

Primary Market Activity and the Cost of Going and Being Public

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List of abbreviations

AIM	Alternative Investment Market
BAS	Bid-ask spread
ADR	American Depository Receipt
AG	Aktiengesellschaft
bp	basis points
DBAG	Deutsche Boerse AG
EC	European Commission
FY	Fiscal Year
GEM	Growth Enterprise Market
HKEX	Hong Kong Stock Exchange
IPO	Initial Public Offering
LSE	London Stock Exchange
MV	Market Value
NASDAQ	National Association of Securities Dealers Automated Quotations
N./No	Number
NYSE	New York Stock Exchange
pp	percentage points
SOX	Sarbanes-Oxley Act
SEC	Securities and Exchange Commission
TVO	Trading Volume
US	United States
SEO	Seasoned / Secondary Equity Offering
Std	Standard
VOL	Stock return volatility
WFE	World Federation of Exchanges
ZTR	Zero-Trade-Ratio

1. Executive summary

This study looks at the primary stock markets from two different perspectives. First, new issue activity at the three largest European stock exchanges over the period 01/01/2005 to 03/31/2008 is scrutinized. Contrary to conventional wisdom it turns out that as far as IPOs are concerned, the dominance of the LSE is by far not as pronounced as expected. In fact, while the LSE recorded 183 IPOs over the period under consideration, Euronext had 206 and Deutsche Börse 135 IPOs. The reason for this result is due to the fact that the by far largest number of new issues take place at AIM (960 over the period mentioned above), but almost all of these issues have not been IPOs, i.e. no prospectus approved by the financial supervision authority according to EU-rules was filed. Also, when looking at the IPO issue volume, LSE is far from dominating the European market. In fact, total IPO issue volume at LSE was about 56 billion Euros over the period considered here, while at Euronext it was equal to 41 billion Euros and at Deutsche Börse to 19 billion Euros. Moreover, it should be noted here that more than 60% of the issue volume recorded at Euronext comes from transactions labelled as "IPO&Placings". Regularly, in these transactions a smaller part of the shares are offered on the EU-regulated market while the larger part is offered via a private placement.

A further interesting result from this primary market analysis is the fact that every of the three exchanges have a different industry focus. In fact, almost all issuers in the alternative energy segment have chosen Deutsche Börse as their primary listing venue. Also for chemicals, software and computer services and electronic equipment Deutsche Börse attracts more than 50% of the IPO issue volume on the three exchanges. LSE is the dominating exchange as far as issues in the mining, metal, retail and travel sector are concerned. Euronext dominated over the period under consideration the sectors electricity, media and transportation.

The second focus of this study was to look at primary stock markets from the perspective of the issuer. Following and extending two former studies of Kaserer/Schiereck (2006, 2007), the authors analyzed these costs for Deutsche Börse, Euronext, Hong-Kong Stock Exchange, LSE, NASDAQ and NYSE. These exchanges are analyzed along different dimensions related to flotation costs, trading costs and listing fees. Using the scoring model developed by Kaserer/Schiereck (2007) it turns out that among the large cap market segments the Frankfurt Prime/General Standard seems to be the most attractive with a score of 2.1. NYSE (Large Cap) and the LSE Main Market achieve a score of 2.6 and 2.8 respectively, while Hong Kong Stock Exchange gets a score of 3.0. In contrast, the NASDAQ (Large Cap) reaches a score of 3.1, followed by Eurolist's score of 3.5. As far as small cap market segments are concerned, the Frankfurt Entry Standard seems to be the most attractive with a score of 2.1. It is followed with by NYSE (Small Cap) and NASDAQ (Small Cap) with a score of 2.5 and 2.8 respectively. GEM gets a score of 3.1 followed by AIM's and Alternext's score of 3.4.

More specifically, the single results behind these overall scores can be summarized as follows:

The cost of going public

1. The average total flotation cost for a new issue recorded over the period 01/01/1999 to 03/31/2008 was 7.5% of gross offering proceeds at Euronext, 7.8% at NYSE, 8.4% at Deutsche Börse, 9.6% at NASDAQ, 12.2% at LSE and 14.0% at Hong-Kong Stock Exchange. The median flotation cost is a little bit lower, although the ranking among the listing venues on the basis of the median would almost be the same. By looking at the large cap segments the average total flotation cost is as follows: 7.0% at Eurolist, 7.4% at NYSE, 7.5% at the Frankfurt Prime/General Standard, 8.0% at NASDAQ, 8.6% at the London Main Market and 10.8% at the Hong-Kong Main Board. For the small cap market segments the results are the following: Alternext 8.6%, NASDAQ and NYSE small cap issues 10.2% and 10.1% respectively, Entry Standard 10.4%, AIM 14.8% and GEM 20.1%. Basically, these results are corroborated when controlling for the impact of issue size by using a standard linear regression approach. However, not all of these differences turn out to be statistically significant.
2. Total flotation costs can be split-up into underwriting fees, i.e. fees paid to the investment banks, and non-underwriting fees, i.e. fees paid to lawyers and auditors as well as other expenses incurred during the offering process. For the median non-underwriting fees the results are as follows: NYSE 1.2%, Euronext 1.9%, NASDAQ 2.1%, Deutsche Börse 2.7%, LSE 4.8% and Hong-Kong Stock Exchange 8.1%. For the median underwriting fees we find: Hong-Kong Stock Exchange 2.5%, LSE 3.4%, Euronext 3.4%, Deutsche Börse 4.8%, NYSE 6.5% and NASDAQ 7.0%. Again, the results are corroborated by a linear regression analysis although, by controlling for the size effect, not all of these differences are statistically significant.
3. Admission fees differ quite substantially across the stock exchanges under consideration. For large cap companies Eurolist, LSE's Main Market and NYSE are the most expensive market segments, while the Frankfurt Prime/General Standard is the most favourable by far. As far as growth markets are concerned similar considerations apply, although NASDAQ and NYSE turn out to be the most expensive exchanges in this segment. Again, the Frankfurt Entry Standard is the most favourable by far.
4. Remarkably, we do not find higher total flotation costs for international issues at any of the stock exchanges covered in this study. Moreover, we even find a higher cost for domestic issues at the LSE.
5. As far as indirect costs in form of underpricing are concerned, we evaluate medium range as overall most attractive. Very small underpricing will induce only limited interest of investors to sign IPOs, and in the case of extreme underwriting newly listed firms leave too much money on the table. Our findings document low first listing day returns in Frankfurt which is closely to our ideal benchmark.

The cost of being public

6. According to the empirical evidence presented in this study mean SEO underwriting fees equal to 2.0% at LSE, 2.1% at Hong-Kong Stock Exchange, 3.0% at Deutsche Börse, 3.7% at Euronext and NYSE and 5.1% at NASDAQ.
7. The difference in listing fees is quite substantial, although not as pronounced as for admission fees. Again, for large cap firms the Prime/General Standard is most attrac-

tive under this dimension, while NYSE and NASDAQ are most expensive. For growth firms the differences among the European exchanges are quite small, while NASDAQ and NYSE are again substantially more expensive.

8. While investors maximize net stock returns, companies have to calculate with gross returns as required costs of capital. The difference between gross returns and net returns contain trading costs. These trading costs consist of explicit and implicit cost components. We show that at the Prime/General Standard (Entry Standard) in Frankfurt the overall trading costs tend to be slightly lower than at NYSE and Eurolist. However, they are significantly lower compared to Main Market (AIM) in London, using recent trading data of new equities. The firm characteristics of new listings in Germany compared to the Eurolist countries, the UK and the US show some remarkable differences. New equities at the Eurolist and the Main Market have a higher ratio of days without any trading than Prime/General Standard IPOs. The new issues at the AIM have higher average market values than IPOs at Alternext, Entry Standard and GEM IPOs, but average trading volumes are remarkably lower and days without trading more often at AIM compared to the Entry Standard. Controlling for these firm characteristics the implicit trading costs (measured by the bid-ask spreads) are the lowest at NYSE and the Hong-Kong Main Board followed by NASDAQ, Prime/General Standard and Eurolist. Consistent with other studies we find extremely high implicit trading costs at Alternext and the AIM. Hence, it seems that IPOs at Alternext and new issues at AIM are unattractive expensive listing alternatives from a trading cost perspective compared to an IPO at Deutsche Börse.

2. Introduction and framework

This chapter reports the recent issue activity on European primary equity markets. More specifically, we look at *new issues* of shares undertaken on the targeted stock markets. It should be noted that the term *new issues* refers both to *initial public offerings* (IPOs) and *private placements*. In this study, an IPO is defined as an offering of new shares to the general public to which the obligation to publish a prospectus according to Directive 2001/34/EC applies. A private placement – referred to also as placing – is an offering of new shares to which the exemption from the obligation to publish a prospectus set forth in Article 3 lit. 2. of the above mentioned directive applies. It should be noted that according to Article 3 lit. 3. of this directive securities offered under this exemption rule cannot be listed on an EU-regulated market. A stock market is called an EU-regulated market, if it complies with the rules set forth in Title III of the Directive 2004/39/EC.¹

Apart from new issues we look also at so called *introductions* in this section. An *introduction* takes place when an issuer applies for the admission to trading of its stocks without offering any stocks to the public and, as a consequence, without raising any new capital. It should be noted, however, that as long as these securities have not already been listed on an EU-regulated market, an introduction on such a regulated market requires a prospectus. Almost all introductions recorded in this study, however, took place on exchange-regulated markets avoiding in this way any obligation to publish a prospectus.

In the last part of this section we briefly introduce the cost of capital framework upon which those parts of these study are based that deal with the cost of going public and being public.

2.1 Recent issue activity in Europe

Subsequently, we analyze the new issue activity at the three largest European stock exchanges - Deutsche Börse (DBAG), Euronext, and London Stock Exchange (LSE). For this purpose, we recorded data on new issues and listings² over the period 01/01/2005 to 03/31/2008 from the homepages of the exchanges. Before we go to the analysis of this new issue activity, we start with some general remarks on the European capital market with respect to its major institutions and compulsory publication requirements associated with the process of going public.

2.1.1 The market for new issues in Europe: institutions and regulations

In order to realize the vision of a single market in financial services, the European Commission (EC) installed two advisory committees in 2001 that support and advise the Commission in regulating those services. With respect to the securities markets, the European Securities Committee (ESC) provides advice and expertise to the European Commission, while the Committee of European Securities Regulators (CESR) functions as a link between the Commission and the supervision authorities in the Member States. As such, the CESR is designed

¹ According to Article 47 of this Directive the Commission publishes each year a list of those stock markets that were designated as regulated markets according to the supervising Member State. For instance, the Frankfurt-based Entry Standard or the London-based AIM are exchange regulated market segments as opposed to EU-regulated markets.

² A new issue is a transaction by which capital is raised. In this study, the term new issue therefore comprises both IPOs and placings. A listing is a process by which equity is newly listed at a stock exchange. Introduction, IPO, and placing are all accompanied by a listing. Hence, we use the term new listings when we refer to the number of listings caused by either a new issue or an introduction.

to ensure the correct and uniform application of measures as defined by the Directives of the European Commission.³

The European capital market has been both liberalized and regulated in 2001 by the Directive 2001/34/EC of the European Parliament enacting “the modernization and harmonization of securities markets with a view to achieving a genuine capital market by both stepping up and simplifying requirements, thereby helping to promote consistency and guarantee investor protection”. Consequently, the European Parliament passed the Directives 2003/71/EC and 2004/109/EC which primarily focus on harmonizing the conditions for the publication of information regarding security offers to the public, admission of securities to an official stock-exchange listing, and admission to trading.

The Directive 2001/34/EC concerns all securities which either are admitted to official listing or request an admission to official listing. In order to be admitted to trading, companies must publish an information sheet to which the Directive refers to as a “listing particular”.

The Directive 2003/71/EC is designed to improve the quality of information provided to investors by companies wishing to raise capital via a public offering. With the Directive, a single authorization system for prospectuses which may be used in all EU Member States ('single passport for issuers') is introduced. The Directive furthermore introduces new rules making it easier and cheaper for companies to raise capital throughout the EU by leaving the approval of an offering solely to the regulatory authority in one Member State ('home competent authority'). The Directive also defines the obligation to publish a prospectus enacting that “Member States shall not allow any offer of securities to be made to the public within their territories without prior publication of a prospectus”.⁴ However, the directive rules that the obligation to publish a prospectus may be exempted for offers of securities addressed solely to qualified investors⁵, to fewer than 100 natural or legal persons per member state, and/or to offers, where each investor acquires a stake of at least 50,000 Euros or the denomination per unit is at least 50,000 Euros. Finally, offerings where the aggregate offering volume over a period of 12 months is less than 100,000 Euros are also exempted from the obligation to publish a prospectus.⁶

In contrast to the market for public offerings, the market for private placements has not yet been harmonized. The EC is, however, currently working on a design of private placement regimes. In its recent assessment report, the EC defines a private placement as “a distribution method through which designated market participants can buy and sell financial instruments to each other without having to comply with the rules that would usually apply when the same instruments are offered to the public or to retail investors.”⁷ For now, it must thus be concluded that private placements are in general exempted from the obligation to publish a prospectus provided that there is no application for listing the shares on any EU-regulated market.

³ Cf. Directives 2001/528/EC and 2001/527/EC.

⁴ Cf. Directive 2003/71/EC Art. 3 lit. 1.

⁵ For a definition of qualified investors cf. Directive 2003/71/EC Art. 2 lit. 1(e).

⁶ Cf. Directive 2003/71/EC Art. 3 lit. 2.

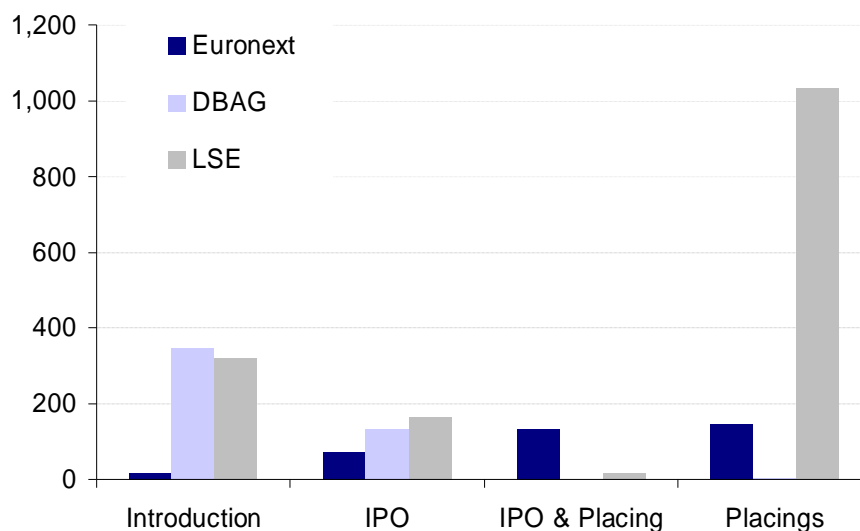
⁷ EC (2008): “Executive Summary to the impact assessment report”, p. 2.

2.1.2 New listings at DBAG, Euronext, and LSE

Although by looking at the total number of listings⁸ LSE is the European exchange with the highest market activity, we will show in the following section that the picture becomes more ambiguous, if one focuses on IPO-activity in a more narrow sense. However, as far as new listings are concerned, LSE reports a number of 1,537 over the period 01/01/2005 to 03/31/2008, while Deutsche Börse and Euronext report 487 and 369 new listings respectively.

Figure 1 reports the number of new listings with regard to the type of transaction. In London, most new listings occur either as a placing or an introduction. In contrast, at Deutsche Börse new listings are either realized as an introduction or an IPO. It should be noted here that Deutsche Börse records the by far largest number of introductions within the period covered. Actually, 347 companies were introduced and admitted to trading at Deutsche Börse between 01/01/2005 and 03/31/2008. Surprisingly, only a few introductions are recorded for the Euronext according to the data provided by the Euronext homepage.

A particularity of the Euronext is that a large number of transactions are classified as simultaneous placing and public offering. According to our research, these transactions are generally structured as such that 90% of the capital is raised by a placing and the remaining 10% by a public offering.⁹



Note: According to our research no mixed offerings (i. e. IPO & Placing) have been undertaken at the DBAG. Effectively, it is very difficult to gather reliable information about private placements related to listings at DBAG. It is not excludable, that a crossborder offering in Europe and USA including a placement according to SEC Rule 144a, which is considered a private placement, is reported in Germany either as a pure IPO or not reported at all instead of a mixed offering. Hence, we can not rule out that LSE or Euronext are classifying such transactions, for instance as mixed offerings, potentially leading to a distortion of the numbers compared here.

Figure 1: Number of new listings at Euronext, DBAG, and LSE over the period 01/01/2005 to 03/31/2008

⁸ The term “new listings” comprises all transaction types (i. e. Introduction, IPO, and Private Placement) covered in this study and refers to the total number of newly listed stock.

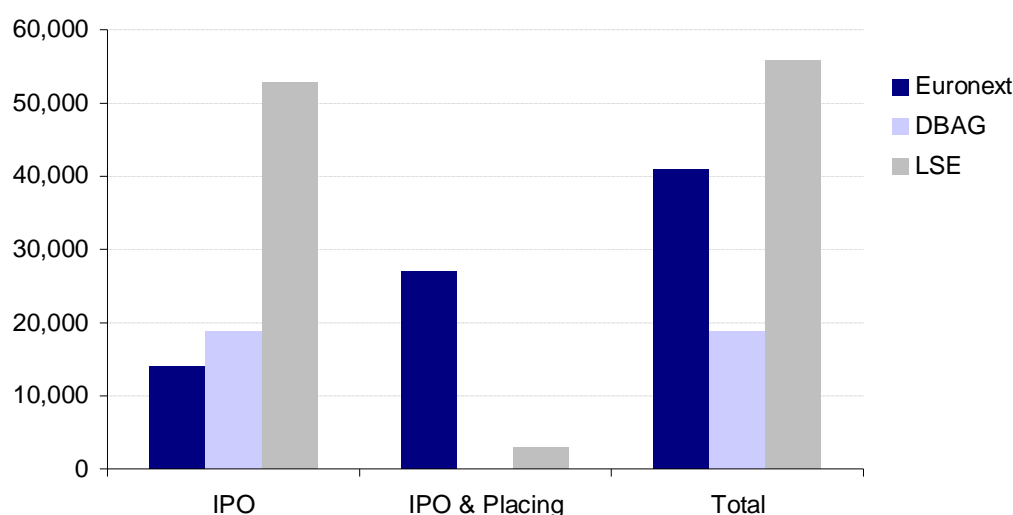
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2.1.3 IPO activity at DBAG, Euronext, and LSE

Over the period 01/01/2005 to 03/31/2008, a total of 115 billion Euros have been raised via IPOs at Deutsche Börse, Euronext, and LSE. Figure 2 displays IPO volumes by stock exchange. It should be noted, the total IPO volume is the sum of IPOs and mixed offerings (IPOs & Placings).

With regard to “pure” IPOs, activity is highest at the LSE where IPO volume sums up to more than 52 billion Euros over the period 01/01/2005 to 31/03/2008. Companies raised almost 19 billion Euros via an IPO at Deutsche Börse, and approximately 14 billion Euros at the Euronext.

As outlined earlier, mixed offerings are primarily conducted at the Euronext where these transactions account for over 65% of Euronext’s total IPO volume which is equal to 41.6 billion Euros. Although mixed offerings are also conducted rather frequently at the LSE, this method of issuance is still of minor importance there.



Note: According to our research no mixed offerings (i. e. IPO & Placing) have been undertaken at the DBAG. Effectively, it is very difficult to gather reliable information about private placements related to listings at DBAG. It is not excludable, that a crossborder offering in Europe and USA including a placement according to SEC Rule 144a, which is considered a private placement, is reported in Germany either as a pure IPO or not reported at all instead of a mixed offering. Hence, we can not rule out that LSE or Euronext are classifying such transactions, for instance as mixed offerings, potentially leading to a distortion of the numbers compared here.

Figure 2: IPO volumes in million Euros over the period 01/01/2005 to 03/31/2008

2.1.3.1 IPO activity by market segment

Table 1 reports the total capital raised via IPOs by market segment. Deutsche Börse as well as Euronext and LSE offer tailor-made market segments for small and large cap companies. The small cap market segments are AIM (LSE), Alternext (Euronext), and Open Market including the Entry Standard (Deutsche Börse). The large cap market segments are Eurolist (Euronext), Main Market (LSE), and Prime or General Standard (Deutsche Börse).

Surprisingly, in terms of capital raised via IPOs, the small cap market segments do not only play a minor role - they almost play no role at all. For the AIM, we do not even record one single “pure” IPO for the period under consideration. Thus, IPO activity apparently takes

primarily place at large cap market segments. With respect to ordinary IPOs, London's Main Market is clear ahead with an IPO volume of 55 billion Euros. Deutsche Börse is next with almost 18 billion Euros, which is almost 50% more than what companies raise at the Euronext over the same period. As outlined earlier, mixed issues, which we count to IPOs, are very familiar at the Euronext. With almost 27 billion Euros raised via mixed offerings, the Euronext is clearly leading in this category. Mixed offerings constitute only about 4% at the LSE. For the Deutsche Börse, no mixed offerings are recorded at all.

