positive valuation effects after the listing. Several studies document higher visibility and analyst coverage after issuing equity in the U.S. Baker et al. (2002) show that firms that cross-list shares on NYSE and LSE have increased visibility in the form of more analyst coverage and media attention. The authors also report a decrease in cost of equity following the increase in analyst coverage, which, in turn, should increase firm valuation.

However, while Foerster and Karolyi (1999) document abnormal returns for firms before and on the cross-listing date, the authors report a decline in abnormal returns after the cross-listing event. Furthermore, Foerster and Karolyi (2000) find that cross-listing firms underperform home market benchmarks of comparable firms by 8% to 15%. Ejara and Ghosh (2004) document a significant long-run underperformance of ADR equity offerings relative to matching US IPOs up to three years after the issue, while both underperform the market during

the same period. Similar results are also presented by Zhang and King (2010). In particular, the authors show a significant drop in profitability and asset turnover for cross-listed firms in the years after ADR IPOs. The authors explain this underperformance with rapid expansion and more intense competition when entering the US market. Furthermore, ADR issuers show no significant increase in sales growth, i.e. issuers do not seem to grow faster than their respective industry peers do in the three years after the issue. Finally, cross-listed firms do not seem to benefit from a reduction in the cost of debt during the first few years after the ADR offer. Hence, overall performance may fall below matched firms or benchmarks during the 5 years after the issue. Given that the present sample compares the same firm at different equity issues, similar results for aftermarket performance are expected. This leads to the following hypotheses.

H1: *ADR equity offerings underperform domestic IPOs of the same firms in the long-run.*

H2: *ADR equity offerings underperform domestic SEOs of the same firms in the long-run.*

The third hypothesis is derived from the bonding hypothesis. The bonding hypothesis suggests that if a foreign company agrees to list shares on stock exchanges with more rigorous regulations such as in the U.S., corporate governance should be improved by binding these companies to respect shareholder rights and by increasing the amount of disclosed information about the firm. This, in turn, attracts more investors and has positive effects on a firm's value (Stulz, 1999). Hence, the bonding hypothesis implies a higher performance for firms after raising equity in the U.S. compared to before the issuance. In addition, several studies find that enhanced investor protection is mainly beneficial to firm value, if the cross-listing firm lists on a major exchange in the US (Doidge et al., 2004; Lel and Miller, 2008).

H3: *Long-run performance after ADR equity offerings is significantly higher than performance after domestic IPO and SEO offerings of the same firms when listed on major US exchanges.*

Foreign firms that cross-list and raise equity in the U.S. must abide by the rules and requirements set by the Security and Exchange Commission (SEC). In particular, the SEC requires firms that cross-list and issue equity under the Level III program to restate their financial statements in US GAAP and to issue Form 20-F[3] each year. This leads to higher visibility of the firm, and the information asymmetry between issuer and investor should be mitigated. Research on domestic IPOs suggests that underpricing is related to information asymmetry between the issuer and investors. In particular, managers underprice new issues to signal positive future prospects of the firm to uninformed investors by setting an offer price below market value. In turn, this suggests that investors who possess more information about the issuing firm should price new shares closer to its actual value and so that no signaling is necessary. This leads to the following hypothesis.

H4: *ADR equity issues are less underpriced than home market IPOs of the same firms.*

In addition, many firms that raise equity in foreign markets have already issued equity in their respective home markets and established an investor base with prior market trading. As such, information about firms with trading history should be more readily available to the public than for firms without prior trading history or public issue.

H5: *ADR equity issues are less underpriced than home market SEOs of the same firms.*

[3] Annual report pursuant to section 13 or 15(d) of the Security Exchange Act of 1934. The registrant shall furnish financial statements for the same fiscal years and accountants' certificates that would be required to be furnished if the registration statement were on Form 10 or the annual report on Form 10-K. The financial statements shall disclose an information content substantially similar to financial statements that comply with U.S. generally accepted accounting principles and Regulation S-X.

4. Data

4.1. Data Source

I download the list of GDRs that raise capital along with information on the amount of capital raised, country of origin, exchange, effective date, industry, initial price and lead underwriter from several sources including J.P. Morgan, Bank of New York, Citibank and NYSE. The sample period starts in 2000 and ends in 2011. All depositary receipts are publicly listed on NYSE or NASDAQ. For performance comparison, I collect similar information from the same firms with preceding home market equity offerings from SDC Platinum Global New Issues. Information on financial performance including first day closing prices and stock returns is obtained from Datastream and the University of Chicago's Center for Research in Security Prices (CRSP) database. To be included in the sample, a firm must have information on both ADR equity offering and preceding home market equity offering. Accounting data of the sample firms upon ADR issuance are obtained from Compustat North America and prior to ADR issuance are obtained from Compustat GlobalVantage.

4.2. Sample Descriptive

Table 3 presents the sample distribution by home country. Most firms in the sample are domiciled in Korea (15) followed by the Netherlands (14), China, Mexico and Taiwan (13). The total number of ADRs in the sample is 184 over the period 2000 – 2013.

Table 4 reports the sample distribution by country and year of depositary receipt equity offering. Most sample firms cross-list on the U.S. market between 1997 and 2000. The largest number of equity offerings in the sample is observed in 2000 (24).

Table 5 reports the average offer price by home country of issuing firm. ADR offer prices range between $10.67 (Greece) and $107.27 (France) with an average offer price of $28.86 for the entire sample.

5. Methodology

5.1. Analysis of Underpricing

Following Ejara and Ghosh (2004) and Francis et al. (2010), I measure underpricing as the percentage difference between the closing price on the first trading day and the offer price.

(1): $UP_{DR} = \frac{CP_{DR} - OP_{DR}}{OP_{DR}}$

(2): $UP_{EO} = \frac{CP_{EO} - OP_{EO}}{OP_{EO}}$

(3): $UP_{Diff} = UP_{DR} - UP_{EO}$

where UP_{DR} is the underpricing of the depositary receipt; CP_{DR} is the closing price of the depositary receipt at the end of the first trading day; OP_{DR} is the offer price of the depositary receipt; UP_{EO} is the underpricing of the preceding equity offering of the same firm in the home market; CP_{EO} is the closing price of stock at the preceding equity offering at the end of the first trading day; and $OP_{EO}$is the offer price of the preceding equity offering. Larger underpricing will result in larger positive values for both measures. Employing t-test, Wilcoxon test and bootstrapped t-test, I compare and contrast the average underpricing of the sample with the average underpricing of preceding equity issues of the same firms in their respective home market as well as matching US equity issues.

I explore the determinants of underpricing, using a number of control variables that have been found to be significant in explaining IPO and SEO underpricing. In particular, these variables include the natural logarithm of the issue size (LNOFFSIZE) of firm *i* at equity

offering, underwriter rank (RANK) for the underwriters of firm *i* at the equity offering, number of underwriters in the underwriting consortium (SYND) of firm *i*, the reciprocal of the offer price (RECPRC), a developed country dummy (DEV) for firm *i* with a value of 1 if the firm is domiciled in an developed country, and 0 otherwise, a high-tech dummy (HT) with a value of 1 if the firm is in the high-tech industry, and 0 otherwise, a binary variable with a value of 1 if the firm is cross-listed in an exchange, and zero otherwise, the natural logarithm of the firm size the year prior to the offering, a binary variable with a value of 1 if the issue is an ADR offering, and zero otherwise (ADR). I estimate OLS-regressions of the following form:

$$(4): UP_{i,t} = \alpha + \beta_1 LNOFFSIZE_{i,t} + \beta_2 RANK_{i,t} + \beta_3 SYND_{i,t} + \beta_4 RECPRC_{i,t} + \beta_5 DEV_{i,t} + \beta_6 HT_{i,t} + \beta_7 EXCH_{i,t} + \beta_8 LNSIZE_{i,t-1} + \beta_9 ADR_{i,t} + \epsilon_{i,t}$$

To be consistent with hypotheses 4 and 5, I expect the coefficient on the ADR variable to be negative and statistically significant. This would indicate that ADR underpricing is significantly lower compared to IPO and SEO offerings of the same firms prior to the ADR equity offering. Furthermore, I control for year-fixed effects and country-fixed effects to omit variable bias.

5.2. Analysis of Aftermarket Performance

To analyze and compare the aftermarket performance of DR equity offerings with preceding home market equity issues, I calculate the buy-and-hold abnormal returns as suggested by Loughran and Vijh (1997) and Barber and Lyon (1997). The abnormal return is the difference between market-adjusted holding period returns of sample ADRs and matching stocks (of the same firms at home market equity issuance) up to five years after the equity issuance events.

$$(5): BHAR_{Issuer} = BHR_{Issuer} - BHR_{Home\ Market\ Offering}$$

I measure annual intervals of up to five years after the cross listing as the buy-and-hold periods starting from the month following the offering month. To explore the determinants of abnormal buy-and-hold returns, I use a number of control variables that have been found to be significant in explaining the long-run aftermarket performance after international equity offerings. In particular, these variables include the natural logarithm of the issue size (LNOFFSIZE) of firm *i* at equity offering, underwriter rank (RANK) for the underwriters of firm *i* at the equity offering, number of underwriters in the underwriting consortium (SYND) of firm *i*, the return on the first trading day of the offering (RET), a developed country dummy (DEV) for firm *i* with a value of 1 if the firm is domiciled in an developed country, and 0 otherwise, a high-tech dummy (HT) with a value of 1 if the firm is in the high-tech industry, and 0 otherwise, a binary variable (EXCH) with a value of 1 if the firm is cross-listed on an exchange, and zero otherwise, a binary variable with a value of 1 if the issue is an ADR offering, and zero otherwise (ADR). The regression is estimated using OLS and has the following form.

$$(6): BHAR_{i,t} = \alpha + \beta_1 LNOFFSIZE_{i,t} + \beta_2 RANK_{i,t} + \beta_3 SYND_{i,t} + \beta_4 RET_{i,t} + \beta_5 DEV_{i,t} + \beta_6 HT_{i,t} + \beta_7 EXCH_{i,t} + \beta_8 ADR_{i,t} + \epsilon_{i,t}$$

Consistent with hypotheses 1 and 2, I expect the coefficient on the ADR variable to be negative and significant. This would indicate that ADR aftermarket performance is significantly lower than the aftermarket performance of the firm's stocks after the domestic offerings. Consistent with hypothesis 3, the coefficient on the EXCH variable is expected to be positive and significant, indicating that the aftermarket performance of exchange listed ADRs exceeds the performance of receipts trading over-the-counter when compared to IPO and SEO offerings of the sample firms prior to the ADR equity offering. I control for year-fixed effects and country-fixed effects to omit variable bias.

6. Results

6.1. Underpricing

Table 6 reports average underpricing in percent for ADR offerings and several matching samples by market listing. The average initial day return for all ADRs is 6.92%. This compares to 25.31% initial day return for a sample of matching US IPOs (year) where the matching is based on the year of the ADR offering (Panel A). The difference between the samples is statistically significant and negative, suggesting that ADR offerings are significantly less underpriced than the matching sample. In Panel B, I compare the same sample of ADR offerings with another sample of matching US IPOs (several) where the matching is based on the offering year, the closest offer price, and principal amount raised at the offering[4]. The results reveal that when matched on these characteristics, the underpricing of U.S. IPOs reduces to just 0.6 percent. The difference between the samples changes to be statistically significant and positive, suggesting that ADR offerings are significantly more underpriced than the matching sample when changing the parameters of the matching sample.

Overall, the results in Table 6 confirms the existence of a matching bias for comparison purposes, i.e. with alternative matching techniques, the matching sample may change and so can the analysis of underpricing and its determinants[5]. Hence, to avoid such a matching bias, I compare the sample of ADR underpricing with that of preceding equity offerings of the sample firms in their respective home market (Panels C and D). In Panel C, the ADR sample is matched with preceding IPO offerings. Since domestic IPO data is not available for all ADRs, the ADR sample

[4] I also employ matching techniques based on year and SIC code with similar results as those reported in Panel B.
[5] Undisclosed results show that U.S. IPO matching significantly overstates the underpricing when compared to domestic IPO and SEO underpricing.

is reduced and matched with those IPOs that have such data available. The average underpricing of the reduced sample is 13.08% for ADR offerings, in comparison to the 43.16% average underpricing for these firms at their respective domestic IPO offering. The difference between the underpricing of these two types equity offerings is significantly negative, suggesting that companies on average significantly less underprice their ADR equity offering compared to their domestic IPO. This result provide supporting evidence for Hypothesis 4. Similar results are observed when comparing the sample of ADRs to preceding SEOs (Panel D) in the home market. However, the difference is only statistically significant and negative for exchange listed ADRs providing some supporting evidence for Hypothesis 5.

Table 7 presents the results of the cross-sectional analysis of underpricing for ADR offerings and their respective domestic IPOs. In all four models, the dependent variable is underpricing (UP). The variable of interest is ADR. The coefficient on the ADR variable is negative and statistically significant at the 1% level across all four models, suggesting that the underpricing observed at ADR equity offerings is significantly lower than the underpricing observed at domestic IPOs of the same firms. This is consistent with the prediction of Hypothesis 4. Moreover, the negative coefficient of -0.313 in Model 1 of Table 7 suggests that on average for every dollar left on the table at domestic IPOs the same company leaves only around 69 cents on the table[6] at ADR equity offerings. The result illustrates how underpricing can vary depending on market locale. Given the average amount of equity raised at equity offerings this difference may also be of economic significance. The other statistically significant coefficient

[6] The negative ADR coefficient of -0.313 implies that for every unit change in IPO underpricing, the ADR underpricing is around 31% lower. This implies that when companies left $1.00 on the table at home market IPO issues they only left $0.69 on the table at ADR issues. For other models, the numbers vary slightly.

across three of four models is the status of country development (DEV). In particular, the positive and statistically significant coefficient suggests that companies from developed countries leave on average more money on the table at ADR and IPO offerings than companies domiciled in developing countries. This result is consistent with the findings by Ejara and Ghosh (2004).

To further analyze the impact of country development on underpricing, I split the sample by status of country development. The results are shown in Table 8. Two main observations prevail. First, 5 out of 6 ADR coefficients remain negative and statistically significant, giving additional support for Hypothesis 4. Second, models 2, 4 and 6 that only include firms from developed countries display negative ADR coefficients that are larger and statistically significant at the 1% level.

Table 9 presents the results of the cross-sectional analysis of underpricing for ADR offerings and their respective domestic SEOs. In all four models, the dependent variable is underpricing (UP). Again, the variable of interest is the dummy variable for ADR offerings. The coefficient on the ADR variable is negative and statistically significant across all four models, suggesting that the underpricing observed at ADR equity offerings is significantly less compared to underpricing observed at domestic SEOs. Moreover, the negative coefficient of -0.087 in Model 1 of Table 9 suggests that on average for every dollar left on the table at domestic SEOs the same company leaves only around 91 cents on the table[7] at ADR equity offerings. This result again underlines the importance of differences in underpricing depending on market locale. The

[7] The negative ADR coefficient of -0.087 implies that for every unit change in SEO underpricing, the ADR underpricing is around 9% lower. This implies that when companies left $1.00 on the table at home market SEO issues they only left $0.91 on the table at ADR issues. For other models, numbers vary slightly.

other two statistically significant coefficients across three of four models are the status of country development and company sector. In particular, the positive and statistically significant DEV coefficient suggests that companies from developed countries leave on average more money on the table at ADR and SEO offerings than companies domiciled in developing countries. The negative and statistically significant HT coefficient suggests that high-tech firms significantly less underprice their SEO and ADR offerings than non-high tech firms.

In Table 10, I further analyze the impact of country development on underpricing by splitting the sample by status of country development. Two main observations exist. First, 4 out of 6 ADR coefficients remain negative and statistically significant, giving additional support for Hypothesis 5. Second, in the preferred specifications in columns 3 and 4, which contain year and country fixed effects, the ADR coefficient is statistically significant.

In Table 11, I present the results of the cross-sectional analysis of underpricing for ADR offerings and a sample of matching US IPOs in the same offering year. The dependent variable in all four models is underpricing (UP). Consistent with the results in previous tables, the coefficient on the ADR variable is negative and statistically significant at the 1% level across all four models, suggesting that the underpricing observed at ADR equity offerings is significantly lower than the underpricing observed at US IPOs. This result is consistent with the results reported by Ejara and Ghosh (2004). The negative coefficient of -0.186 in Model 1 of Table 11 suggests that on average for every dollar left on the table at US IPOs only around 81 cents are left on the table[8] at ADR equity offerings. This result is important as it points out the impact of

[8] The negative ADR coefficient of -0.186 implies that for every unit change in IPO underpricing, the ADR underpricing is around 19% lower. This implies that when matching companies left $1.00 on the table at US IPOs ADR firms left only $0.81 on the table at ADR issues.

offering type and the origin of equity offering firms on the magnitude of underpricing. Specifically, foreign firms leave less money on the table when issuing on the US market than comparable US firms.

In Table 12, I split the sample by status of country development to further analyze the impact of country development on underpricing. Two main observations prevail. First, all 6 ADR coefficients remain negative and statistically significant at the 1% level. Second, Models 2, 4 and 6 that only include firms from developed countries display negative ADR coefficients that are larger in size.

Finally, Table 13 shows the results of the cross-sectional analysis of underpricing for ADR offerings and a sample of matching US IPOs, where the matching of US IPOs is based on several characteristics including the ADR offering year, closest offer price, and principal amount raised at the offering. In all four models, the dependent variable is underpricing (UP). Interestingly, the results suggest that in contrast to previous tables, the coefficient of the ADR variable is positive and statistically significant at the 1%-level across all four models, suggesting that the underpricing observed at ADR equity offerings is significantly higher compared to underpricing observed at matched US IPOs. The positive coefficient of 0.061 in models 1 through 4 suggests that on average for every dollar left on the table at US IPOs around 106 cents are left on the table[9] at ADR equity offerings. This result is particularly important as it emphasizes the dependency of the results on the selection criteria of the matching sample and reveals a matching bias as documented in the equity offering literature by Li and Zhao (2006)

[9] The positive ADR coefficient of 0.061 implies that for every unit change in IPO underpricing, the ADR underpricing is around 6% higher. This implies that when matching companies left $1.00 on the table at US IPOs ADR firms left $1.06 on the table at ADR issues.

and Zheng (2007). In other words, depending on the selection criteria, differences in underpricing may vary and so would the implications. Given the widely used application of different matching criteria for US IPOs, elimination of a matching bias as conducted in this study is of utmost importance for proper analysis.

To further analyze the impact of country development on underpricing, I split the sample by status of country development. The results are shown in Table 14. Although all ADR coefficients remain positive, only Models 2, 4 and 6 that only include firms from developed countries display positive ADR coefficients that are statistically significant at the 1%-level. Thus, the result in this table suggests two things. First, compared to previous tables the type of matching impacts the magnitude and significance of other independent variables such as the development status (DEV). Second, only firms from developed countries show ADR underpricing that is larger than IPO underpricing of the matching sample. However, this result should be interpreted carefully since it is based on a matching sample that may not correctly represent the ADR sample for the reasons mentioned before.

6.2. Aftermarket Performance

To analyze and compare the aftermarket performance of ADR equity offerings with their preceding domestic IPOs and SEOs, I calculate the buy-and-hold returns as suggested by Loughran and Vijh (1997)(regression 6). For the analysis, I chose annual intervals up to five years starting from the second day following the offering. I compare the aftermarket performance of ADR equity offerings with that of the CRSP value weighted index.[10] The results of the analysis are presented in Panel A of Table 15. In all periods, the ADR sample on average outperforms the market. This

[10] Alternative indices including CRSP equally weighted index are used with similar results.

result contradicts with the findings by Ejara and Ghosh (2004), who show a slight underperformance of ADRs as compared to the S&P500 over the same period. This discrepancy may be explained by the different underlying index used in my analysis. Moreover, the result by Ejara and Ghosh (2004) is statistically insignificant.

Panel B presents the market adjusted average buy-and-hold returns for ADRs and the sample of matching U.S. IPOs where the matching is based on the year of the ADR offering. In all periods, the ADRs significantly outperform the matching sample. Similar results are obtained when the matching is based on several characteristics (Panel C) including the ADR offering year, closest offer price, and principal amount raised at the offering.[11] These results stand in sharp contrast to those obtained in Panel D, where ADR performance is compared to the sample firms' domestic IPOs. The domestic IPO and SEO performances are adjusted by their respective local MSCI-index. In all periods analyzed, the ADR performance is on average less than the performance after domestic IPOs. Similar results are obtained when comparing ADR performance with preceding SEO performance as shown in Panel E. These results confirm Hypotheses 1 and partially Hypothesis 2. In summary, the long-run performance after ADR equity offers compared to home market offers of the same companies is inferior over periods of 1 to 5 years.

Table 16 presents the results of the cross-sectional analysis of the BHAR analysis for ADR offerings and their respective domestic IPOs. The dependent variables are the market-adjusted buy-and-hold returns (BHAR) for the periods between 12 months (BHAR12) and 60 months (BHAR60) after the equity offering. The independent variables of interest are the dummy variables ADR and EXCH. Over all periods, the coefficient on the ADR variable is negative and

[11] I also employ matching techniques based on year and SIC code with similar results as those reported in Panel C.

statistically significant at various levels, suggesting that on average the long-run performance observed after ADR equity offerings is significantly lower compared to the long-run performance after domestic IPOs of the same firms. These findings are consistent with Hypothesis 1 and point towards differences in long-run performances depending on market locale. The other statistically significant coefficient across four of the five years analyzed is the status of country development. In particular, the negative and statistically significant coefficient suggests that on average companies from developed countries experience less valuation effect than companies from emerging countries do. Finally, although the coefficient for the EXCH variable is positive in 4 out of the 5 analyzed periods, their magnitude is not statistically significant providing no support for Hypothesis 3.

