The Impact of First-Day Returns on the Listing Location Decision in International IPOs

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Abstract

The thesis at hand introduces historical first-day returns as a predictor for the listing location decision in international initial public offerings (IPO). Furthermore, it examines the moderating impact of firm characteristics on the effect of first-day returns. We use data from nine of the most important countries for international IPOs since 2000 and test hypotheses derived from previous research on foreign listings and IPO underpricing. Using a linear probability model we find that historical first-day returns tend to increase the listing probability in the according country. We argue that our results support existing theories which claim positive first-day returns to be desirable for firms, but that firms do not seem to be able to fully control the degree of underpricing. Moreover, we affirm our hypothesis that high-tech firms tend to avoid countries with high average underpricing, and find indications that the perception of first-day returns is not constant over time and is moderated by firm nationality.

Keywords: Listing location decision, international IPOs, IPO underpricing

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1. Introduction

It might have been the event in the financial world receiving the highest media coverage in 2014. The sizeable initial public offering (IPO) of the Ali Baba Group on the 19th of September not only raised an astronomical sum of 25 billion USD and made Jack Ma, the founder, and a few of his closest business acquaintances unbelievably rich (Barreto, 2014), but also provided the Ali Baba Group with vast financial resources. Consequently, the whole world is eagerly waiting for the tech giant's next move to expand its empire from Asia to the rest of the world. It is widely expected that it is only a matter of time until Jack Ma makes use of the IPO proceeds and adds further strategic puzzle pieces to the Ali Baba Group's impressive portfolio.

The Ali Baba Group's IPO is the example of a Chinese company listing at the New York Stock Exchange (NYSE) in the United States (US). It perfectly illustrates a recent development; an increasing tendency for companies to go public outside their home market. Between 1990 and 2001 only 12.2% of total proceeds raised through public equity offerings were collected cross border (Henderson, Jegadeesh & Weisbach, 2006). In the time period from 1995 until 2007 already a fifth of all IPO proceeds stemmed from IPOs conducted outside the firms' home countries (Caglio, Weiss Hanley, and Marietta-Westberg, 2013). But why do firms list abroad? In the case of the Ali Baba Group, the reason was mainly attributed to the regulatory environment of the NYSE. Contrary to the Hong Kong Stock Exchange (HKSE), the NYSE accepted the proposed shareholding structure of the Ali Baba Group according to which a predefined cable of 30 managers has the right to make crucial decisions regarding compensation, management succession, acquisition strategy, and the business and financial strategy, against the will of the group's shareholders if deemed necessary (Thomas & Barreto, 2014; "Out of control", 2014).

The company's motives are in line with existing literature on the subject – previous studies revolved discussions around the fit of foreign markets' institutional and firms' governance characteristics (cf. Moore, Bell, Filatotchev & Rasheed, 2012). In general, the research question why some firms list abroad and what firms do so has gotten

considerable attention[1]. However, only few authors examined how companies choose among potential foreign exchange markets, and most of them focused on country-specific characteristics when doing so. Additionally, a majority of the early research ignores the difference between international IPOs and seasoned cross-listings. The modest specific coverage of international IPOs in the existing literature is particularly surprising in light of the increasing importance of cross border IPOs mentioned at the outset.

Astonishingly, one question that has not received any attention in academic literature is whether first-day returns in a specific country affect the listing location decision in international IPOs[2]. The question arises from two major research findings. First, a great number of academic papers on new issues address the phenomenon of underpricing and estimate the size of forgone proceeds. For example, Ritter (2014) assessed the value of first-day returns for 1'343 IPOs in the US between 2001 and 2013 and documented an equally weighted average underpricing of 13.3% which sums up to 43 billion USD[3] or about 2.5 times the 2013 GDP of the US – an undeniably important sum of money that firms could have invested in positive net present value projects. Second, underpricing differs significantly between countries and there is a plenitude of potential reasons (cf. Loughran, Ritter & Rydqvist, 1994).

With this thesis, we aim at contributing to the recently growing literature on listing location decisions in the context of international IPOs by introducing first-day returns as an explanatory variable. Furthermore, we examine whether first-day returns affect the decision differently across various types of firms. However, findings will be equally relevant for research on IPO underpricing and its consequences since the results implicitly provide insights regarding the validity of prevailing theories. Therefore, the

[1] For example, Pagano, Röell and Zechner (2002) and the working paper for the United States Securities and Exchange Commission by Caglio et al. (2013) both discuss the topic exhaustively.
[2] Colak, Jens, Knill, and Syvrud (2014) analyze a firm's decision to conduct an international IPO and control for the difference in underpricing between the domestic and the listing nation. No one has examined the impact of first-day returns in potential listing markets conditional on the decision to go public abroad, however.
[3] Note, Ritter (2014) computes the value as the difference between the closing price at the first trading day and the offer price, multiplied by the number of shares issued. Dawson (1987) argues that this measure even underestimates the arising indirect costs to the company as "the traditional investor-oriented underpricing measure does not acknowledge the market value decrease per share caused by selling new shares below their value" (p. 259).

study at hand addresses the research communities of previously named areas, but also governments, investors, investment bankers, and any other interested readers.