	IPO	IPO & Placing	Total	IPO in %	IPO & Placing in %
Number of transactions					
Small cap market segments					
Alternext (Euronext)	8	70	78	10%	90%
Marché Libre (Euronext)	25	4	29	86%	14%
Open Market (DBAG)	7	0	7	100%	0%
Entry Standard (DBAG)	56	0	56	100%	0%
AIM (LSE)	0	3	3	0%	100%
Large cap market segments					
Eurolist (Euronext)	39	60	99	39%	61%
Prime / General Standard (DBAG)	72	0	72	100%	0%
Main Market (LSE)	165	15	180	92%	8%
Capital raised in million Euros					
Small cap market segments					
Alternext (Euronext)	77	690	767	10%	90%
Marché Libre (Euronext)	27	16	43	62%	38%
Open Market (DBAG)	29	0	29	100%	0%
Entry Standard (DBAG)	720	0	721	100%	0%
AIM (LSE)	0	658	658	0%	100%
Large cap market segments					
Eurolist (Euronext)	13,937	26,228	40,165	35%	65%
Prime / General Standard (DBAG)	17,940	0	17,940	100%	0%
Main Market (LSE)	52,888	2,318	55,094	96%	4%

Note: According to our research no mixed offerings (i. e. IPO & Placing) have been undertaken at the DBAG. Effectively, it is very difficult to gather reliable information about private placements related to listings at DBAG. It is not excludable, that a crossborder offering in Europe and USA including a placement according to SEC Rule 144a, which is considered a private placement, is reported in Germany either as a pure IPO or not reported at all instead of a mixed offering. Hence, we can not rule out that LSE or Euronext are classifying such transactions, for instance as mixed offerings, potentially leading to a distortion of the numbers compared here.

Table 1: IPO volumes by market segment over the period 01/01/2005 to 03/31/2008

2.1.3.2 Industry analysis of IPO activity

With respect to industry analysis we find as a first result that new-issue-activity at the LSE is clearly dominated by financial companies. In fact, Table 2 splits issue volumes into capital raised by financial and non-financial companies. As can be seen, almost every second Euro raised through a new issue at the LSE is collected by a financial company. Also at the Euro-

next, financial companies are an important issuer, at least as far as their ratio of total proceeds is concerned. While only 14% of capital raised through an IPO at Deutsche Börse was collected by financial companies, the same ratio was 46% at LSE and 40% at Euronext.

In order to get an idea of which industries raise capital in particular and to see whether there are differences in industry capitalization among exchanges, we classify all issues in our database according to the ICB classification standard¹⁰. Figure 3 displays the IPO volumes for each non-financial super sector. With altogether more than 21 billion Euros issue volume basic resources, oil & gas, and industrial goods constitute the major industries within the IPO market of LSE. Euronext profits from the privatization of Electricité de France which raised 7 billion Euros in 2005 alone and thus boosted the volume of utilities to over 8 billion Euros. IPO activity at Deutsche Börse is most intense in industrial goods & services and chemicals.

	IPO	IPO & Placing	Placing	Total	in % of Total
Number of transactions					
Financials					
Euronext	18	26	21	65	18%
DBAG	33			33	24%
LSE	95	14	353	462	38%
Non-Financials					
Euronext	54	108	126	288	82%
DBAG	102	0	5	107	76%
LSE	70	4	681	755	62%
Capital raised in million Euros					
Financials					
Euronext	6,270	6,217	6,632	19,119	40%
DBAG	2,641			2,641	14%
LSE	17,656	2,466	28,930	49,052	46%
Non-Financials					
Euronext	7,770	20,781	294	28,845	60%
DBAG	16,049	0	282	16,330	86%
LSE	35,232	511	22,047	57,790	54%

Note: According to our research no mixed offerings (i. e. IPO & Placing) have been undertaken at the DBAG. Effectively, it is very difficult to gather reliable information about private placements related to listings at DBAG. It is not excludable, that a crossborder offering in Europe and USA including a placement according to SEC Rule 144a, which is considered a private placement, is reported in Germany either as a pure IPO or not reported at all instead of a mixed offering. Hence, we can not rule out that LSE or Euronext are classifying such transactions, for instance as mixed offerings, potentially leading to a distortion of the numbers compared here.

Table 2: Relation of financials to non-financials according to number of listings and issue volume over the period 01/01/2005 to 03/31/2008

¹⁰ Dow Jones and FTSE together define the Industry Classification Benchmark which consists of 10 Industries, 19 Super Sectors, 41 Sectors, and 114 Subsectors. Both Euronext and LSE use the ICB standard. For more information see www.icbenchmark.com.

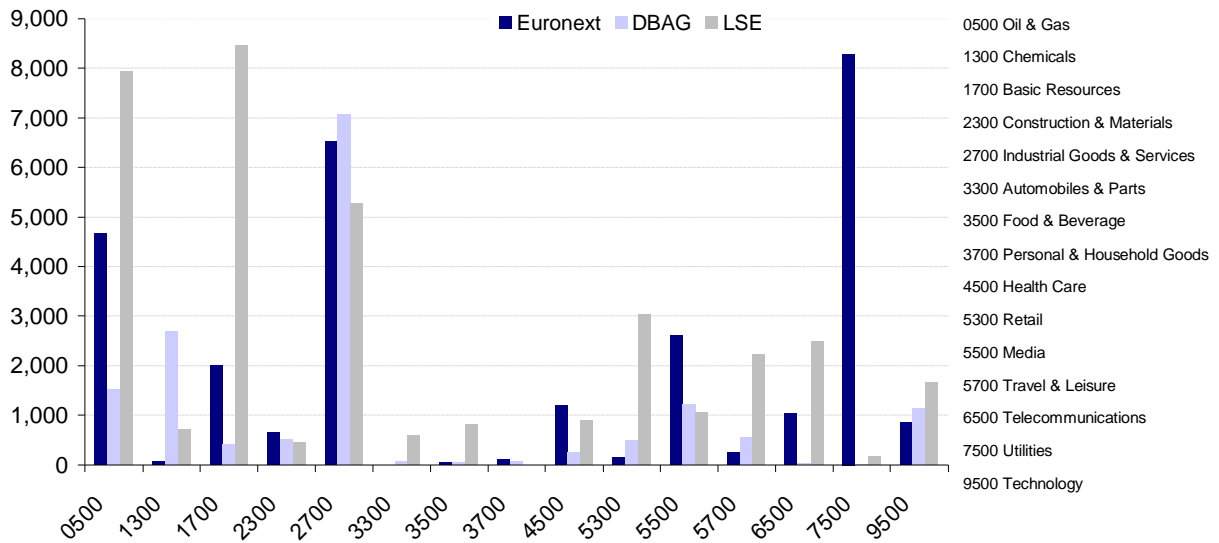


Figure 3: IPO volumes (in million Euros) by industry over the period 01/01/2005 to 03/31/2008

Another interesting approach with respect to industry analysis is to take a closer look at growing industries such as alternative energies and high technology. According to the ICB classification, subsectors of alternative energies are renewable energy equipment (0583) and alternative fuels (0587). High technology is split up into computer services (9533), internet (9535), software (9537), computer hardware (9572), semiconductors (9576), and telecommunications equipment (9578). Remarkably, Deutsche Börse seems to be the sole harbor for companies specializing in alternative energies. With altogether 1.5 billion Euros, alternative energies raised a respectable amount of money. With regard to high technology IPOs, each exchange seems to occupy a particular field. Deutsche Börse reports a lot of IPO activity in internet and software, Euronext in telecommunications equipment, and the LSE in hardware.

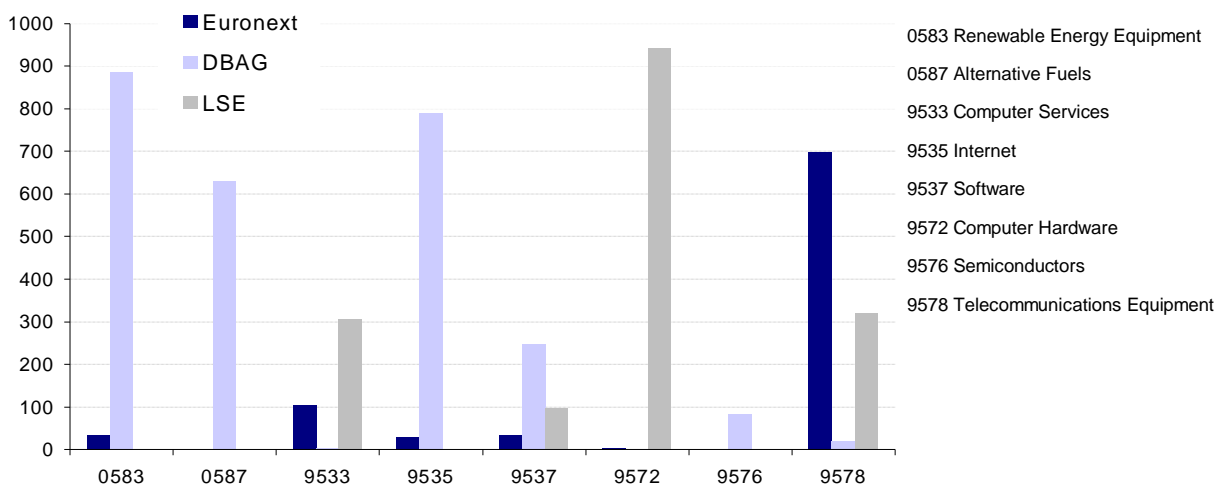


Figure 4: IPO volumes (million Euros) in alternative energy and high technology over the period 01/01/2005 to 03/31/2008

Table 3 reports the five largest sectors for each exchange.¹¹ It turns out that Deutsche Börse attracts in particular companies specializing in electronic equipment, chemicals, and alternative energy. These three sectors account already for more than 40% of the total IPO volume at Deutsche Börse. Furthermore, the five largest subsectors account for almost 55% of total IPO volume at DBAG.

IPO markets at Euronext and LSE are not that concentrated. At the Euronext, it is the privatization of Gas de France which raised 7 billion Euros at once which accounts for the major part of the high volume reported for electricity companies. The LSE has the least concentrated IPO market. Here, in particular companies specializing in the exploitation of natural resources raise money. Oil, gas, and mining companies have raised over 16 billion Euros in the past three years.

Table 4 displays the five largest subsectors according to their total market share on the three exchanges under consideration here. Deutsche Börse harbours almost all IPOs within the field of alternative energy. With over 1.5 billion Euros in total IPO volume, alternative energy has become an important sector at Deutsche Börse. Notably, only about 2% of total capital raised within alternative energy on the three exchanges has not been brought up at this exchange. Companies specializing in chemicals and high tech services are also predominantly pursuing a listing at Deutsche Börse. Euronext has only one very dominant sector which is electricity. The volume in electricities which is remarkable both in absolute and relative terms results however primarily from the privatization of EDF (Electricité de France) in 2005. As already outlined earlier companies specializing in mining predominantly raise money at the LSE.

DBAG	volume	% of total capital raised at DBAG
1. Electronic & Electrical Equipment	3,402	18.2%
2. Chemicals	2,700	14.4%
3. Alternative Energy	1,517	8.1%
4. Industrial Transportation	1,390	7.4%
5. Media	1,221	6.5%
Total	10,230	54.7%

Euronext	volume	% of total capital raised at Euronext
1. Electricity	8,273	19.9%
2. Oil & Gas Producers	4,573	11.0%
3. Electronic & Electrical Equipment	2,816	6.8%
4. Media	2,621	6.3%
5. Industrial Transportation	2,036	4.9%
Total	20,319	48.8%

LSE	volume	% of total capital raised at LSE
1. Oil & Gas Producers	7,622	13.6%
2. Ind. Metals & Mining	5,113	9.2%
3. Mining	3,338	6.0%
4. General Industrials	2,702	4.8%
5. General Retailers	2,465	4.4%
Total	21,240	38.0%

Table 3: TOP Five sectors according to IPO volume in million Euros (best absolute strength) over the period 01/01/2005 to 03/31/2008

¹¹ Altogether the ICB distinguishes 41 Sectors.

		% of total capital raised	
DBAG	volume	at respective sector	
1. Alternative Energy	1,517	97.8%	
2. Chemicals	2,700	77.9%	
3. Software & Comp. Services	1,040	64.6%	
4. Electronic & Electrical Equipment	3,402	50.8%	
5. Industrial Transportation	1,390	36.1%	
Total	10,049	58.5%	

		% of total capital raised	
Euronext	volume	at respective sector	
1. Electricity	8,273	97.7%	
2. Media	2,621	53.5%	
3. Industrial Transportation	2,036	52.8%	
4. Electronic & Electrical Equipment	2,816	42.1%	
5. Support Services	1,172	39.8%	
Total	16,918	63.0%	

		% of total capital raised	
LSE	volume	at respective sector	
1. Mining	3,338	99.7%	
2. General Retailers	2,465	94.1%	
3. Travel & Leisure	2,226	73.7%	
4. General Industrials	2,702	73.0%	
5. Industrial Metals & Mining	5,113	71.9%	
Total	15,844	80.0%	

Table 4: TOP Five billion Euros sectors according to relative IPO volume (best relative strength) over the period 01/01/2005 to 03/31/2008, volume in million Euros

2.1.4 New issue activity at DBAG, Euronext and LSE

Over the period 01/01/2005 to 03/31/2008, 174 billion Euros have been raised in total at Deutsche Börse, Euronext, and LSE. The total issue volume at the LSE is equal to 107 billion Euros - approximately two thirds of it is raised at the Main Market according to Table 5, which reports the total issue volume for each market segment. About 48 billion Euros are raised at the Euronext and 19 billion Euros at Deutsche Börse.

Table 5 furthermore splits total issue volume into total IPO volume and placing volume. In general, IPO volumes account for at least 75% of total issue volumes within each market segment. The AIM forms the only exception from this rule as here IPOs account for only 2% of total issue volumes. Quite opposite, placings at Deutsche Börse generally occur very rarely.¹²

Figure 5 displays the new issue volumes by industry. The LSE reports large issue volumes for oil & gas, basic resources, industrial goods & services, retail and media. For both Euronext and Deutsche Börse we record high volumes within industrial goods & services as well. Oil & gas and utilities are also very important at the Euronext. As outlined earlier, most volume reported for utilities comes from the privatization of Electricité de France in 2005. Deutsche Börse reports its highest IPO activity in industrial goods & services. Deutsche Börse is also relatively strong in chemicals.

¹² It should be noted in this regard that because placings don't have a prospectus approved by any financial supervision authority, the information given in the registration documents is of minor quality as it cannot easily be verified. This disclaimer applies to all the information with respect to placings collected either from the exchanges' websites or from registration documents and used in this study.

	IPO / IPO & Placing	Private Placement / Placing	Total	IPO / IPO & Placing in %	Private Placement / Placing in %
Number of transactions					
Small cap market segments					
Alternext (Euronext)	78	40	118	66%	34%
Marché Libre (Euronext)	29	85	114	25%	75%
Open Market (DBAG)	7	2	9	78%	22%
Entry Standard (DBAG)	56	2	58	97%	3%
AIM (LSE)	3	957	960	0%	100%
Large cap market segments					
Eurolist (Euronext)	99	22	121	82%	18%
Prime / General Standard (DBAG)	72	1	73	99%	1%
Main Market (LSE)	180	77	257	70%	30%
Capital raised in million Euros					
Small cap market segments					
Alternext (Euronext)	767	249	1,016	76%	24%
Marché Libre (Euronext)	43	20	63	68%	32%
Open Market (DBAG)	29	41	70	41%	59%
Entry Standard (DBAG)	720	84	804	90%	10%
AIM (LSE)	658	32,954	33,612	2%	98%
Large cap market segments					
Eurolist (Euronext)	40,165	6,658	46,822	86%	14%
Prime / General Standard (DBAG)	17,940	157	18,097	99%	1%
Main Market (LSE)	55,094	18,023	73,117	75%	25%

Table 5: IPO and placing volumes by market segment over the period 01/01/2005 to 03/31/2008

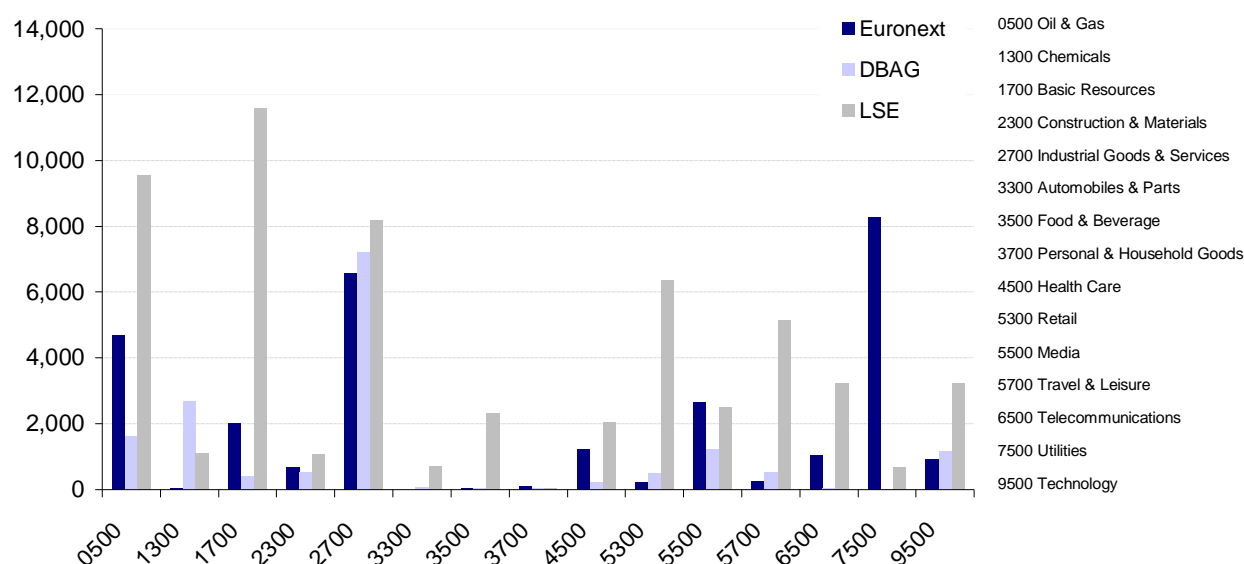


Figure 5: Issue activity according to ICB classification for all Non-Financial industries according to issue volume in million Euros over the period 01/01/2005 to 03/31/2008

Again we take a closer look at growing industries such as alternative energies and high technology. As shown for IPO volumes, Deutsche Börse seems to be the sole harbor for companies specializing in alternative energies. With altogether 1.5 billion Euros, alternative energies raised a respectable amount of money. With regard to high technology IPOs, again each exchange seems to occupy a particular field. Deutsche Börse reports a lot of IPO activity in internet and software, Euronext in telecommunications equipment, and the LSE in hardware according to Figure 6. Overall this picture is quite similar to that reported in section 2.1.3.2

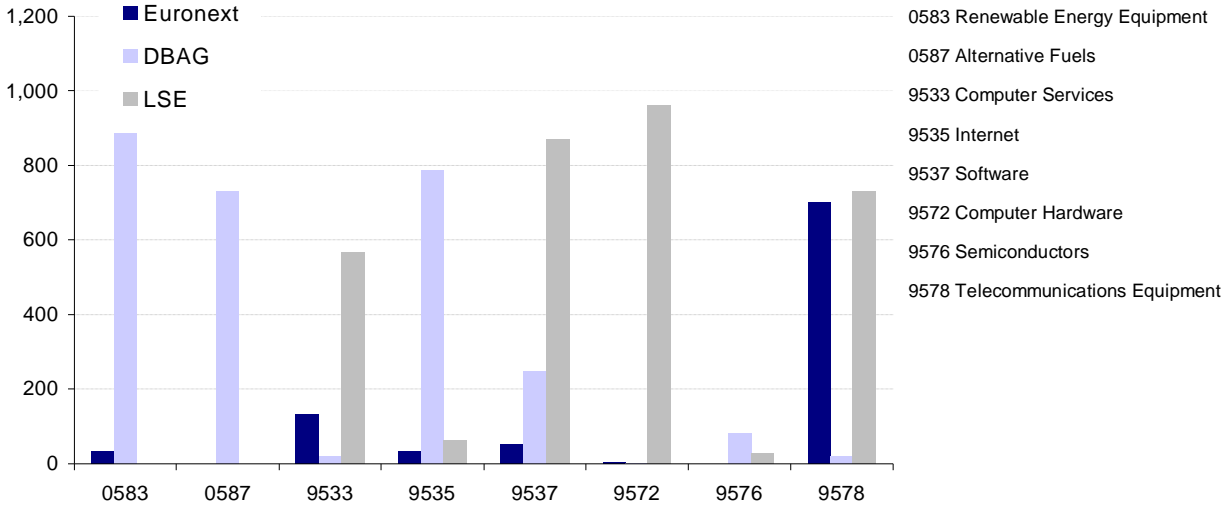


Figure 6: Issue activity according to ICB classification for “Alternative Energy” and “High Tech” issues according to issue volume in million Euros over the period 01/01/2005 to 03/31/2008

2.1.5 Delisting probability and determining factors

For a stock exchange and even more for the investors it is of utmost importance whether new listings come to stay or consider the public status as a transient state of financing. Table 6 summarizes the number of delisted companies for each stock exchange. While the LSE and Euronext both had higher numbers for IPOs compared to DBAG they also attract by far more transient listings. About one out of ten new listings from the period 2001 to 2008 is today not longer quoted at LSE and Euronext.¹³ In the US and Hong Kong more than 3% of new listings are already vanished again while all (!!) IPOs in Germany are still quoted.¹⁴

Delisting	Dead/Delist	No. of IPOs	in %
NYSE/NASDAQ	33	1,018	3.24%
London Stock Exchange	52	498	10.44%
Hong Kong	9	264	3.41%
Euronext	12	178	6.74%
Deutsche Börse	0	168	0.00%

Table 6: Delistings across stock exchanges between January 2001 and March 2008

There are many different reasons why a company might decide to delist and go private again. The bankruptcy induced delistings, however, are the most relevant for investors. Here, we observe for the London Stock Exchange that 5.41% of IPOs went bankrupt. Considerably high is also the ratio of 2.81% at Euronext, while only 0.10% for NYSE and NASDAQ and 0.00% at DBAG and Hong Kong went bankrupt. Obviously, there is a remarkable quality problem with new listings in London.