Table 17 presents the results of the cross-sectional analysis of the BHARs for ADR offerings and their respective domestic SEOs. The dependent variables are the market-adjusted buy-and-hold returns (BHAR) for the periods between 12 months (BHAR12) and 60 months (BHAR60) after the equity offering, alternatively. The independent variables of interest are ADR and EXCH. Although, the coefficients for the ADR variables are negative for the first two years of the analysis, the magnitude is not statistically significant giving no support for Hypothesis 2. The coefficient for the EXCH variable is positive in all analyzed periods and statistically significant in year 2 at the 1% level. This provides support for Hypothesis 3.

Table 18 shows the results of the cross-sectional analysis of the BHAR analysis for ADR offerings and a matching portfolio of US IPOs where the matching is based on the offering year. The dependent variables are the market-adjusted buy-and-hold returns (BHAR) for the periods between 12 months (BHAR12) and 60 months (BHAR60) after the equity offering, alternatively. The independent variables of interest are ADR and EXCH. The coefficients on the ADR variable

is consistently positive and statistically significant in all periods, suggesting that on average the long-run performance observed after ADR equity offerings is significantly higher than the long-run performance after US IPOs. These findings suggest that long-run performances vary by market locale as well as the choice of the matching portfolio. Although the coefficient for the EXCH variable is positive in in the first two years of the analysis, its magnitude is not statistically significant. This is not surprising as US IPO firms are subject to the same transparency as Level III ADRs.

Finally, Table 19 shows the results of the cross-sectional analysis of the BHAR analysis for ADR offerings and a matching portfolio of US IPOs where the matching is based on several characteristics including the ADR offering year, closest offer price, and principal amount raised at the offering. The dependent variables are the market-adjusted buy-and-hold returns (BHAR) for the periods between 12 months (BHAR12) and 60 months (BHAR60) after the equity offering, alternatively. The independent variables of interest are ADR and EXCH. The coefficients on the ADR and EXCH variables are statistically insignificant in all periods, suggesting that on average the long-run performance observed after ADR equity offerings is similar to the long-run performance after US IPOs with no impact of exchanges on performance. In combination with previous results, these findings emphasize once more the influence of a matching bias when analyzing the data.

6.3. Robustness of Results

The validity of the results from the OLS regressions in the preceding section rests on the assumptions of uncorrelated exogenous independent variables and homoscedastic and serially uncorrelated errors. In this section, I run a series of tests to assess whether such assumptions hold and thus OLS is the proper estimation technique for equations (4) and (6). First, as it is possible

that there are high correlations among predictor variables, leading to unreliable and unstable estimates of regression coefficients, I test for multicollinearity using the tolerance (TOL) and variance inflation factor (VIF). The results indicate that both measures are within the acceptable range[12], suggesting no issues with multicollinearity. Second, I employ the White test as developed by White (1980) to establish whether the residual variance in the regression model is constant. The results of the analysis show no evidence of heteroscedasticity.[13] Third, I use the Jarque-Bera normality test as introduced by Jarque and Bera (1980). The results suggest no rejection of the null hypothesis of normal distribution of the residuals for most models analyzed[14]. Furthermore, the normality test has known issues with small sample sizes, i.e. the Chi-squared approximation is overly sensitive and can lead to rejection of the null hypothesis while normality is in fact present. The models showing rejection of the null hypothesis are in fact the models with the smallest sample sizes. However, to eliminate concerns with the results, I re-estimate equations (4) and (6) using maximum likelihood estimation method.

6.4. MLE for Underpricing

For the maximum likelihood estimation, the dependent and independent variables are the same as used in the OLS-regression previously employed, i.e. to measure underpricing I use the first day returns. To analyze the relationship between the dependent variables and the set of independent variables, I estimate the following equation:

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[12] Only in two models analyzed two VIF values exceeded the value of 2 suggesting acceptable range and no concerns with multicollinearity.
[13] The white test is based on the null hypothesis that the variance is constant. All models analyzed have large probabilities (p-value > 0.2) suggesting acceptance of the null hypothesis of constant variance.
[14] The Jarque-Bera test is based on the null hypothesis of normal distribution. With the exception of two models, all models analyzed have large probabilities suggesting acceptance of the null hypothesis of normal distribution of the error terms.

$$(7)\ UNDERPRICING_i = X\beta_i + \epsilon_i$$

where *i* denotes the firm, *X* is the matrix of regressors, β_i is the vector of coefficients of interest and ϵ_i is the error term. I estimate equation (7) via maximum likelihood. The log-likelihood for the *i*th firm is then written as:

$$(8)\ \ln l_i = \sum_{i=1}^{n} \ln f(y_i|\theta)$$

The maximum likelihood estimates are reported in Tables 20 through 23. Table 20 presents the results of the maximum likelihood analysis of underpricing for ADR offerings and their respective domestic IPOs. In all four models, the dependent variable is underpricing. The variable of interest is ADR. Consistent with the results obtain using OLS, the coefficient of the ADR variable is negative and statistically significant at the 1% level across all four models, suggesting that the underpricing observed at ADR equity offerings is significantly less compared to underpricing observed at domestic IPOs of the same firms. This is consistent with Hypothesis 4; the maximum likelihood estimates suggest strong evidence in support of the differences in underpricing of equity offerings depending on market locale.

Table 21 presents the results of the maximum likelihood estimates for ADR offerings and their respective domestic SEOs. In all four models, the dependent variable is underpricing. Again, the variable of interest is ADR. Consistent with the results obtained using OLS, the coefficient of the ADR variable is negative and statistically significant at various levels across all four models, suggesting that the underpricing observed at ADR equity offerings is significantly less compared to underpricing observed at domestic SEOs. This is consistent with Hypothesis 5.

In Table 22, I present the results of the maximum likelihood estimates for ADR offerings and a sample of matching US IPOs, where the matching of US IPOs is based on the offering year. In all four models, the dependent variable is underpricing. Consistent with previous tables,

the coefficient of the ADR variable is negative and statistically significant at the 1% level across all four models, suggesting that the underpricing observed at ADR equity offerings is significantly lower than the underpricing observed at US IPOs.

Finally, Table 23 shows the results of the maximum likelihood estimates for ADR offerings and a sample of matching US IPOs, where the matching of US IPOs is based on several characteristics including the ADR offering year, closest offer price, and principal amount raised at the offering. In all four models, the dependent variable is underpricing. Again, all results are consistent with those obtained using OLS. The results suggest that in contrast to previous tables, the coefficient of the ADR variable is positive and statistically significant at the 1% level across all four models, suggesting that the underpricing observed at ADR equity offerings is significantly higher than the underpricing observed at matched US IPOs.

6.5. MLE for Aftermarket Performance

To analyze the relationship between the dependent variables and the set of independent variables using maximum likelihood estimation technique, I estimate the following equation:

$$(9)\ BHAR_i = \{X\beta_i + \epsilon_i\}$$

where *i* denotes the firm, *X* is the matrix of regressors, β_i is the vector of coefficients of interest and ϵ_i is the error term. I estimate equation (9) via maximum likelihood. The log-likelihood for the *i*th firm is then written as:

$$(10)\ \ln l_i = \sum_{i=1}^{n} \ln f(y_i|\theta)$$

The maximum likelihood estimates for the BHAR analysis are reported in Tables 24 through 27. Table 24 presents the results of the maximum likelihood estimation of the BHAR analysis for ADR offerings and their respective domestic IPOs. The dependent variables are the market-adjusted buy-and-hold returns (BHAR) for the periods between 12 months (BHAR12)

and 60 months (BHAR60) after the equity offering. The coefficients of interest are ADR and EXCH. Over all periods analyzed the coefficients of the ADR variable is negative and statistically significant at various levels, suggesting that on average the long-run performance observed after ADR equity offerings is significantly lower than the long-run performance after domestic IPOs of the same firms. These findings are consistent with the OLS analysis and Hypothesis 1, confirming the differences in long-run performances among market locale.

Table 25 presents the maximum likelihood estimates for ADR offerings and their respective domestic SEOs. The dependent variables are the market-adjusted buy-and-hold returns (BHAR) for the periods between 12 months (BHAR12) and 60 months (BHAR60) after the equity offering. The independent variables of interest are ADR and EXCH. Although, the coefficients for the ADR variables are negative for the first two years of the analysis, the magnitude is not statistically significant giving no support for Hypothesis 2. The estimate for the EXCH variable is positive in all analyzed periods and statistically significant in years 1 through 3 at various significance levels. This provides support for Hypothesis 3.

Table 26 shows the maximum likelihood estimates for ADR offerings and a matching portfolio of US IPOs where the matching is based on the offering year. The dependent variables are the market-adjusted buy-and-hold returns (BHAR) for the periods between 12 months (BHAR12) and 60 months (BHAR60) after the equity offering. The variables of interest are ADR and EXCH. Over all periods analyzed the coefficients of the ADR variable is positive and statistically significant at various levels, suggesting that on average the long-run performance observed after ADR equity offerings is significantly higher compared to the long-run performance after US IPOs. These findings are consistent with the findings from the OLS model. These findings point towards differences in long-run performances depending on market locale

as well as differences due to the choice of the matching portfolio. As before, the coefficients for EXCH are never statistically significant. This is not surprising as US IPO firms are often subject to the same transparency as Level III ADRs.

In Table 27, I present the results of the maximum likelihood estimation for ADR offerings and a matching portfolio of US IPOs where the matching is based on several characteristics including the ADR offer year, closest offer price, and principal amount raised at the offering. The dependent variables are the market-adjusted buy-and-hold returns (BHAR) for the periods between 12 months (BHAR12) and 60 months (BHAR60) after the equity offering. The estimates of interest are ADR and EXCH. Over all periods analyzed the coefficients of the ADR and EXCH are positive but statistically insignificant, suggesting that on average the long-run performance observed after ADR equity offerings is similar compared to the long-run performance after US IPOs with no impact of exchanges on performance. In combination with previous results, these findings emphasize once more the influence of a matching bias when analyzing the data.

7. Conclusions

I analyze the underpricing and aftermarket performance of firms cross-listed on the US market. In particular, the sample consists of firms that cross-list, offer equity and that have prior trading and equity offerings in their respective domestic markets. The results indicate that domestic equity offerings are significantly larger underpriced than foreign equity offerings suggesting that firms signal relatively higher future expectations about firm performance. I report that the average buy-and-hold abnormal returns for ADRs underperform the companies' preceding domestic issuances over holding periods of 1 to 5 years after the equity issuance. Finally, comparing my results to prior literature, I find that ADRs that issue equity and that have

prior trading in their domestic market are significantly less underpriced than pure ADR IPOs as reported by Ejara and Ghosh (2004). The gap in underpricing can be explained by less information asymmetry for firms with trading history.

Table 3: Sample Distribution by Home Country

Country	*Number*	*Percent*	***Country***	*Number*	*Percent*
Argentina	5	2.72	Israel	6	3.26
Australia	1	0.54	Italy	6	3.26
Austria	1	0.54	Japan	8	4.35
Brazil	8	4.35	Korea	15	8.15
Chile	4	2.17	Mexico	13	7.07
China	13	7.07	Netherlands	14	7.61
Denmark	1	0.54	New Zealand	2	1.09
France	11	5.98	Norway	9	4.89
Germany	5	2.72	Portugal	7	3.80
Greece	2	1.09	Russia	4	2.17
Hong Kong	1	0.54	S. Africa	7	3.80
Hungary	2	1.09	Spain	2	1.09
India	6	3.26	Switzerland	1	0.54
Indonesia	2	1.09	Taiwan	13	7.07
Ireland	8	4.35	U.K.	7	3.80
			Total	**184**	**100.00**

Geographical information is obtained from COMPUSTAT, Bank of New York and Citibank.

Table 4: Sample Distribution by Country and Year of Listing

Country	*Year*	*#*	***Country***	*Year*	*#*	***Country***	*Year*	*#*	***Country***	*Year*	*#*	***Country***	*Year*	*#*
Argentina	1994	1		1995	1		1998	1		2006	2		2004	1
	1997	1		1996	2		1999	2		2007	2		2006	1
	2000	1		1997	4	Italy	1994	1		2009	2	S. Africa	1999	1
	2007	1		1998	1		1995	1		2010	1		2001	1
	2011	1	Germany	1996	2		1996	1	Netherlands	1995	1		2002	1
Australia	1999	1		2000	2		1997	1		1996	1		2003	1
Austria	2000	1		2001	1		1998	1		1998	3		2006	1
Brazil	1997	1	Greece	1998	1		1999	1		1999	2		2009	1
	2002	1		1999	1	Japan	1998	1		2000	7		2010	1
	2004	2	Hong Kong	1999	1		1999	3	New Zealand	1991	1	Spain	1995	1
	2007	2	Hungary	1997	1		2000	1		1998	1		1997	1
	2009	1		1999	1		2002	2	Norway	1993	1	Switzerland	1998	1
	2010	1	India	1999	1		2006	1		1994	2	Taiwan	1997	1
Chile	1994	2		2001	1	Korea	1994	2		1995	1		1998	1
	1997	1		2005	2		1995	1		1996	1		2000	2
	2007	1		2006	2		1997	1		1997	1		2002	2
China	1997	1	Indonesia	1995	1		1998	3		1999	1		2003	3
	1998	1		1996	1		1999	2		2000	1		2004	1
	2000	3	Ireland	1991	1		2000	1		2001	1		2005	2
	2001	2		1993	2		2002	1	Portugal	1995	1		2007	1
	2002	1		1996	1		2004	1		1996	1	U.K.	1992	1
	2004	2		1997	1		2005	3		1997	2		1998	2
	2008	2		1998	1	Mexico	1991	1		1998	1		1999	1
	2009	1		1999	1		1992	1		1999	1		2000	1
Denmark	1991	1		2003	1		1993	1		2000	1		2005	1
France	1991	1	Israel	1996	2		2000	2	Russia	2000	1		2011	1
	1992	2		1997	1		2005	1		2002	1			

Geographical information is obtained from COMPUSTAT, Bank of New York and Citibank.

Table 5: Sample Distribution by Home Country and Offer Price

Country	***Average Offer Price***				**Country**	***Average Offer Price***			
	n	*ADR*	*n*	*SEO*		*n*	*ADR*	*n*	*SEO*
Argentina	5	23.10	1	39.70	Israel	6	18.33	0	n.a.
Australia	1	19.14	0	n.a.	Italy	6	43.86	3	LIRA 6,993.67
Austria	1	15.28	0	n.a.	Japan	8	51.84	5	YEN 1,532,808.00
Brazil	8	22.38	5	44.30	Korea	15	21.47	3	652,833.33
Chile	4	32.84	1	80.56	Mexico	13	34.55	4	54.72
China	13	19.19	0	n.a.	Netherlands	14	30.34	8	66.92
Denmark	1	16.50	1	115.00	New Zealand	2	23.55	0	n.a.
France	11	107.27	2	337.50	Norway	9	24.68	0	n.a.
Germany	5	25.06	1	25.00	Portugal	7	31.44	4	5,885.00
Greece	2	10.67	2	6,400.00	Russia	4	21.00	0	n.a.
Hong Kong	1	27.00	0	n.a.	S. Africa	7	24.66	5	135.20
Hungary	2	22.58	0	n.a.	Spain	2	55.07	2	1,615.00
India	6	32.83	0	n.a.	Switzerland	1	25.30	0	n.a.
Indonesia	2	24.82	0	n.a.	Taiwan	13	14.11	4	32.75
Ireland	8	29.78	0	n.a.	U.K.	7	17.15	2	16.54

Offer price is obtained from COMPUSTAT, Bank of New York and Citibank. ADR offer prices are in USD and SEO prices are home market currency as denoted.

Table 6: Underpricing Comparison

	Percentage Underpricing		
Type of Offering	Total	Exchange Listed	OTC
Panel A: ADR and US IPO (year)			
ADR	6.918	6.398	8.524
US - IPO	25.310	21.940	35.721
Difference in Underpricing	-18.392	-15.542	-27.197
t-stat	(-6.44 ***)	(-4.65 ***)	(-5.13 ***)
Panel B: ADR and US IPO (several)			
ADR	6.918	6.398	8.524
US - IPO	0.604	0.505	0.912
Difference in Underpricing	6.313	5.893	7.612
t-stat	(2.79 **)	(2.19 **)	(1.85 *)
Panel C: ADR and Domestic IPO			
ADR	13.076	0.785	19.694
Sample Firm Domestic IPO	43.158	33.997	48.091
Difference in Underpricing	-30.082	-33.213	-28.396
t-stat	(-2.80 **)	(-3.89 ***)	(-1.76 *)
Panel D: ADR and Domestic SEO			
ADR	4.607	2.562	9.442
Sample Firm Domestic SEO	12.456	19.396	-3.949
Difference in Underpricing	-7.848	-16.834	13.391
t-stat	(-1.29)	(-2.35 **)	(1.48)

Underpricing is measured as the percentage difference between the closing price on the first trading day, and the offer price. Offer price is obtained from COMPUSTAT, Bank of New York and Citibank. Closing price is obtained from Datastream. The equity offering is underpriced when the ratio is positive. Exchange listed refer to NASDAQ and NYSE. OTC refers to over-the-counter ADRs. *, **, *** represent significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 7: Analysis of Underpricing of ADR IPOs vs. Domestic IPOs

	(1)	(2)	(3)	(4)
Independent Variables	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.016	0.026	0.035	0.023
	(0.835)	(1.153)	(1.596)	(0.867)
RANK	0.006	0.007	-0.001	0.001
	(1.147)	(1.106)	(-0.176)	(0.187)
SYND	0.022	0.038	0.055	0.054
	(0.669)	(1.037)	(1.596)	(1.434)
RECPRC	-0.499	-0.021	0.373	0.557
	(-0.919)	(-0.034)	(0.659)	(0.813)
DEV	0.102**	0.053	0.425***	0.347*
	(2.227)	(1.007)	(2.860)	(1.945)
HT	0.020	0.042	-0.058	-0.050
	(0.487)	(0.955)	(-1.382)	(-1.050)
EXCH	0.017	-0.044	0.023	-0.007
	(0.340)	(-0.792)	(0.410)	(-0.098)
LNSIZE	-0.015***	-0.014**	0.004	0.009
	(-2.677)	(-2.214)	(0.393)	(0.672)
ADR	-0.313***	-0.347***	-0.242***	-0.274***
	(-4.760)	(-4.904)	(-3.903)	(-4.148)
Constant	0.113	0.315	-0.646	-0.371
	(0.306)	(0.756)	(-1.553)	(-0.720)
Year-fixed effects	No	Yes	No	Yes
Country-fixed effects	No	No	Yes	Yes
Observations	174	174	174	174
Adj. R-squared	0.210	0.297	0.523	0.568
F	4.836***	2.097***	4.173***	2.745***

The dependent variable is the underpricing of ADR and matching sample measured as the difference between the closing price on the first trading day, and the offer price, expressed as a percent of the offer price. LNOFFSIZE is the natural logarithm of the total dollar amount offered at ADR equity offering, RANK is the underwriter rank obtained from Jay Ritter's website, SYND is the number of underwriters in the consortium including the lead underwriter, RECPRC is the reciprocal of the offer price, DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry, EXCH is a dummy variable that has the value of 1 if the ADR is listed on NASDAQ or NYSE, LNSIZE is the natural logarithm of the size of the firm the year before the offering, ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Analysis Underpricing of ADR IPOs vs. Domestic IPOs by Status of Country Development

	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables	Underpricing	Underpricing	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.016	0.052	-0.010	0.049	-0.010	0.069**
	(0.564)	(1.539)	(-0.314)	(1.112)	(-0.425)	(1.994)
RANK	-0.002	0.016	0.006	0.005	0.004	-0.001
	(-0.328)	(1.659)	(0.789)	(0.568)	(0.579)	(-0.124)
SYND	-0.008	0.106	-0.012	0.104	0.002	0.098
	(-0.234)	(1.595)	(-0.293)	(1.530)	(0.062)	(1.648)
RECPRC	0.892	-0.205	0.723	1.350	0.217	0.244
	(1.289)	(-0.187)	(0.970)	(1.080)	(0.375)	(0.264)
HT	-0.074	0.070	-0.076	-0.037	-0.061	-0.017
	(-1.506)	(0.995)	(-1.446)	(-0.413)	(-1.491)	(-0.228)
EXCH	0.182**	-0.107	0.129	-0.077	0.083	-0.039
	(2.614)	(-1.167)	(1.548)	(-0.695)	(1.204)	(-0.429)
LNSIZE	0.000	-0.021**	0.011	0.020	0.003	0.002
	(0.004)	(-2.129)	(0.555)	(0.943)	(0.254)	(0.118)
ADR	-0.165*	-0.406***	-0.149	-0.314***	-0.167*	-0.289***
	(-1.738)	(-4.206)	(-1.525)	(-3.544)	(-1.808)	(-3.511)
Constant	-0.269	-0.068	0.190	-1.111	0.363	-1.031
	(-0.375)	(-0.116)	(0.224)	(-1.335)	(0.620)	(-1.529)
Developed Country	No	Yes	No	Yes	No	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	No	No
Country-fixed effects	No	No	Yes	Yes	Yes	Yes
Observations	67	107	67	107	67	107
Adj. R-squared	0.447	0.359	0.565	0.628	0.206	0.563
F	1.169	1.814**	1.152	2.472***	0.750	3.958***

The dependent variable is the underpricing of ADR and matching sample measured as the difference between the closing price on the first trading day, and the offer price, expressed as a percent of the offer price. LNOFFSIZE is the natural logarithm of the total dollar amount offered at ADR equity offering, RANK is the underwriter rank obtained from Jay Ritter's website, SYND is the number of underwriters in the consortium including the lead underwriter, RECPRC is the reciprocal of the offer price; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry, EXCH is a dummy variable that has the value of 1 if the ADR is listed on NASDAQ or NYSE, LNSIZE is the natural logarithm of the size of the firm the year before the offering, ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9: Analysis of Underpricing of ADR IPOs vs. Domestic SEOs

Independent Variables	(1) Underpricing	(2) Underpricing	(3) Underpricing	(4) Underpricing
LNOFFSIZE	0.005	0.007	0.023	0.010
	(0.255)	(0.348)	(1.014)	(0.369)
RANK	0.008	0.008	0.005	0.006
	(1.521)	(1.520)	(0.964)	(1.023)
SYND	0.006	0.018	0.028	0.030
	(0.183)	(0.529)	(0.801)	(0.804)
RECPRC	-0.652	-0.079	0.033	0.346
	(-1.297)	(-0.138)	(0.059)	(0.515)
DEV	0.115**	0.067	0.441***	0.367**
	(2.547)	(1.334)	(2.810)	(1.985)
HT	-0.068*	-0.054	-0.124***	-0.128***
	(-1.690)	(-1.265)	(-2.795)	(-2.636)
EXCH	0.074	0.026	0.093	0.080
	(1.508)	(0.476)	(1.551)	(1.163)
LNSIZE	-0.009*	-0.007	-0.004	-0.001
	(-1.795)	(-1.149)	(-0.386)	(-0.041)
ADR	-0.087*	-0.104**	-0.133***	-0.143***
	(-1.898)	(-2.136)	(-2.887)	(-2.921)
Constant	0.061	0.291	-0.453	-0.201
	(0.172)	(0.732)	(-1.044)	(-0.382)
Year-fixed effects	No	Yes	No	Yes
Country-fixed effects	No	No	Yes	Yes
Observations	191	191	191	191
Adj. R-squared	0.099	0.203	0.358	0.420
F	2.201**	1.413*	2.384***	1.735***

The dependent variable is the underpricing of ADR and matching sample measured as the difference between the closing price on the first trading day, and the offer price, expressed as a percent of the offer price. LNOFFSIZE is the natural logarithm of the total dollar amount offered at ADR equity offering, RANK is the underwriter rank obtained from Jay Ritter's website, SYND is the number of underwriters in the consortium including the lead underwriter, RECPRC is the reciprocal of the offer price, DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry, EXCH is a dummy variable that has the value of 1 if the ADR is listed on NASDAQ or NYSE, LNSIZE is the natural logarithm of the size of the firm the year before the offering, ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Analysis of Underpricing of ADR IPOs vs. Domestic SEOs by Status of Country Development

	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables	Underpricing	Underpricing	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.016	0.030	0.001	0.040	-0.010	0.046
	(0.435)	(0.923)	(0.026)	(0.959)	(-0.339)	(1.338)
RANK	-0.001	0.016*	0.004	0.010	0.007	0.007
	(-0.166)	(1.935)	(0.316)	(1.209)	(0.914)	(0.871)
SYND	0.001	0.039	-0.005	0.049	-0.009	0.053
	(0.017)	(0.652)	(-0.082)	(0.801)	(-0.210)	(0.940)
RECPRC	0.704	0.396	0.328	1.663	-0.400	0.060
	(0.766)	(0.377)	(0.320)	(1.374)	(-0.588)	(0.064)
HT	-0.111	-0.035	-0.113	-0.135	-0.081	-0.149**
	(-1.582)	(-0.516)	(-1.457)	(-1.597)	(-1.484)	(-2.003)
EXCH	0.154	-0.042	0.177	0.015	0.135	0.072
	(1.480)	(-0.478)	(1.390)	(0.140)	(1.458)	(0.774)
LNSIZE	-0.000	-0.012	-0.012	0.016	-0.015	0.001
	(-0.007)	(-1.238)	(-0.391)	(0.780)	(-1.016)	(0.081)
ADR	-0.108*	-0.102	-0.153**	-0.132*	-0.162***	-0.110
	(-1.731)	(-1.340)	(-2.219)	(-1.813)	(-2.680)	(-1.561)
Constant	-0.269	-0.068	0.190	-1.111	0.363	-1.031
	(-0.375)	(-0.116)	(0.224)	(-1.335)	(0.620)	(-1.529)
Developed Country	No	Yes	No	Yes	No	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	No	No
Country-fixed effects	No	No	Yes	Yes	Yes	Yes
Observations	79	112	79	112	79	112
Adj. R-squared	0.339	0.239	0.408	0.535	0.284	0.394
F	0.969	1.081	0.847	1.816**	1.422	2.124***

The dependent variable is the underpricing of ADR and matching sample measured as the difference between the closing price on the first trading day, and the offer price, expressed as a percent of the offer price. LNOFFSIZE is the natural logarithm of the total dollar amount offered at ADR equity offering, RANK is the underwriter rank obtained from Jay Ritter's website, SYND is the number of underwriters in the consortium including the lead underwriter, RECPRC is the reciprocal of the offer price; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry, EXCH is a dummy variable that has the value of 1 if the ADR is listed on NASDAQ or NYSE, LNSIZE is the natural logarithm of the size of the firm the year before the offering, ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 11: Underpricing of ADR IPOs vs. Matching (year) US IPOs

	(1)	(2)	(3)	(4)
Independent Variables	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.001	0.006	0.011	0.007
	(0.067)	(0.485)	(0.712)	(0.416)
RANK	0.006	0.003	0.005	0.001
	(1.646)	(0.792)	(1.309)	(0.259)
SYND	0.016	0.013	0.021	0.021
	(0.772)	(0.638)	(0.836)	(0.885)
RECPRC	-0.253	0.070	-0.028	0.251
	(-0.739)	(0.205)	(-0.068)	(0.573)
DEV	0.061**	0.017	0.184	0.143
	(2.039)	(0.555)	(1.636)	(1.246)
HT	0.005	0.005	-0.027	-0.026
	(0.183)	(0.206)	(-0.864)	(-0.846)
EXCH	-0.038	-0.009	-0.019	-0.000
	(-1.174)	(-0.292)	(-0.435)	(-0.001)
LNSIZE	-0.004	-0.007*	0.000	0.003
	(-1.225)	(-1.835)	(0.037)	(0.348)
ADR	-0.186***	-0.186***	-0.186***	-0.186***
	(-8.027)	(-9.071)	(-8.117)	(-9.014)
Constant	0.233	0.225	-0.047	-0.058
	(0.998)	(0.961)	(-0.153)	(-0.173)
Year-fixed effects	No	Yes	No	Yes
Country-fixed effects	No	No	Yes	Yes
Observations	316	316	316	316
Adj. R-squared	0.216	0.426	0.301	0.474
F	9.358***	7.321***	3.333***	4.162***

The dependent variable is the underpricing of ADR and matching sample measured as the difference between the closing price on the first trading day, and the offer price, expressed as a percent of the offer price. LNOFFSIZE is the natural logarithm of the total dollar amount offered at ADR equity offering, RANK is the underwriter rank obtained from Jay Ritter's website, SYND is the number of underwriters in the consortium including the lead underwriter, RECPRC is the reciprocal of the offer price, DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry, EXCH is a dummy variable that has the value of 1 if the ADR is listed on NASDAQ or NYSE, LNSIZE is the natural logarithm of the size of the firm the year before the offering, ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 12: Underpricing of ADR IPOs vs. Matching US IPOs (year) by Status of Country Development

	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables	Underpricing	Underpricing	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.008	0.015	-0.000	0.017	0.011	0.011
	(0.395)	(0.766)	(-0.014)	(0.590)	(0.560)	(0.415)
RANK	-0.001	0.007	0.002	0.004	0.008	0.003
	(-0.310)	(1.379)	(0.286)	(0.602)	(1.611)	(0.500)
SYND	-0.006	0.040	-0.005	0.042	-0.050*	0.089**
	(-0.220)	(1.096)	(-0.161)	(0.978)	(-1.794)	(2.087)
RECPRC	0.378	0.206	0.287	0.817	0.280	-0.119
	(0.731)	(0.336)	(0.498)	(1.015)	(0.606)	(-0.176)
HT	-0.024	0.010	-0.021	-0.031	-0.010	-0.026
	(-0.645)	(0.249)	(-0.511)	(-0.542)	(-0.301)	(-0.485)
EXCH	0.062	-0.026	0.043	-0.023	0.064	-0.020
	(1.190)	(-0.483)	(0.661)	(-0.303)	(1.126)	(-0.295)
LNSIZE	-0.001	-0.010*	0.001	0.010	0.006	-0.008
	(-0.148)	(-1.785)	(0.067)	(0.710)	(0.611)	(-0.595)
ADR	-0.176***	-0.192***	-0.176***	-0.192***	-0.176***	-0.192***
	(-7.366)	(-6.202)	(-7.129)	(-6.180)	(-6.424)	(-5.730)
Constant	-0.269	-0.068	0.190	-1.111	0.363	-1.031
	(-0.375)	(-0.116)	(0.224)	(-1.335)	(0.620)	(-1.529)
Developed Country	No	Yes	No	Yes	No	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	No	No
Country-fixed effects	No	No	Yes	Yes	Yes	Yes
Observations	128	188	128	188	128	188
Adj. R-squared	0.547	0.388	0.555	0.452	0.344	0.288
F	4.465***	4.110***	3.273***	2.765***	3.397***	2.501***

The dependent variable is the underpricing of ADR and matching sample measured as the difference between the closing price on the first trading day, and the offer price, expressed as a percent of the offer price. LNOFFSIZE is the natural logarithm of the total dollar amount offered at ADR equity offering, RANK is the underwriter rank obtained from Jay Ritter's website, SYND is the number of underwriters in the consortium including the lead underwriter, RECPRC is the reciprocal of the offer price, DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry, EXCH is a dummy variable that has the value of 1 if the ADR is listed on NASDAQ or NYSE, LNSIZE is the natural logarithm of the size of the firm the year before the offering, ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 13: Underpricing of ADR IPO vs. Matching US IPOs (several)

	(1)	(2)	(3)	(4)
Independent Variables	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.003	0.006	0.011	0.006
	(0.419)	(0.596)	(1.082)	(0.510)
RANK	0.002	0.003	0.000	0.001
	(0.885)	(1.045)	(0.035)	(0.297)
SYND	0.009	0.013	0.022	0.020
	(0.678)	(0.856)	(1.353)	(1.186)
RECPRC	-0.179	0.020	0.140	0.213
	(-0.801)	(0.080)	(0.538)	(0.685)
DEV	0.037*	0.015	0.160**	0.134*
	(1.927)	(0.685)	(2.275)	(1.651)
HT	-0.001	0.007	-0.028	-0.026
	(-0.034)	(0.371)	(-1.413)	(-1.190)
EXCH	0.011	-0.010	0.009	0.000
	(0.508)	(-0.430)	(0.333)	(0.012)
LNSIZE	-0.007***	-0.006**	0.002	0.004
	(-2.920)	(-2.424)	(0.440)	(0.570)
ADR	0.061***	0.061***	0.061***	0.061***
	(4.042)	(4.028)	(4.241)	(4.167)
Constant	-0.028	0.050	-0.296	-0.220
	(-0.184)	(0.291)	(-1.531)	(-0.927)
Year-fixed effects	No	Yes	No	Yes
Country-fixed effects	No	No	Yes	Yes
Observations	316	316	316	316
Adj. R-squared	0.094	0.147	0.249	0.278
F	3.520***	1.700**	2.573***	1.782***

The dependent variable is the underpricing of ADR and matching sample measured as the difference between the closing price on the first trading day, and the offer price, expressed as a percent of the offer price. LNOFFSIZE is the natural logarithm of the total dollar amount offered at ADR equity offering, RANK is the underwriter rank obtained from Jay Ritter's website, SYND is the number of underwriters in the consortium including the lead underwriter, RECPRC is the reciprocal of the offer price, DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry, EXCH is a dummy variable that has the value of 1 if the ADR is listed on NASDAQ or NYSE, LNSIZE is the natural logarithm of the size of the firm the year before the offering, ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 14: Underpricing of ADR IPOs vs. Matching US IPOs (several) by Status of Country Development

	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variables	Underpricing	Underpricing	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.007	0.014	-0.002	0.015	-0.003	0.022
	(0.688)	(0.939)	(-0.126)	(0.701)	(-0.354)	(1.298)
RANK	-0.001	0.007*	0.002	0.003	0.002	0.000
	(-0.617)	(1.779)	(0.583)	(0.753)	(0.660)	(0.034)
SYND	-0.005	0.039	-0.005	0.040	-0.004	0.042
	(-0.390)	(1.381)	(-0.287)	(1.287)	(-0.300)	(1.495)
RECPRC	0.316	0.152	0.224	0.764	0.045	0.173
	(1.186)	(0.326)	(0.774)	(1.299)	(0.207)	(0.383)
HT	-0.020	0.012	-0.018	-0.034	-0.021	-0.025
	(-1.029)	(0.393)	(-0.851)	(-0.815)	(-1.328)	(-0.704)
EXCH	0.060**	-0.029	0.038	-0.019	0.027	-0.001
	(2.223)	(-0.707)	(1.174)	(-0.342)	(1.013)	(-0.018)
LNSIZE	-0.001	-0.010**	0.002	0.011	0.001	0.001
	(-0.343)	(-2.221)	(0.199)	(1.063)	(0.131)	(0.136)
ADR	0.017	0.091***	0.017	0.091***	0.017	0.091***
	(1.359)	(3.842)	(1.350)	(4.005)	(1.299)	(4.065)
Constant	-0.170	-0.124	-0.006	-0.585	0.047	-0.602*
	(-0.831)	(-0.466)	(-0.027)	(-1.407)	(0.276)	(-1.844)
Developed Country	No	Yes	No	Yes	No	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	No	No
Country-fixed effects	No	No	Yes	Yes	Yes	Yes
Observations	128	188	128	188	128	188
Adj. R-squared	0.246	0.196	0.297	0.342	0.092	0.286
F	1.208	1.576**	1.109	1.741***	0.653	2.481***

The dependent variable is the underpricing of ADR and matching sample measured as the difference between the closing price on the first trading day, and the offer price, expressed as a percent of the offer price. LNOFFSIZE is the natural logarithm of the total dollar amount offered at ADR equity offering, RANK is the underwriter rank obtained from Jay Ritter's website, SYND is the number of underwriters in the consortium including the lead underwriter, RECPRC is the reciprocal of the offer price, DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry, EXCH is a dummy variable that has the value of 1 if the ADR is listed on NASDAQ or NYSE, LNSIZE is the natural logarithm of the size of the firm the year before the offering, ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 15: BHR and BHAR Matching Comparisons

	Average Holding Period Returns				
Matching Sample	Year 1	Year 2	Year 3	Year 4	Year 5
Panel A: Average BHR for ADR equity offerings					
ADR IPO perf.	19.40%	24.63%	32.20%	47.05%	60.28%
CRSP value-weighted index	8.70%	15.40%	22.56%	29.33%	35.32%
Diff (market adj. ADR perf.)	10.70%	9.24%	9.64%	17.71%	24.96%
t-stat	(1.79*)	(1.25)	(1.28)	(1.99**)	(2.40**)
Panel B: Avg. market-adj. BHR for US IPO matching firm (by year)					
Market adj. ADR perf.	10.70%	9.24%	9.64%	17.71%	24.96%
Market adj. US IPO perf.	-7.54%	-8.12%	-7.07%	-8.33%	-9.51%
Diff (market adj. BHAR)	18.25%	17.35%	16.71%	26.04%	34.46%
t-stat	(2.98***)	(2.28**)	(2.16**)	(2.86***)	(3.27***)
Panel C: Avg. market-adj. BHR for US IPO matching firm (several)					
Market adj. ADR perf.	10.70%	9.24%	9.64%	17.71%	24.96%
Market adj. US IPO perf.	0.14%	0.15%	0.20%	0.19%	0.23%
Diff (market adj. BHAR)	10.56%	9.08%	9.44%	17.52%	24.73%
t-stat	(1.77 *)	(1.23)	(1.25)	(1.97 *)	(2.37 **)
Panel D: Avg. market-adj. BHR for sample firm domestic IPO					
Market adj. ADR perf.	-3.06%	-15.46%	-11.22%	-2.89%	-7.31%
Market adj. sample IPO perf.	12.89%	31.56%	16.80%	16.87%	41.21%
Diff (market adj. BHAR)	-18.79%	-45.06%	-19.16%	-18.24%	-55.17%
t-stat	(-2.50**)	(-3.03***)	(-1.16)	(-0.84)	(-2.12**)
Panel E: Avg. market-adj. BHR for last sample firm domestic SEO					
Market adj. ADR perf.	3.87%	-1.03%	3.50%	-4.47%	-3.52%
Market adj. sample SEO perf.	13.04%	8.92%	-1.05%	-3.06%	19.14%
Diff (market adj. BHAR)	-7.85%	-7.95%	2.84%	-0.98%	-27.70%
t-stat	(-0.66)	(-0.59)	(0.20)	(-0.48)	(-1.98 *)

The aftermarket performance is measured as the buy-and-hold returns following Loughran and Vijh (1997), and computed on the closing prices (after adjustment for dividends and stock-splits) on second trading day after equity offering, and the last day of the holding period. Aftermarket, market-adjusted performances are reported for ADR Offerings (Panels A-E) and their respective matching equity offerings (Panel B-D). *, **, *** represent significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 16: BHAR Analysis of ADR IPOs vs. Domestic IPOs

Independent Variables	BHAR12	BHAR24	BHAR36	BHAR48	BHAR60
LNOFFSIZE	0.169	0.290	0.352	-0.130	0.235
	(1.244)	(1.077)	(1.175)	(-0.089)	(0.498)
RANK	-0.036	0.185	0.155	0.978	0.048
	(-0.159)	(0.414)	(0.312)	(0.362)	(0.061)
SYND	-0.080	0.120	-0.004	-1.334	-0.009
	(-0.411)	(0.312)	(-0.010)	(-0.457)	(-0.014)
RET	-0.024	-0.590	-1.008	1.718	-1.470
	(-0.050)	(-0.618)	(-0.948)	(0.241)	(-0.878)
DEV	-1.428***	-2.302**	-4.651***	-3.255*	-2.080
	(-2.774)	(-2.252)	(-4.088)	(-1.767)	(-1.161)
HT	0.210	0.127	0.448	3.519	0.800
	(0.453)	(0.138)	(0.437)	(0.531)	(0.496)
EXCH	0.210	0.886	0.659	-1.151	0.076
	(0.467)	(0.990)	(0.662)	(-0.311)	(0.048)
ADR	-0.188**	-0.451***	-0.192	-0.188	-0.552**
	(-2.533)	(-3.060)	(-1.169)	(-0.808)	(-2.138)
Constant	-1.762	-5.886	-4.589	-4.634	-3.604
	(-0.432)	(-0.727)	(-0.510)	(-0.368)	(-0.254)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	62	62	62	62	62
Adj. R-squared	0.808	0.772	0.841	0.760	0.720
F	4.343***	3.497***	5.485***	3.054***	2.662***

The dependent variables are the market-adjusted aftermarket performance of ADRs and matching sample measured as the buy-and-hold returns following Loughran and Vijh (1997), and computed on the closing prices (after adjustment for dividends and stock-splits) on second trading day after equity offering, and the last day of the holding period. BHAR12 refers to a one year holding period; BHAR24 refers to a 24 months holding period; BHAR36 refers to a three year holding period; BHAR48 refers to a four year holding period and BHAR60 refers to a five year holding period; LNOFFSIZE is the total amount offered at ADR equity offering; RANK is the underwriter rank obtained from Jay Ritter's website; SYND is the number of underwriters in the consortium including the lead underwriter; RET is the return on the first trading day; DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry; EXCH is a dummy variable that has the value of 1 if the ADR is listed on NYSE; ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 17: BHAR Analysis of ADR IPOs vs. Domestic SEOs