To analyze the delisting reasons in more detail, we attempt to determine the likelihood that a newly listed company will be delisted. We calculate the conditional probability of a delisting by estimating a Logit model using observable firm characteristics to determine whether a firm is more likely to be delisted (the dependent variable takes a value of “1”) or not (the dependent variable takes a value of “0”).¹⁵ Table 7 shows that companies with higher trading volume and higher trading volume relative to their market capitalization, i.e. more liquid stocks, are more likely to stay public. Furthermore, stocks with a substantial number of days without any trading over the specific time period, indicated by a high zero-trade-ratio (ZTR), are more likely to be delisted. Considering stock return volatility, we find that companies can increase their survival by choosing a stock exchange with a low stock return volatility. However, a company is only able to choose a market segment and, we find that companies listed in the smaller segments Alternext, GEM, NASDAQ and AIM to the Entry Standard (indicated by the binary variable small cap segment) are more likely to suspend their listing. Overall, the

¹³ Extending the survivorship analysis to the alternative markets and looking at all new listings for the period from 1995 to 2004, the death ratio at AIM goes up to 80%. See Ahnefeld et al. (2006): Die Qualität von Marktsteigsegmenten am Beispiel des Alternative Investment Market, Bank Archiv, 54, pp. 799-812.

¹⁴ Note that the data analyzed here represents only a subsample of all IPOs having taken place at the respective exchanges. Furthermore, only IPOs are included into the analysis. Absolute numbers in this paragraph must therefore be interpreted carefully. In particular, it is important to realize that private placements are not considered for the analysis here.

¹⁵ The firm specific variables used within this Logit-regression are explained in more detail in section 4.2.2.

results of the Logit model indicate that the probability of delisting is a negative function of a stock's liquidity and, therefore, companies should favour large market segments at stock exchanges which provide a liquid trading.

	Model I		Model II	
	Coefficient	z-statistics	Coefficient	z-statistics
constant	-3.677 ***	-15.437	-3.557 ***	-16.269
small cap segment	0.541 **	2.487	0.428 *	1.941
log(market capitalization)	---	---	---	---
log(trading volume)	---	---	-0.171 ***	-4.220
trading volume relative to market capitalization	-8.357	-1.009	---	---
zero-trade-ratio	1.384 ***	3.284	---	---
stock return volatility	10.468 **	2.436	8.046 *	1.876
N	2,107		2,105	
Mc Fadden R ²	3.10%		3.64%	
LR statistic	26.408 ***		31.006 ***	

The sample covers listings between January 2001 and March 2008. The Logit regressions were run so that the dependent variable equals "0" if the company was delisted within the sample period (and "1" if the company was still listed at the end of March 2008). The target characteristics are: a dummy variable indicating that the issue was placed in a small cap segment; logarithm of market value (log(MV)); logarithm of trading volume (log(TVO)); the trading volume relative to the market value (TVO/MV); the number of days without any trading over the total number of observation days included in the sample per stock (zero-trade-ratio, ZTR) and the standard deviation of daily returns (stock return volatility, VOL). ***, **, and * indicates statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7: Logit-Model: Determinants of Delistings Probability

We also compared the number of firms that switched the market segment after their initial offering. Two firms decided to suspend their listing at LSE's Main Market in favour of AIM, while nine companies stepped up from AIM to the Main Market segment. Concerning the remaining European stock exchanges DBAG is the only one with a considerable share of firms (6.25%) that turned to the higher Prime/General Standard. Although this might be partly a size effect of growing firms, a change from DBAG's Entry Standard to the Prime/General Standard is associated with higher level information disclosure. Thus, only high-quality firms will attempt to separate themselves from low-quality firms by stepping up their market segment and signalling their quality.

Change of Segments		No. of Segment Changes	No. of IPOs	in %
London Stock Exchange	from AIM	9	408	2.21%
	from Main Market	2	90	2.22%
Euronext	from Eurolist	0	117	0.00%
	from Alternext	0	61	0.00%
Deutsche Börse	from Prime/General Std.	0	104	0.00%
	from Entry Std.	4	64	6.25%

Table 8: Change of segments across the three European stock exchanges between January 2001 and March 2008

2.2 The cost of capital framework¹⁶

If a company decides to go public, then it incurs two different types of costs, which are illustrated in Figure 7: (a) the costs associated directly with the IPO, i.e. the costs of going public, and (b) the costs associated with being a listed firm including the costs associated with a future seasoned equity offering (SEO). According to the financial economics literature these costs are split-up in direct and indirect components. As direct costs all expenses related to the listing decision are considered. Most importantly, underwriting fees paid to the lead investment bank as well as to lawyers and auditors are major items belonging to the direct costs. Other direct costs components are fees paid to the stock exchange, advertising and press costs and expenses incurred to comply with disclosure and corporate governance rules. The most prominent indirect costs component is the impact of the listing decision on the equity valuation.

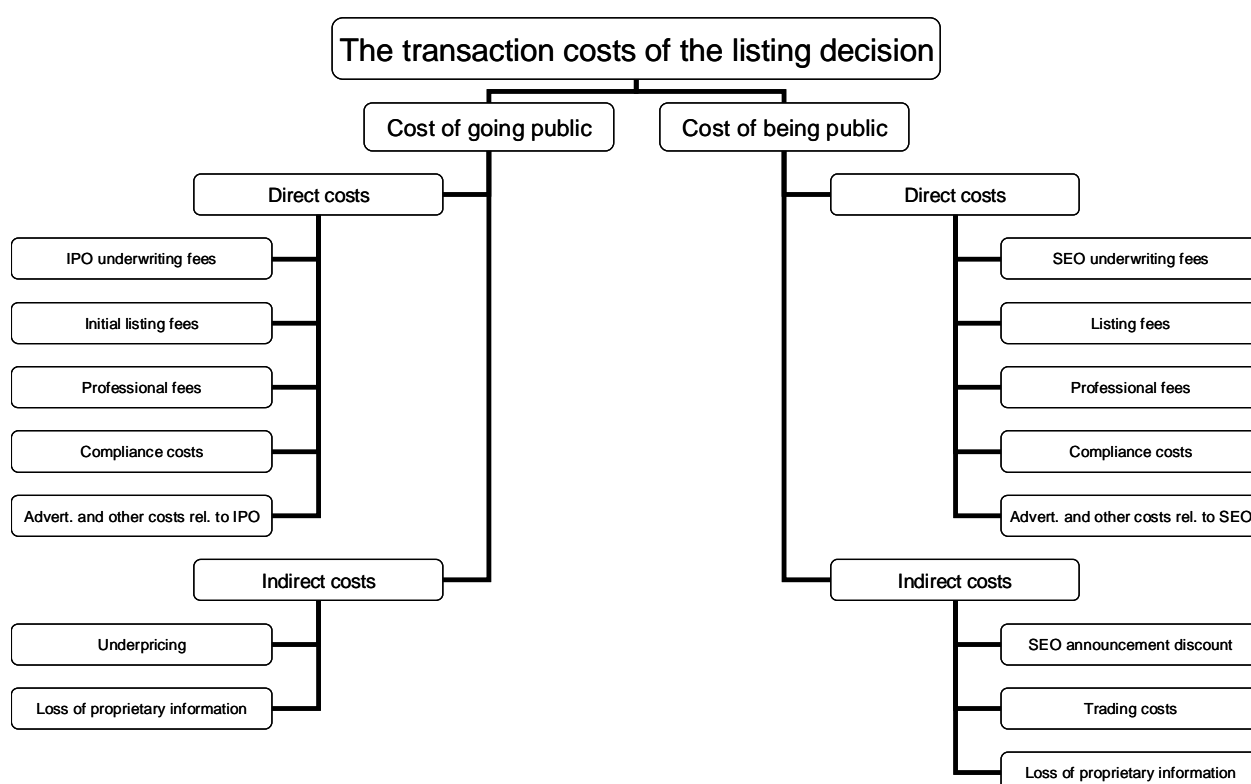


Figure 7: Direct and indirect transaction costs associated with the listing decision¹⁷

In the preceding study of Kaserer/Schiereck (2006) a formal framework for analysing the impact of the cost of going or being public on the overall cost of capital of a company has been developed. Such a framework allows putting different cost items in relation to each other by quantifying their impact on the overall cost of capital of the company. This is vital, as different markets might have cost advantages for some items and disadvantages for others. Comparing these markets necessarily implies the need to figure out, what the overall impact on the

¹⁶ This Section is quite similar to Section 2.2 in Kaserer/Schiereck (2007), Going Public and Being Public - A Global Comparison of the Impact of the Listing Decision on the Cost of Capital, and Section 2.2 in Kaserer/Schiereck (2006), Deutsche Börse: Going Public and Being Public. The Impact of the Listing Decision on the Cost of Capital – An International Comparison, Frankfurt.

¹⁷ Cf. also Oxera (2006), The Cost of Capital – An International Comparison, Oxford, p. 14.

firm's cost of capital will be. As the (academically) interested reader could easily apply the results presented here to that formal model, we decided not to repeatedly present this model again in this follow-on study. Instead, following Kaserer/Schiereck (2007) we propose a simpler scoring model that allows making a comparison between different stock exchanges along the different cost items presented in Figure 7. The structure of this scoring model will be explained in section 5.

It should be noted that two indirect cost items are not included in our scoring model. More specifically, we neither consider the impact of the listing venue on the underpricing nor on the equity valuation in general. Of course, it could be argued that because of adverse selection or moral hazard issues the firm has to offer its stocks at a discount, leading to the well known phenomenon of underpricing, in case of an IPO, or a negative announcement reaction of the stock price in case of a SEO.¹⁸ Although these kind of indirect costs have to be taken into account for the decision whether to raise equity on public markets, it is rather questionable whether the listing venue may have any influence on these indirect costs.¹⁹ According to recent evidence presented by behavioural economists, it is even questionable whether companies are able to manage underpricing at all. In fact, there is evidence that the underpricing phenomenon is driven by market sentiment, at least to some extent. In fact, new shares issued during hot market periods are more likely to suffer from long-run underpricing than shares offered in less optimistic markets.²⁰ Similar considerations apply to the stock market reactions to SEO announcements. Although we will present pertinent empirical evidence in this study, we strongly doubt that these types of indirect costs are a manageable cost component associated with the listing venue.

Evidently, the assessment is totally different as far as trading costs are concerned. The transaction costs that are induced by the investors' buy and sell orders reduce the gross returns of equity investments. As investors maximize the net returns of their portfolio trades, transaction costs influence the required gross returns of companies that raise equity via the stock market.²¹ The higher the transaction costs the higher the required gross returns for equity raising companies. Domowitz/Steil (2001) estimate that a 10% increase in transaction costs will lead to a 1.4 to 1.7% increase in the post-tax cost of equity capital. Consistently with this estimate a number of empirical studies observe a positive relationship between returns and trading costs.²²

¹⁸ These are two well documented phenomena in corporate finance; for an overview cf. Berk/De Marzo (2007), *Corporate Finance*, Boston et al., pp. 757 n.

¹⁹ To the extent that disclosure rules are different on different stock exchanges there may be such an impact. However, it would be extremely difficult to isolate the value effect of specific disclosure rules. Moreover, it should be noted that on EU-regulated market these differences are quite small.

²⁰ Cf. Ljungqvist/Nanda/Singh (2006), Hot markets, investor sentiment, and IPO pricing, *Journal of Business* 79, pp. 1667-1702, and Lowry/Schwert (2002), IPO market cycles: bubbles or sequential learning?, *Journal of Finance* 57, pp. 1171-1200.

²¹ See e.g. Amihud/Mendelson (1986), Asset Pricing and the Bid-Ask Spread, *Journal of Financial Economics* 17, pp. 223-249.

²² Consistent with the „liquidity hypothesis“ the following authors provide supporting empirical evidence: Amihud/Mendelson (1989), The Effects of Beta, Bid-Ask Spread, Residual Risk, and Size on Stock Returns, *Journal of Finance* 44, pp. 479-486, Eleswarapu (1997), Cost of Transacting and Expected Returns in the NASDAQ Market, *Journal of Finance* 52, pp. 2113-2127, Brennan/Subrahmanyam (1996), Market Microstructure and Asset Pricing, *Journal of Financial Economics* 41, pp. 441-464, Amihud/Mendelson/Lauterbach (1997), Market microstructure and securities values: Evidence from the Tel Aviv Stock Exchange, *Journal of Financial Economics* 45, pp. 365-390, Domowitz/Glen/Madhavan (2001), Liquidity, Volatility and Equity Trading Costs Across Countries and Over Time, *International Finance* 4, pp. 221-255.

3. The cost of going public

3.1 Direct costs

This part of the study is an extension of section 3.1 in Kaserer/Schiereck (2007).²³ As there, flotation costs and admission fees of six among the largest stock exchanges in the world are recorded. Specifically, Deutsche Börse, London Stock Exchange, Euronext, NYSE, NASDAQ and Hong-Kong Stock Exchange have been analyzed. The difference to Kaserer/Schiereck (2007) is mainly that the research period has been extended to the end of the first quarter of 2008. Hence, the total research period in this study goes from 01/01/1999 to 03/31/2008. It should be noted, therefore, that the sample used in this part of the study is different from the sample used in section 2.1. This is mainly due to the fact that for coming up with statistically robust results it was necessary to analyse a large number of new issues over a longer period. Moreover, it should be noted that because of missing data we could only analyse a sample of new issues and were not able to cover the whole universe of all new issues undertaken at the stock exchanges under consideration here.

3.1.1 Flotation costs

It has been shown in Figure 7 that the direct cost of going public can be split-up in underwriting fees, professional fees, initial listing costs, compliance costs, and advertising and other costs. While underwriting fees regularly are disclosed in the prospectus or in the registration document, it is not that clear how to get reliable information on the other cost items. However, in some cases the prospectus or registration document gives information about underwriting and non-underwriting costs. It can be assumed that non-underwriting fees reflect professional fees, initial listing costs, advertising costs, and other expenses directly related to the IPO. Of course, to the extent that an IPO generates internal costs, e.g. because the financial department of the company has to be increased due to new disclosure rules it has to comply with, they are not disclosed in the prospectus. Hence, one should be aware that a comprehensive estimation of non-underwriting flotation costs is certainly not possible. With the exception of NYSE and NASDAQ we report the total flotation costs not only for the exchanges but also for different market segments for large and small cap firms, which will be put under a separate scrutiny in this study. For the sake of completeness we artificially define the NASDAQ and NYSE small (large) cap segment consisting of those new issues with an issue volume of up to (larger than) 100 million Euros. Specifically, we recorded information on gross proceeds and total IPO flotation costs. In some cases information about gross spreads paid to the lead investment bank, i.e. underwriting fees, and other expenses, i.e. non-underwriting fees, were disclosed separately. Unfortunately, for the European new issues this additional information could be recorded only exceptionally. Data has been collected from the Thomson One Banker database as well as from hand-collected prospectuses or registration documents available at the websites of the stock exchanges, the financial supervision authority or the company itself.

In this study we analyse the flotation costs of new issues undertaken at Deutsche Börse, London Stock Exchange, Euronext, NYSE, NASDAQ and Hong-Kong Stock Exchange. The same data as used in Kaserer/Schiereck (2007) is also used here. For this study, however, we

²³ Cf. Kaserer/Schiereck (2007), *Going Public and Being Public - A global Comparison on the Impact of the Listing Decision on the Cost of Capital*.

extended the covered period to the end of the first quarter of 2008. Over all exchanges, we report the costs for 369 additional new issues resulting in a total sample size of 2,668 issues. A resume of the data is given in Table 9. As one can see, roughly 60% of the new issues in the sample are related to the US market, while about 25% are related to the European stock market. This bias in favour of the US market is simply related to the fact that data availability is much better there.²⁴

	no of obs.	Mean issue volume (m€)	Median issue volume (m€)
Deutsche Börse	172	163.75	45.04
Prime/General Standard	69	271.01	107.00
Neuer Markt	75	120.62	40.57
Entry Standard	28	14.97	11.64
Euronext	121	257.97	17.50
Eurolist	81	380.29	54.60
Alternext	40	10.26	9.00
Hong Kong Stock Exchange (HKEX)	394	145.92	21.63
Main Board	260	211.18	51.02
GEM	134	19.30	7.13
London Stock Exchange (LSE)	435	123.83	40.35
Main Market	185	225.65	87.63
AIM	250	48.49	15.04
NASDAQ	1146	96.73	66.32
Small Caps (<100 m€)	845	56.24	54.90
Large Caps (=>100 m€)	301	210.40	146.61
NYSE	400	444.27	203.59
Small Caps (<100 m€)	55	77.53	76.53
Large Caps (=>100 m€)	345	502.73	239.14
ALL	2668	172.15	67.67

Table 9: New issues analyzed in this study covering the period 01/01/1999 to 03/31/2008²⁵

Due to this procedure one would expect that the differences to the results obtained in the preceding study of Kaserer/Schiereck (2007) should be small. In fact, according to a regression analysis not reported here, costs did not change at all at the LSE and the NYSE, and only minor changes took place at the NASDAQ and the DBAG. For Euronext, however, a reduction in the flotation costs of 1.17 percentage points could be found, after controlling for all influences coming from issue size, share of secondary shares, etc. Similarly, for the HKEX we find an increase of 1.90 percentage points. It must be noted, however, that with the exception of the increase at the HKEX none of these changes are statistically significant at a 10 percent level. We thus conclude that with the exception of HKEX there has been no systematic change in total flotation costs during the one-year period from 04/01/2007 to 03/31/2008 compared with the period 01/01/1999 to 03/31/2007.

²⁴ The reader should note that the total number of IPOs is larger than the number of issues taken into consideration here. For the exchanges analyzed here, we have simply taken all the new issues where we have been able to collect at least the issue data, offering proceeds as well as total flotation costs.

²⁵ IPOs that have taken place before the introduction of the Prime Standard and General Standard segments in the year 2003 at Deutsche Börse were subsumed under these two segments, if the new shares were listed under the rules of the segments "Amtlicher Handel" or "Geregelter Markt". New issues at the former small cap segments at Euronext, i.e. Nouveau Marché, have not been taken into account as no data was available for these issues.

3.1.1.1 Deutsche Börse

The results with respect to IPOs at Deutsche Börse are resumed in Table 10 and Table 11. As one can see, the mean total flotation costs are equal to 8.42% which is a slow rise compared to the average of 8.30% recorded in Kaserer/Schiereck (2007). Kaserer/Kraft (2003) reported slightly smaller total flotation costs for German new issues over the period 1993-99 of 7.77%.²⁶ The median firm incurs a cost of 7.83% of gross offering proceeds, which is very close to the 7.88% presented in Kaserer/Schiereck (2007) and to the 7.30% presented in Kaserer/Kraft (2003). Interestingly, for the subsample of 48 firms, where we have been able to collect information on the gross spread, the median underwriting fees are equal to 4.75%, which is slightly lower than the 5.00% presented in Kaserer/Kraft (2003). The median non-underwriting fees are equal to 2.69%, which is perceptibly higher than the 2.16% presented in Kaserer/Kraft (2003). Although no clear conclusion about any time pattern can be drawn from this, it might be that the slight increase in total flotation costs since the nineties is caused by an increase in the other expenses rather than in the underwriting fees.

Moreover, it can be seen that flotation costs are lower at the Prime/General Standard segment compared with the Entry Standard. This is mainly due to a size effect²⁷, as can be seen from Table 11. There, the flotation costs for different size brackets are presented. As expected, flotation costs monotonically decrease with larger issue size.²⁸ While in the highest size bracket average flotation costs sum up to 4.66%, they are almost twice as high for the companies in the smallest size bracket.

	Market	n	mean	weighted mean	median
Gross Proceeds (m€)	All	172	163.75		45.04
	Prime/General	69	271.01		107.00
	Neuer	75	120.62		40.57
	Entry	28	14.97		11.64
Total Costs	All	172	8.42%	5.18%	7.83%
	Prime/General	69	7.47%	4.64%	6.54%
	Neuer	75	8.56%	6.15%	8.29%
	Entry	28	10.38%	8.27%	9.17%
Other Expenses	All	48	3.33%	2.31%	2.69%
Gross Spread	All	48	4.56%	3.16%	4.75%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 10: Flotation costs in percent of gross offering proceeds at Deutsche Börse over the period 01/01/1999 to 03/31/2008

²⁶ Cf. Kaserer/Kraft (2003), How issue size, risk, and complexity are influencing external financing costs - German IPOs analyzed from an Economies of Scale Perspective, *Journal of Business Finance and Accounting* 30, pp. 479-512.

²⁷ For an academic discussion of the existence of economies of scale in the investment banking technology cf. Kaserer/Kraft (2003), How issue size, risk, and complexity are influencing external financing costs - German IPOs analyzed from an Economies of Scale Perspective, *Journal of Business Finance and Accounting* 30, pp. 479-512.

²⁸ This is not true for all subsamples in Table 8. Most probably this is due to the fact that for some subsamples the number of observations is extremely small.