Independent Variables	BHAR12	BHAR24	BHAR36	BHAR48	BHAR60
LNOFFSIZE	-0.090	-0.197	-0.292**	-0.343***	-0.196
	(-0.700)	(-1.355)	(-2.026)	(-2.854)	(-1.430)
RANK	0.182**	0.019	0.041	-0.001	-0.041
	(2.213)	(0.202)	(0.442)	(-0.010)	(-0.474)
SYND	0.183	-0.025	-0.228	-0.316	-0.151
	(0.677)	(-0.081)	(-0.759)	(-1.338)	(-0.528)
RET	0.140	-0.063	-0.440	-0.125	0.036
	(0.201)	(-0.080)	(-0.567)	(-0.211)	(0.050)
DEV	2.881***	2.190**	0.140	0.005	-0.744
	(3.236)	(2.183)	(0.141)	(0.005)	(-0.789)
HT	-0.441	-0.571	-0.144	0.215	0.145
	(-0.800)	(-0.919)	(-0.235)	(0.424)	(0.248)
EXCH	1.117	3.271***	1.336	0.711	0.529
	(1.548)	(4.024)	(1.660)	(1.029)	(0.694)
ADR	-0.170	-0.044	0.096	0.084	-0.167
	(-1.262)	(-0.287)	(0.638)	(0.724)	(-1.170)
Constant	-3.969	-1.312	5.043	5.263	4.483
	(-1.240)	(-0.364)	(1.412)	-1.694	(1.324)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	104	104	104	104	104
Adj. R-squared	0.469	0.579	0.539	0.655	0.617
F	1.575*	2.455***	2.083***	3.149***	2.874***

The dependent variables are the market-adjusted aftermarket performance of ADRs and matching sample measured as the buy-and-hold returns following Loughran and Vijh (1997), and computed on the closing prices (after adjustment for dividends and stock-splits) on second trading day after equity offering, and the last day of the holding period. BHAR12 refers to a one year holding period; BHAR24 refers to a 24 months holding period; BHAR36 refers to a three year holding period; BHAR48 refers to a four year holding period and BHAR60 refers to a five year holding period; LNOFFSIZE is the total amount offered at ADR equity offering; RANK is the underwriter rank obtained from Jay Ritter's website; SYND is the number of underwriters in the consortium including the lead underwriter; RET is the return on the first trading day; DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry; EXCH is a dummy variable that has the value of 1 if the ADR is listed on NYSE; ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 18: BHAR Analysis of ADR IPOs vs. Matching US IPOs (year)

Independent Variables	BHAR12	BHAR24	BHAR36	BHAR48	BHAR60
LNOFFSIZE	-0.043	-0.129**	-0.131**	-0.191***	-0.158**
	(-1.456)	(-2.529)	(-2.377)	(-3.011)	(-2.088)
RANK	0.016	0.034	0.039	0.060	0.060
	(0.882)	(1.090)	(1.174)	(1.558)	(1.314)
SYND	-0.021	-0.083	0.008	-0.084	-0.070
	(-0.389)	(-0.899)	(0.082)	(-0.725)	(-0.508)
RET	0.061	-0.021	0.114	0.064	0.134
	(0.514)	(-0.100)	(0.510)	(0.250)	(0.440)
DEV	-0.152	0.328	0.450	0.669	0.692
	(-0.652)	(0.811)	(1.023)	(1.324)	(1.154)
HT	0.105*	0.241**	0.195*	0.148	0.043
	(1.671)	(2.221)	(1.654)	(1.094)	(0.270)
EXCH	0.000	0.070	-0.067	-0.041	0.003
	(0.001)	(0.466)	(-0.410)	(-0.217)	(0.013)
ADR	0.131***	0.090	0.148*	0.223**	0.328***
	(3.199)	(1.264)	(1.924)	(2.518)	(3.120)
Constant	0.676	1.668*	1.637	2.280*	1.743
	(1.177)	(1.678)	(1.516)	(1.838)	(1.183)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	316	316	316	316	316
Adj. R-squared	0.248	0.216	0.292	0.269	0.319
F	1.526*	1.275	1.908***	1.703**	2.171***

The dependent variables are the market-adjusted aftermarket performance of ADRs and matching sample measured as the buy-and-hold returns following Loughran and Vijh (1997), and computed on the closing prices (after adjustment for dividends and stock-splits) on second trading day after equity offering, and the last day of the holding period. BHAR12 refers to a one year holding period; BHAR24 refers to a 24 months holding period; BHAR36 refers to a three year holding period; BHAR48 refers to a four year holding period and BHAR60 refers to a five year holding period; LNOFFSIZE is the total amount offered at ADR equity offering; RANK is the underwriter rank obtained from Jay Ritter's website; SYND is the number of underwriters in the consortium including the lead underwriter; RET is the return on the first trading day; DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry; EXCH is a dummy variable that has the value of 1 if the ADR is listed on NYSE; ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 19: BHAR Analysis of ADR IPOs vs. Matching US IPOs (several)

Independent Variables	BHAR12	BHAR24	BHAR36	BHAR48	BHAR60
LNOFFSIZE	-0.115*	-0.185**	-0.161**	-0.317***	-0.197**
	(-1.756)	(-2.448)	(-2.203)	(-3.097)	(-2.110)
RANK	0.030	0.046	0.072	0.131**	0.105
	(0.602)	(0.814)	(1.311)	(2.054)	(1.499)
SYND	-0.198	-0.112	0.032	-0.196	-0.099
	(-1.475)	(-0.725)	(0.213)	(-1.076)	(-0.518)
RET	0.303	0.249	0.297	0.191	0.510
	(0.999)	(0.711)	(0.879)	(0.466)	(1.183)
DEV	-0.439	0.137	0.470	1.198	0.633
	(-0.846)	(0.229)	(0.815)	(1.425)	(0.859)
HT	0.141	0.337*	0.204	0.254	0.042
	(0.910)	(1.882)	(1.186)	(1.182)	(0.190)
EXCH	-0.170	0.061	-0.019	0.008	-0.003
	(-0.827)	(0.255)	(-0.085)	(0.027)	(-0.010)
ADR	0.071	0.003	0.025	0.064	0.061
	(0.414)	(0.017)	(0.133)	(0.285)	(0.251)
Constant	2.317*	3.009*	2.404	3.475*	2.512
	(1.661)	(1.869)	(1.550)	(1.717)	(1.269)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	210	210	210	187	210
Adj. R-squared	0.259	0.226	0.384	0.414	0.497
F	0.979	0.818	1.743***	1.639**	2.763***

The dependent variables are the market-adjusted aftermarket performance of ADRs and matching sample measured as the buy-and-hold returns following Loughran and Vijh (1997), and computed on the closing prices (after adjustment for dividends and stock-splits) on second trading day after equity offering, and the last day of the holding period. BHAR12 refers to a one year holding period; BHAR24 refers to a two year holding period; BHAR36 refers to a three year holding period; BHAR48 refers to a four year holding period and BHAR60 refers to a five year holding period; LNOFFSIZE is the total amount offered at ADR equity offering; RANK is the underwriter rank obtained from Jay Ritter's website; SYND is the number of underwriters in the consortium including the lead underwriter; RET is the return on the first trading day; DEV is a dummy variable that has the value of 1 if a company is domiciled in a developed country as defined by the Worldbank, and 0 otherwise; HT is a dummy variable that has the value of 1 if the company is in the high-tech industry; EXCH is a dummy variable that has the value of 1 if the ADR is listed on NYSE; ADR is a dummy variable that has the value of 1 if the issue is an ADR issue, and zero otherwise. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 20: MLE for Underpricing of ADR IPOs vs. Domestic IPOs

	(1)	(2)	(3)	(4)
Variables in *X:*	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.016	0.026	0.018	0.028
	(0.019)	(0.020)	(0.019)	(0.020)
RANK	0.006	0.007	0.006	0.006
	(0.005)	(0.005)	(0.005)	(0.006)
SYND	0.022	0.038	0.020	0.035
	(0.032)	(0.033)	(0.032)	(0.033)
RECPRC	-0.499	-0.021	-0.385	0.082
	(0.527)	(0.565)	(0.540)	(0.581)
DEV	0.102**	0.053	0.112**	0.063
	(0.044)	(0.047)	(0.046)	(0.049)
HT	0.020	0.042	0.021	0.043
	(0.039)	(0.040)	(0.039)	(0.040)
EXCH	0.017	-0.044	0.011	-0.048
	(0.049)	(0.051)	(0.049)	(0.051)
LNSIZE	-0.015***	-0.014**	-0.014**	-0.014**
	(0.005)	(0.006)	(0.005)	(0.006)
ADR	-0.313***	-0.347***	-0.306***	-0.343***
	(0.064)	(0.064)	(0.064)	(0.064)
Constant	0.113	0.315	0.090	0.283
	(0.358)	(0.379)	(0.358)	(0.381)
ln σ	-1.467***	-1.526***	-1.469***	-1.527***
	(0.054)	(0.054)	(0.054)	(0.054)
Year-fixed effects	No	Yes	No	Yes
Country-fixed effects	No	No	Yes	Yes
Observations	174	174	174	174
Log Likelihood	8.384	18.55	8.797	18.83

This table shows the MLE estimates of the pooled model. The dependent variables is UNDERPRICING in all four models. Figures in parentheses are standard errors. ***, **, * significant at 1%, 5%, and 10% respectively. Definitions of all variables is identical to previous tables.

Table 21: MLE for Underpricing of ADR IPOs vs. Domestic SEOs

	(1)	(2)	(3)	(4)
Variables in *X:*	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.005	0.007	0.003	0.005
	(0.018)	(0.019)	(0.018)	(0.019)
RANK	0.008	0.008*	0.008	0.009*
	(0.005)	(0.005)	(0.005)	(0.005)
SYND	0.006	0.018	0.007	0.020
	(0.030)	(0.031)	(0.030)	(0.031)
RECPRC	-0.652	-0.079	-0.723	-0.181
	(0.489)	(0.521)	(0.506)	(0.545)
DEV	0.115***	0.067	0.108**	0.058
	(0.044)	(0.046)	(0.046)	(0.048)
HT	-0.068*	-0.054	-0.068*	-0.055
	(0.039)	(0.039)	(0.039)	(0.039)
EXCH	0.074	0.026	0.077	0.028
	(0.048)	(0.050)	(0.048)	(0.050)
LNSIZE	-0.009*	-0.007	-0.010*	-0.007
	(0.005)	(0.005)	(0.005)	(0.005)
ADR	-0.087*	-0.104**	-0.086*	-0.101**
	(0.045)	(0.045)	(0.045)	(0.045)
Constant	0.061	0.291	0.076	0.322
	(0.343)	(0.365)	(0.343)	(0.368)
ln σ	-1.475***	-1.536***	-1.476***	-1.537***
	(0.051)	(0.051)	(0.051)	(0.051)
Year-fixed effects	No	Yes	No	Yes
Country-fixed effects	No	No	Yes	Yes
Observations	191	191	191	191
Log Likelihood	10.67	22.40	10.82	22.61

This table shows the MLE estimates of the pooled model. The dependent variables is UNDERPRICING in all four models. Figures in parentheses are standard errors. ***, **, * significant at 1%, 5%, and 10% respectively. Definitions of all variables is identical to previous tables.

Table 22: MLE for Underpricing of ADR IPOs vs. Matching US IPOs (year)

	(1)	(2)	(3)	(4)
Variables in *X:*	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.001	0.006	0.000	0.005
	(0.012)	(0.012)	(0.012)	(0.012)
RANK	0.006*	0.003	0.006*	0.003
	(0.003)	(0.003)	(0.003)	(0.003)
SYND	0.016	0.013	0.017	0.014
	(0.021)	(0.019)	(0.021)	(0.019)
RECPRC	-0.253	0.070	-0.266	0.021
	(0.337)	(0.327)	(0.346)	(0.337)
DEV	0.061**	0.017	0.059*	0.011
	(0.029)	(0.028)	(0.030)	(0.030)
HT	0.005	0.005	0.005	0.005
	(0.026)	(0.024)	(0.026)	(0.024)
EXCH	-0.038	-0.009	-0.038	-0.008
	(0.032)	(0.030)	(0.032)	(0.030)
LNSIZE	-0.004	-0.007*	-0.004	-0.007*
	(0.003)	(0.003)	(0.004)	(0.003)
ADR	-0.186***	-0.186***	-0.186***	-0.186***
	(0.023)	(0.019)	(0.023)	(0.019)
Constant	0.233	0.225	0.236	0.244
	(0.229)	(0.223)	(0.230)	(0.225)
ln σ	-1.597***	-1.753***	-1.597***	-1.753***
	(0.040)	(0.040)	(0.040)	(0.040)
Year-fixed effects	No	Yes	No	Yes
Country-fixed effects	No	No	Yes	Yes
Observations	316	316	316	316
Log Likelihood	56.18	105.5	56.19	105.7

This table shows the MLE estimates of the pooled model. The dependent variables is UNDERPRICING in all four models. Figures in parentheses are standard errors. ***, **, * significant at 1%, 5%, and 10% respectively. Definitions of all variables is identical to previous tables.

Table 23: MLE for Underpricing of ADR IPOs vs. Matching US IPOs (several)

	(1)	(2)	(3)	(4)
Variables in *X:*	Underpricing	Underpricing	Underpricing	Underpricing
LNOFFSIZE	0.003	0.006	0.003	0.004
	(0.008)	(0.009)	(0.008)	(0.009)
RANK	0.002	0.003	0.002	0.003
	(0.002)	(0.002)	(0.002)	(0.002)
SYND	0.009	0.013	0.010	0.014
	(0.014)	(0.014)	(0.014)	(0.014)
RECPRC	-0.179	0.020	-0.201	-0.022
	(0.219)	(0.241)	(0.226)	(0.249)
DEV	0.037*	0.015	0.035*	0.010
	(0.019)	(0.021)	(0.020)	(0.022)
HT	-0.001	0.007	-0.001	0.006
	(0.017)	(0.018)	(0.017)	(0.018)
EXCH	0.011	-0.010	0.012	-0.009
	(0.021)	(0.022)	(0.021)	(0.023)
LNSIZE	-0.007***	-0.006**	-0.007***	-0.007***
	(0.002)	(0.003)	(0.002)	(0.003)
ADR	0.061***	0.061***	0.061***	0.061***
	(0.015)	(0.014)	(0.015)	(0.014)
Constant	-0.028	0.050	-0.022	0.067
	(0.149)	(0.165)	(0.150)	(0.166)
ln σ	-2.025***	-2.056***	-2.026***	-2.056***
	(0.040)	(0.040)	(0.040)	(0.040)
Year-fixed effects	No	Yes	No	Yes
Country-fixed effects	No	No	Yes	Yes
Observations	316	316	316	316
Log Likelihood	191.6	201.2	191.7	201.5

This table shows the MLE estimates of the pooled model. The dependent variables is UNDERPRICING in all four models. Figures in parentheses are standard errors. ***, **, * significant at 1%, 5%, and 10% respectively. Definitions of all variables is identical to previous tables.

Table 24: MLE BHAR Analysis of ADR IPOs vs. Domestic IPOs

Variables in *X:*	BHAR12	BHAR24	BHAR36	BHAR48	BHAR60
LNOFFSIZE	0.169*	0.290	0.352*	0.350	0.235
	(0.096)	(0.191)	(0.212)	(0.277)	(0.334)
RANK	-0.036	0.185	0.155	-0.031	0.048
	(0.159)	(0.316)	(0.352)	(0.460)	(0.554)
SYND	-0.080	0.120	-0.004	-0.249	-0.009
	(0.137)	(0.272)	(0.303)	(0.396)	(0.477)
RET	-0.024	-0.590	-1.008	-1.130	-1.470
	(0.340)	(0.676)	(0.752)	(0.983)	(1.184)
DEV	-1.428***	-2.302***	-4.651***	-3.904***	-2.080
	(0.364)	(0.723)	(0.804)	(1.051)	(1.266)
HT	0.210	0.127	0.448	0.630	0.800
	(0.328)	(0.651)	(0.724)	(0.946)	(1.140)
EXCH	0.210	0.886	0.659	0.590	0.076
	(0.319)	(0.633)	(0.704)	(0.920)	(1.109)
ADR	-0.188***	-0.451***	-0.192*	-0.182	-0.552***
	(0.052)	(0.104)	(0.116)	(0.151)	(0.182)
Constant	-1.762	-5.886	-4.589	-3.556	-3.604
	(2.882)	(5.722)	(6.367)	(8.322)	(10.025)
ln σ	-1.577***	-0.892***	-0.785***	-0.517***	-0.331***
	(0.090)	(0.090)	(0.090)	(0.090)	(0.090)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	62	62	62	62	62
Log Likelihood	9.822	-32.70	-39.33	-55.93	-67.47

This table shows the MLE estimates of the pooled model. The dependent variables are the buy-and-hold abnormal returns in years 1 through 5, respectively. Figures in parentheses are standard errors. ***, **, * significant at 1%, 5%, and 10% respectively. Definitions of all variables is identical to previous tables.

Table 25: MLE BHAR Analysis of ADR IPOs vs. Domestic SEOs

Variables in *X:*	BHAR12	BHAR24	BHAR36	BHAR48	BHAR60
LNOFFSIZE	-0.090	-0.197*	-0.292**	-0.326***	-0.196*
	(0.103)	(0.116)	(0.115)	(0.088)	(0.109)
RANK	0.182***	0.019	0.041	-0.018	-0.041
	(0.065)	(0.074)	(0.073)	(0.056)	(0.069)
SYND	0.183	-0.025	-0.228	-0.277	-0.151
	(0.215)	(0.242)	(0.240)	(0.184)	(0.227)
RET	0.140	-0.063	-0.440	-0.179	0.036
	(0.554)	(0.624)	(0.618)	(0.475)	(0.586)
DEV	2.881***	2.190***	0.140	-0.529	-0.744
	(0.709)	(0.799)	(0.791)	(0.609)	(0.751)
HT	-0.441	-0.571	-0.144	0.262	0.145
	(0.439)	(0.495)	(0.490)	(0.377)	(0.464)
EXCH	1.117*	3.271***	1.336**	0.608	0.529
	(0.575)	(0.648)	(0.641)	(0.493)	(0.608)
ADR	-0.170	-0.044	0.096	0.057	-0.167
	(0.107)	(0.121)	(0.120)	(0.092)	(0.114)
Constant	-3.969	-1.312	5.043*	6.434***	4.483*
	(2.550)	(2.874)	(2.845)	(2.189)	(2.699)
ln σ	-0.602***	-0.483***	-0.493***	-0.755***	-0.546***
	(0.069)	(0.069)	(0.069)	(0.069)	(0.069)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	104	104	104	104	104
Log Likelihood	-84.93	-97.37	-96.31	-69.05	-90.81

This table shows the MLE estimates of the pooled model. The dependent variables are the buy-and-hold abnormal returns in years 1 through 5, respectively. Figures in parentheses are standard errors. ***, **, * significant at 1%, 5%, and 10% respectively. Definitions of all variables is identical to previous tables.

Table 26: MLE BHAR Analysis of ADR IPOs vs. Matching US IPOs (year)

Variables in *X:*	BHAR12	BHAR24	BHAR36	BHAR48	BHAR60
LNOFFSIZE	-0.067*	-0.107***	-0.101**	-0.139***	-0.118**
	(0.036)	(0.041)	(0.041)	(0.049)	(0.056)
RANK	0.012	0.023	0.030	0.045	0.045
	(0.026)	(0.029)	(0.030)	(0.035)	(0.041)
SYND	-0.099	-0.062	0.035	-0.033	-0.029
	(0.075)	(0.085)	(0.087)	(0.102)	(0.118)
RET	0.163	0.075	0.149	0.161	0.211
	(0.166)	(0.189)	(0.193)	(0.226)	(0.262)
DEV	-0.204	0.101	0.232	0.222	0.330
	(0.269)	(0.307)	(0.313)	(0.368)	(0.426)
HT	0.081	0.210**	0.134	0.110	0.009
	(0.084)	(0.096)	(0.098)	(0.115)	(0.133)
EXCH	-0.075	0.018	-0.029	-0.097	-0.011
	(0.113)	(0.128)	(0.131)	(0.154)	(0.178)
ADR	0.182***	0.143**	0.150**	0.231***	0.334***
	(0.057)	(0.065)	(0.067)	(0.078)	(0.091)
Constant	1.327*	1.750**	1.659*	2.155**	1.626
	(0.741)	(0.843)	(0.862)	(1.010)	(1.172)
ln σ	-0.611***	-0.481***	-0.460***	-0.300***	-0.152***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	358	358	358	358	358
Log Likelihood	-289.3	-335.6	-343.5	-400.4	-453.6

This table shows the MLE estimates of the pooled model. The dependent variables are the buy-and-hold abnormal returns in years 1 through 5, respectively. Figures in parentheses are standard errors. ***, **, * significant at 1%, 5%, and 10% respectively. Definitions of all variables is identical to previous tables.

Table 27: MLE BHAR Analysis of ADR IPOs vs. Matching US IPOs (several)

Variables in *X:*	BHAR12	BHAR24	BHAR36	BHAR48	BHAR60
LNOFFSIZE	-0.115**	-0.185***	-0.161**	-0.230***	-0.197**
	(0.056)	(0.065)	(0.063)	(0.073)	(0.080)
RANK	0.030	0.046	0.072	0.101*	0.105*
	(0.042)	(0.049)	(0.047)	(0.055)	(0.060)
SYND	-0.198*	-0.112	0.032	-0.088	-0.099
	(0.115)	(0.132)	(0.128)	(0.150)	(0.163)
RET	0.303	0.249	0.297	0.382	0.510
	(0.260)	(0.300)	(0.289)	(0.340)	(0.369)
DEV	-0.439	0.137	0.470	0.436	0.633
	(0.445)	(0.513)	(0.494)	(0.580)	(0.631)
HT	0.141	0.337**	0.204	0.189	0.042
	(0.133)	(0.153)	(0.148)	(0.173)	(0.188)
EXCH	-0.170	0.061	-0.019	-0.159	-0.003
	(0.176)	(0.203)	(0.196)	(0.230)	(0.250)
ADR	0.071	0.003	0.025	0.028	0.061
	(0.147)	(0.170)	(0.163)	(0.192)	(0.209)
Constant	2.317*	3.009**	2.404*	3.398**	2.512
	(1.195)	(1.379)	(1.328)	(1.560)	(1.696)
ln σ	-0.430***	-0.287***	-0.324***	-0.164***	-0.080
	(0.049)	(0.049)	(0.049)	(0.049)	(0.049)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	210	210	210	210	210
Log Likelihood	-207.6	-237.7	-229.9	-263.6	-281.2

This table shows the MLE estimates of the pooled model. The dependent variables are the buy-and-hold abnormal returns in years 1 through 5, respectively. Figures in parentheses are standard errors. ***, **, * significant at 1%, 5%, and 10% respectively. Definitions of all variables is identical to previous tables.

CHAPTER III

REAL ACTIVITIES MANIPULATION OF CROSS-LISTING FIRMS

1. Introduction

In this chapter, I study the accrual-based and real activities manipulation of non-U.S. firms that cross-list on the U.S. market via American Depositary Receipts (ADRs). I investigate whether earnings management activities are utilized to make firms look more attractive to prospective U.S. investors around cross-listing events, and whether these activities have implications on the future performance of the cross-listed firms.

Accrual-based earnings management mainly refers to accounting maneuvers when consolidating or reporting financial statements to smooth earnings and to give an overall more stable or better outlook of the company. Real earnings management, also called real activities manipulation, refers to activities that change the normal course of operation, investment and financing activities (Roychowdhury, 2006; Zang, 2012). While accrual-based earnings management does not affect the future cash flows of a firm, real activities manipulation can have a serious economic impact on future cash flows and long-term performance of the firm conducting these activities.

In addition, real activities manipulation is widely popular among managers as an earnings management method since it can be disguised as "sincere" operating decisions. Graham et al. (2005) report that 78 percent of surveyed CFOs stated that they would sacrifice long-term economic performance to smooth earnings or to meet an earnings target. Furthermore, 79.9% of

their sample CFOs admitted that they would decrease discretionary spending on R&D, advertising, and maintenance, which are all measures of real activities manipulation.[15] Since the passage of Sarbanes Oxley, which imposes more stringent scrutiny on financial reports, managers find it more viable to engage in real activities manipulation than accruals-based earnings management.

In spite of the prevalence of real activities manipulation, prior studies focus only on accruals-based earnings management of firms prior to their equity offerings. It is well documented that equity offerings are often accompanied by earnings management activities to deceive potential investors and to favor investment decisions. These activities have been found to negatively impact the operating performance of firms after the equity issue (Cohen and Zarowin, 2010; DuCharme et al., 2004; Rangan, 1998; Shivakumar, 2000; Teoh et al., 1998).

With regard to the earnings management of cross-listed firms, research has provided mixed results. For instance, a study by Lang et al. in 2006 compares the earnings management of US firms with those of cross-listed non-US firms that need to reconcile earnings to cross list on the US market. The results show more accrual-based earnings management activities for non-US firms than for US firms in general. These results are also supported by Cahan et al. (2009). In contrast to these results, Eng and Lin (2012) suggest that there is no difference in accrual-based earnings management between firms that cross-list in the US and firms that do not cross-list in the US suggesting that the cross-listing decision is not necessarily related to a change in accounting or that firms cross-listing in the U.S. use earnings management to make the firm look more attractive to US investors.

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[15] 55.3% of the survey CFOs also admitted that they would delay starting a new project to smooth earnings, which also qualifies as real earnings management.

In addition, because of a tradeoff between accrual-based and real earnings management (Zang, 2012), the analysis of earnings management activities is only comprehensive when taking into account both measures simultaneously. Specifically, Zang (2012) suggests that managers weigh the trade-offs between accrual-based earnings management and real activities manipulation and engage in accruals earnings management based upon the outcome of real activities management to smooth earnings. Thus, focusing only on accruals-based earnings management and ignoring real activities manipulation might result in misleading conclusions about earnings management activities by firms prior to their cross-listing.

2. Literature Review

2.1. Equity Offerings and Earnings Management

An early paper by Jain and Kini (1994) analyzes the operating performance[16] of firms that make the transition from private to public firms via IPOs. The authors analyze a sample of 683 firms that raise equity between 1976 and 1988. While the authors find a significant first day average abnormal return for the analyzed firms, the long-run operating performance underperforms pre-IPO levels for up to three years after the equity issue, both before and after industry adjustment. The authors suggest that managers attempt to window-dress accounting numbers before going public, which positively impacts investor demand and expectation, but which cannot be achieved in the aftermarket. The study also documents a sharp increase in capital expenditures after equity issues, which suggests that firms hold back on major investments prior to the IPO issue. The later would qualify as real earnings management.

[16] Operating performance is measured as operating return on assets and operating cash flow divided by total assets.

Another study by Rangan (1998) investigates whether earnings management can help to explain the poor long-run performance of firms after seasoned equity offerings. The author hypothesizes that if firms actively manage earnings prior to equity issues and investors fail to identify earnings management, stock prices will display poor performance in the aftermath of the issue, because the market will value the firm at its true price. Consistent with his hypothesis, the study shows that for the 230 SEOs analyzed, discretionary accounting accruals during the year around the offering predict part of the poor performance. Similar results are presented by Shivakumar (2000), who investigates accrual-based earnings management for 1,222 SEOs between 1983 and 1992. In contrast to Rangan (1998) and Teoh et al. (1998), the author suggests that earnings management activities are not targeted at misleading potential equity investors. According to their results, investors anticipate earnings management activities, but discount these activities at the issue announcement.

Teoh et al. (1998) provide similar evidence on accrual-based earnings management activities prior to IPOs. In particular, the authors argue that prior to issuance, firms report earnings in excess of cash flows by using accrual-based earnings management. In consequence, this negatively impacts long-run firm performance after the issuance, as expected pre-IPO performance cannot be sustained. More importantly, the study quantifies the extent of earnings management activities and shows that they are inversely related to the post issue performance. Specifically, the authors report that the quartile of firms that engage most actively in earnings management underperform the quartile of firms that engage least actively in earnings management by 20% in the three years after the issue.

More recent literature by DuCharme et al. (2004) proposes that accrual-based earnings management around a sample of IPOs and SEOs is abnormally high for firms that face litigation

after the issue. The authors suggest that firms conduct earnings management to take advantage of higher possible offer prices to maximize proceeds. However, the higher the degree of earnings management before the issue, the higher the chances of being subject to lawsuits, and the lower the aftermarket firm performance.

Finally, Cohen and Zarowin (2010) analyze both real and accrual-based earnings management for a sample of 1,511 seasoned equity offerings in the period 1987 to 2006. The authors report that in addition to accrual-based earnings management the long-run underperformance of SEO firms after equity offerings is even more determined by real earnings management. This result is consistent with Graham et al. (2005) and the notion that firms that undertake real earnings management may pass up or delay profitable projects that may benefit the firm in the long run.

2.2. Cross-listing and Earnings Management

Lang et al. (2003) compare a sample of 413 cross-listing firms with a sample of size based matched firms that are not cross-listed. The purpose of their study is to investigate accrual-based earnings management activities that management initiates around cross-listing events. Their findings reveal that, on average, cross-listed firms utilize less earnings management activities and report more conservative accounting data. The authors account this decline in earnings management activities to the strict U.S. reporting requirements of cross-listed firms as opposed to home country reporting requirements. Additionally, their results are only observed for firms listed on U.S. exchanges where reporting requirements are most strict. This result is consistent with Burgstahler and Eames (2006), who find that both public and private firms exhibit more earnings management in countries with weak legal enforcement.

Lang et al. (2006) compare firm reconciled earnings of firms that cross-list in the U.S. with earnings of a sample of U.S. firms based on year, industry, and growth. The sample in this study comprises 181 non-U.S. firms that report earnings via Form 20-F. The data suggests that cross-listing firms more actively manage accruals than the control sample of U.S. firms. Furthermore, consistent with Leuz et al. (2003), Burgstahler and Eames (2006) and Cahan et al. (2009) the results show that earnings management is strongest for firms that are domiciled in countries with weak investor protection.

Ndubizu (2007) reports that, on average, performance and cash flows peak at cross listing for a sample of 535 equity issuing and non-equity issuing firms. The author suggests that firms time the cross listing on the U.S. market to take advantage of high performance perceptions. Moreover, their findings show that cross-listing firms engage in earnings management at the time of the cross listing independent of raising equity motives. In other words, earnings management activities observed at the time of the cross listing are not directly related to maximize proceeds for equity issuing firms, but rather to increase investor recognition.

Cabán-García (2009) investigates a sample of 112 European firms that cross-list on other European markets in the period 1989 to 2001. The paper helps to explain in how far the earnings management activities observed for cross-listing firms on U.S. markets are similar for markets with less stringent investor protection rights. The findings reveal that the different foreign regulatory requirements observed in European countries do not seem to have an effect on the reported earnings. These results are consistent with prior literature that suggests that strict regulation and disclosure requirements as present in the U.S. are inversely related to accrual-based earnings management.

Eng and Lin (2012) compare a sample of 31 Chinese firms cross-listed in the U.S. with a sample of 55 Chinese firms cross-listed in Hong Kong. The result of this comparison indicates that accrual-based earnings management is not significantly different between the analyzed firms around the cross-listing period. This finding contradicts with prior literature by e.g., Leuz (2003), Burghstahler et al. (2006), Lang et al. (2006), and Cahan et al. (2009), who suggest that earnings quality significantly increases with stricter regulatory environment as existent in the United States.

3. Hypotheses

The bonding hypothesis suggests that firms that cross-list on markets with high investor protection and strict regulatory environment should display improved firm performance in the long run. In other words, firms may display higher quality reporting the longer assets are traded on markets with a stricter regulatory environment (Lang et al., 2003). Furthermore, research has provided evidence that firms domiciled in countries with weaker investor protection more frequently utilize earnings management due to the weak regulatory environment that could reveal such practices. However, as firms from these countries enter the U.S. market, the use of earnings management should decline. Ajinkya et al. (2005) provide evidence that greater institutional ownership and stricter regulatory environment are related to less optimistically biased accounting and thus less accrual-based earnings management. Hence,

H1: *Firms that cross-list on U.S. markets reduce accrual-based earnings management after the cross-listing event.*

Zang (2012) explains that firms facing greater scrutiny from auditors and regulators, especially since the passage of the Sarbanes-Oxley Act, have a higher level of real activities manipulation. This is important, as it also points toward an increase of real activities

manipulation before cross listing on the U.S. market, which is known for its scrutiny. Given the high regulatory environment existing in the U.S., this leads to the following hypothesis.

H2: *Firms that cross-list in the U.S. display higher real activities manipulation than accrual-based earnings management around cross-listing events.*

This especially applies to Level II & III and Rule 144a DR listings as they trade on major U.S. exchanges and target the private equity market of knowledgeable institutional buyers, respectively.

H3: *Firms that cross-list via Level II, III and 144a manage real earnings more than firms that cross-list via Level I.*

Finally, sponsored ADRs exist when a company is actively involved in the cross-listing process and, therefore, have an influence as to the date of the cross-listing. This means that companies with sponsored ADRs can prepare for the cross-listing process, while unsponsored ADRs are mostly the result of a depositary bank satisfying the demand for foreign company shares. Thus,

H4: *Sponsored ADRs display more real earnings manipulation than unsponsored ADRs around cross-listing events.*

4. Data

4.1. Data Source

The list of cross-listed depositary receipts along with information on country of origin, exchange, effective date, industry, initial price and lead underwriter is downloaded from several sources including J.P. Morgan, Bank of New York, Citibank and NYSE. The sample starts in 2000 and ends in 2013 and includes ADR Levels I – III and Rule 144ADR. To be included in the sample,

a firm must have accounting data available before and after the cross-listing event. I download accounting data from several sources such as WorldScope, MergentOnline and GlobalVantage

4.2. Sample Descriptive

I present the sample distribution in Table 28. The sample includes a total of 1,349 cross-listed firms over the period 2000 – 2013. The majority of firms (1,102) are cross-listed via Level I. Most of the firms in the sample cross-listed in 2008 (474) followed by firms listing in 2012 (172).

Furthermore, 880 of the cross-listed firms had a single underwriter, while 85 firms used 4 or more underwriters in the cross-listing process. The majority of firms analyzed (847) offer depositary receipts in ratios below 1, i.e. more than one home market share represents one depositary receipt. Table 29 describes the sample by home country. The majority of sample firms that cross-list their shares on foreign markets are domiciled in the U.K. (162) followed by Australia (142) and Hong Kong (99).[17]

5. Methodology

To analyze the accrual-based and real activities manipulation measures around cross-listing events, I follow the methodology by Roychowdhury (2006), Cohen and Zarowin (2010), and Zang (2012).

5.1. Accruals-Based Earnings Management Activities

To estimate accrual-based earnings management (*AM*), I use discretionary accruals as used in prior literature. I estimate discretionary accruals as the difference between a firm's actual

[17] More tables including sample descriptives can be found in the Appendix.

accruals and the normal level of accruals (Zang, 2012),where the normal level of accruals is estimated using the modified Jones (1991) model as follows.

(1): $\frac{Accruals_{i,t}}{As_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{As_{i,t-1}} + \beta_2 \frac{\Delta S_{i,t}}{As_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{As_{i,t-1}} + \epsilon_{i,t}$

where $Accruals_{i,t}$ is the earnings before extraordinary items and discontinued operations minus the operating cash flow taken from the statement of cash flows for firm *i* in year *t;* $As_{i,t-1}$ are the total assets of firm *i* at time *t-1* [18], $\Delta S_{i,t}$ *is* the change in sales of firm *i* at time *t* compared to the prior year, $PPE_{i,t}$ is the gross value of property, plant and equipment of firm *i* at time *t, AM* denotes the estimated residual (ϵ) from the regression and is used to measure the extent of accrual-based earnings management (*AM*). The model is estimated for each industry year with at least 15 observations, where industry is defined by Fama and French (1997). *AM* is calculated for each of the four quarters preceding and following the cross-listing event to analyze the pattern in discretionary accruals around the cross-listing event. I compare and contrast the average discretionary accruals in the four preceding quarters (e.g. average discretionary accruals before the cross-listing events) and in the four following quarters (e.g. average discretionary accruals after the cross-listing events).

5.2. Real Activities Manipulation

Recent literature analyzes real activities manipulation in two ways: (1) abnormal measure of production costs (RM_{PROD}) and (2) abnormal measure of discretionary expenditures (RM_{DISX}). The former is measured using OLS-regression following the methodology by Roychowdhury (2006) as follows:

[18] The lag is used because the earnings are generated with previous year's assets.

(2): $\frac{PROD_{i,t}}{As_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{As_{i,t-1}} + \beta_2 \frac{S_{i,t}}{As_{i,t-1}} + \beta_3 \frac{\Delta S_{i,t}}{As_{i,t-1}} + \beta_4 \frac{\Delta S_{i,t-1}}{As_{i,t-1}} + \epsilon_{i,t}$

where $PROD_{i,t}$ is the sum of the costs of goods sold for firm *i* in year *t* and the change in inventory from *t*-1 to *t*, $As_{i,t-1}$ are the total assets of firm *i* at time *t*-1; $S_{i,t}$ is the net sales for firm *i* in year *t*, $\Delta S_{i,t}$ *is* the change in net sales of firm *i* at time *t* compared to the prior year; $\Delta S_{i,t-1}$ is the change in net sales of firm *i* at time *t-1*. Likewise, following Roychowdhury (2006) the model is estimated for each industry-year with at least 15 observations, where industry is derived by Fama and French (1997). RM_{PROD} denotes the estimated residuals of the model, where larger residuals signify larger amounts of inventory overproduction, and increase in reported earnings.

The second measure of real activities manipulation, (RM_{DISX}), is estimated using OLS by finding the normal level of discretionary expenditures following Roychowdhury (2006) as follows:

(3): $\frac{DISX_{i,t}}{As_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{As_{i,t-1}} + \beta_2 \frac{S_{i,t-1}}{As_{i,t-1}} + \epsilon_{i,t}$

where $DISX_{i,t}$ is the sum of discretionary expenditures, which includes SG&A, advertising, and R&D for firm *i* in year *t*, $As_{i,t-1}$ are the total assets for firm *i* in year $t-1$ and $S_{i,t-1}$ are the net sales for firm *i* in year $t-1$. Following Roychowdhury (2006) the model is estimated for each industry-year with at least 15 observations, where industry is derived by Fama and French (1997). Consistent with prior literature, I measure (RM_{DISX}) by multiplying the residuals of the above equation with -1. This allows me to manipulate the values, such that higher values in residuals designate greater amounts of discretionary expenditures cuts. Finally, both measures of real activities manipulation are summed up into one proxy for total real activities manipulation, denoted as *RM*. RM_{PROD}, RM_{DISX} *and RM* are calculated for each of the four quarters preceding and following the cross-listing event to analyze the pattern in earnings management around the

cross-listing event. I compare and contrast the average RM_{PROD}, RM_{DISX} *and RM* in the four preceding quarters (e.g. average real activities manipulation before the cross-listing events) and in the four following quarters (e.g. average real activities manipulation after the cross-listing events).

5.3. Data Analysis

As a robustness check, in addition to the raw earnings management variables obtained in equations 1 to 3, I adjust the variables with matching firm variables. Specifically, for each of the cross-listed firms, I select a matching firm from the cross-listed firm's home market that has never been involved in any cross-listing activity. The matching firm is in the same size quartile and has the closest market-to-book ratio as compared to the cross-listing firm in the quarter preceding the cross-listing. I calculate the difference in the earnings management variables (*AM*, RM_{PROD}, RM_{DISX} and *RM*) between each sample firm and its matching firm to identify matching firm-adjusted earnings management.

A multivariate model is tested as follows using OLS-regression analysis:

(4): $$Earnings\ Management\ _{j,t} = \alpha_j + \sum_{t=-4}^{+4} \beta_1\ QUARTER_{j,t} + \beta_2 HT_{j,t} + \beta_3 LEVEL_{j,t} + \beta_4 SPONSOR_{j,t} + \beta_5 LNSIZE_{j,t} + \beta_6 DEBT_{j,t} + \varepsilon_{j,t}$$

HT is the dummy variable for high-tech firms. *LEVEL* is a binary variable for firms cross-listed via Level II, III and 144A programs. SPONSOR is a dummy variable that has the value 1 if the cross-listing firm was sponsored, and zero otherwise. *LNSIZE* is the natural logarithm of the firm size the quarter before the cross-listing. *DEBT* is the debt to total assets ratio in the quarter prior to the cross-listing.

In the above regression, the dependent variables are the time-series earnings management variables in quarter –4 to quarter +4. The focus is on the coefficients that capture the relative

quarters (*QUARTERs)*, which help to determine if and when the cross-listing firm starts to engage in more earnings management manipulation.

6. Results

6.1. Initial Results

In Table 30, I report the summary statistics of the earnings management variables in each of the 8 quarters surrounding the cross-listing date. I show several graphs (see Figures 6 - 8) to better illustrate the trend in real activities manipulation and accrual-based earnings management. Figure 6 shows the accrual based earnings management activities surrounding the cross-listing event with quarter 0 being the quarter of the event. There is a gradual but distinct increase in the earnings management measures leading to the quarter of the cross-listing (i.e., quarter 0) and a reversal in the trend post-cross-listing. The t-test between the mean values in the (-4, -1) window and the (+1, +4) window, with 0 representing the quarter of the M&A announcement, is highly significant. This suggest that accrual based earnings manipulation is significantly reduced after the cross-listing event, which supports hypothesis 1. Figure 7 through 9 present the real earnings manipulation scores surrounding the cross-listing event. While the abnormal production cost score (Figure 7) seems to gradually increase in the two quarters leading to the cross-listing event, abnormal discretionary expense score (Figure 8) as well total real earnings management score (Figure 9) are both at high levels throughout the entire period analyzed. Interestingly, all three earnings management score reveal largest values in the quarter of the cross-listing event that is highly significant compared to the respective previous quarters (-1). This result may suggest that cross-listing firms skip especially discretionary expenses in the quarter of the cross-listing to promote their listing in the U.S. market while returning to normal standards after the cross-listing. Comparing the accrual based earnings management scores with real earnings

management scores, Table 30 reveals that real activities manipulation is significantly higher than accrual based earnings management in almost all quarters around cross-listing event, especially in the quarter of the cross-listing. This provides strong support for hypothesis 2. This is not surprising as a stricter regulatory environment may help prevent accrual based manipulation.