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	172	163.75		45.04
	Other Expenses	48	3.33%	2.31%	2.69%
	Gross Spread	48	4.56%	3.16%	4.75%
	Total Costs	172	8.42%	5.18%	7.83%
0-100 (m€)	Other Expenses	31	3.84%	3.23%	3.30%
	Gross Spread	31	5.29%	5.03%	5.00%
	Total Costs	125	9.41%	8.36%	8.67%
100 - 250 (m€)	Other Expenses	7	2.11%	1.86%	1.49%
	Gross Spread	7	3.82%	3.66%	4.25%
	Total Costs	21	6.80%	6.41%	5.59%
250 - 500 (m€)	Other Expenses	3	3.27%	3.36%	2.47%
	Gross Spread	3	3.00%	2.89%	3.25%
	Total Costs	13	5.23%	5.27%	4.70%
over 500 (m€)	Other Expenses	7	2.34%	2.01%	2.81%
	Gross Spread	7	2.74%	2.73%	3.00%
	Total Costs	13	4.66%	3.98%	4.69%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 11: Flotation costs in percent of gross offering proceeds at Deutsche Börse over the period 01/01/1999 to 03/31/2008 according to issue size

Finally, it should be noted that we do not find any evidence for a clustering of gross spreads on the German market.²⁹ The mode³⁰ of the underwriting spread is 5%; however, in only 13% of the cases the gross spread was exactly equal to the mode.

²⁹ It has been argued in the literature that gross spreads are clustered at some widely accepted figures. For instance, the so called 7%-rule is a well documented phenomenon for the US; cf. Hansen (2001), Do Investment Banks Compete in {IPOs}?: The Advent of the '7% plus contract', Journal of Financial Economics 59, pp. 313-346. Torstila (2001), What determines the IPO gross spreads in Europe, European Financial Management 7, pp. 523-541, documents that clustering is not a widespread phenomenon in European IPOs.

³⁰ The mode is the most frequent value assumed by a random variable.

3.1.1.2 London Stock Exchange

The results with respect to new issues at the London Stock Exchange are resumed in Table 12. Table 13 and Table 14 report the costs for the Main Market and the AIM respectively.

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	435	123.83		40.35
	Other Expenses	53	5.27%	4.85%	4.80%
	Gross Spread	54	3.70%	2.97%	3.38%
	Total Costs	435	12.17%	6.93%	9.00%
0-100 (m€)	Other Expenses	18	7.90%	7.60%	7.33%
	Gross Spread	18	3.65%	3.32%	3.50%
	Total Costs	318	14.24%	9.18%	11.00%
100 - 250 (m€)	Other Expenses	19	3.74%	3.64%	3.36%
	Gross Spread	19	4.28%	4.09%	4.38%
	Total Costs	74	6.65%	6.53%	6.18%
250 - 500 (m€)	Other Expenses	7	3.38%	3.41%	3.30%
	Gross Spread	8	3.38%	3.32%	3.50%
	Total Costs	24	6.44%	6.14%	5.65%
over 500 (m€)	Other Expenses	9	4.71%	5.20%	4.93%
	Gross Spread	9	2.85%	2.63%	3.00%
	Total Costs	19	6.22%	6.49%	5.94%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 12: Flotation costs in percent of gross offering proceeds at London Stock Exchange over the period 01/01/1999 to 03/31/2008

As one can see from Table 12, the mean total flotation costs are equal to 12.17% which is a slight reduction compared to the average of 12.59% recorded in Kaserer/Schiereck (2007). The median firm incurs a cost of 9.00% of gross offering proceeds, which is almost one percentage point less than in the preceding study (9.94%). For the subsample of 53 firms, where we have been able to collect the relevant information, the median non-underwriting fees are equal to 4.80%, while the median gross spread is equal to 3.38%. It should be noted that these results are in line with results presented by Oxera (2006).³¹ By using a recent sample of 84 IPOs covering the period 2003 to 2005 they find an average spread of 3.6%. The mode of the underwriting spread is 3%, but again only a relatively small fraction of 15% of the issues under consideration had a gross spread exactly equal to that figure. While in the highest size

³¹ Oxera (2006), The cost of capital: An international comparison, Oxford.

bracket average flotation costs sum up to 6.22%, they are equal to 14.24%, i.e. more than twice as high, for the companies in the smallest size bracket.

Not surprisingly, the flotation costs are lower at the Main Market segment compared with the Alternative Investment Market (AIM). This is mainly due to a size effect, as can be seen from a comparison of Table 13 and Table 14, where the flotation costs for different size brackets are presented for each market segment individually. As expected, flotation costs decrease monotonically with larger issue size.

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	185	225.65		87.63
	Other Expenses	47	5.04%	4.87%	4.52%
	Gross Spread	48	3.49%	2.93%	3.24%
	Total Costs	185	8.57%	6.96%	7.33%
0-100 (m€)	Other Expenses	15	7.46%	7.61%	7.15%
	Gross Spread	15	3.18%	3.21%	3.25%
	Total Costs	102	9.87%	8.71%	8.63%
100 - 250 (m€)	Other Expenses	16	4.18%	3.60%	4.19%
	Gross Spread	16	3.68%	4.01%	3.16%
	Total Costs	48	7.22%	7.04%	6.84%
250 - 500 (m€)	Other Expenses	7	3.38%	3.41%	3.30%
	Gross Spread	8	3.38%	3.32%	3.50%
	Total Costs	18	6.72%	6.29%	6.14%
over 500 (m€)	Other Expenses	9	4.71%	5.20%	4.93%
	Gross Spread	9	2.85%	2.63%	3.00%
	Total Costs	17	6.53%	6.73%	5.99%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 13: Flotation costs in percent of gross offering proceeds at LSE's Main Market over the period 01/01/1999 to 03/31/2008 for different size brackets

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	250	48.49		15.04
	Other Expenses	6	7.09%	4.06%	6.01%
	Gross Spread	6	5.38%	4.71%	5.60%
	Total Costs	250	14.83%	6.82%	11.11%
0-100 (m€)	Other Expenses	3	10.11%	7.52%	9.68%
	Gross Spread	3	5.97%	6.44%	6.19%
	Total Costs	216	16.31%	9.71%	12.70%
100 - 250 (m€)	Other Expenses	3	4.07%	3.83%	3.66%
	Gross Spread	3	4.78%	4.59%	4.78%
	Total Costs	26	5.59%	5.57%	5.04%
250 - 500 (m€)	Other Expenses				
	Gross Spread				
	Total Costs	6	5.58%	5.65%	4.36%
over 500 (m€)	Other Expenses				
	Gross Spread				
	Total Costs	2	3.58%	3.21%	3.58%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 14: Flotation costs in percent of gross offering proceeds at LSE's Alternative Investment Market (AIM) over the period 01/01/1999 to 03/31/2008 for different size brackets

3.1.1.3 Euronext

The results with respect to new issues at Euronext are resumed in Table 15. As one can see, the mean total flotation costs are equal to 7.49% which is almost similar to the 7.56% reported in Kaserer/Schiereck (2007). The median firm incurs a cost of 6.56% of gross offering proceeds, which is the virtually the same as in the preceding study. For the subsample of 41 firms, where it was feasible to collect the relevant information, the median non-underwriting fees are equal to 1.89%, while the median gross spread is equal to 3.44%. Again, no clustering in gross spreads can be detected as the mode does not even exist. Not surprisingly, the flotation costs are lower at the Eurolist segment compared with the Alternext segment. As expected, flotation costs decrease in issue size.³² While in the higher size bracket average flotation costs sum up to 3.84%, they are equal to 8.46%, i.e. more than twice as high, for the companies in the lower size bracket.

³² Note that due to the concentration of more than 80% for all issues in the size bracket going up to 100 m€, it makes no sense to record the figures for the same grid as was done in Table 13.

		Market	n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	All	121	257.97		17.50
		Eurolist	81	380.29		54.60
		Alternext	40	10.26		9.00
	Total costs	All	121	7.49%	4.01%	6.56%
		Eurolist	81	6.97%	3.97%	5.46%
		Alternext	40	8.55%	6.74%	7.56%
	Other Expenses	All	41	2.91%	1.63%	1.89%
	Gross Spread	All	41	4.53%	2.47%	3.44%
	0 - 100 (m€)	Other Expenses	All	28	3.55%	2.46%
Gross Spread		All	28	5.47%	3.51%	4.03%
Total costs		All	96	8.46%	6.35%	7.55%
over 100 (m€)	Other Expenses	All	13	1.54%	1.59%	1.52%
	Gross Spread	All	13	2.50%	2.43%	2.55%
	Total costs	All	25	3.84%	3.82%	3.91%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 15: Flotation costs in percent of gross offering proceeds at Euronext over the period 01/01/1999 to 03/31/2008

3.1.1.4 New York Stock Exchange

The results with respect to IPOs at the New York Stock Exchange are resumed in Table 16. As one can see, the mean total flotation costs are equal to 7.78%. The median firm incurs a cost of 7.77% of gross offering proceeds. These results are very similar to those reported in Kaserer/Schiereck (2007). For the NYSE, it was also possible to record non-underwriting fees for the whole sample. Median non-underwriting fees are equal to 1.24%. The median gross spread is equal to 6.50%, the mode is equal to 7%. It turns out that in one third of all issues the gross spread is exactly equal to 7%. Hence, at NYSE a strong clustering-effect is present.³³

In order to get an idea to what extent flotation costs are affected by a size effect, Table 16 splits up the data in different size brackets. Once again, it can be shown that flotation costs monotonically decrease in size. While in the highest size bracket (larger than 500 million Euros) average flotation costs sum up to 5.49%, they are equal to 10.13%, i.e. almost twice as high, for the small cap size bracket (up to 100 million Euros).

³³ This is in accordance with the findings of Hansen (2001), Do Investment Banks Compete in {IPOs}?: The Advent of the '7% plus contract', Journal of Financial Economics 59, pp. 313-346.

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	400	444.27		203.59
	Other Expenses	400	1.61%	0.89%	1.24%
	Gross Spread	400	6.17%	4.95%	6.50%
	Total Costs	400	7.78%	5.84%	7.77%
0-100 (m€)	Other Expenses	55	3.18%	3.16%	2.88%
	Gross Spread	55	6.94%	6.95%	7.00%
	Total Costs	55	10.13%	10.11%	9.79%
100 - 250 (m€)	Other Expenses	180	1.76%	1.70%	1.54%
	Gross Spread	180	6.59%	6.58%	7.00%
	Total Costs	180	8.35%	8.28%	8.33%
250 - 500 (m€)	Other Expenses	93	1.08%	1.07%	0.91%
	Gross Spread	93	5.96%	5.94%	6.00%
	Total Costs	93	7.05%	7.01%	7.00%
over 500 (m€)	Other Expenses	72	0.70%	0.54%	0.54%
	Gross Spread	72	4.79%	4.14%	4.75%
	Total Costs	72	5.49%	4.68%	5.48%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 16: Flotation costs in percent of gross offering proceeds at NYSE over the period 01/01/1999 to 03/31/2008 for different size brackets

3.1.1.5 NASDAQ

The results with respect to IPOs at the NASDAQ are resumed in Table 17. As one can see, the mean total flotation costs are equal to 9.63%. The median firm incurs a cost of 9.08% of gross offering proceeds. As with the NYSE, we do not record results which are substantially different from the preceding study. Median non-underwriting fees are equal to 2.12%. The median and mode gross spread is equal to 7%, which is not surprising, as in 87% of the issues the gross spread was exactly 7%. This once again confirms the 7%-rule prevalent in the US investment banking industry.

In order to get an idea to what extent flotation costs are affected by a size effect, we again split up the data in different size brackets.³⁴ As already emphasized, also for the NASDAQ flotation costs monotonically decrease in issue size. While in the highest size bracket average flotation costs sum up to 5.72%, they are equal to 10.21% for the companies in the lowest size bracket, which means higher by a factor of 1.8 compared with the costs for the companies in the highest size bracket.

³⁴ Because of the high concentration in the size bracket up to 100 million Euros, we decided to use different size brackets in Table 17.

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	1146	96.73		66.32
	Other Expenses	1146	2.73%	1.77%	2.12%
	Gross Spread	1146	6.91%	6.53%	7.00%
	Total Costs	1146	9.63%	8.30%	9.08%
0-100 (m€)	Other Expenses	845	3.22%	2.69%	2.53%
	Gross Spread	845	6.98%	6.98%	7.00%
	Total Costs	845	10.21%	9.67%	9.50%
100 - 250 (m€)	Other Expenses	257	1.44%	1.39%	1.25%
	Gross Spread	257	6.83%	6.81%	7.00%
	Total Costs	257	8.27%	8.20%	8.18%
250 - 500 (m€)	Other Expenses	29	0.77%	0.75%	0.72%
	Gross Spread	29	6.33%	6.25%	6.25%
	Total Costs	29	7.09%	7.01%	7.29%
over 500 (m€)	Other Expenses	15	0.51%	0.57%	0.44%
	Gross Spread	15	5.21%	4.75%	5.25%
	Total Costs	15	5.72%	5.32%	5.82%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 17: Flotation costs in percent of gross offering proceeds at NASDAQ over the period 01/01/1999 to 03/31/2008 for different size brackets

3.1.1.6 Hong-Kong Stock Exchange

The results with respect to new issues at the Hong-Kong Stock Exchange are resumed in Table 18. Table 19 and Table 20 report the results for the Main Board and the Growth Enterprise Market (GEM) respectively.

As one can see in Table 18 the mean total flotation costs are equal to 13.96% which means a decrease of more than 60 basis points compared to the Kaserer/Schiereck (2007). The median firm incurs a cost of 10.89% of gross offering proceeds, being equivalent to a reduction of almost two percentage points compared to the last study. Also, for the Hong-Kong Stock Exchange sample we have been able to record non-underwriting fees for all the issues under consideration here. Median non-underwriting fees are equal to 8.09% and, therefore, extremely high. The median gross spread is 2.5% which is equal to the mode. Also at the Hong-Kong Stock Exchange there is a substantial clustering as in 50% of the issues the spread was exactly equal to 2.5%.

In order to get an idea to what extent flotation costs are affected by a size effect, Table 18 splits up the data in different size brackets.³⁵ Once again, it can be shown that flotation costs monotonically decrease in size. While in the highest size bracket average flotation costs sum up to 4.21%, they are equal to 16.49%, i.e. roughly four times as high, for the companies in the lowest size bracket.

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	394	145.92		21.63
	Other Expenses	394	10.95%	2.54%	8.09%
	Gross Spread	394	3.01%	2.72%	2.50%
	Total Costs	394	13.96%	5.27%	10.89%
0-100 (m€)	Other Expenses	298	13.43%	7.84%	11.76%
	Gross Spread	298	3.06%	2.88%	2.75%
	Total Costs	298	16.49%	10.72%	14.81%
100 - 250 (m€)	Other Expenses	52	4.46%	4.23%	2.99%
	Gross Spread	52	2.89%	2.86%	2.50%
	Total Costs	52	7.36%	7.09%	5.98%
250 - 500 (m€)	Other Expenses	21	2.28%	2.36%	1.86%
	Gross Spread	21	2.87%	2.86%	3.00%
	Total Costs	21	5.15%	5.23%	4.60%
over 500 (m€)	Other Expenses	23	1.47%	1.15%	1.32%
	Gross Spread	23	2.74%	2.63%	2.50%
	Total Costs	23	4.21%	3.79%	3.88%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 18: Flotation costs in percent of gross offering proceeds at HKEX, 01/01/1999 to 03/31/2008

³⁵ Because of the high concentration in the size bracket up to 100 m€ we decided to use the same size brackets as for the NASDAQ-sample.

Table 19 and Table 20 report the results for the market segments of the Hong Kong Stock Exchange separately. Not surprisingly, the average total flotation costs are on average higher at the GEM than at the Main Board. For the lowest size bracket, Table 19 reports mean total flotation costs of 13.29% for the Main Board, while Table 20 reports mean total flotation costs of 20.67% for the GEM - about 50% higher than at the Main Board. However, the differences in costs are at least to some extent caused by a lower median issue size at the GEM. There, the median issue size is 7.13 million Euros, while the median issue size at the Main Board is more than seven times as high. In fact, 96% of all issues taking place at the GEM have an offering size of less than 100 million Euros and there is not a single issue with an offering size of more than 500 million Euros.

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	260	211.18		51.02
	Other Expenses	260	8.04%	2.31%	5.12%
	Gross Spread	260	2.74%	2.70%	2.50%
	Total Costs	260	10.79%	5.00%	7.68%
0-100 (m€)	Other Expenses	169	10.59%	6.82%	8.21%
	Gross Spread	169	2.71%	2.73%	2.50%
	Total Costs	169	13.29%	9.56%	10.95%
100 - 250 (m€)	Other Expenses	49	4.61%	4.35%	3.01%
	Gross Spread	49	2.82%	2.80%	2.50%
	Total Costs	49	7.43%	7.15%	5.95%
250 - 500 (m€)	Other Expenses	19	2.21%	2.31%	1.79%
	Gross Spread	19	2.88%	2.87%	3.00%
	Total Costs	19	5.09%	5.18%	4.59%
over 500 (m€)	Other Expenses	23	1.47%	1.15%	1.32%
	Gross Spread	23	2.74%	2.63%	2.50%
	Total Costs	23	4.21%	3.79%	3.88%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 19: Flotation costs in percent of gross offering proceeds at the HKEX's Main Board over the period 01/01/1999 to 03/31/2008

		n	mean	weighted mean	median
Whole Sample	Gross Proceeds (m€)	260	19.30		7.13
	Other Expenses	260	16.60%	7.58%	15.78%
	Gross Spread	260	3.52%	3.33%	3.50%
	Total Costs	260	20.12%	10.92%	20.00%
0-100 (m€)	Other Expenses	169	17.15%	11.49%	16.73%
	Gross Spread	169	3.52%	3.41%	3.50%
	Total Costs	169	20.67%	14.90%	20.23%
100 - 250 (m€)	Other Expenses	49	2.00%	1.87%	2.51%
	Gross Spread	49	4.17%	4.07%	4.00%
	Total Costs	49	6.17%	5.93%	6.51%
250 - 500 (m€)	Other Expenses	19	2.88%	2.89%	2.88%
	Gross Spread	19	2.75%	2.78%	2.75%
	Total Costs	19	5.63%	5.67%	5.63%

Note that only for a subset of those new issues, where we have been able to collect information about total flotation costs, also information about other expenses or the gross spread could be recorded. Hence, the sum of the mean other expenses and the mean gross spread is not necessarily equal to the mean total flotation costs.

Table 20: Flotation costs in percent of gross offering proceeds at the HKEX's Growth Enterprise Market over the period 01/01/1999 to 03/31/2008 for different size brackets

3.1.1.7 Comparing flotation costs at different listing venues

Total flotation costs

In Figure 8 we compare median and mean total IPO flotation costs for different listing venues. In terms of the median, Euronext has clearly the lowest total flotation costs with 6.6%, while NYSE and Deutsche Börse are close to each other with 7.8%. LSE and NASDAQ seem to be more expensive with 9.0% resp. 9.1%, while Hong-Kong Stock Exchange is by far the most expensive listing venue among those considered here with average flotation costs of 10.9%. It is interesting to see that the ranking among the listing venues remains almost the same, if the mean flotation costs are used instead of the median flotation cost. Only NASDAQ and LSE switch ranks as LSE reports strongly higher mean flotation costs of 12.2%.

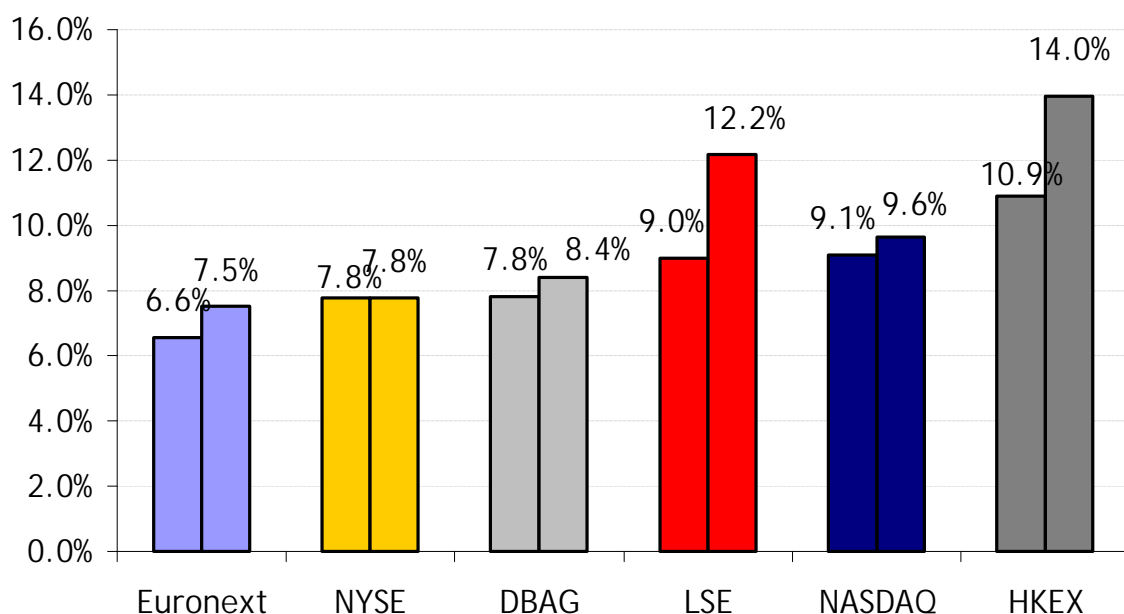


Figure 8: Median (first) and mean (second) total flotation costs for different listing venues over the period 01/01/1999 to 03/31/2008

Of course, one has to be careful with such a comparison. As it is well known, flotation costs are determined by different factors, especially by the size of the firm.³⁶ Due to the fact that it was not possible to construct our sample by a perfect random sampling process, and taking the underlying differences in the firm size distribution on the capital markets under consideration, it cannot be ruled out that there may be a selection bias. Indeed, a look at Table 9, p. 29, reveals that IPO proceeds are very much different among the different listing venues as well as the different market segments. For that reason we first look at flotation costs at different market segments, as with the exception of the US stock exchanges all others have segments targeted towards large and small cap firms. Second, we set up a regression model in order to control for all factors that do not depend on the listing venue.