I further examine the accrual-based earnings management and real activities manipulation in Tables 31 through Table 34 using the multiple regression model 6 as described above. In Table 31, the dependent variable in all four models is discretionary accruals. I include dummy variables representing quarters (-4 to +4), with the cross-listing event in quarter 0, as well as a series of other control variables as described in regression 4 and in the notes. As already suspected from the univariate analysis above, accrual based earnings management is significantly higher in the quarter of the cross-listing evidenced by the positive and statistically significant coefficient in quarter 0. The other variables of interest are LEVEL and SPONSOR. In all four models, the coefficients for the LEVEL variable are likewise positive and statistically significant at the 1% level. This suggests that firms with Level II, III and 144A ADRs employ significantly higher accrual based earnings manipulation than Level I ADRs. Furthermore, the analysis reveals that sponsored ADRs do not have a different level of accrual based earnings management than unsponsored ADR around the cross-listing event. Finally, other variables that significantly impact accrual based earnings management around cross-listing events are the size of the firm and the debt level of the firm, both showing positive and statistically significant coefficients at various significance levels.

In Table 32, I present the first measure of real earnings manipulation. The dependent variable in all four models is the abnormal production cost score. I include variables as described before representing quarters (-4 to +4), with the cross-listing event in quarter 0, as well as a

series of other control variables. The results suggest that abnormal production cost is significantly higher in the quarter of the cross listing evidenced by the positive and statistically significant coefficient in quarter 0. The other variables of interest are level of listing (LEVEL) and the sponsorship (SPONSOR). In three out of four models, the coefficients for the LEVEL variable are likewise positive and statistically significant at various levels. This suggests that firms with Level II, III and 144A ADRs have a significantly higher abnormal production score than Level I ADRs (Hypothesis 3). Furthermore, in contrast to accrual based earnings management, sponsored ADRs have a higher level of abnormal production scores than unsponsored ADR around the cross-listing event (Hypotheses 2 and 4). This is suggested by the consistently positive and statistically significant SPONSOR variable. Finally, other variables that significantly impact abnormal production cost around cross-listing events are the size of the firm and the debt level of the firm, both showing positive and statistically significant coefficients at the 1% significance level.

In Table 33, I present the second measure of real earnings manipulation. More specifically, the dependent variable in all four models is the abnormal discretionary expense score. I include dummy variables representing quarters (-4 to +4), with the cross-listing event in quarter 0, as well as a series of other control variables as described in regression 4 and in the notes. The results suggest that abnormal discretionary expense scores are significantly higher in the quarter of the cross listing evidenced by the positive and statistically significant coefficient in quarter 0 across all four models. The other variables of interest are level of listing (LEVEL) and the sponsorship (SPONSOR). In all four models, the coefficients for the LEVEL variable are likewise positive and statistically significant at various levels. This suggests that firms with Level II, III and 144A ADRs employ significantly higher real earnings manipulation than Level I

ADRs (Hypothesis 3). Furthermore, the coefficients for the SPONSOR variable are positive in all four models, sponsored ADRs do not seem to have a lower level of abnormal discretionary expenses than unsponsored ADR around the cross-listing event due to the missing statistical significance.

Finally, in Table 34, the dependent variable in all four models is the total real earnings management score. Again, I include dummy variables representing quarters (-4 to +4), with the cross-listing event in quarter 0, as well as a series of other control variables as described in regression 4 and in the notes. The results suggest that total real earnings manipulation is significantly higher in the quarter of the cross listing evidenced by the positive and statistically significant (1% level) coefficient in quarter 0 across all four models. The other variables of interest are level of listing (LEVEL) and the sponsorship (SPONSOR). In two out of four models, the coefficients for the LEVEL variable are positive and statistically significant. This partially confirms that firms with Level II, III and 144A ADRs employ significantly higher real earnings manipulation than Level I ADRs (Hypothesis 3). Furthermore, in contrast to accrual based earnings management, sponsored ADRs have a higher level of real earnings management than unsponsored ADR around the cross-listing event (Hypotheses 2 and 4). This is suggested by the consistently positive and statistically significant SPONSOR variable. Finally, the other variable that significantly impacts total real earnings management around cross-listing events is the size of the firm, showing positive and statistically significant coefficients at the 1% significance level across all four models.

6.2. Robustness of Results

Given the nature of the data, one might suspect that OLS is not the appropriate method in estimating the models. Hence, in the following I conduct additional tests that help specify the

appropriate model. First, I analyze whether OLS or a fixed effects model is appropriate by using an F-test comparing for the pooled OLS results with the results from a fixed effects panel regression[19]. The tests reveal that a fixed effects model is preferred to OLS[20]. Second, I use Breusch and Pagan (1979) tests to assess whether OLS or a random effects model is more appropriate. The tests confirm the random effects model as more appropriate. Finally, I use Hausman (1978) tests to check whether fixed effects or random effects models are appropriate. The results indicate that the fixed-effects model is preferred[21]. Hence, I rerun the analysis using a fixed effects panel regression[22]. The results are shown in Table 35. The dependent variables in each model are as described. Overall, the results are very similar to those obtained using OLS[23], i.e., firm significantly manage their earnings in the quarter of the cross-listing using discretionary accruals or real earnings manipulation. Furthermore, the size of the firm at the time of the cross-listing plays a significant role in the degree of earnings management measures used.

7. Conclusions

I analyze the extent of both real activities manipulation and accrual-based earnings management for firms cross-listing on the U.S. market. The sample consists of 1,349 cross-listing events that took place between 2000 and 2013. My proxies for earnings management are at high levels surrounding the cross-listing events with significantly high values in the quarter of the cross-listing. Overall, my results suggest that firms actively manage their real earnings

[19] I use the XTREG command in Stata.
[20] For all models tested p-values < 0.01.
[21] For all models tested p-values < 0.01.
[22] I also run random effects models as we well as least squared dummy variables (LSDV) models with similar results as obtained using OLS
[23] Sponsorship, Listing Level and High-tech binary variables are omitted due to their time invariant nature.

around cross-listing events, especially when listed via Level II, III and Level 144A due to the increased level of regulatory scrutiny that prevents these firms to continue with accrual based earnings management after the cross-listing event. Furthermore, unsponsored ADR firms manage their earnings significantly less around cross-listing events due to the nature of the cross-listing procedure.

Table 28: Sample Distribution

	Number	*Percent*		*Number*	*Percent*
Year of Listing			***Level***		
2000	5	0.37	Level I	1,102	81.69
2001	2	0.15	Level II	16	1.19
2002	7	0.52	Level III	16	1.19
2003	3	0.22	144A	89	6.60
2004	26	1.93	Reg S	126	9.34
2005	61	4.52			
2006	48	3.56	***Sponsored***		
2007	70	5.19	No	879	65.16
2008	474	35.14	Yes	470	34.84
2009	161	11.93			
2010	129	9.56	***Ratio***		
2011	161	11.93	1 and above	502	37.21
2012	172	12.75	below 1	847	62.79
2013	30	2.22			
Total	1,349	100.00	***Depositary Banks***		
			1	880	65.23
Type			2	233	17.27
ADR	1,134	84.06	3	151	11.19
GDR	214	15.86	4 or more	85	6.30
HDR	1	0.07			

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 29: Sample Distribution by Home Country

Country	*Number*	*Percent*	***Country***	*Number*	*Percent*
Argentina	8	0.59	Kazakhstan	2	0.15
Australia	142	10.53	Luxembourg	4	0.30
Austria	9	0.67	Macau	1	0.07
Bahrain	2	0.15	Malaysia	2	0.15
Belgium	19	1.41	Mexico	13	0.96
Bermuda	2	0.15	Netherlands	11	0.82
Brazil	56	4.15	New Zealand	29	2.15
Chile	9	0.67	Norway	21	1.56
China	89	6.60	Pakistan	5	0.37
Colombia	6	0.44	Peru	2	0.15
Croatia	4	0.30	Philippines	18	1.33
Cyprus	1	0.07	Poland	16	1.19
Czech Republic	3	0.22	Portugal	11	0.82
Denmark	16	1.19	Russia	80	5.93
Egypt	9	0.67	Singapore	42	3.11
Finland	18	1.33	South Africa	31	2.30
France	53	3.93	South Korea	3	0.22
Germany	64	4.74	Spain	24	1.78
Greece	9	0.67	Sweden	31	2.30
Hong Kong	99	7.34	Switzerland	29	2.15
Hungary	1	0.07	Taiwan	21	1.56
Iceland	1	0.07	Thailand	1	0.07
India	43	3.19	Turkey	20	1.48
Indonesia	35	2.59	Ukraine	2	0.15
Ireland	9	0.67	United Arab Emirates	5	0.37
Israel	13	0.96	United Kingdom	162	12.01
Italy	39	2.89	Venezuela	1	0.07
Jersey	2	0.15	Vietnam	1	0.07

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 30: Comparing Earnings Management Activities Around Cross-listing

Relative quarters	Discretionary accruals	Abnormal Production Costs	Abnormal Discretionary Expense	Total Real Earnings Management
-4	-0.02198	-0.00228	-0.14465	-0.21025
-3	-0.00915	-0.00607	0.01863	0.00958
-2	-0.00392	-0.01833	0.84570	1.01614
-1	-0.00076	-0.00659	-0.08286	-0.10183
0	-0.00454	0.00269	5.36649	6.58513
1	-0.01771	-0.00872	0.00129	-0.01192
2	-0.02250	-0.01068	-0.76105	-0.88780
3	-0.02224	-0.00771	-0.02487	-0.02361
4	-0.02604	-0.00842	0.01116	-0.01190
Mean (-2)	-0.00392	-0.01833	0.84570	1.01614
Mean (-1)	-0.00076	-0.00659	-0.08286	-0.10183
Difference	0.00316	0.01174	-0.92855	-1.11798
t-stat	(0.21)	(0.93)	(-1.11)	(-1.11)
Mean (-1)	-0.00076	-0.00659	-0.08286	-0.10183
Mean (0)	-0.00454	0.00269	5.36649	6.58513
Difference	-0.00378	0.00928	5.44935	6.68696
t-stat	(-0.70)	(1.83*)	(1.73*)	(1.73*)
Mean (0)	-0.00454	0.00269	1.36649	1.58513
Mean (+1)	-0.01771	-0.00872	0.00129	-0.01192
Difference	-0.01316	-0.01140	-5.36520	-6.59706
t-stat	(-1.73*)	(-3.07***)	(-1.73*)	(-1.74*)
Mean (+1)	-0.01771	-0.00872	0.00129	-0.01192
Mean (+2)	-0.02250	-0.01068	-0.76105	-0.88780
Difference	-0.00479	-0.00196	-0.76234	-0.87588
t-stat	(-0.67)	(-1.50)	(-1.01)	(-1.00)
Mean (-4, -1)	-0.00244	-0.00922	0.34833	0.40002
Mean (+1, +4)	-0.02048	-0.00886	-0.18597	-0.22265
Difference	-0.01804	0.00036	-0.53430	-0.62266
t-stat	(-3.00 ***)	(0.24)	(-1.24)	(-1.25)

Quarter 0 represents the quarter of the Cross-listing. Regressions 1 through 5 are used to measure real activities manipulation and accrual-based earnings management. *, **, *** represent significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 31: Cross Sectional Analysis of Discretionary Accruals

Independent Variables	(1)	(2)	(3)	(4)
QUARTER (-4)	0.004	0.004	0.004	0.005
	(1.002)	(1.124)	(1.154)	(1.228)
QUARTER (-3)	0.001	0.001	0.002	0.002
	(0.197)	(0.363)	(0.416)	(0.553)
QUARTER (-2)	0.001	0.002	0.002	0.003
	(0.379)	(0.478)	(0.637)	(0.713)
QUARTER (-1)	0.001	0.001	0.002	0.002
	(0.320)	(0.344)	(0.560)	(0.549)
QUARTER (0)	0.010***	0.010***	0.011***	0.010***
	(2.643)	(2.714)	(2.889)	(2.930)
QUARTER (+1)	0.002	0.001	0.002	0.002
	(0.469)	(0.379)	(0.582)	(0.460)
QUARTER (+2)	0.002	0.001	0.002	0.001
	(0.436)	(0.407)	(0.450)	(0.408)
QUARTER (+3)	-0.004	-0.004	-0.004	-0.004
	(-1.081)	(-1.142)	(-1.118)	(-1.186)
QUARTER (+4)	0.000	0.000	0.000	-0.000
	(0.125)	(0.075)	(0.033)	(-0.001)
HT	-0.006**	-0.001	-0.007***	-0.001
	(-2.470)	(-0.392)	(-3.014)	(-0.568)
LEVEL	0.009***	0.013***	0.013***	0.013***
	(2.783)	(2.729)	(3.596)	(3.323)
SPONSOR	0.002	0.002	0.002	0.003
	(0.702)	(0.580)	(0.944)	(1.019)
LNSIZE	0.001*	0.002***	0.001**	0.002***
	(1.900)	(4.231)	(2.011)	(4.485)
DEBT	0.073***	0.078***	0.073***	0.077***
	(18.879)	(19.023)	(18.854)	(18.866)
Constant	-0.029***	0.009	0.023	0.020
	(-8.421)	(0.669)	(1.203)	(0.901)
Year-fixed effects	No	No	Yes	Yes
Country-fixed effects	No	Yes	No	Yes
Observations	19,348	19,348	19,348	19,348
Adj. R-squared	0.0194	0.0564	0.0320	0.0707
F	27.35***	16.94***	23.65***	18.11***

The dependent variable in all models is discretionary accruals as measured in equation 1. The dependent variables are the time-series earnings management variables (QUARTER) in quarter –4 to quarter +4 around the cross-listing. HT is the dummy variable for high-tech firms. LEVEL a dummy variable that has a value of 1 if the firm cross-listed via Level II, III and 144A programs, and zero otherwise. SPONSOR is a dummy variable that has the value 1 if the cross-listing firm was sponsored, and zero otherwise. LNSIZE is the natural logarithm of the firm size the quarter before the cross-listing. DEBT is the debt to total assets ratio in the quarter prior to the cross-listing. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 32: Cross Sectional Analysis of Abnormal Production Cost

Independent Variables	(1)	(2)	(3)	(4)
QUARTER (-4)	0.001	0.001	0.001	0.001
	(0.475)	(0.538)	(0.592)	(0.652)
QUARTER (-3)	-0.001	-0.001	-0.001	-0.001
	(-0.607)	(-0.512)	(-0.477)	(-0.399)
QUARTER (-2)	-0.004*	-0.004*	-0.003	-0.003
	(-1.695)	(-1.679)	(-1.517)	(-1.529)
QUARTER (-1)	-0.002	-0.002	-0.002	-0.002
	(-1.009)	(-1.011)	(-0.805)	(-0.852)
QUARTER (0)	0.004*	0.004*	0.004*	0.004*
	(1.711)	(1.725)	(1.695)	(1.702)
QUARTER (+1)	0.000	0.000	0.000	0.000
	(0.110)	(0.028)	(0.221)	(0.119)
QUARTER (+2)	-0.002	-0.002	-0.002	-0.002
	(-0.767)	(-0.833)	(-0.741)	(-0.829)
QUARTER (+3)	-0.001	-0.001	-0.001	-0.002
	(-0.590)	(-0.648)	(-0.598)	(-0.683)
QUARTER (+4)	-0.001	-0.001	-0.001	-0.002
	(-0.545)	(-0.633)	(-0.594)	(-0.703)
HT	-0.001	0.000	-0.001	0.001
	(-0.610)	(0.307)	(-0.826)	(0.556)
LEVEL	0.001	0.010***	0.004*	0.016***
	(0.446)	(3.467)	(1.672)	(5.276)
SPONSOR	0.003**	0.003*	0.007***	0.008***
	(1.973)	(1.854)	(3.991)	(4.070)
LNSIZE	0.002***	0.003***	0.002***	0.003***
	(7.793)	(10.251)	(6.609)	(8.716)
DEBT	0.018***	0.024***	0.018***	0.026***
	(6.981)	(8.920)	(7.287)	(9.432)
Constant	-0.029***	-0.048***	-0.047***	-0.061***
	(-13.214)	(-6.155)	(-4.556)	(-4.925)
Year-fixed effects	No	No	Yes	Yes
Country-fixed effects	No	Yes	No	Yes
Observations	17,804	17,804	17,804	17,804
Adj. R-squared	0.00705	0.0477	0.0148	0.0543
F	9.03***	13.07***	10.30***	12.71***

The dependent variable in all models is abnormal production cost as measured in equation 2. The dependent variables are the time-series earnings management variables (QUARTER) in quarter –4 to quarter +4 around the cross-listing. HT is the dummy variable for high-tech firms. LEVEL a dummy variable that has a value of 1 if the firm cross-listed via Level II, III and 144A programs, and zero otherwise. SPONSOR is a dummy variable that has the value 1 if the cross-listing firm was sponsored, and zero otherwise. LNSIZE is the natural logarithm of the firm size the quarter before the cross-listing. DEBT is the debt to total assets ratio in the quarter prior to the cross-listing. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 33: Cross Sectional Analysis of Abnormal Discretionary Expenses

Independent Variables	(1)	(2)	(3)	(4)
QUARTER (-4)	0.149	0.147	0.303	0.263
	(0.290)	(0.289)	(0.592)	(0.518)
QUARTER (-3)	-0.208	-0.184	-0.051	-0.071
	(-0.412)	(-0.367)	(-0.102)	(-0.142)
QUARTER (-2)	-0.552	-0.488	-0.446	-0.411
	(-1.111)	(-0.992)	(-0.900)	(-0.836)
QUARTER (-1)	-0.096	-0.072	-0.033	-0.003
	(-0.195)	(-0.149)	(-0.067)	(-0.006)
QUARTER (0)	1.397***	1.426***	1.440***	1.481***
	(4.802)	(4.909)	(4.909)	(5.022)
QUARTER (+1)	-0.364	-0.301	-0.343	-0.275
	(-0.737)	(-0.615)	(-0.699)	(-0.562)
QUARTER (+2)	-0.389	-0.329	-0.397	-0.328
	(-0.778)	(-0.663)	(-0.797)	(-0.662)
QUARTER (+3)	-0.179	-0.114	-0.224	-0.145
	(-0.353)	(-0.227)	(-0.442)	(-0.289)
QUARTER (+4)	-0.123	-0.045	-0.217	-0.119
	(-0.237)	(-0.087)	(-0.419)	(-0.231)
HT	-0.125	-0.145	-0.217	-0.190
	(-0.387)	(-0.418)	(-0.670)	(-0.543)
LEVEL	1.374***	1.414**	1.085**	1.268*
	(3.032)	(2.267)	(2.249)	(1.907)
SPONSOR	0.498	0.190	0.009	0.042
	(1.502)	(0.502)	(0.025)	(0.106)
LNSIZE	0.115**	0.055	0.119**	0.044
	(2.363)	(0.795)	(2.407)	(0.627)
DEBT	-0.012	-0.017	-0.003	-0.014
	(-0.116)	(-0.171)	(-0.032)	(-0.141)
Constant	-1.229***	-1.679	-1.536	-0.696
	(-2.666)	(-0.937)	(-0.654)	(-0.241)
Year-fixed effects	No	No	Yes	Yes
Country-fixed effects	No	Yes	No	Yes
Observations	18,727	18,727	18,727	18,727
Adj. R-squared	0.00365	0.0267	0.0150	0.0304
F	4.890***	7.531***	10.550***	7.216***

The dependent variable in all models is abnormal production cost as measured in equation 3. The dependent variables are the time-series earnings management variables (QUARTER) in quarter –4 to quarter +4 around the cross-listing. HT is the dummy variable for high-tech firms. LEVEL a dummy variable that has a value of 1 if the firm cross-listed via Level II, III and 144A programs, and zero otherwise. SPONSOR is a dummy variable that has the value 1 if the cross-listing firm was sponsored, and zero otherwise. LNSIZE is the natural logarithm of the firm size the quarter before the cross-listing. DEBT is the debt to total assets ratio in the quarter prior to the cross-listing. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 34: Cross Sectional Analysis of Total Real Management

Independent Variables	(1)	(2)	(3)	(4)
QUARTER (-4)	-0.013	-0.003	0.272	0.231
	(-0.020)	(-0.006)	(0.431)	(0.367)
QUARTER (-3)	-0.282	-0.251	0.005	-0.024
	(-0.450)	(-0.403)	(0.007)	(-0.039)
QUARTER (-2)	-0.379	-0.303	-0.147	-0.121
	(-0.616)	(-0.496)	(-0.241)	(-0.199)
QUARTER (-1)	0.143	0.178	0.320	0.345
	(0.236)	(0.296)	(0.530)	(0.574)
QUARTER (0)	1.912***	1.927***	2.041***	2.062***
	(4.696)	(4.758)	(4.928)	(4.984)
QUARTER (+1)	-0.166	-0.097	-0.076	-0.010
	(-0.274)	(-0.161)	(-0.125)	(-0.017)
QUARTER (+2)	-0.190	-0.121	-0.158	-0.090
	(-0.310)	(-0.199)	(-0.258)	(-0.148)
QUARTER (+3)	0.033	0.105	-0.033	0.045
	(0.053)	(0.169)	(-0.053)	(0.072)
QUARTER (+4)	0.094	0.181	-0.076	0.026
	(0.148)	(0.286)	(-0.120)	(0.042)
HT	0.194	0.219	0.327	0.278
	(0.488)	(0.510)	(0.821)	(0.642)
LEVEL	1.017*	1.322*	0.355	0.822
	(1.799)	(1.711)	(0.587)	(0.981)
SPONSOR	0.835**	0.943*	0.927*	0.912**
	(1.961)	(1.947)	(1.919)	(1.986)
LNSIZE	0.310***	0.307***	0.312***	0.286***
	(4.875)	(3.480)	(4.850)	(3.177)
DEBT	-0.791	-1.257*	-0.747	-1.192
	(-1.148)	(-1.690)	(-1.086)	(-1.596)
Constant	-3.232***	-4.466**	-3.277	-2.737
	(-5.386)	(-2.082)	(-1.186)	(-0.800)
Year-fixed effects	No	No	Yes	Yes
Country-fixed effects	No	Yes	No	Yes
Observations	17,014	17,014	17,014	17,014
Adj. R-squared	0.00478	0.0240	0.0169	0.0292
F	5.834***	6.130***	11.260***	6.371***