Figure 9 gives total flotation costs for the large cap market segments of the exchange under consideration here. As neither NYSE nor NASDAQ have special market segments targeted towards large or small cap firms, we decided to artificially construct a large cap segment for these two exchanges. For that purpose we took the numbers recorded for issues larger than 100 million Euros as being representative for large cap issues. Accordingly, issues up to 100 million Euros were defined as being representative for small cap issues. Using the median flotation cost, one can see once again that the large cap segment at Euronext, called Eurolist, has the lowest initial flotation cost with 5.5%. The cost at the Frankfurt Prime/General Standard is 6.5%, which is clearly the second lowest figure. Then the other exchanges follow. Interestingly, it turns out that according to median IPO flotation costs NASDAQ is the most

³⁶ For a detailed analysis of the determinants of IPO flotation costs cf. among others, Altinkiliç/Hansen (2003), Discounting and Underpricing in Seasoned Equity Offers, *Journal of Financial Economics* 69, pp. 285-323, and Kaserer/Kraft (2003), How issue size, risk, and complexity are influencing external financing costs - German IPOs analyzed from an Economies of Scale Perspective, *Journal of Business Finance and Accounting* 30, pp. 479-512.

expensive exchange, while in terms of mean IPO flotation costs, the Main Board of the HKEX is clearly the most expensive large cap market segment.

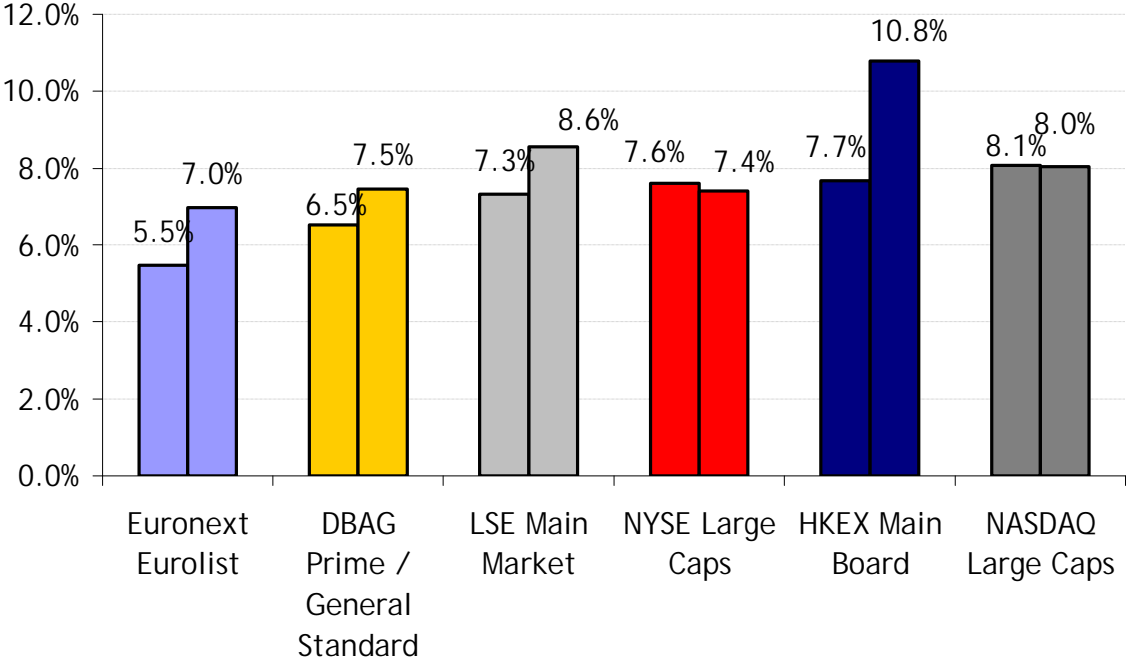


Figure 9: Median (first) and mean (second) total flotation costs for large cap market segments at different listing venues over the period 01/01/1999 to 03/31/2008

Figure 10 reports the total flotation costs for the small cap market segments. Again using the median flotation cost, one can see that the growth market segment at Euronext, called Alternext, has the lowest median flotation cost with 7.6%. The cost at the Deutsche Börse Entry Standard is 9.2%. Small issues at NASDAQ respectively NYSE incur higher median flotation costs of 9.5% respectively 9.8%. However, there is an even larger gap with respect to the AIM market as well as to the Growth Enterprise Market (GEM) at Hong-Kong Stock Exchange. Both markets are, irrespective of whether we focus on the median or mean flotation cost, extremely expensive. The companies on average have to pay between 11.1 and 20.0% of their flotation proceeds as underwriting fees and other issue expenses.

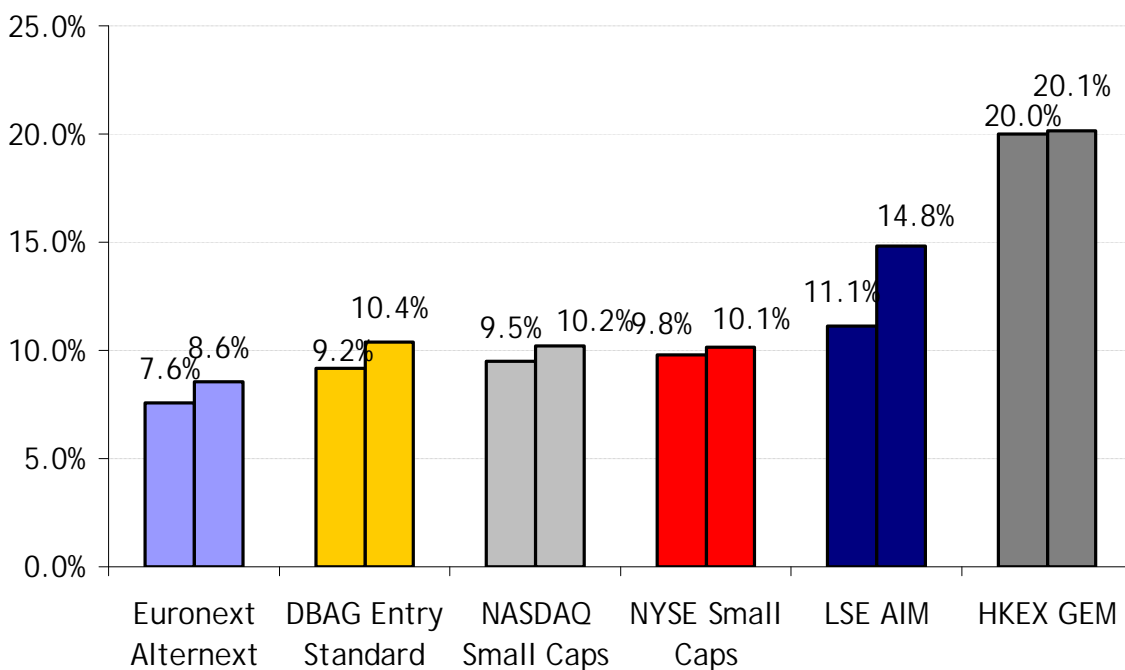


Figure 10: Median (first) and mean (second) total flotation costs for small cap market segments at different listing venues over the period 01/01/1999 to 03/31/2008

In order to exclude that our results are driven by a selection bias as well as to get an idea whether these differences in flotation costs are significant from a statistical point of view, we set up a linear regression model. We rely on academic literature showing that proceeds and the ratio of secondary shares offered to the public are the most important factors explaining flotation costs.³⁷ By using these variables we control for their impact on the flotation costs and, hence, we can test, whether flotation costs are significantly influenced by the listing venues. The results are given in Table 21. According to the adjusted R^2 the models are able to explain 30 to 37% of cross sectional variation in total flotation costs, which is not that bad. The base case is an IPO at Deutsche Börse. As we can see, total flotation costs are significantly higher at all other exchanges with the exception of Euronext and NYSE. The difference ranges between 1.8 percentage points (NASDAQ) and 5.3 percentage points (Hong-Kong Stock Exchange). On the other side, new issues at Euronext are cheaper by 1.6 percentage points at Euronext. The total flotation costs at the NYSE are not different from those at the DBAG from a statistical point of view.

³⁷ Cf. in this regard footnote 36 on p. 41.

Variable	All New Issues			Financial and Real Estate Issues excluded		
	Coefficient	Std. Error	Prob.	Coefficient	Std. Error	Prob.
Constant	0.077	0.004	0.000	0.079	0.004	0.000
Secondary Shares	0.002	0.005	0.691	-0.009	0.005	0.073
Gross Proceeds	0.000	0.000	0.000	0.000	0.000	0.000
1 / Gross Proceeds	0.167	0.007	0.000	0.149	0.006	0.000
NASDAQ	0.018	0.005	0.000	0.016	0.004	0.000
NYSE	0.008	0.005	0.131	0.006	0.005	0.215
LSE	0.024	0.005	0.000	0.024	0.005	0.000
HKEX	0.053	0.005	0.000	0.053	0.005	0.000
Euronext	-0.016	0.007	0.016	-0.014	0.006	0.036
adj. R-squared	0.300			0.318		
Observations	2,545			2,162		

Notes: Dependent variable is the ratio of total flotation costs to offering proceeds. Secondary shares give the ratio of secondary shares offered to total shares offered. Proceeds are total offering proceeds in million Euros. NASDAQ, NYSE, LSE, Hong-Kong Stock Exchange and Euronext are dummy variables set to “1”, if the new issue has taken place at one of these exchanges. The base case is an IPO at Deutsche Börse. In line with academic literature we exclude Financial and Real Estate Issue on the right hand side of the table.

Table 21: OLS-estimation results of total flotation costs over the period 01/01/1999 to 03/31/2008

Results are basically going in the same direction, if we further refine the model by using a dummy variable for all the market segments under consideration here. These results are reported on Table 22. The base case is an issue at the Prime/General standard of Deutsche Börse. As one can see, Eurolist and Alternext, the two market segments at Euronext, have lower flotation costs, although the difference is not significant in a statistical sense. At the market segments at the LSE and the HKEX, costs are significantly higher (in the range of 1.4 to 10.5 percentage points). Similar is true for small cap issues at both New York exchanges. However, there is no significant difference with respect to the flotation costs at the Frankfurt Entry Standard as well as the NASDAQ and NYSE large cap segments.

As outlined in 3.1.1, we do not find significant changes in costs since the preceding study. Only at the HKEX, we find weak evidence for an increase in costs of about 1.90 percentage points. We also do not find any trend in the data. Kaserer et al. (2008) however, recently document a statistically significant increase in total flotation costs at NASDAQ and NYSE since the introduction of the Sarbanes-Oxley Act (SOX) in 2002.³⁸ The authors find that SOX imposes additional non-underwriting expenses of about 500,000 USD or about 0.7 percentage points on average.

³⁸ Cf. Kaserer/Mettler/Obernberger (2008): “Has the Sarbanes-Oxley Act decreased the Adverse Selection Cost of Going Public”, Available at SSRN: <http://ssrn.com/abstract=1147138>.

Variable	All New Issues			Financial and Real Estate Issues excluded		
	Coefficient	Std. Error	Prob.	Coefficient	Std. Error	Prob.
Constant	0.077	0.004	0.000	0.074	0.007	0.000
Secondary Shares	0.002	0.005	0.691	0.000	0.005	0.930
Gross Proceeds	0.000	0.000	0.000	0.000	0.000	0.000
1 / Gross Proceeds	0.167	0.007	0.000	0.136	0.007	0.000
NASDAQ (Large Cap)	0.010	0.007	0.168	0.009	0.007	0.221
NASDAQ (Small Cap)	0.027	0.007	0.000	0.026	0.007	0.000
NYSE (Large Cap)	0.008	0.007	0.292	0.006	0.007	0.411
NYSE (Small Cap)	0.028	0.010	0.005	0.026	0.010	0.012
LSE AIM	0.040	0.008	0.000	0.040	0.008	0.000
LSE Main Market	0.014	0.008	0.073	0.019	0.008	0.017
HK GEM	0.105	0.008	0.000	0.101	0.008	0.000
HKEX Main Board	0.032	0.007	0.000	0.032	0.008	0.000
Eurolist	-0.013	0.009	0.148	-0.011	0.009	0.228
Alternext	-0.011	0.011	0.324	-0.009	0.010	0.373
Entry Standard	-0.005	0.012	0.711	-0.005	0.012	0.659
Neuer Markt	0.011	0.009	0.237	0.010	0.009	0.259
adj. R-squared	0.348			0.371		
Observations	2,545			2,162		

Notes: Dependent variable is the ratio of total flotation cost to offering proceeds. Secondary shares give the ratio of secondary shares offered to total shares offered. Proceeds are total offering proceeds in m€ NASDAQ (Large Cap), NASDAQ (Small Cap), NYSE (Large Cap), NYSE (Small Cap), AIM, Main Market, Main Board, GEM, Eurolist, Alternext and Entry Standard are also dummy variables, which are set to "1", if the new issue has taken place at one of these market segments. When using these dummy variables the base case is an IPO at the Prime/General market segment at Deutsche Börse. In line with academic literature we exclude Financial and Real Estate Issue on the right hand side of the table.

Table 22: OLS-estimation results of total flotation costs over the period 01/01/1999 to 03/31/2008

In order to present the results of this OLS-estimation in a more illustrative way, we use the parameter estimation presented in Table 22 for estimating the absolute flotation cost for issues with different proceeds.

First, this point estimation is done for the large cap segments. The results are presented in Table 23, where the ordering of the different exchanges is according to the size of flotation costs.³⁹ As one can see, the difference in absolute flotation costs can be substantial. While for a 250 million Euros issue the cost at Eurolist respectively Prime/General Standard is 15 million Euros respectively 18 million Euros, the cost is about 20 million Euros, if the same issue is done at NYSE, NASDAQ or the LSE Main Market. At the Hong-Kong Main Board the cost might even be larger than 26 million Euros.

³⁹ The reader should note that estimations are done based on the assumption that the ratio of secondary shares is equal to "0".

proceeds (m€)	100	250	500	1,000
Eurolist	6.35	14.90	27.23	44.70
Prime / General Standard	7.64	18.12	33.68	57.61
NYSE (Large Cap)	8.40	20.03	37.51	65.26
NASDAQ (Large Cap)	8.65	20.65	38.73	67.71
LSE Main Market	9.03	21.62	40.67	71.59
HKEX Main Board	10.86	26.18	49.79	89.83

Table 23: Point estimation of total flotation costs for different gross proceeds in the large cap segment (million Euros)

Almost the same ordering among the different stock exchanges applies for small cap market segments, as can be seen in Table 24. If one takes an issue of 50 million Euros as representative, the cost at Alternext or Entry Standard is 3.4 million Euros respectively 3.72 million Euros. For the NASDAQ and NYSE small cap segments it is about 5 million Euros, while for AIM it reaches almost 6 million Euros. Again, the most expensive exchange is Hong-Kong, as the same issue realized at GEM would have a total cost of more than 9 million Euros.

proceeds (m€)	10	25	50	100
Alternext	0.82	1.80	3.42	6.57
Entry Standard	0.89	1.96	3.72	7.18
NASDAQ (Small Cap)	1.20	2.74	5.29	10.32
NYSE (Small Cap)	1.22	2.78	5.37	10.49
LSE AIM	1.33	3.07	5.96	11.65
HK GEM	1.99	4.71	9.22	18.18

Table 24: Point estimation of total flotation costs for different gross proceeds in the small cap segment (million Euros)

Other expenses

As far as the analysis of the underwriting and non-underwriting fees is concerned, we would like to point out that this analysis should be treated carefully, as we already reported that we do not have many new issues at the European exchanges, for which this information was available. Hence, a pure comparison of mean or median values might be totally misleading. We therefore only compare these cost items on the basis of regression analysis, which has the additional advantage that we can directly control for the influence of the issue size.

Results are reported in Table 25. The model seems to work quite well, as we get an adjusted R^2 in the range of 42% to 45%. In the first regression, reported on the left-hand side of the table, we set an issue at Deutsche Börse as the base case. We find no statistically significant difference in the non-underwriting fees between Deutsche Börse, NYSE and NASDAQ. Actually, other expenses incurred at LSE and Hong-Kong Stock Exchange are significantly higher compared with Frankfurt, while issuers at Euronext profit from significantly lower non-underwriting fees.

Variable	All New Issues			Financial and Real Estate Issues excluded		
	Coefficient	Std. Error	Prob.	Coefficient	Std. Error	Prob.
Constant	0.019	0.007	0.004	0.020	0.007	0.006
Gross Proceeds	0.000	0.000	0.000	0.000	0.000	0.000
1 / Gross Proceeds	0.302	0.013	0.000	0.279	0.014	0.000
NASDAQ	0.003	0.007	0.601	0.004	0.007	0.610
NYSE	-0.001	0.007	0.851	-0.002	0.008	0.800
LSE	0.030	0.009	0.001	0.029	0.010	0.003
HKEX	0.066	0.007	0.000	0.069	0.008	0.000
Euronext	-0.022	0.010	0.022	-0.024	0.011	0.027
adj. R-squared	0.448			0.422		
Observations	2,081			1,811		

Notes: Dependent variable is the ratio of non-underwriting fees to offering proceeds. Proceeds are total offering proceeds in million Euros. NASDAQ, NYSE, LSE, HKEX and Euronext are dummy variables set to “1”, if the new issue has taken place at one of these exchanges. The base case is an IPO at Deutsche Börse. In line with academic literature we exclude Financial and Real Estate Issue on the right hand side of the table.

Table 25: OLS-estimation results of other expenses over the period 01/01/1999 to 03/31/2008

The regression results reported on Table 26 analyse the non-underwriting fees by different market segments. Here, the base case is an issue at the Prime/General Standard at Deutsche Börse. The refined model seems to work slightly better than the model presented on Table 25, as we get an adjusted R^2 in the range of 46% to 49%. The picture is pretty much the same, as issuers at both market segments of the Hong-Kong Stock Exchange and the LSE Main Market suffer from significantly higher other expenses. Similarly, the two market segments at Euronext have statistically significant lower non-underwriting fees. With respect to the market segments of the two New York exchanges there is no statistically significant difference.

Variable	All New Issues			Financial and Real Estate Issues excluded		
	Coefficient	Std. Error	Prob.	Coefficient	Std. Error	Prob.
Constant	0.027	0.010	0.006	0.027	0.011	0.016
Gross Proceeds	0.000	0.000	0.001	0.000	0.000	0.013
1 / Gross Proceeds	0.262	0.014	0.000	0.247	0.015	0.000
NASDAQ (Large Cap)	-0.014	0.010	0.169	-0.014	0.012	0.215
NASDAQ (Small Cap)	0.000	0.010	0.985	0.000	0.011	0.988
NYSE (Large Cap)	-0.011	0.010	0.258	-0.012	0.012	0.285
NYSE (Small Cap)	0.002	0.011	0.848	0.001	0.013	0.952
LSE AIM	0.016	0.020	0.419	0.022	0.023	0.344
LSE Main Market	0.024	0.012	0.042	0.022	0.013	0.098
HK GEM	0.100	0.011	0.000	0.098	0.012	0.000
HKEX Main Board	0.042	0.010	0.000	0.043	0.012	0.000
Eurolist	-0.024	0.013	0.058	-0.028	0.015	0.053
Alternext	-0.032	0.017	0.057	-0.031	0.018	0.095
Entry Standard	-0.057	0.021	0.006	-0.068	0.023	0.004
Neuer Markt	0.003	0.013	0.834	0.002	0.015	0.866
adj. R-squared	0.491			0.461		
Observations	2,081			1,811		

Notes: Dependent variable is the ratio of non-underwriting fees to offering proceeds. Proceeds are total offering proceeds in million Euros. NASDAQ (Large Cap), NASDAQ (Small Cap), NYSE (Large Cap), NYSE (Small Cap), AIM, Main Market, HK Main Board, HK GEM, Eurolist, Alternext and Entry Standard are also dummy variables, which are set to "1", if the new issue has taken place at one of these market segments. When using these dummy variables the base case is an IPO at the Prime/General market segment at Deutsche Börse. In line with academic literature we exclude Financial and Real Estate Issue on the right hand side of the table.

Table 26: OLS-estimation results of other expenses over the period 01/01/1999 to 03/31/2008

Gross spread

In the next step we look at the gross spread. Results are reported in Table 27 and Table 28. In this case our linear regression model seems to work even better, as we get an adjusted R^2 in the range of 81% to 82%. In the first regression, reported on the left-hand side of Table 27, we set an issue at Deutsche Börse as the base case. We find only a slight statistically significant difference in the underwriting fees between Deutsche Börse and Euronext of 0.4 percentage points. Issuers at NYSE and NASDAQ incur statistically significant higher gross spreads, while issuers at LSE and Hong-Kong Stock Exchange profit from statistically significant lower underwriting fees.

Variable	All New Issues			Financial and Real Estate Issues excluded		
	Coefficient	Std. Error	Prob.	Coefficient	Std. Error	Prob.
Constant	0.043	0.001	0.000	0.044	0.001	0.000
Gross Proceeds	0.000	0.000	0.000	0.000	0.000	0.000
1 / Gross Proceeds	0.065	0.002	0.000	0.067	0.002	0.000
NASDAQ	0.025	0.001	0.000	0.025	0.001	0.000
NYSE	0.020	0.001	0.000	0.020	0.001	0.000
LSE	-0.006	0.002	0.000	-0.006	0.002	0.000
HKEX	-0.018	0.001	0.000	-0.019	0.001	0.000
Euronext	-0.004	0.002	0.040	-0.004	0.002	0.018
adj. R-squared	0.806			0.811		
Observations	2,082			1,812		

Notes: Dependent variable is the ratio of non-underwriting fees to offering proceeds. Proceeds are total offering proceeds in million Euros. NASDAQ, NYSE, LSE, HKEX and Euronext are dummy variables set to “1”, if the new issue has taken place at one of these exchanges. The base case is an IPO at Deutsche Börse. In line with academic literature we exclude Financial and Real Estate Issue on the right hand side of the table.

Table 27: OLS-estimation results of gross spreads over the period 01/01/1999 to 03/31/2008

The regression results reported on the left-hand side of Table 28 analyse the non-underwriting fees by different market segments. Here, the base case is an issue at the Prime/General Standard at Deutsche Börse. Actually, the picture with respect to NYSE, NASDAQ, Hong-Kong Stock Exchange and Euronext is the same, while we do not find a statistically significant difference with respect to AIM or LSE Main Market. However, with respect to Euronext it changes, as both market segments seem to have lower underwriting fees than those that are prevalent at the Prime/General Standard at Deutsche Börse. As an additional insight it is interesting to see that at the Frankfurt Entry Standard underwriting fees are not significantly higher than at the Prime/General Standard, when controlling for issue size. However, issues at Neuer Markt (which has been dissolved several years ago) faced higher gross spreads than Prime or General Standard issues. Underwriting fees were thus apparently reflecting the higher risks associated with New Economy issues which were predominantly going public at the Neuer Markt.

Variable	All New Issues			Financial and Real Estate Issues excluded		
	Coefficient	Std. Error	Prob.	Coefficient	Std. Error	Prob.
Constant	0.036	0.002	0.000	0.036	0.002	0.000
Gross Proceeds	0.000	0.000	0.000	0.000	0.000	0.000
1 / Gross Proceeds	0.064	0.002	0.000	0.066	0.003	0.000
NASDAQ (Large Cap)	0.031	0.002	0.000	0.031	0.002	0.000
NASDAQ (Small Cap)	0.032	0.002	0.000	0.032	0.002	0.000
NYSE (Large Cap)	0.026	0.002	0.000	0.026	0.002	0.000
NYSE (Small Cap)	0.033	0.002	0.000	0.033	0.002	0.000
LSE AIM	0.011	0.004	0.003	0.014	0.004	0.001
LSE Main Market	0.000	0.002	0.916	0.000	0.002	0.963
HK GEM	-0.011	0.002	0.000	-0.011	0.002	0.000
HKEX Main Board	-0.011	0.002	0.000	-0.011	0.002	0.000
Eurolist	0.003	0.002	0.267	0.002	0.003	0.434
Alternext	0.006	0.003	0.037	0.006	0.003	0.059
Entry Standard	0.005	0.004	0.145	0.004	0.004	0.362
Neuer Markt	0.014	0.002	0.000	0.014	0.003	0.000
adj. R-squared	0.812			0.818		
Observations	2,082			1,812		

Notes: Dependent variable is the ratio of underwriting fees to offering proceeds. Proceeds are total offering proceeds in million Euros. NASDAQ (Large Cap), NASDAQ (Small Cap), NYSE (Large Cap), NYSE (Small Cap), AIM, Main Market, Main Board, GEM, Eurolist, Alternext and Entry Standard are also dummy variables, which are set to "1", if the new issue has taken place at one of these market segments. When using these dummy variables the base case is an IPO at the Prime/General market segment at Deutsche Börse. In line with academic literature we exclude Financial and Real Estate Issue on the right hand side of the table.

Table 28: OLS-estimation results of gross spreads over the period 01/01/1999 to 03/31/2008

3.1.2 Admission fees

Although admission fees regularly are assumed to be negligible, a closer look reveals that the differences can be quite substantial, as reported on Table 29.⁴⁰ While Deutsche Börse AG has fixed admission fees of 5,500 Euros at the Prime/General Standard, admission fees at the large cap market segments of the other stock exchanges are related either to market capitalization of the company or the number of shares to be listed. For a market capitalization of 1 billion Euros, admission fees at Eurolist are equal to 374,500 Euros making it the most expensive market segment for an issue of that size. However, the fees at the LSE Main Market as well as both New York exchanges are also substantially higher than at the Deutsche Börse.

As far as growth markets are concerned the picture is similar. The DBAG again offers the best conditions for its Entry Standard charging a fixed fee of 750 Euros to 1,500 Euros. All the other exchanges have again market capitalization or number of shares related fees, which

⁴⁰ With regard to the previous study, admission fees remained constant at all but the LSE's AIM. In the previous, we report admission fees to be constantly at 6,712 Euros. Note that LSE has increased the fees in spring 2008 also for its Main Market.

are substantially above the fee at the Entry Standard. Assuming a market capitalization of 50 million Euros, NYSE is by far the most expensive stock exchange. But even when looking at core growth markets only, it turns out that there is a perceptible difference between the Entry Standard at the one side and Alternext, AIM, and GEM at the other side.

Furthermore, there are only minor differences between costs for national and international offerings. In general, only LSE and Euronext distinguish between national and international issues within their fee schedules. As such, the minimum fee for international issues at the Main Market of the LSE is twice the one for national issues. At the Euronext, international issues have to pay a maximum fee of 300,000 Euros.

market cap (m€)	10	50	250	500	1,000
~ no. of shares	1,000,000	5,000,000	25,000,000	50,000,000	100,000,000
Deutsche Börse					
Prime / General Standard			5,500 €		
Entry Standard			750 - 1500€		
LSE					
Main Market - domestic	11,089 €	37,315 €	101,236 €	156,961 €	230,565 €
Main Market - international	22,203 €	37,315 €	101,236 €	156,961 €	230,565 €
AIM	9,508 €	22,630 €	54,580 €	78,042 €	89,438 €
NASDAQ	66,667 €	66,667 €	66,667 €	83,333 €	100,000 €
NYSE	100,000 €	100,000 €	100,000 €	160,000 €	166,667 €
Hong Kong Stock Exchange					
Main Board	15,000 €	25,000 €	50,000 €	65,000 €	65,000 €
GEM	10,000 €	15,000 €	20,000 €	20,000 €	20,000 €
Euronext					
Eurolist - domestic	10,000 €	34,000 €	124,000 €	224,000 €	374,500 €
Eurolist - international	10,000 €	34,000 €	124,000 €	224,000 €	300,000 €
Alternext - domestic	7,500 €	31,500 €	121,500 €	221,500 €	371,500 €
Alternext - international	7,500 €	31,500 €	121,500 €	300,000 €	300,000 €

Notes: For the calculation we looked at the fee schedules for domestic and international issuers of ordinary shares. For NASDAQ the fee schedule of the NASDAQ Global Market was used. LSE, Euronext and HKEX have fee schedules according to market capitalization. NASDAQ and NYSE have fee schedules according to the number of shares to be listed. Where necessary, we assumed an offer price of 10 Euros per share in order to compute an appropriate number of shares outstanding. The following exchange rates were used: 1 €=1.5 US-\$=1/1.35£=10 HK-\$.

Table 29: Admission fees by market capitalization, Source: Websites of Exchanges

3.1.3 International versus domestic issues

Yet to be determined is the question whether international new issues, i.e. where the country of origin of the issuer is different from the country where the listing takes place, face costs different from pure domestic new issues. For that purpose, we set up again a linear regression model, in which we control for offering size and the ratio of secondary shares. As base case we define international issues. The results of our estimations are reported in Table 30. It turns out that internationality does not impact the total flotation costs with the exception of the LSE, where a domestic issue has a total flotation cost which is higher by 3.1 percentage points compared to an international issue.

Variable	Euronext		DBAG		LSE	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Constant	0.068	0.000	0.079	0.000	0.090	0.000
Secondary Shares	-0.041	0.000	0.003	0.811	0.006	0.727
Gross Proceeds	0.000	0.391	0.000	0.002	0.000	0.015
1 / Gross Proceeds	0.127	0.000	0.135	0.000	0.131	0.000
domestic Issue	0.004	0.781	0.000	0.983	0.031	0.001
adj. R-squared	0.534		0.368		0.243	
Observations	119		171		402	

Variable	HKEX		NASDAQ		NYSE	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Constant	0.078	0.000	0.079	0.000	0.063	0.000
Secondary Shares	0.000	0.980	-0.001	0.793	-0.001	0.733
Gross Proceeds	0.000	0.042	0.000	0.011	0.000	0.000
1 / Gross Proceeds	0.789	0.000	1.248	0.000	2.702	0.000
domestic Issue	-0.005	0.550	-0.004	0.167	0.002	0.159
adj. R-squared	0.580		0.308		0.564	
Observations	380		1098		370	

Notes: Dependent variable is the ratio of total costs to offering proceeds. Proceeds are total offering proceeds in million Euros. "Domestic Issue" is a dummy variable, which is set to "1", if the country of origin of the issuer is equal to the country where the listing is pursued.

Table 30: OLS-estimation results of total flotation costs over the period 01/01/1999 to 03/31/2008

3.2 Indirect costs: IPO Underpricing

3.2.1 Underpricing

3.2.1.1 Introduction

When companies are brought, public uncertainty about their true value exists due to asymmetric information between the parties involved in an IPO: On the one hand information asymmetry exists between future (outside) investors and pre-IPO (inside) investors. On the other hand different investors may experience an imbalance of information [Rock (1986)]. Generally, this asymmetric distribution of information is regarded as the reason for substantial positive first-day returns (underpricing) [Rock (1986), Altinkilic and Hansen (2003), and Brau and Fawcett (2006)]. Although, underpricing constitutes substantial costs for the issuing firm, academics and practitioners suggest that issuing companies are willing to offer their shares with a discount as they seek to ensure full subscription of their issues. Furthermore, firms that are interested in future equity offerings as a mean of subsequent financing, have a high interest in successfully placing of their shares and avoiding bad publicity and investors' resentment. This can be achieved through underpricing, since a lower offering price increases the probability of full subscription and also the positive news coverage and the investors' interest in future equity offerings.

IPO discounts are also in line with the interests of underwriters as they want to ensure e.g. a full subscription of the offerings. Underpricing is a negative function of an issuing company's risk and tends to be higher the riskier the issuing firm is in order to attract as many investors as possible. This, in turn, may offer an investment opportunity for investors interested only in short-term profits. As the degree of underpricing is related to the level of risk associated with the issuing firm, those particular stock exchanges are regarded to provide riskier investment opportunities. As Ritter (2003) documents, underpricing varies significantly across countries. Therefore, the following analysis measures one source of indirect costs of going public across all six stock exchanges by comparing IPO discounts. The remainder of the analysis is organized as follows: First, we introduce the sample and provide some descriptive statistics. Second, we describe our methodology used for comparing underpricing at Deutsche Börse with other stock exchanges. Finally, the results of our analysis are presented and discussed.

3.2.1.2 Data, methodology and descriptive statistics

Our analysis uses three primary databases. For the five countries and six stock exchanges we extract the issue days, IPO proceeds and the market segments for all equity offerings between January 2001 and March 2008 from Thomson Financial SDC. In addition, we matched Thomson Financial SDC's information on IPOs with the information available at the homepage of the six stock exchanges to obtain suggestions for additions. Next, we exclude unit offerings, closed-end funds and American Depository Receipts (ADRs). We use Thomson Financial DataStream for the time series data, i.e., the daily closing prices for all firms in our sample, the respective trading volume and the IPO firm's corresponding market index. Adjustments due to missing IPO offer or stock prices and multiple entries reduce our sample to 2,126 IPOs. Table 31 provides an overview of all IPOs in the sample.

	Deutsche Börse		Euronext		Hong Kong		LSE		New York		Total
	Prime/General Std.	Entry Std.	Eurolist	Alternext	Main Board	GEM	Main Market	AIM	NYSE	NASDAQ	
2001	20	0	2	0	4	6	6	6	29	28	101
2002	6	0	5	0	10	21	7	6	48	24	127
2003	0	0	6	0	18	16	1	12	53	27	133
2004	6	0	13	0	21	14	11	52	96	107	320
2005	14	8	13	11	32	6	20	122	91	101	418
2006	34	35	31	32	43	5	21	156	67	124	548
2007	24	20	37	18	57	2	20	52	83	122	435
2008	0	1	10	0	8	1	4	2	11	7	44
Subtotal	104	64	117	61	193	71	90	408	478	540	2,126
Total	168		178		264		498		1,018		2,126

Table 31: New IPOs across time and stock exchanges (except for AIM where the number refers to new issues) between January 2001 and March 2008

Table 31 shows a clustering of IPOs in the years 2001 to 2008. Considering the geographic distribution of all IPOs most companies went public in the United States and the United Kingdom. While a high IPO frequency might be a motivation for domestic companies to issue their equity it may also attract foreign enterprises to offer their shares at stock exchanges where companies have successfully placed their shares. Considering the number of listings conducted by foreign companies, Table 32 shows that the by far highest ratio can be observed for the London Stock Exchange, while the percentage of foreign listings at the remaining markets ranges around 6%. Only the Hong Kong Stock Exchange is exceptionally less frequented by foreign issuers.

Foreign Listing	No. of foreign IPOs	No. of IPOs	in %
NYSE/NASDAQ	77	1,018	7.56%
London Stock Exchange	126	498	25.30%
Hong Kong	4	264	1.52%
Euronext	11	178	6.18%
Deutsche Börse	10	168	5.95%

Table 32: Foreign listings across stock exchanges between January 2001 and March 2008

Although companies might have different reasons for a listing at a foreign stock exchange, they are also interested in a liquid trading. Hence, we analyze the probability of listings conducted by foreign companies by applying a Logit model to predict whether a firm is a foreign issuer (the dependent variable takes a value of “1”) or domestic issuer (the dependent variable takes a value of “0”) conditional on firm specific liquidity measures.

We calculate the conditional probability of an IPO of foreign issuers by estimating a Logit model using observable firm characteristics to determine whether a firm is more likely to be listed by a foreign issuer (the dependent variable takes a value of “1”) or by domestic issuers

(the dependent variable takes a value of “0”).⁴¹ Table 33 shows that foreign issuers seem to prefer small cap segments for their listing, indicated by the positive sign of the small cap segment dummy. Note, stocks of foreign listed companies have a lower stock return volatility. However, this might be an expression of a size effect as the average market capitalization of foreign listings is relatively large. Low volatility of stock returns is usually also an indicator of high trading liquidity. By contrast, other liquidity indicators like the relative turnover volume and the zero-trade-ratio (ZTR) show opposite signs. These variables indicate that companies with a high zero-trade-ratio and a low turnover volume are more likely to be foreign listed companies. Therefore, the liquidity numbers of foreign listed companies are mixed and hard to interpret.

	Model I		Model II	
	Coefficient	z-statistics	Coefficient	z-statistics
constant	-2.235 ***	-12.888	-2.003 ***	-13.013
small cap segment	0.328 **	2.059	0.551 ***	3.339
log(market capitalization)	---	---	---	---
log(trading volume)	---	---	-0.047	-1.423
trading volume relative to market capitalization	-13.738 *	-1.705	---	---
zero-trade-ratio	1.936 ***	6.127	---	---
stock return volatility	-13.602 ***	-2.863	-22.235 ***	-4.389
<hr/>				
N	2,107		2,105	
Mc Fadden R ²	5.98%		2.99%	
LR statistic	83.280 ***		41.517 ***	

The sample covers listings between January 2001 and March 2008. The Logit regressions were run so that the dependent variable equals “0” if the company was delisted within the sample period (and “0” if the company was still listed at the end of March 2008). The target characteristics are: a dummy variable indicating that the issue was placed in a small cap segment; logarithm of market value (log(MV)); logarithm of trading volume (log(TVO)); the trading volume relative to the market value (TVO/MV); the number of days without any trading over the total number of observation days included in the sample per stock (zero-trade-ratio, ZTR) and the standard deviation of daily returns (stock return volatility, VOL). ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 33: Logit-Model: Determining the likelihood of foreign listings

The optimal level of underpricing an issuer should offer to its new shareholders is only roughly to determine. An extremely high underpricing indicates that the offering price was set to low and the issuer left much money on the table. A small or even negative underpricing might disappoint the new shareholders and make them sceptical about the prospects of their investments. We calculate IPO underpricing (raw underpricing and index adjusted) as per Megginson and Weiss (1991)⁴² and Schenone (2004)⁴³ as:

⁴¹ The firm specific variables used within this Logit-regression are explained in more detail in section 4.2.2.

⁴² Megginson, William L., and Kathleen A. Weiss, 1991, Venture Capitalist Certification in Initial Public Offerings, *Journal of Finance* 46, 879-903.

$$\text{raw underpricing}_i = \frac{P_{i,1}}{P_{i,0}} - 1 \text{ and index adjusted underpricing}_i = \frac{P_{i,1}}{P_{i,0}} - \frac{I_1}{I_0}$$

where $P_{i,1}$ is the first-day closing price, $P_{i,0}$ the IPO offering prices, I_0 and I_1 are the corresponding national stock market index levels, respectively.

3.2.1.3 Analysis of underpricing

We compare the average IPO returns across the different stock exchanges. Statistical significant underpricing returns in mean (t-test) and median (Wilcoxon-test) at significance levels of 1%, 5% and 10% are denoted by ***, ** and *. We analyze in the group of larger exchange segments Eurolist, Main Board, Main Market and NYSE to the Prime/General Standard and the smaller segments Alternext, GEM, NASDAQ and AIM to the Entry Standard. We apply this distinction to account for the firm specific differences in stock exchange segments.

	Deutsche Börse		Euronext		Hong Kong		LSE		New York	
	Prime/General Std.	Entry Std.	Eurolist	Alternext	Main Board	GEM	Main Market	AIM	NYSE	NASDAQ
Raw underpricing (in %)										
No.	104	64	117	61	193	71	90	408	478	540
Mean	3.61% ***	7.40% ***	3.57% ***	3.06% **	17.41% ***	20.61% ***	5.18% ***	15.40% ***	7.18% ***	12.5% ***
Median	0.70% **	0.74% ***	0.00% ***	0.00% ***	9.58% ***	12.12% ***	2.59% ***	8.59% ***	0.82% ***	6.49% ***
Minimum	-28.40%	-19.83%	-22.01%	-59.51%	-20.48%	-18.75%	-47.29%	-88.83%	-27.41%	-33.50%
Maximum	83.57%	105.00%	46.29%	33.85%	188.93%	211.11%	83.08%	250.00%	125.49%	354.80%
Index-adjusted underpricing (in %)										
No.	104	64	117	61	193	71	90	408	478	540
Mean	3.57% ***	7.21% ***	3.39% ***	2.87% *	17.30% ***	20.63% ***	5.17% ***	15.36% ***	7.22% ***	12.60% ***
Median	0.85% ***	1.16% ***	0.65% ***	0.21% ***	9.58% ***	11.54% ***	2.42% ***	8.49% ***	1.18% ***	6.52% ***
Minimum	-29.76%	-19.50%	-23.18%	-59.77%	-20.39%	-19.05%	-47.32%	-89.78%	-24.47%	-33.35%
Maximum	85.21%	104.38%	46.75%	35.35%	187.21%	212.39%	82.47%	248.69%	125.39%	355.56%
Total	168		178		264		498		1,018	

We use the CDAX as the corresponding benchmark for IPOs at the Prime/General and Entry Standard, the SFB 120 Index for listings at the Euronext and Alternext, the HANG SENG Index for Hong Kong's Main Board and GEM IPOs, the FTSE All-Share Index for LSE IPOs and S&P 500 COMPOSITE Index for listings at the NYSE and NASDAQ. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 34: Underpricing across exchange segments between January 2001 and March 2008

While methodological differences between raw underpricing and index-adjusted underpricing are negligible, Table 34 indicates that initial returns are different for the particular market segments and stock exchanges. Prime/General Standard (3.61%) and Euronext (3.57%) offer overall moderate levels of underpricing and combine the interests of investors and issuers convincingly while in other segments [Main Market (5.18%), NYSE (7.18%) and Main Board (17.4%)] the level of underpricing becomes more and more unattractive from the perspective of issuing companies.

As prior research has shown, the underpricing phenomenon is strongly correlated to the size of the IPO companies. Therefore, differences between the two groups of market segments can

⁴³ Schenone, Carola, 2004, The Effect of Banking Relationships on the Firm's IPO Underpricing, Journal of Finance 59, 2903-2958.

be influenced by size effects. Since the presented (univariate) results do not account for possible size effects, we apply a multiple regression model to determine whether the size of an IPO affects the level of underpricing. Specifically, we estimate the following regression model:

$$UP_j = b_0 \text{ size}_j + \sum_{i=1}^{10} b_i \text{ Exchange}_{i,j} + e_j,$$

where the dependent variable UP stands for the raw underpricing of firm j , the independent variable size is the IPO proceed of firm j and the variable Exchange is a dummy variable taking the value of “1” if firm j is from Exchange i and “0” otherwise.

	raw underpricing	
	Coefficient	t-statistics
Size	-4.16E-04	-0.342
Entry Standard	7.406 **	2.571
Prime/General Standard	3.700	1.625
Alternext	3.070	1.041
Eurolist	3.640 *	1.701
GEM	20.616 ***	7.538
Main Board	17.450 ***	10.343
AIM	15.413 ***	13.502
Main Market	5.777 **	2.259
NASDAQ	12.605 ***	12.549
NYSE	7.067 ***	6.198
N	2113	
Adj. R ²	3.7%	

The sample covers listings between January 2001 and March 2008. Underpricing as defined by the first-day stock return is used as the dependent variable and is explained by the following variables. The gross IPO proceeds in million Euros are used as a proxy for size. Furthermore, we include a dummy variable for every market place.