The dependent variable in all models is total real management as measured by summing abnormal production cost and abnormal discretionary expense scores. The dependent variables are the time-series earnings management variables (QUARTER) in quarter –4 to quarter +4 around the cross-listing. HT is the dummy variable for high-tech firms. LEVEL a dummy variable that has a value of 1 if the firm cross-listed via Level II, III and 144A programs, and zero otherwise. SPONSOR is a dummy variable that has the value 1 if the cross-listing firm was sponsored, and zero otherwise. LNSIZE is the natural logarithm of the firm size the quarter before the cross-listing. DEBT is the debt to total assets ratio in the quarter prior to the cross-listing. t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 35: Fixed Effects Panel Regression

Independent Variables	Discretionary Accruals	Abnormal Production Cost	Abnormal Discretionary Expenditures	Total Real Earnings Management
QUARTER (-4)	0.005*	0.002	0.047	-0.049
	(1.858)	(1.069)	(0.092)	(-0.082)
QUARTER (-3)	0.002	-0.001	-0.143	-0.104
	(0.996)	(-0.428)	(-0.281)	(-0.175)
QUARTER (-2)	0.002	-0.003*	-0.407	-0.119
	(1.027)	(-1.818)	(-0.816)	(-0.203)
QUARTER (-1)	0.002	-0.002	0.078	0.421
	(1.006)	(-1.002)	(0.159)	(0.729)
QUARTER (0)	0.010***	0.004***	1.754***	2.390***
	(4.055)	(2.616)	(5.493)	(5.740)
QUARTER (+1)	0.000	0.001	0.007	0.342
	(0.162)	(0.419)	(0.015)	(0.593)
QUARTER (+2)	0.000	-0.002	-0.028	0.283
	(0.036)	(-0.962)	(-0.055)	(0.484)
QUARTER (+3)	-0.005**	-0.002	0.176	0.510
	(-2.113)	(-1.118)	(0.346)	(0.859)
QUARTER (+4)	-0.001	-0.001	0.274	0.393
	(-0.572)	(-0.910)	(0.525)	(0.650)
LNSIZE	0.007***	0.002***	2.212***	2.418***
	(6.136)	(3.058)	(9.154)	(8.391)
DEBT	0.007	0.021***	-0.103	-2.437
	(1.244)	(4.666)	(-0.964)	(-1.462)
Constant	-0.079***	-0.033***	8.053***	10.232***
	(-8.113)	(-5.073)	(9.092)	(8.249)
Observations	19,348	17,804	18,727	17,014
Number of Firms	1,179	1,086	1,166	1,071
Adj. R-squared	0.00365	0.00285	0.00651	0.00652
F	6.042***	4.344***	10.450***	9.503***

The dependent variables are as described in the table. The independent variables are the time-series earnings management variables (QUARTER) in quarter –4 to quarter +4 around the cross-listing. HT is the dummy variable for high-tech firms. LEVEL a dummy variable that has a value of 1 if the firm cross-listed via Level II, III and 144A programs, and zero otherwise. SPONSOR is a dummy variable that has the value 1 if the cross-listing firm was sponsored, and zero otherwise. LNSIZE is the natural logarithm of the firm size the quarter before the cross-listing. DEBT is the debt to total assets ratio in the quarter prior to the cross-listing. t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 6: Discretionary Accruals Around Cross-listing Events

[Horizontal Axis represents quarters relative to cross-listing date with 0 being the quarter of the cross-listing; Vertical axis represents score for earnings management.]

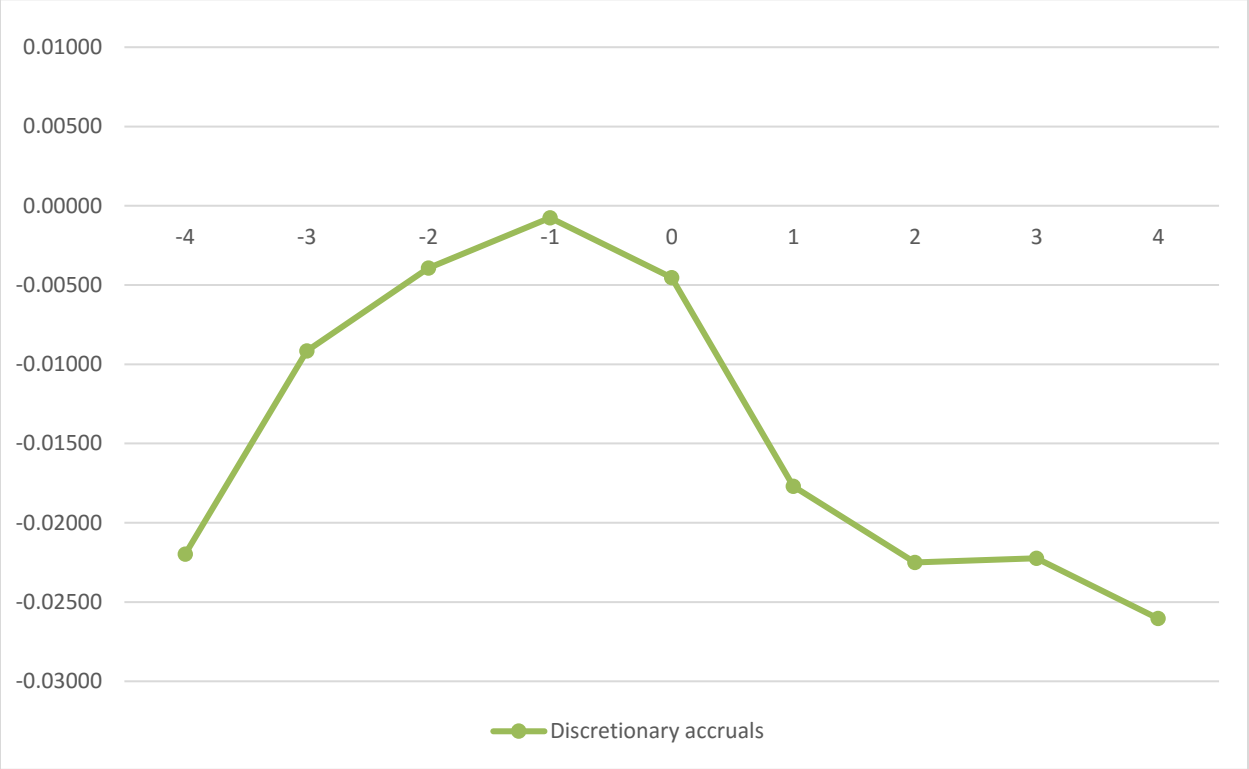

Figure 7: Abnormal Production Costs Around Cross-listing Events

[Horizontal Axis represents quarters relative to cross-listing date with 0 being the quarter of the cross-listing; Vertical axis represents score for earnings management.]

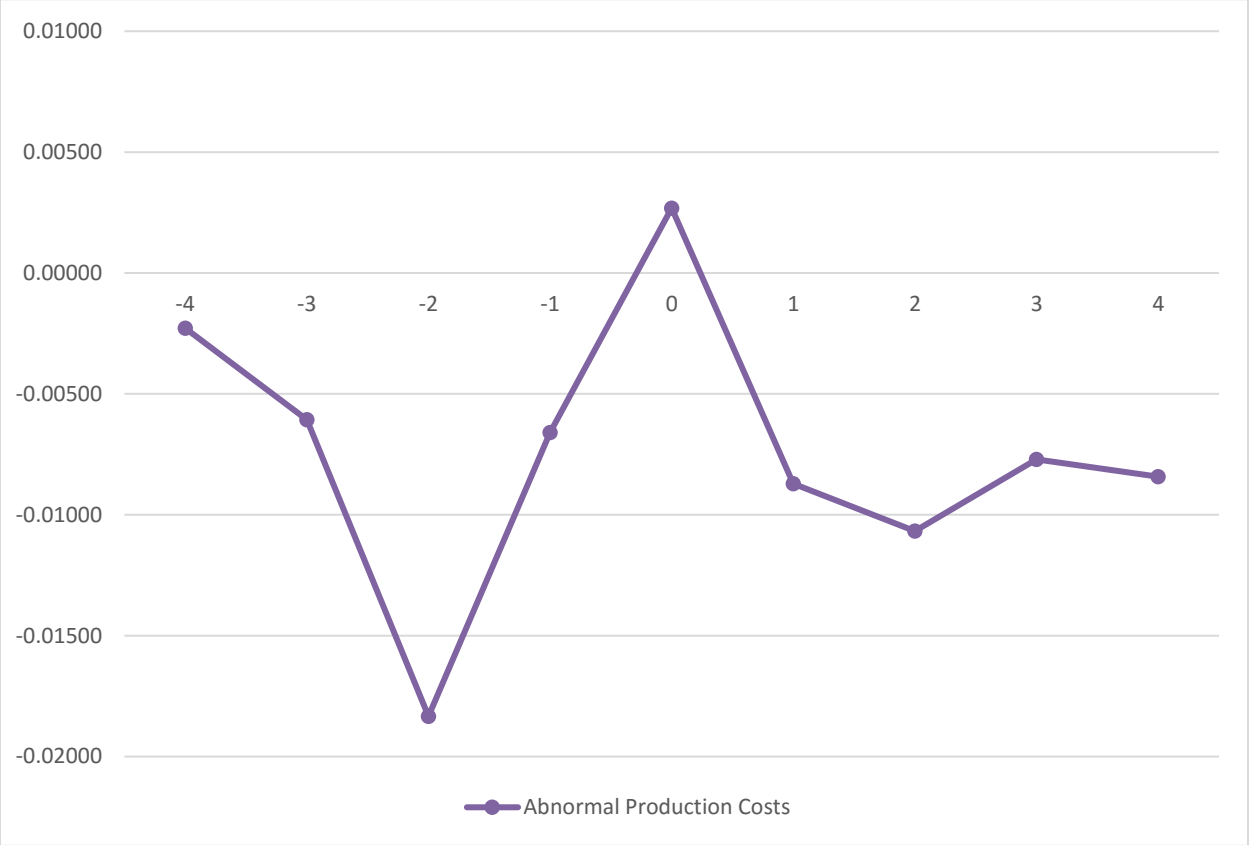

Figure 8: Abnormal Discretionary Expense Around Cross-listing Events

[Horizontal Axis represents quarters relative to cross-listing date with 0 being the quarter of the cross-listing; Vertical axis represents score for earnings management.]

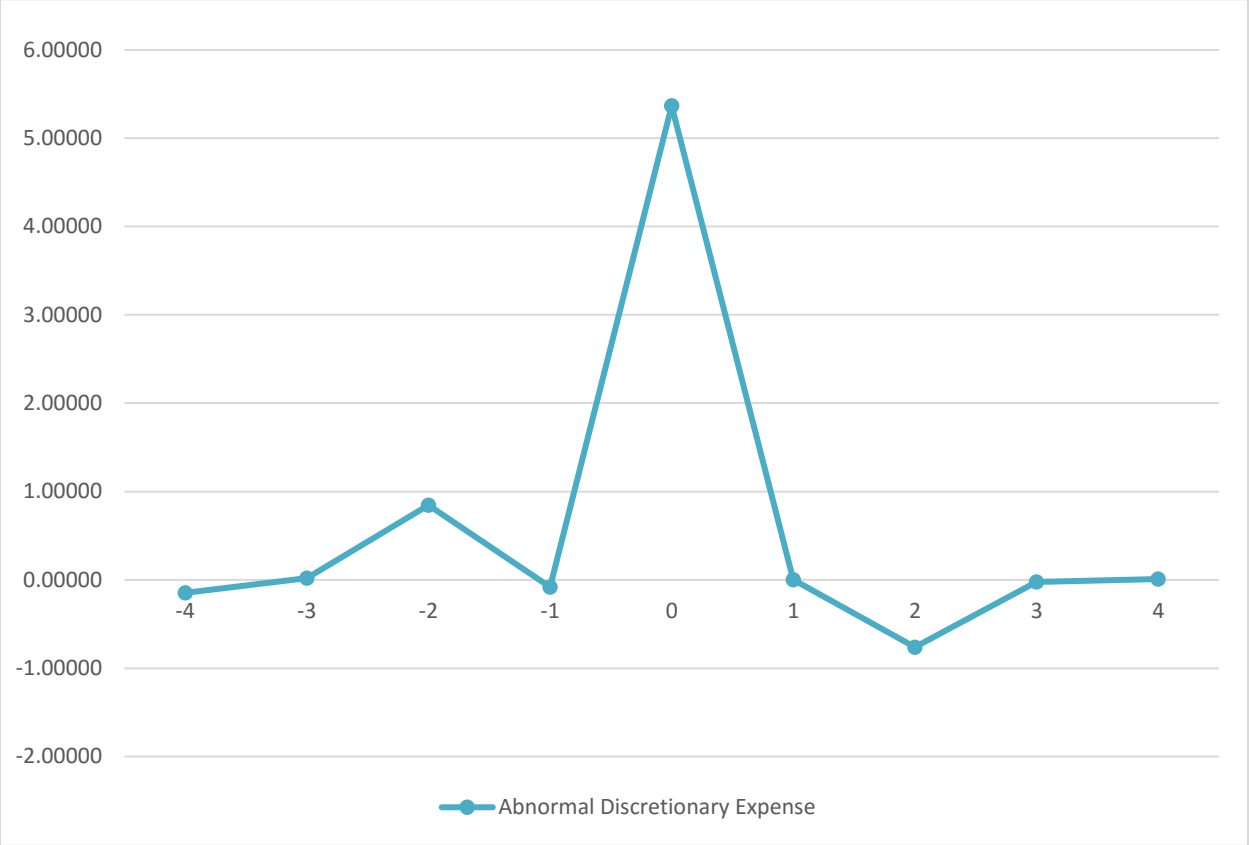

Figure 9: Total Real Earnings Management Around Cross-listing Events

[Horizontal Axis represents quarters relative to cross-listing date with 0 being the quarter of the cross-listing; Vertical axis represents score for earnings management.]

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APPENDIX

APPENDIX

Table 36: Sample Distribution by Industry

Industry Code	*Number*	*Percent*	***Industry Code***	*Number*	*Percent*
AERO	7	0.52	LABEQ	2	0.15
AGRIC	10	0.74	MACH	43	3.19
AUTOS	27	2.00	MEALS	27	2.00
BEER	17	1.26	MEDEQ	23	1.70
BLDMT	35	2.59	MINES	50	3.71
BOOKS	18	1.33	OIL	93	6.89
BOXES	3	0.22	OTHER	40	2.97
BUSSV	90	6.67	PAPER	16	1.19
CHEM	39	2.89	PERSV	2	0.15
CHIPS	55	4.08	RTAIL	97	7.19
CLTHS	30	2.22	RUBBR	7	0.52
CNSTR	49	3.63	SHIPS	4	0.30
COAL	16	1.19	SMOKE	1	0.07
COMPS	17	1.26	SODA	3	0.22
DRUGS	69	5.11	STEEL	46	3.41
ELCEQ	16	1.19	TELCM	59	4.37
FOOD	44	3.26	TOYS	5	0.37
FUN	17	1.26	TRANS	80	5.93
GOLD	12	0.89	TXTLS	11	0.82
HLTH	12	0.89	UTIL	93	6.89
HSHLD	28	2.08	WHLSL	34	2.52
INSUR	2	0.15			

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank. The Industry codes are according to the Fama-French industry classification.

Table 37: Sample Distribution by Home Country and Exchange

Exchange Code	*Number*	*Percent*	***Exchange Code***	*Number*	*Percent*
BVMF	56	4.15	XKAR	5	0.37
DIFX	3	0.22	XKAZ	2	0.15
MISX	14	1.04	XKLS	2	0.15
MTAA	38	2.82	XKOS	1	0.07
ROCO	7	0.52	XKRX	3	0.22
RTSX	64	4.74	XLIM	2	0.15
SPAD	3	0.22	XLIS	12	0.89
WBAH	9	0.67	XLON	174	12.90
XAMS	10	0.74	XLUX	2	0.15
XASX	142	10.53	XMCE	23	1.71
XATH	9	0.67	XMEX	13	0.96
XBAH	2	0.15	XMUN	1	0.07
XBOG	6	0.44	XNSE	32	2.37
XBOM	11	0.82	XNZE	29	2.15
XBRU	17	1.26	XOSL	25	1.85
XBUD	1	0.07	XPAR	54	4.00
XBUE	7	0.52	XPHS	18	1.33
XCAI	9	0.67	XPLU	1	0.07
XCAR	1	0.07	XSES	53	3.93
XCSE	16	1.19	XSGO	9	0.67
XDUB	8	0.59	XSTC	1	0.07
XETR	63	4.67	XSTO	30	2.22
XFRA	1	0.07	XSWX	17	1.26
XHEL	18	1.33	XTAE	13	0.96
XHKG	179	13.27	XTAI	14	1.04
XICE	1	0.07	XVTX	11	0.82
XIDX	35	2.59	XWAR	18	1.33
XIST	20	1.48	XZAG	4	0.30
XJSE	30	2.22			

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 38: Sample Distribution by Region

Region	*Number*	*Percent*
Developed Asia	311	23.05
Developed Europe	532	39.44
Emerging Asia	220	16.31
Emerging Europe	128	9.49
Latin America	97	7.19
Middle East / Africa	61	4.52

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 39: Sample Distribution by Home Country and Level

Country	*Level*						***Country***	*Level*					
	Level I	*Level II*	*Level III*	*144A*	*Reg S*	*Total*		*Level I*	*Level II*	*Level III*	*144A*	*Reg S*	*Total*
Argentina	2	1	1	2	2	8	Kazakhstan	0	0	0	1	1	2
Australia	139	3	0	0	0	142	Luxembourg	4	0	0	0	0	4
Austria	9	0	0	0	0	9	Macau	1	0	0	0	0	1
Bahrain	0	0	0	1	1	2	Malaysia	2	0	0	0	0	2
Belgium	17	1	0	1	0	19	Mexico	6	2	2	2	1	13
Bermuda	2	0	0	0	0	2	Netherlands	11	0	0	0	0	11
Brazil	26	2	4	13	11	56	New Zealand	29	0	0	0	0	29
Chile	2	1	1	3	2	9	Norway	21	0	0	0	0	21
China	88	0	1	0	0	89	Pakistan	1	0	0	2	2	5
Colombia	2	0	0	2	2	6	Peru	1	0	1	0	0	2
Croatia	0	0	0	2	2	4	Philippines	18	0	0	0	0	18
Cyprus	1	0	0	0	0	1	Poland	16	0	0	0	0	16
Czech Republic	1	0	0	1	1	3	Portugal	11	0	0	0	0	11
Denmark	16	0	0	0	0	16	Russia	3	0	2	33	42	80
Egypt	3	0	0	3	3	9	Singapore	42	0	0	0	0	42
Finland	18	0	0	0	0	18	South Africa	31	0	0	0	0	31
France	53	0	0	0	0	53	South Korea	0	0	0	1	2	3
Germany	63	1	0	0	0	64	Spain	23	1	0	0	0	24
Greece	9	0	0	0	0	9	Sweden	31	0	0	0	0	31
Hong Kong	97	1	1	0	0	99	Switzerland	29	0	0	0	0	29
Hungary	1	0	0	0	0	1	Taiwan	0	0	0	10	11	21
Iceland	1	0	0	0	0	1	Thailand	0	0	0	0	0	1
India	0	0	2	6	35	43	Turkey	1	0	0	1	1	20
Indonesia	33	0	0	1	1	35	Ukraine	18	0	0	1	1	2
Ireland	9	0	0	0	0	9	United Arab Emirates	2	0	0	1	2	5
Israel	10	1	0	1	1	13	United Kingdom	158	2	1	0	1	162
Italy	38	0	0	1	0	39	Venezuela	1	0	0	0	0	1
Jersey	2	0	0	0	0	2	Vietnam	0	0	0	0	1	1

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 40: Sample Distribution by Year of Listing and Level

Year of Listing	*Level*					
	Level I	*Level II*	*Level III*	*144A*	*Reg S*	*Total*
2000	2	0	1	1	1	5
2001	2	0	0	0	0	2
2002	5	1	0	0	1	7
2003	0	0	0	1	2	3
2004	12	1	3	5	5	26
2005	21	4	1	16	19	61
2006	12	0	3	15	18	48
2007	27	0	4	16	23	70
2008	436	2	1	17	18	474
2009	140	2	0	7	12	161
2010	111	3	0	2	13	129
2011	144	1	0	6	10	161
2012	162	2	2	3	3	172
2013	28	0	1	0	1	30
Total	1,102	16	16	89	126	1,349

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 41: Sample Distribution by Industry and Level

Industry Code	*Level*						***Industry Code***	*Level*					
	Level I	*Level II*	*Level III*	*144A*	*Reg S*	*Total*		*Level I*	*Level II*	*Level III*	*144A*	*Reg S*	*Total*
AERO	6	0	0	0	1	7	LABEQ	2	0	0	0	0	2
AGRIC	6	1	0	1	2	10	MACH	41	1	0	0	1	43
AUTOS	25	0	0	0	2	27	MEALS	26	0	0	0	1	27
BEER	13	1	0	1	2	17	MEDEQ	21	0	0	1	1	23
BLDMT	30	0	1	2	2	35	MINES	46	1	0	2	1	50
BOOKS	16	0	0	1	1	18	OIL	71	3	0	8	11	93
BOXES	3	0	0	0	0	3	OTHER	33	0	0	3	4	40
BUSSV	82	0	1	2	5	90	PAPER	15	0	0	0	1	16
CHEM	31	0	0	3	5	39	PERSV	2	0	0	0	0	2
CHIPS	35	2	1	8	9	55	RTAIL	82	1	1	6	7	97
CLTHS	27	0	0	1	2	30	RUBBR	5	0	0	0	2	7
CNSTR	41	0	1	4	3	49	SHIPS	4	0	0	0	0	4
COAL	16	0	0	0	0	16	SMOKE	1	0	0	0	0	1
COMPS	15	0	0	0	2	17	SODA	3	0	0	0	0	3
DRUGS	56	3	1	3	6	69	STEEL	26	0	2	7	11	46
ELCEQ	14	0	0	0	2	16	TELCM	40	3	2	7	7	59
FOOD	39	0	0	3	2	44	TOYS	3	0	0	1	1	5
FUN	15	0	1	0	1	17	TRANS	69	0	3	4	4	80
GOLD	12	0	0	0	0	12	TXTLS	5	0	0	0	6	11
HLTH	11	0	0	1	0	12	UTIL	55	0	2	17	19	93
HSHLD	23	0	0	3	2	28	WHLSL	34	0	0	0	0	34
INSUR	2	0	0	0	0	2							

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank. The Industry codes are according to the Fama-French industry classification

Table 42: Sample Distribution By Home Country and Sponsorship

Country	*Sponsorship*			*Country*	*Sponsorship*		
	S	*U*	*Total*		*S*	*U*	*Total*
Argentina	8	0	8	Kazakhstan	2	0	2
Australia	70	72	142	Luxembourg	0	4	4
Austria	3	6	9	Macau	0	1	1
Bahrain	2	0	2	Malaysia	2	0	2
Belgium	4	15	19	Mexico	10	3	13
Bermuda	0	2	2	Netherlands	3	8	11
Brazil	54	2	56	New Zealand	2	27	29
Chile	9	0	9	Norway	3	18	21
China	9	80	89	Pakistan	4	1	5
Colombia	6	0	6	Peru	1	1	2
Croatia	4	0	4	Philippines	1	17	18
Cyprus	0	1	1	Poland	1	15	16
Czech Republic	2	1	3	Portugal	1	10	11
Denmark	2	14	16	Russia	77	3	80
Egypt	9	0	9	Singapore	2	40	42
Finland	0	18	18	South Africa	14	17	31
France	10	43	53	South Korea	3	0	3
Germany	16	48	64	Spain	5	19	24
Greece	0	9	9	Sweden	2	29	31
Hong Kong	10	89	99	Switzerland	1	28	29
Hungary	0	1	1	Taiwan	21	0	21
Iceland	1	0	1	Thailand	0	1	1
India	43	0	43	Turkey	2	18	20
Indonesia	2	33	35	Ukraine	2	0	2
Ireland	0	9	9	United Arab Emirates	3	2	5
Israel	5	8	13	United Kingdom	34	128	162
Italy	3	36	39	Venezuela	1	0	1
Jersey	0	2	2	Vietnam	1	0	1

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 43: Sample Distribution by Year of Listing and Sponsorship

Year of Listing	*Sponsorship*				*Total*
	Sponsored		*Unsponsored*		
	Number	*Percent*	*Number*	*Percent*	*Number*
2000	3	60	2	40	5
2001	2	100	0	0	2
2002	7	100	0	0	7
2003	2	67	1	33	3
2004	25	96	1	4	26
2005	61	100	0	0	61
2006	45	94	3	6	48
2007	60	86	10	14	70
2008	62	13	412	87	474
2009	55	34	106	66	161
2010	54	42	75	58	129
2011	50	31	111	69	161
2012	36	21	136	79	172
2013	8	27	22	73	30
Total	470	62	879	38	1,349

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 44: Sample Distribution by Industry and Sponsorship

Industry Code	*Sponsorship*			*Industry Code*	*Sponsorship*		
	Sponsored	*Unsponsored*	*Total*		*Sponsored*	*Unsponsored*	*Total*
AERO	1	6	7	LABEQ	0	2	2
AGRIC	6	4	10	MACH	10	34	44
AUTOS	6	21	27	MEALS	3	24	27
BEER	7	10	17	MEDEQ	7	16	23
BLDMT	10	25	35	MINES	24	26	50
BOOKS	3	15	18	OIL	36	57	93
BOXES	0	3	3	OTHER	11	29	40
BUSSV	29	61	90	PAPER	3	13	16
CHEM	15	24	39	PERSV	2	0	2
CHIPS	28	27	55	RTAIL	25	72	97
CLTHS	7	23	30	RUBBR	2	5	7
CNSTR	13	36	49	SHIPS	1	3	4
COAL	1	15	16	SMOKE	0	1	1
COMPS	7	10	17	SODA	1	2	3
DRUGS	43	26	69	STEEL	22	24	46
ELCEQ	5	11	16	TELCM	23	36	59
FOOD	11	33	44	TOYS	3	2	5
FUN	5	12	17	TRANS	18	62	80
GOLD	5	7	12	TXTLS	7	4	11
HLTH	6	6	12	UTIL	52	41	93
HSHLD	10	18	28	WHLSL	3	31	34
INSUR	0	2	2				

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank. The Industry codes are according to the Fama-French industry classification.

Table 45: Sample Distribution by Year of Listing and Region

Year of Listing	***Region***													
	Developed Europe		*Emerging Europe*		*Developed Asia*		*Emerging Asia*		*Latin America*		*Middle East/ Africa*		*Total*	
	#	*%*	*#*	*%*	*#*	*%*	*#*	*%*	*#*	*%*	*#*	*%*	*#*	*%*
2000	0	0.00	3	0.22	0	0.00	0	0.00	2	0.15	0	0.00	5	0.37
2001	1	0.07	0	0.00	1	0.07	0	0.00	0	0.00	0	0.00	2	0.15
2002	1	0.07	0	0.00	4	0.30	0	0.00	0	0.00	2	0.15	7	0.52
2003	0	0.00	1	0.07	0	0.00	1	0.07	0	0.00	1	0.07	3	0.22
2004	3	0.22	4	0.30	8	0.59	2	0.15	7	0.52	2	0.15	26	1.93
2005	11	0.82	11	0.82	10	0.74	14	1.04	9	0.67	6	0.44	61	4.52
2006	7	0.52	17	1.26	3	0.22	6	0.44	13	0.96	2	0.15	48	3.56
2007	14	1.04	17	1.26	8	0.59	8	0.59	22	1.63	1	0.07	70	5.19
2008	246	18.24	40	2.97	127	9.41	34	2.52	9	0.67	18	1.33	474	35.14
2009	51	3.78	18	1.33	24	1.78	51	3.78	8	0.59	9	0.67	161	11.93
2010	47	3.48	4	0.30	35	2.59	29	2.15	9	0.67	5	0.37	129	9.56
2011	71	5.26	5	0.37	40	2.97	27	2.00	11	0.82	7	0.52	161	11.93
2012	63	4.67	7	0.52	46	3.41	44	3.26	7	0.52	5	0.37	172	12.75
2013	17	1.26	1	0.07	5	0.37	4	0.30	0	0.00	3	0.22	30	2.22
Total	**532**	**39.44**	**128**	**9.49**	**311**	**23.05**	**220**	**16.31**	**97**	**7.19**	**61**	**4.52**	**1,349**	**100.00**

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 46: Sample Distribution by Country and Number of Depositary Banks

Country	*Number of Depositary Banks*					*Country*	*Number of Depositary Banks*				
	1	*2*	*3*	*4+*	*Total*		*1*	*2*	*3*	*4+*	*Total*
Argentina	8	0	0	0	8	Kazakhstan	2	0	0	0	2
Australia	107	15	12	8	142	Luxembourg	3	0	1	0	4
Austria	6	2	1	0	9	Macau	0	1	0	0	1
Bahrain	2	0	0	0	2	Malaysia	2	0	0	0	2
Belgium	10	6	2	1	19	Mexico	13	0	0	0	13
Bermuda	0	2	0	0	2	Netherlands	5	0	4	2	11
Brazil	56	0	0	0	56	New Zealand	26	3	0	0	29
Chile	9	0	0	0	9	Norway	14	6	0	1	21
China	32	30	19	8	89	Pakistan	5	0	0	0	5
Colombia	6	0	0	0	6	Peru	2	0	0	0	2
Croatia	4	0	0	0	4	Philippines	15	3	0	0	18
Cyprus	0	1	0	0	1	Poland	14	2	0	0	16
Czech Republic	3	0	0	0	3	Portugal	8	2	1	0	11
Denmark	5	5	3	3	16	Russia	80	0	0	0	80
Egypt	9	0	0	0	9	Singapore	11	24	6	1	42
Finland	9	4	3	2	18	South Africa	22	1	3	5	31
France	19	14	11	9	53	South Korea	3	0	0	0	3
Germany	39	9	8	8	64	Spain	11	7	3	3	24
Greece	6	2	1	0	9	Sweden	17	7	4	3	31
Hong Kong	40	27	26	6	99	Switzerland	13	2	7	7	29
Hungary	1	0	0	0	1	Taiwan	21	0	0	0	21
Iceland	1	0	0	0	1	Thailand	1	0	0	0	1
India	43	0	0	0	43	Turkey	10	7	3	0	20
Indonesia	22	6	7	0	35	Ukraine	2	0	0	0	2
Ireland	8	1	0	0	9	United Arab Emirates	4	1	0	0	5
Israel	12	1	0	0	13	United Kingdom	93	32	24	13	162
Italy	22	10	2	5	39	Venezuela	1	0	0	0	1
Jersey	2	0	0	0	2	Vietnam	1	0	0	0	1

Notes:

Table 47: Sample Distribution by Region and Number of Depositary Banks

Region	***Number of Depositary Banks***				
	1	*2*	*3*	*4+*	*Total*
Developed Europe	291	109	75	57	532
Emerging Europe	116	9	3	0	128
Developed Asia	183	69	44	15	311
Emerging Asia	146	40	26	8	220
Latina America	95	2	0	0	97
Middle East / Africa	49	4	3	5	61
Total	880	233	151	85	1,349

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

Table 48: Sample Distribution by Industry and Number of Depositary Banks

Industry Code	*Number of Depositary Banks*					*Industry Code*	*Number of Depositary Banks*				
	1	*2*	*3*	*4+*	*Total*		*1*	*2*	*3*	*4+*	*Total*
AERO	1	0	2	4	7	LABEQ	2	0	0	0	2
AGRIC	9	0	1	0	10	MACH	19	10	11	3	43
AUTOS	15	3	4	5	27	MEALS	17	5	5	0	27
BEER	10	4	1	2	17	MEDEQ	11	3	4	5	23
BLDMT	21	8	3	3	35	MINES	36	8	5	1	50
BOOKS	10	5	3	0	18	OIL	67	16	5	5	93
BOXES	3	0	0	0	3	OTHER	22	11	5	2	40
BUSSV	60	16	7	7	90	PAPER	9	5	2	0	16
CHEM	31	3	2	3	39	PERSV	2	0	0	0	2
CHIPS	40	9	4	2	55	RTAIL	61	15	15	6	97
CLTHS	14	6	6	4	30	RUBBR	4	3	0	0	7
CNSTR	30	11	7	1	49	SHIPS	3	1	0	0	4
COAL	8	3	4	1	16	SMOKE	0	1	0	0	1
COMPS	13	2	1	1	17	SODA	2	1	0	0	3
DRUGS	57	5	5	2	69	STEEL	34	8	3	1	46
ELCEQ	8	3	2	3	16	TELCM	40	9	6	4	59
FOOD	24	8	8	4	44	TOYS	4	1	0	0	5
FUN	10	5	2	0	17	TRANS	44	23	9	4	80
GOLD	10	1	1	0	12	TXTLS	11	0	0	0	11
HLTH	8	3	1	0	12	UTIL	71	6	9	7	93
HSHLD	18	2	6	2	28	WHLSL	19	10	2	3	34
INSUR	2	0	0	0	2						

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank. The Industry codes are according to the Fama-French industry classification

Table 49: Sample Distribution by Year of Listing and Ratio

Year of Listing	*Ratio*				*Total*
	>=1	*Percent*	*<1*	*Percent*	
2000	1	20	4	80	5
2001	0	0	2	100	2
2002	2	29	5	71	7
2003	2	67	1	33	3
2004	11	42	15	58	26
2005	25	41	36	59	61
2006	26	54	22	46	48
2007	27	39	43	61	70
2008	200	42	274	58	474
2009	48	30	113	70	161
2010	45	35	84	65	129
2011	52	32	109	68	161
2012	48	28	124	72	172
2013	15	50	15	50	30
Total	502	36	847	64	1,349

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank. The ratio is the number of underlying shares per depositary receipt. >=1 means that there is one or a fraction of one underlying share per depositary receipt. <1 means that there are more than 1 underlying share per depositary receipt.

Table 50: Sample Distribution by Country and Ratio

Country	*Ratio*				*Country*	*Ratio*			
	>=1	*Percent*	*<1*	*Percent*		*>=1*	*Percent*	*<1*	*Percent*
Argentina	0	0.00	8	100.00	Kazakhstan	2	100.00	0	0.00
Australia	21	14.79	121	85.21	Luxembourg	3	75.00	1	25.00
Austria	9	100.00	0	0.00	Macau	0	0.00	1	100.00
Bahrain	0	0.00	2	100.00	Malaysia	0	0.00	2	100.00
Belgium	17	89.47	2	10.53	Mexico	0	0.00	13	100.00
Bermuda	0	0.00	2	100.00	Netherlands	10	90.91	1	9.09
Brazil	34	60.71	22	39.29	New Zealand	0	0.00	29	100.00
Chile	0	0.00	9	100.00	Norway	12	57.14	9	42.86
China	2	2.25	87	97.75	Pakistan	0	0.00	5	100.00
Colombia	5	83.33	1	16.67	Peru	1	50.00	1	50.00
Croatia	4	100.00	0	0.00	Philippines	0	0.00	18	100.00
Cyprus	1	100.00	0	0.00	Poland	7	43.75	9	56.25
Czech Republic	2	66.67	1	33.33	Portugal	3	27.27	8	72.73
Denmark	15	93.75	1	6.25	Russia	25	31.25	55	68.75
Egypt	6	66.67	3	33.33	Singapore	0	0.00	42	100.00
Finland	17	94.44	1	5.56	South Africa	16	51.61	15	48.39
France	49	92.45	4	7.55	South Korea	3	100.00	0	0.00
Germany	60	93.75	4	6.25	Spain	15	62.50	9	37.50
Greece	8	88.89	1	11.11	Sweden	22	70.97	9	29.03
Hong Kong	1	1.01	98	98.99	Switzerland	27	93.10	2	6.90
Hungary	1	100.00	0	0.00	Taiwan	5	23.81	16	76.19
Iceland	1	100.00	0	0.00	Thailand	0	0.00	1	100.00
India	16	37.21	27	62.79	Turkey	3	15.00	17	85.00
Indonesia	0	0.00	35	100.00	Ukraine	2	100.00	0	0.00
Ireland	3	33.33	6	66.67	United Arab Emirates	1	20.00	4	80.00
Israel	8	61.54	5	38.46	United Kingdom	45	27.78	117	72.22
Italy	19	48.72	20	51.28	Venezuela	0	0.00	1	100.00
Jersey	0	0.00	2	100.00	Vietnam	1	100.00	0	0.00

Notes: Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank.

The ratio is the number of underlying shares per depositary receipt. >=1 means that there is one or a fraction of one underlying share per depositary receipt. <1 means that there are more than 1 underlying share per depositary receipt.

Table 51: Sample Distribution by Region and Ratio

Region	***Ratio***					
	>=1	*Percent*	*<1*	*Percent*	*Total*	*Percent*
Developed Europe	334	24.76	198	14.68	532	39.44
Emerging Europe	46	3.41	82	6.08	128	9.49
Developed Asia	22	1.63	289	21.42	311	23.05
Emerging Asia	28	2.08	192	14.23	220	16.31
Latina America	40	2.97	57	4.23	97	7.19
Middle East / Africa	32	2.37	29	2.15	61	4.52
Total	**502**	**37.21**	**847**	**62.79**	**1,349**	**100.00**

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank. The ratio is the number of underlying shares per depositary receipt. >=1 means that there is one or a fraction of one underlying share per depositary receipt. <1 means that there are more than 1 underlying share per depositary receipt.

Table 52: Sample Distribution by Industry and Ratio

Industry Code	*Ratio*					*Industry Code*	*Ratio*				
	>=1	*Percent*	*<1*	*Percent*	*Total*		*>=1*	*Percent*	*<1*	*Percent*	*Total*
AERO	5	71.43	2	28.57	7	LABEQ	2	100.00	0	0.00	2
AGRIC	5	50.00	5	50.00	10	MACH	26	60.47	17	39.53	43
AUTOS	14	51.85	13	48.15	27	MEALS	5	18.52	22	81.48	27
BEER	11	64.71	6	35.29	17	MEDEQ	10	43.48	13	56.52	23
BLDMT	12	34.29	23	65.71	35	MINES	16	32.00	34	68.00	50
BOOKS	4	22.22	14	77.78	18	OIL	28	30.11	65	69.89	93
BOXES	1	33.33	2	66.67	3	OTHER	11	27.50	29	72.50	40
BUSSV	33	36.67	57	63.33	90	PAPER	4	25.00	12	75.00	16
CHEM	20	51.28	19	48.72	39	PERSV	2	100.00	0	0.00	2
CHIPS	19	34.55	36	65.45	55	RTAIL	39	40.21	58	59.79	97
CLTHS	11	36.67	19	63.33	30	RUBBR	2	28.57	5	71.43	7
CNSTR	24	48.98	25	51.02	49	SHIPS	1	25.00	3	75.00	4
COAL	1	6.25	15	93.75	16	SMOKE	1	100.00	0	0.00	1
COMPS	6	35.29	11	64.71	17	SODA	0	0.00	3	100.00	3
DRUGS	30	43.48	39	56.52	69	STEEL	21	45.65	25	54.35	46
ELCEQ	8	50.00	8	50.00	16	TELCM	21	35.59	38	64.41	59
FOOD	15	34.09	29	65.91	44	TOYS	2	40.00	3	60.00	5
FUN	7	41.18	10	58.82	17	TRANS	29	36.25	51	63.75	80
GOLD	3	25.00	9	75.00	12	TXTLS	1	9.09	10	90.91	11
HLTH	4	33.33	8	66.67	12	UTIL	22	23.66	71	76.34	93
HSHLD	16	57.14	12	42.86	28	WHLSL	8	23.53	26	76.47	34
INSUR	2	100.00	0	0.00	2						

Notes: The sample of cross-listing firms is downloaded from J.P. Morgan database. The sample period starts in 2000 and ends in 2013. Most depositary receipts are either publicly or privately listed on NYSE, NASDAQ, LSE, LUX, OTC, OTCQX, or Portal. The underlying firm must have share price data before and after cross-listing on Datastream and accounting data in GlobalVantage. Depositary Banks include Bank of New York, J.P. Morgan, Citibank, and Deutsche Bank. The ratio is the number of underlying shares per depositary receipt. >=1 means that there is one or a fraction of one underlying share per depositary receipt. <1 means that there are more than 1 underlying share per depositary receipt. The Industry codes are according to the Fama-French industry classification.

BIOGRAPHICAL SKETCH

Klaus Soenke Beckmann earned his Ph.D. in Business Administration (Finance) from the University of Texas Rio Grande Valley in 2016. He received his MBA in Finance from the University of Texas-Pan American in 2013 and his BA in Business Law (minor: Financial Services) from Leuphana University in Lueneburg, Germany in 2008. He is certified as a banker by the German Chamber of Industry and Commerce and has several years of experience in the banking industry including Investment Banking, Corporate Finance and Private Banking for Hypovereinsbank, Germany and Project Finance for Unicredit, New York.

Klaus's area of research is International Asset Pricing, Real Estate Finance, Behavioral Finance and Corporate Finance and he has presented his research at major conferences including FMA, SFA and AIB. Klaus has published his research in the Journal of Multinational Financial Management and several of his research papers are currently under review at high quality peer-reviewed finance journals. Furthermore, Klaus has several years of experience teaching undergraduate and graduate finance courses at the University Texas-Pan American and the University of Minnesota Duluth.

Permanent mailing address: 816 N Cross Ln Apt. 1, Edinburg, Texas 78541.