***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 35: Multiple regression model for underpricing across stock exchanges

Table 35 summarizes the results of the multiple regression model. The coefficient for size is negative but insignificant. Considering the impact of market segments all exchange coefficients except for the Prime/General Standard and Alternext dummies are statistically significant and positive. This result suggests that underpricing is significantly positive in all exchange segments except for the Prime/General Standard and Alternext. Furthermore, this result is in line with the findings of our univariate analysis, i.e. that underpricing at DBAG and Euronext is very moderate. However, overall explanatory power of the model is rather low suggesting that the variance in underpricing across firms can only be explained to a very limited degree by the different trading platforms.

4. The cost of being public

4.1 Direct costs

Again, this part of the study is an extension of section 4.1 in Kaserer/Schiereck (2007).⁴⁴ As there, SEO flotation costs and listing fees at Deutsche Börse, London Stock Exchange, Euronext, NYSE, NASDAQ and Hong-Kong Stock Exchange have been analyzed. The difference to Kaserer/Schiereck (2007) is mainly that the research period has been extended to the end of the first quarter of 2008. Hence, the total research period in this study goes from 01/01/1999 to 03/31/2008. With respect to the period 01/01/1999 to 03/31/2007 we are using the same data as in the preceding study.

It should be noted that the direct cost of being public can be split-up into two different components: (a) the costs incurred in the case the company decides to issue seasoned stocks and (b) continuous expenses caused by being a listed firm. These two cost components will be scrutinized in more detail in this section.

4.1.1 SEO flotation costs

For this part of the study we have collected data on SEO flotation costs from the Thomson One Banker database as well as from the websites of the financial supervision authorities and the issuers. Unfortunately, for the European exchanges it turned out that it was pretty difficult to collect detailed information on SEOs. One reason might be that according to the Directive 2003/71/EC on the admission of securities to official stock exchange listing some exemptions from the obligation to publish a prospectus are set up. These exemptions apply, among others, to SEOs under certain conditions such as that shares are only offered to existing shareholders or that the increase in shares does not exceed 10 percent of already existing shares. For that reason we are able to gather relevant information for only a relatively small number of SEOs at Deutsche Börse, LSE and Euronext, while this number is substantially higher for NYSE, NASDAQ and Hong-Kong Stock Exchange. More information is given in Table 36, where it can be seen that we have relevant information on 182 European SEOs and on 1,582 SEOs at NYSE, NASDAQ or Hong-Kong Stock Exchange. Moreover, for Deutsche Börse and LSE we are only able to collect information on gross spreads, but not on other expenses.

The first interesting result emerging from Table 36 indicates that underwriting fees for SEOs have risen substantially since the nineties. This is especially true for Germany, and to a minor extent also for UK and France. In fact, while according to former research reported Kaserer/Schiereck (2007) median underwriting fees were around 1% in Germany and 1.75% in the UK, this average now is 3% and 2%.⁴⁵ Hence, especially in Germany a substantial increase has taken place. One, although limited, explanation for this development is related to the fact that issuing procedures today are different than they used to be up to the nineties. Since the end of the nineties in Germany as well as in the UK almost all SEOs were in the form of a rights offering. This is different today as about one third of the German offerings recorded in Table 36 were bookbuilding offerings; for the UK the ratio is still quite smaller. As it is known that bookbuilding offerings are more expensive because of the higher risk and

⁴⁴ Cf. Kaserer/Schiereck (2007), *Going Public and Being Public - A global Comparison on the Impact of the Listing Decision on the Cost of Capital*.

⁴⁵ Cf. Kaserer/Schiereck (2007), *Going Public and Being Public - A global Comparison on the Impact of the Listing Decision on the Cost of Capital*, p. 41 n.

effort incurred by the investment bank, this could explain a part of the results reported in Table 36.⁴⁶ Moreover, because of national rulings under the Directive 2001/34/EC on the admission of securities to official stock exchange listing, small offerings are much more likely to be exempted from the obligation to publish a prospectus. This may cause an additional bias.

A second interesting result emerging from Table 36 is the fact that SEOs are more expensive at NYSE and NASDAQ than at Deutsche Börse or LSE. Euronext is somewhere in between, although the gross spread there is also clearly higher than at the other two European exchanges. Contrary to the results that we have found for IPO flotation costs, seasoned shares can be issued at a competitive cost at Hong-Kong Stock Exchange.

		DBAG	LSE	Euronext	NASDAQ	NYSE	HKEX
Proceeds (m€)	number	78	48	79	1,159	634	163
	mean	707.39	602.96	462.20	128.28	302.64	24.29
	median	157.76	147.36	46.67	79.45	170.23	5.24
Total Flotation Costs	number			79	1,007	517	162
	mean	n/a	n/a	4.04%	6.16%	4.35%	3.86%
	weighted mean	n/a	n/a	1.59%	5.01%	3.55%	3.36%
	median	n/a	n/a	3.72%	6.05%	4.63%	3.13%
Other Expenses	number			19	1,011	518	119
	mean	n/a	n/a	1.21%	1.01%	0.55%	2.06%
	weighted mean	n/a	n/a	0.39%	0.65%	0.33%	3.12%
	median	n/a	n/a	0.94%	0.61%	0.34%	1.03%
Gross Spread	number	72	48	19	1,155	633	119
	mean	3.03%	2.08%	3.69%	5.12%	3.74%	2.10%
	weighted mean	2.05%	1.38%	2.52%	4.38%	2.98%	2.22%
	median	3.01%	1.80%	3.83%	5.25%	4.09%	2.50%

Table 36: Comparison of SEO flotation costs by different listing venues over the period 01/01/1999 to 03/31/2008

A resume of these results can be found in Figure 11. As noted earlier, SEOs at the LSE are accompanied with the lowest gross spreads, while SEOs at the NASDAQ face fees which are about three times as high.

⁴⁶ Cf. Kaserer/Bühner (2002), The Structure of External Financing Costs and the Economies of Scale View - New Evidence from Seasoned Equity Offerings in Germany, European Financial Management 8, pp. 315-338, and additional references given there.

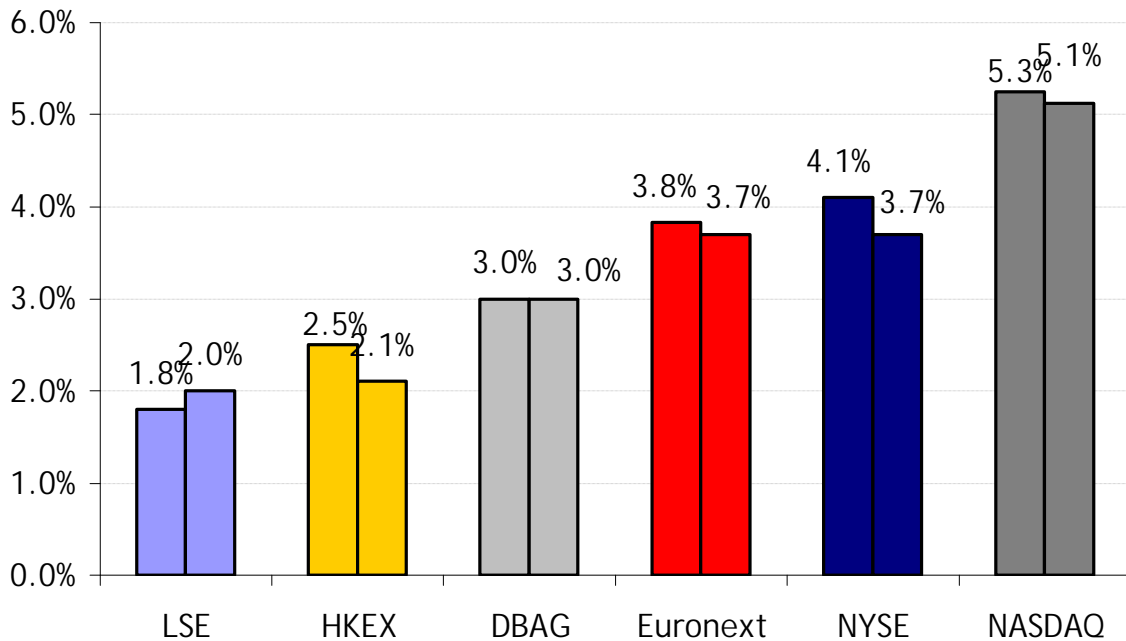


Figure 11: Median (first) and mean (second) SEO underwriting fees by different listing venues over the period 01/01/1999 to 03/31/2008

Again, we would like to analyse whether the differences among the listing venues are statistically significant when controlling for issue size. As it was done in the context of the flotation costs analysis we use a linear regression model for that purpose. Results are reported in Table 37. As we do not have sufficient variables in order to control for other influences than size, the adjusted R^2 is only 24%.⁴⁷ However, as size is one of the most important variables determining the underwriting spread, this model might be appropriate for testing whether underwriting fees are influenced by the listing venue.

The results presented in Table 37 corroborate the findings given in Figure 11. It turns out that an issuer at NASDAQ or NYSE has to bear a statistically significantly higher gross spread compared with the same issuer at Deutsche Börse. The difference with respect to NYSE is only weakly significant, while there is no statistically significant difference with respect to Euronext. Issuers profit from significantly lower underwriting fees at LSE and Hong-Kong Stock Exchange.

⁴⁷ A more sophisticated model is used in Kaserer/Schiereck (2006), Deutsche Börse: Going Public and Being Public. The Impact of the Listing Decision on the Cost of Capital – An International Comparison, Frankfurt. For a more academic discussion of this issue cf. Kaserer/Bühner (2002), The Structure of External Financing Costs and the Economies of Scale View - New Evidence from Seasoned Equity Offerings in Germany, European Financial Management 8, pp. 315-338, and additional references given there.

Variable	Coefficient	Std. Error	Prob.
Constant	0.035	0.002	0.000
Gross Proceeds	0.000	0.000	0.000
1 / Gross Proceeds	0.004	0.002	0.073
NASDAQ	0.018	0.002	0.000
NYSE	0.005	0.002	0.032
LSE	-0.011	0.003	0.002
Hong Kong	-0.014	0.003	0.000
Euronext	0.004	0.005	0.385
adj. R-squared	0.242		
number	2,024		

Notes: Dependent variable is the ratio of underwriting fees to SEO offering proceeds. Proceeds are total offering proceeds in million Euros. NASDAQ, NYSE, LSE, Hong-Kong Stock Exchange and Euronext are dummy variables set to “1”, if the SEO has taken place at one of these exchanges. The base case is an SEO at Deutsche Börse.

Table 37: Comparison of SEO gross spreads in an OLS estimation context

4.1.2 Listing fees

Like admission fees listing fees are often regarded as negligible, although these fees have to be paid on a yearly basis. Moreover, a closer look reveals that the differences among the different listing venues can be quite substantial. This is revealed by Table 38.⁴⁸ While Deutsche Börse AG has fixed listing fees of 10,000 Euros at the Prime Standard and 7,500 Euros at the General Standard respectively, admission fees at the large cap market segments of the other stock exchanges are related to either the market capitalization of the company or the number of shares outstanding. For a market capitalization of 1 billion Euros, listing fees at the Main Market of the LSE are at about 19,000 Euros for both national and international offerings. It may be noted here that only the Euronext, LSE, and the NASDAQ differentiate between national and international SEOs at all. Furthermore, only at NASDAQ there are substantial differences in fees for international issuers. While national offerings face a fee of about 63,000 Euros when listing a volume of 100 million shares, an international offering via issuing ADRs⁴⁹ faces a fee of only 20,000 Euros. NYSE does not distinguish between national and international offerings charging 60,000 Euros for a listing of 100 million shares, which is pretty much the same as the NASDAQ does charge for national offerings. The HKEX charges fees according to the nominal value of shares outstanding which is similar to the method which uses the number of shares outstanding.

As far as growth markets are concerned the picture is a little bit different, as the London AIM has a fixed fee of 6,413 Euros. This is higher than the fixed fee of 5,000 Euros charged by the Frankfurt Entry Standard. All the other exchanges have again market capitalization or shares outstanding related fees, which are in most of the cases above the fee at the Entry Standard. Assuming a market capitalization of 50 million Euros, NYSE and NASDAQ are again by far the most expensive stock exchanges. When looking at core growth markets only, it turns out that Alternext is rather close to the Entry Standard with a fee of 4,000 Euros, while GEM is twice as expensive as the Entry Standard with a fee of 10,000 Euros.

⁴⁸ With regard to the previous study, listing fees remained stable at all exchanges. Note that the LSE has increased its fees in spring 2008.

⁴⁹ All foreign companies wishing to list in the US have to issue American Depositary Receipts (ADRs) via a Depository Bank where they deposit their ordinary shares.

market cap (m€)	10	50	250	500	1,000
~ no. of shares	1,000,000	5,000,000	25,000,000	50,000,000	100,000,000
Deutsche Börse					
Prime Standard			10,000 €		
General Standard			7,500 €		
Entry Standard			5,000 €		
LSE					
Main Market - domestic	5,211 €	5,211 €	7,316 €	10,201 €	18,523 €
Main Market - international	7,999 €	8,191 €	10,558 €	13,518 €	19,453 €
AIM			6,413 €		
NASDAQ					
NASDAQ - domestic	20,000 €	20,000 €	23,333 €	25,000 €	63,333 €
NASDAQ - ADRs	14,150 €	14,150 €	17,667 €	19,880 €	20,000 €
NYSE					
	25,333 €	25,333 €	25,333 €	31,000 €	62,000 €
HKEX					
Main Board	14,500 €	14,500 €	22,400 €	35,600 €	54,100 €
GEM	10,000 €	10,000 €	15,000 €	15,000 €	20,000 €
Euronext					
Eurolist - domestic	3,000 €	4,000 €	12,000 €	12,000 €	16,000 €
Eurolist - international			10,000 €		
Alternext - domestic / intern.	3,000 €	4,000 €	12,000 €	12,000 €	16,000 €

Notes: For the calculation we looked at the fee schedules for domestic and international issuers of ordinary shares. For NASDAQ the fee schedule of the NASDAQ Global Market was used. Only the LSE has fee schedules according to market capitalization. Euronext, HKEX, NASDAQ, and NYSE have fee schedules according to the number of shares outstanding. Where necessary we assumed a share price of 10 Euros in order to compute an appropriate number of shares outstanding. The following exchange rates were used: 1 €=1.5 US-\$=1/1.35 £=10 HK-\$.

Table 38: Listing fees by market capitalization, Source: Websites of Exchanges

4.2 Indirect costs

4.2.1 Trading costs

Obviously, high trading costs reduce an investor's net portfolio return. Since investors seek to increase the value of their pooled capital, they are willing to pay higher prices for shares with low transaction costs only. Furthermore, high trading costs do not only affect investor's returns but also the required gross returns of companies that raise equity via the stock market.⁵⁰ The higher the transaction costs the higher the required gross returns for companies raising equity. Empirical research has found that a 10% increase in transaction costs results in a 1.4% to 1.7% higher post-tax cost of equity capital.⁵¹

A considerable body of research has analyzed the effect of trading costs on returns and finds evidence of an positive between returns and trading costs.⁵² Harris (2003)⁵³ defines trading costs as all costs associated with securities trading. In detail they consist of explicit costs, implicit costs and missed trade opportunity costs. As for explicit trading costs (brokerage commissions and fees), a recent study by Oxera (2006)⁵⁴ finds that they differ from each other in important ways across stock exchanges, and that DBAG has rather low direct costs of trading compared to LSE and NYSE.

Within the following analysis, we not only include direct costs, but also implicit trading costs as institutional investors base their choice of trading platform mainly on implicit trading costs. Specifically, implicit trading costs refer to costs of liquidity, whereas a liquid stock market composes of low implicit trading costs (low costs of liquidity or low liquidity premium). We expect more liquid market to be associated with a lower liquidity premium required by investors for buying a stock. A trading platform that is able to organize a superior liquidity level in stock trading reduces the cost of capital for a company raising equity and hence provides for more advantageous conditions for the company.

According to commonly applied methodology, we use trading volume in a stock (normalized by its market capitalization), the short-term volatility and the zero-trade-ratio (the share of trading days without any trade) as indicators for the quality market liquidity. However, liquidity is predominantly measured by the bid-ask spread (BAS). Specifically, we use the difference between the best binding buy opportunity and the best binding sell opportunity offered to investors at any given point of time. Here, the rationale is that a trader who simultaneously buys and sells a share has to pay the BAS as so called round trip costs. Already Demsetz (1968)⁵⁵ argued that the bid-ask spread is the mark-up that is paid for predictable immediacy of exchange in organized markets.

⁵⁰ See e.g. Amihud/Mendelson (1986), Asset Pricing and the Bid-Ask Spread, *Journal of Financial Economics* 17, pp. 223-249.

⁵¹ See Domowitz/Steil (2001), Innovation in Equity Trading Systems: the Impact on Transactions Costs and Cost of Capital, in Nelson/Victor/Steil (eds.), *Technological Innovation and Economic Performance*, Princeton University Press.

⁵² Consistent with the „liquidity hypothesis“ the following authors provide supporting empirical evidence: Amihud/Mendelson (1989), The Effects of Beta, Bid-Ask Spread, Residual Risk, and Size on Stock Returns, *Journal of Finance* 44, pp. 479-486, Eleswarapu (1997), Cost of Transacting and Expected Returns in the NASDAQ Market, *Journal of Finance* 52, pp. 2113-2127, Brennan/Subrahmanyam (1996), Market Microstructure and Asset Pricing, *Journal of Financial Economics* 41, pp. 441-464, Amihud/Mendelson/Lauterbach (1997), Market microstructure and securities values: Evidence from the Tel Aviv Stock Exchange, *Journal of Financial Economics* 45, pp. 365-390, Domowitz/Glen/Madhavan (2001), Liquidity, Volatility and Equity Trading Costs Across Countries and Over Time, *International Finance* 4, pp. 221-255.

⁵³ Harris (2003), *Trading & Exchanges: Market Microstructure for Practitioners*, Oxford, p. 421.

⁵⁴ Oxera (2006), *The cost of capital: An international comparison*, Oxford.

⁵⁵ Demsetz (1968), The Cost of Transacting, *Quarterly Journal of Economics* 82, pp. 33-53.

The rest of this analysis proceeds as follows. Section 4.2.2 introduces the sample and describes our methodology used for comparing implicit trading costs of the six stock exchanges. In Section 4.2.3 we report and discuss our results of the bid-ask spread analysis, while section 4.2.4 concludes.

4.2.2 Data and descriptive statistics

Within this analysis we restrict our above mentioned sample to initial public offering of common stock at one of the six analysed stock exchanges between January 2005 and December 2007.⁵⁶ Therefore, our results should be comparable to the findings of previous studies.

Venkataraman (2001)⁵⁷ provides evidence that bid-ask spreads are also affected by firm-specific characteristics such as market size, stock trading volume, prices, and stock return volatility. Against this background, our interpretation of bid-ask spreads from different markets and diverging portfolios of stocks has to bear in mind that results sensitively depend on specific firm characteristics. Consequently, we control for firm-specific characteristics identified by Venkataraman (2001) when comparing implicit trading costs across different market segments. Therefore, we include the following five firm-specific variables into consideration. Unless stated otherwise means across the first ten trading days after the IPO express the average value per item and market segment.

- § Market Value (MV) is used as the most common measure for company size. It is calculated as share price multiplied by the number of ordinary shares in issue. MV is displayed in millions of US\$.
- § Trading volume (TVO) is calculated as the number of shares traded (in millions) multiplied with the unadjusted closing price per day.⁵⁸ Relative trading volume (TVO / MV) is calculated as the ratio of trading volume by market value. This measure provides information about the relative level of trading activity for a specific company. Trading volume is a rough but remarkably well predicting indicator for market liquidity when standardized by market values.
- § Stock return volatility (VOL) is approximated as the standard deviation of daily returns over all observations included in the sample.
- § The zero-trade-ratio (ZTR) is estimated as the number of days without any trading over the total number of observation days included in the sample per stock. The lowest possible trading activity is no trades at all during a day. The more days without trading, the less trading activity takes place at the market segment. Thus, a liquidity measure estimating the probability of a no trading day is introduced.

Table 39 offers average descriptive statistics for the firm-specific characteristics across the five stock exchanges for the first ten trading days after the IPO.⁵⁹ Next to means we provide additional statistical information (minimum, maximum and medians). We evaluate the statistical significance of the means and medians using a standard t-statistic and the Wilcoxon rank sum z-score at significance levels of 1%, 5% and 10% [denoted by ***, **, *]. We compare

⁵⁶ See chapter 3.2.1.2 for a detailed description of our sample.

⁵⁷ Venkataraman (2001), Automated versus Floor Trading: An Analysis of Execution Costs on the Paris and New York Exchanges, *Journal of Finance* 56, pp. 1445-1485.

⁵⁸ As Datastream does not provide sufficient data for trading volumes of German IPOs at the screen-based trading platform Xetra, the daily numbers of traded shares for Xetra and Frankfurt floor-based trading platform are provided by Deutsche Börse AG, separately.

⁵⁹ Note, that we do not divide the NYSE and NASDAQ data into large and small cap segment in this section.

the firm specific characteristics of companies listed in the larger segments Prime/General Standard, Eurolist, Main Board, Main Market, NYSE and NASDAQ and the smaller segments Entry Standard, Alternext, GEM and AIM respectively.

Concerning average market values of IPOs there are significant differences across exchanges. Since means are highly distorted by some outliers it seems justifiable to compare for size effects median market capitalizations. As shown in Table 39 market value differs significantly across segments. Median values are systematically lower for the smaller segments. For the larger stock segments IPOs at NYSE (711 million US\$), LSE's Main Market (548 million US\$) and Hong Kong's Main Board (326 million US\$) have higher market capitalizations than IPOs at Prime/General Standard (316 million US\$). However, comparing to Eurolist (146 million US\$), IPOs at Prime/General Standard are larger. Regarding the smaller segments IPOs at Entry Standard (41 million US\$) are about of the same size as at Alternext (45 million US\$), GEM (25 million US\$) and AIM (50 million US\$).

	Deutsche Börse		Euronext		Hong Kong		LSE		New York	
	Prime/General Std.	Entry Std.	Eurolist	Alternext	Main Board	GEM	Main Market	AIM	NYSE	NASDAQ
MV (in - mUS\$)										
No.	66	56	79	69	122	9	53	390	177	327
Mean	896 ***	78 ***	812 ***	57 ***	1,006 ***	49 *	1,403 ***	97 ***	1,135 ***	428 ***
Median	316 ***	41 ***	146 ***	45 ***	326 ***	25 ***	548 ***	50 ***	711 ***	309 ***
Minimum	45	9	7	11	21	7	44	2	0	0
Maximum	6,554	1,063	7,508	210	9,825	211	10,940	1,582	11,053	3,452
TVO (in - mUS\$)										
No.	65	56	79	68	119	9	53	387	177	327
Mean	16,047 ***	2,316 *	9,379 ***	374 ***	26,914 ***	456 *	34,399 ***	741 ***	42,185 ***	14,458 ***
Median	5,547 ***	718 ***	709 ***	145 ***	11,221 ***	151 ***	7,754 ***	136 ***	19,833 ***	8,161 ***
Minimum	108	6	2	0	13	5	48	0	444	176
Maximum	140,320	71,505	103,950	5,070	167,420	1,744	246,020	35,754	827,000	161,830
TVO/MV (in %)										
No.	66	56	79	68	122	9	53	387	162	325
Mean	2.4% ***	2.4% ***	0.8% ***	0.6% ***	3.2% ***	1.0% *	2.0% ***	0.7% ***	3.8% ***	3.2% ***
Median	1.5% ***	1.3% ***	0.5% ***	0.3% ***	2.8% ***	0.6% ***	1.4% ***	0.3% ***	3.0% ***	2.3% ***
Minimum	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%
Maximum	10.5%	15.2%	5.0%	3.6%	14.9%	4.4%	6.7%	5.8%	19.6%	36.7%
VOL (in %)										
No.	66	56	80	69	123	9	53	390	177	327
Mean	2.9% ***	4.1% ***	3.6% ***	4.8% ***	3.6% ***	3.4% ***	1.7% ***	2.7% ***	2.3% ***	2.9% ***
Median	2.2% ***	3.2% ***	2.5% ***	3.2% ***	3.3% ***	3.1% ***	1.5% ***	1.8% ***	1.9% ***	2.5% ***
Minimum	0.5%	0.9%	0.6%	0.3%	0.8%	1.3%	0.2%	0.0%	0.0%	0.3%
Maximum	10.3%	16.9%	14.4%	28.5%	13.1%	5.7%	5.2%	18.2%	15.8%	15.7%
ZTR (in %)										
No.	66	56	80	69	123	9	53	388	177	327
Mean	3.3% ***	2.60% ***	15.1% ***	17.92% ***	7.9% ***	9.09% **	8.9% ***	24.09% ***	4.2% ***	4.06% ***
Median	0.0% ***	0.00% ***	9.1% ***	9.09% ***	0.0% ***	9.09% **	0.0% ***	18.18% ***	0.0% ***	0.00% ***
Minimum	0.0%	0.00%	0.0%	0.00%	0.0%	0.00%	0.0%	0.00%	0.0%	0.00%
Maximum	27.3%	36.36%	81.8%	90.91%	36.4%	27.27%	45.5%	90.91%	18.2%	36.36%

The sample covers listings between January 2005 and December 2007. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The data for Germany was provided by the Deutsche Boerse Group.

Table 39: Security characteristics of IPOs – for the first ten days after the IPO (except for AIM where the number refers to new issues)

Since trading volume is a rough but remarkably well predicting and widely accepted indicator for market liquidity when standardized by market values, we compare TVO/MV means across stock exchanges and segments. As Table 39 shows, DBAG IPOs have a relative high TVO/MV ratio in the ten days after their listing compared to LSE's Main Market and Eurolist. Therefore, firms going public at DBAG are with respect to this indicator more liquid during the first ten days after the IPO than those floating at other trading platforms.

The average ZTR during the first ten days after the IPO at the Prime/General Standard (3.3%) is remarkable lower than for all its peers. As liquidity and implicit trading costs are thought to be highly correlated, implicit trading costs at Deutsche Börse can be assumed to be lower. As regards the Entry Standard (2.60%), the average ZTR is also lower than for all its peers. Especially AIM (24.09%), Alternext (17.92%) and GEM (9.09%) have very large average ZTRs and can be regarded as rather illiquid stock exchanges compared to the Entry Standard.

Overall, these results indicate that significant differences across stock exchanges exist with respect to firm-specific measures. First, we show that there are systematic differences between the small and the large segments with respect to all five firm characteristics. Second, we reveal ambiguous results. Note that some results might have change compared to prior studies. The underlying reason for these differences might be the different time period. Altogether, the results strongly suggest taking all five variables into account when analysing bid-ask spreads.

4.2.3 Analysis of bid-ask spreads

We begin our analysis of bid-ask spreads with a comparison across market segments on a stand alone basis. This provides some understanding of the total level of bid-ask spreads. In a second step a multivariate regression will be conducted to control for potential combined effects by the firm characteristics discussed above. Implicit trading costs are approximated using the relative closing spread, which is provided by Datastream on a daily basis and calculated as follows:

$$R_{\text{spread}} = \frac{C_a - C_b}{\frac{C_a + C_b}{2}},$$

where C_a is the closing ask price and C_b is the closing bid price. The relative spread is the favourable measure because it accounts for differences in price levels across securities.

	Deutsche Börse		Euronext		Hong Kong		LSE		New York	
	Prime/General Std.	Entry Std.	Eurolist	Alternext	Main Board	GEM	Main Market	AIM	NYSE	NASDAQ
Rspread (in %)										
No.	64	48	60	54	123	9	53	389	127	211
Mean	0.89% ***	1.85% ***	0.82% ***	0.81% ***	0.86% ***	3.87% ***	2.16% ***	7.20% ***	0.58% ***	0.92% ***
Median	0.76% ***	1.63% ***	0.67% ***	0.63% ***	0.64% ***	3.15% ***	2.10% ***	5.37% ***	0.49% ***	0.73% ***
Minimum	0.17%	0.16%	0.13%	0.00%	0.09%	0.84%	0.35%	0.81%	0.07%	0.17%
Maximum	2.73%	3.94%	3.77%	2.83%	5.41%	7.31%	6.77%	49.00%	4.40%	3.98%

The sample covers listings between January 2005 and December 2007. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The data for Germany was provided by the Deutsche Börse Group.

Table 40: Relative bid-ask spread across stock exchanges for the first ten days after the IPO (except for AIM where the number refers to new issues)

Table 40 shows that the relative spread for Prime/General Standard (0.89%) is one of lowest in Europe and considerably smaller than at LSE's Main Market (2.16%). Only compared to Hong Kong's Main Board (0.86%) and NYSE (0.58%) the Rspread is marginally higher. The picture is similar turning to the smaller exchange segments. The relative bid-ask spread for Entry Standard (1.85%) is smaller than at GEM (3.87%) and AIM (7.20%). However, Alternext (0.81%) shows even lower relative bid-ask spreads during the first ten days after the IPO.

Findings on a stand alone basis suggest that implicit trading costs at Deutsche Börse during the first ten days after the IPO are very attractive compared to its European peer exchanges. However, as discussed above, the degree of implicit trading costs might be highly influenced by certain firm-specifics rather than stock exchanges. Hence, in a next step we measure relative bid-asks spreads and control for those firm-specifics. The model we use looks as follows:

$$\text{Rspread}_j = d_1 \cdot \log(MV_j) + d_2 \cdot \log(TVO_j) + d_3 \cdot TVO / MV_j + d_4 \cdot ZTR_j + d_5 \cdot VOL_j \\ + \sum_{i=1}^{10} b_i \cdot \text{Exchange}_{i,j} + e_j ,$$

where the dependent variable Rspread stands for the relative bid-ask spread of firm j , the independent variable MV, TVO, TVO/MV, ZTR and VOL are the variables as described in 4.2.2 and the variable Exchange is a dummy variable taking the value of "1" if firm j is from Exchange i and "0" if otherwise. The structure of this model and the choice of variables for the regression analysis follow the regression framework applied by Venkataraman (2001). The specialty of this framework features no intercept but a different dummy variable for each market. This method allows an intuitive interpretation of the market variables. The coefficient measures the estimated implicit trading costs of executing a trade on each trading platform for an average firm from the entire sample.⁶⁰

Table 41 reports regression results with Rspread as dependent variable. Coefficients and their respective t-statistics are reported and ***, **, * denote statistical significance at the 1%, 5%, and 10% level. The table shows three different models to further underline that results are not driven by collinearity. Results are fairly similar for all three models. As regards the firm-specific coefficients, three of the five coefficients are statistically significant. The coefficient for trading volume (TVO) is significant and negative throughout each model indicating that higher trading volume is associated with lower relative bid-ask spreads. Furthermore, the coefficient of ZTR is positive and significant. In line with prior findings, this suggests that firms with high zero-trade-ratios experience higher implicit trading costs. Finally, the coefficient for return volatility (Vol) is positive, indicating that an increase in volatility leads to an increase in relative bid-ask spreads.

As regards the exchange dummies all coefficients are negative except Eurolist and statistically significant except for the LSE and NYSE in Model 2. The negative coefficients are intuitive as they document that a listing at a particular market segment can – ceteris paribus – lower the expected relative bid-ask spread. Consequently, coefficients have to be interpreted in a way that listings at the Eurolist are less favourable. Comparing the size of coefficients reveals that after controlling for differences in market value, trading volume and volatility, the Hong-Kong Main Board exhibits the lowest implicit trading costs followed by the Prime/General

⁶⁰ In unreported tables, we use variance inflation factors and condition indices to detect collinearity problems. We found no multicollinearity.

Standard. Regarding the smaller segments Alternext and Entry Standard have the lowest implicit trading costs. Remarkably, a listing at one of LSE's market segments has no positive impact on relative bid-ask spreads.

	Model I		Model II		Model III	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
log(MV)	---	---	-0.001	-1.173		
log(TVO)	-0.008 ***	-10.427	-0.008 ***	-10.656	-0.008 ***	-10.427
TVO/MV	-0.009	-0.180	---	---	-0.009	-0.180
ZTR	0.072 ***	8.763	0.076 ***	9.382	0.072 ***	8.763
VOL	1.134 ***	17.291	1.154 ***	18.843	1.134 ***	17.291
Entry Standard	-0.029 ***	-4.392	-0.027 ***	-3.995	-0.029 ***	-4.392
Prime/General Standard	-0.017 ***	-3.430	-0.014 **	-2.384	-0.017 ***	-3.430
Alternext	-0.046 ***	-6.867	-0.044 ***	-6.505	-0.046 ***	-6.867
Eurolist	0.014 **	2.529	0.016 ***	2.980	0.014 **	2.529
GEM	-0.024 ***	-3.792	-0.023 ***	-3.680	-0.024 ***	-3.792
Main Board	-0.024 ***	-5.494	-0.021 ***	-4.191	-0.024 ***	-5.494
AIM	0.001	0.134	---	---	0.001	0.134
Main Market	0.003	0.442	0.006	0.941	0.003	0.442
NASDAQ	-0.024 ***	-6.231	-0.020 ***	-4.319	-0.024 ***	-6.231
NYSE	-0.011 **	-2.440	-0.007	-1.253	-0.011 **	-2.440
N	1,463		1,463		1,463	
Adj. R ²	46.04%		45.65%		45.56%	

The sample covers listings between January 2005 and December 2007. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 41: Multiple regression model for relative bid-ask spreads

4.2.4 Lessons learnt

This chapter presented empirical evidence on implicit transaction costs across different stock exchanges. Transaction costs form the difference between net stock returns and gross stock returns. As investors focus on maximizing their net stock returns higher transaction costs induce higher expected gross returns and therefore higher costs of capital for exchange listed firms. Summarizing our results, we have clear evidence in favour of low costs of capital induced by transaction costs at Deutsche Börse:

- § Firm characteristics revealed ambiguous results. While zero-trade ratios suggest low implicit trading costs at Deutsche Börse, stock price volatility suggest the contrary.
- § Considering the implicit trading costs (relative bid-ask spreads) Deutsche Börse range at second place behind Hong Kong's Main Board and Alternext when controlling for firm characteristics. Also, the Prime/General Standard has moderate spreads. Only the Hong-Kong Stock Exchange and NYSE are documented to have lower spreads than the Prime/General Standard. Interestingly, the Hong Kong's Main Board and Alternext have lower spreads than Deutsche Börse once controlling for firm characteristics.

5. Comparing the cost of going and being public

A substantial part of this study was focused on a detailed comparison of six global stock exchanges. The comparison was done along the dimensions of different types of direct and indirect costs associated with going public and being a listed firm. Evidently, the profile of the exchanges under consideration here is quite different. Hence, with respect to some dimensions one exchange offers advantageous terms, while with respect to others it does not. An issuer evidently, at the end of the day must decide which exchange shall be chosen as the primary listing venue. Therefore, in the tradition of Kaserer/Schiereck (2007)⁶¹ we offer a comparison between these exchanges on the basis of a scoring model, which allows any issuer to get a quick idea about the strong and weak points of any listing venue. The results are presented in Table 42 and Table 43.

We have chosen four variables related to the indirect cost of being public, and four variables related to the direct cost of going and being public. Evidently, there could be a lengthy discussion why we haven chosen exactly this set of variables and not any other. Although there is no straightforward way how to define which set of variables should be chosen, we think that we capture the most important topics for any firm considering going public.⁶² For a short description how the scores have been assigned the reader is referred to the notes in Table 42 and Table 43. The overall score, finally, is just the average score value assigned for any single criteria. Note that we compute for each stock exchange a score relative to all its peers. This is important if we want to compare our results to outcome of prior studies since a declining score for an individual stock exchange does not necessarily imply a deterioration of trading conditions; rather the conditions of its peer group have changed.

Large Cap Segments						
	DBAG Prime/General Standard	NYSE (Large Cap)	LSE Main Market	HKEX Main Board	NASDAQ (Large Cap)	Eurolist
Rspread	2	1	4	2	2	2
TVO/MV	3	2	3	3	3	5
VOL	3	3	2	4	3	4
ZTR	1	2	3	3	2	5
IPO - TFC	3	3	3	4	3	3
SEO - GS	3	3	2	2	5	3
Admission Fees	1	4	4	2	2	5
Listing Fees	1	3	1	4	5	1
Overall Score	2.1	2.6	2.8	3.0	3.1	3.5

⁶¹ Cf. Kaserer/Schiereck (2007), Going Public and Being Public - A global Comparison on the Impact of the Listing Decision on the Cost of Capital.

⁶² More specifically, one may argue that by taking into account listing as well as admission fees as two separate items, this type of cost is overweighted. However, even if these two items would get only half of the weight of all the other items, the rankings among the exchanges would remain almost the same.

Notes: Rspread is the mean relative spread, TVO is the mean trading volume, MV is the mean market value, VOL is the mean stock return volatility, ZTR is the mean zero-trade-ratio, IPO-TFC is the mean IPO total flotation costs, SEO-GS is the mean SEO gross spread, admission fees are the fees paid for listing the stocks the first time, listing fees are the yearly fees for having the stock listed. For calculating the admission and listing fees at the large segments we have assumed a market cap of 500 million Euros, at the small segments a market cap of 50 million Euros. SEO gross spreads have been calculated only by listing venue, not by market segment. In the case where we did not split up the NYSE and NASDAQ analysis into a large and small cap segment, we took the same values for both segments. Scores are based on relative deviations from the mean value for each category (1=very good, ... 5=very bad). "5" was assigned for a negative deviation from sample mean of more than 50%, "4" for a negative deviation between 26 and 50%, "3" for an absolute deviation of 25%, "2" for a positive deviation between 26 and 50%, and "1" for a positive deviation of more than 50%.

Table 42: Results of the scoring model by large cap market segments

Small Cap Segments						
	DBAG Entry Standard	NYSE (Small Cap)	NASDAQ (Small Cap)	HKEX GEM	AIM	Alternext
Rspread	2	1	1	5	5	1
TVO/MV	3	1	1	4	5	5
VOL	3	2	3	3	3	4
ZTR	1	1	1	3	5	5
IPO - TFC	3	3	3	5	3	2
SEO - GS	3	3	5	2	2	3
Admission Fees	1	5	3	1	3	5
Listing Fees	1	4	5	2	1	2
Overall Score	2.1	2.5	2.8	3.1	3.4	3.4

Notes: Rspread is the mean relative spread, TVO is the mean trading volume, MV is the mean market value, VOL is the mean stock return volatility, ZTR is the mean zero-trade-ratio, IPO-TFC is the mean IPO total flotation costs, SEO-GS is the mean SEO gross spread, admission fees are the fees paid for listing the stocks the first time, listing fees are the yearly fees for having the stock listed. For calculating the admission and listing fees at the large segments we have assumed a market cap of 500 million Euros, at the small segments a market cap of 50 million Euros. SEO gross spreads have been calculated only by listing venue, not by market segment. In the case where we did not split up the NYSE and NASDAQ analysis into a large and small cap segment, we took the same values for both segments. Scores are based on relative deviations from the mean value for each category (1=very good, ... 5=very bad). "5" was assigned for a negative deviation from sample mean of more than 50%, "4" for a negative deviation between 26 and 50%, "3" for an absolute deviation of 25%, "2" for a positive deviation between 26 and 50%, and "1" for a positive deviation of more than 50%.

Table 43: Results of the scoring model by small cap market segments

On the basis of such a simple scoring model it turns out that the Frankfurt Prime/General Standard seems to be the most attractive market segment among all the large cap segments, while the Frankfurt Entry Standard seems to be the most attractive among the small cap segments. On position two there is NYSE for large cap segments and NASDAQ (Small Cap) for small cap segments.

6. Glossary

Delisting	A delisting is the suspension of a public listing. It is also known as going private.
Gross Spread	Fee charged by the underwriting syndicate for offering a company public.
International Issues	Issues where the country of origin of the issuer is different from the country of the stock exchange where the company pursues a listing.
Introduction	The admission and listing of shares at a stock exchange.
IPO	Initial Public Offering. The first offering of shares to the public.
IPO & Placement	A transaction which consists of both an Initial Public Offering and a Private Placement. Very Common at HKEX and Euronext.
Market Value (MV)	The market value of a company is a proxy for firm size. It is calculated as share price multiplied by the number of ordinary shares in issue.
New Issue	“New Issue” is a general term used to describe both IPOs and private placements. A New Issue therefore involves the raising of capital.
New Listing	“New Listing” is a general term used to describe a transaction in which a stock exchange is involved through a listing. In this study there are four such transaction types considered: Introduction, IPO, IPO & Placing, and Private Placement. The number of new listings therefore comprises all transactions considered in this study.
(Private) Placement / Placing	A distribution method through which designated market participants can buy and sell financial instruments to each other without having to comply with the rules that would usually apply when the same instruments are offered to the public or to retail investors.
Rights Offering	Issuing rights to a company's existing shareholders to buy a proportional number of additional securities at a given price (usually at a discount) within a fixed period.
SEO	The term “Seasoned Equity Offering” is used to describe offerings of equity to the public which follow the initial offering of equity to the public.

Stock return volatility (VOL)	Stock return volatility (<i>VOL</i>) is measured as the standard deviation of daily returns over all observations included in the sample.
Total Flotation Costs	The total flotation costs cover all direct costs associated with an IPO. The components of the total flotation costs are gross spread (underwriting fees) and all other expenses directly related to an offering (non-underwriting fees).
Trading Volume (TVO)	This firm-specific characteristic is calculated as the number of shares traded (in millions US\$) multiplied with the unadjusted closing price per day and provides information about the relative level of trading volume of a specific company.
Underpricing	Underpricing denotes a situation when shares are offered with a discount. On the one hand this might lead to substantial gains for investors. On the other hand, underpricing constitutes costs for the issuing company as they “left money on the table” in the sense that they could have chosen a higher IPO offer price.
Underwriting	In a strict sense, underwriting means bearing the risk of an issue, i. e. the underwriter guarantees a certain amount of money to be raised. This understanding of underwriting is in particular applied in the UK. In the US, the term underwriting rather refers to a syndicate or group of banks which are offering a company to the public.
Zero-Trade-Ratio (ZTR)	The zero-trade-ratio (ZTR) is the number of days without any trading over the total number of observation days included in the sample per stock.