The remainder of this paper is organized as follows. The second chapter summarizes existing literature on international listings and presents key theories that attempt to explain the persistent existence of IPO underpricing. In the same chapter, we derive our hypotheses from elucidated theories and selected complementary findings in the existing literature. The third chapter is dedicated to data; we outline the collection process and describe our data samples. Chapter four elucidates the empirical methodology applied to test our hypotheses. In chapter five, we present our regression results and compare them to our hypotheses before we discuss implications and potential explanations drawing on IPO underpricing theories in chapter six. Finally, we close off with a conclusion, discuss limitations of our study, and suggest further research in chapter seven.

2. Existing Literature and Derivation of Hypotheses

In the following two subsections, we first summarize previous research on international listings. Next, we briefly discuss literature on IPO underpricing. We thereby focus on theories we deem relevant in the context of the main research questions. Finally, we derive our hypotheses based on the two literature sections and selected additional research on the role of firm characteristics in the context of IPOs and their underpricing.

2.1 Previous Research on International Listings

We organize the review of existing literature on international listings in three separate blocks. First, we summarize research that focuses on the advantages and disadvantages of listing abroad – the bulk of existing literature. Next, we refer to articles that emphasize the difference between international IPOs and seasoned cross-listings. Finally, we present findings with respect to where firms list their shares in international IPOs.

2.1.1 Domestic vs. Foreign Listings

Despite the undisputed fact that a maximum of proceeds for investments are one of the main reasons for going public (Loughran & Ritter, 2004), literature on foreign listings offers a wide variety of factors that supposedly influence the decision to tap international equity markets. Colak, Jens, Knill, and Syvrud (2014) argue that a reduction of the cost of capital can be achieved through the selection of a foreign market with lower foreign investment barriers. This was illustrated by Lombardo and Pagano (1999), Stulz (1999), and Martin and Rey (2000) who outline that a wider clientele for a firm's shares results in better risk-sharing and, ultimately, in cheaper funding. Kadlec and McConnell (1994), Noronha, Sarin, and Saudagaran (1996), Smith and Sofianos (1997), and Foerster and Karolyi (1998) additionally stress that a wider shareholder base can narrow the spreads and therefore increase trading activity involving a firm's shares. The resulting superior liquidity is one of the benefits which has been associated with international offerings in aforementioned studies.

Furthermore, Cantale (1996) and Fuerst (1998) argue that an international offering can also be used to commit to stricter disclosure and corporate governance standards, thereby reducing the agency cost of external financing and, ultimately, cost of capital. The underlying idea was presented by Shleifer and Wolfenzon (2002) who outline that a

commitment to more stringent securities laws reduces the ability of an entrepreneur to extract private benefits. Their ascertainment is in line with the observation that capital markets tend to be larger in countries with pronounced investor protection (LaPorta, de Silanes, Shleifer & Vishny, 1997). Stulz (2009) even concludes that "there is a demand from entrepreneurs for mechanisms that allow them to commit to credible disclosure because disclosure helps reduce agency cost" (p. 349). Logically, this demand can be served by an international offering in a country with high disclosure standards.

Another possible benefit of an international offering is stressed by Blass and Yafeh (2000) in their study into why foreign firms list in the US. They argue that an international listing can provide access to superior analysts. Based on this insight, Chemmanur and Fulghieri (2006) introduced a model that makes the firms listing choice dependent on the presence, or absence, of skilled analysts and well-informed investors. Similarly, Subrahmanyam and Titman (1999) argue that positive externalities in informational efficiency can be created in markets with more listed firms. Even though Chemmanur and Fulghieri (2006) and Subrahmanyam and Titman (1999) did not identify the same source for comparative information advantage, both papers conclude that it results in a reduction of information asymmetry. Consequently, the right choice of the foreign listing country can mitigate levels of information asymmetry during the offering process and therefore reduce cost of capital.

Stoughton, Wong and Zechner (2001) provide a more strategic reason to list shares abroad. In their model, companies undertake international offerings to signal the high quality of their products to potential customers. The model predicts that those companies will be able to boost their profits through higher market shares, as a consequence of the listing. Their theory on the effects of product market spillovers also suggests that the stated mechanism is especially important for companies operating in industries in which market reputation is of high relevance – producers of retail goods are mentioned as a prime example. The motive of using international offerings as a tool for global marketing implementation is confirmed by Bancel and Mittoo (2001) who conducted a survey among international CFOs and CEOs.

Despite above named advantages, listing shares abroad can have its drawbacks. Hymer (1976) illustrated that doing business abroad provides certain obstacles to companies.

He argues that companies expanding into new markets face additional cost arising from unfamiliarity with the environment, from cultural, political and economic differences and from the increased need of coordination. Zaheer (1995) outlines that this is equally true for firms offering shares to investors in a foreign capital market. Zaheer and Mosakowski (1997) reconfirmed those results and also emphasized that this liability is declining the longer a firm is present in a specific market. Closely connected to this issue is the liability of newness; first described by Stinchcombe (1965). This liability is defined as the risk of failure which is higher for new firms than for established companies due to the dependence on strangers and relatively low levels of legitimacy. Certo (2003) claims the concept of liability of newness to be a problem for IPOs in general and describes it as "the discount that investors place on IPO firms because these firms have not demonstrated an ability to cope effectively with the demands of public trading" (p. 433). However, Moore et al. (2012) specifically argue that the liability of foreignness is particularly severe for companies offering new shares in a foreign market.

Moreover, international offerings can have more direct disadvantages than the drawbacks mentioned in the preceding paragraph. Pagano, Röell and Zechner (2002) mention direct costs including listing fees or fees for professional advice as a possible disadvantage for international offerings, as those can be considerably higher than in domestic issues. However, the main cost cited in a survey by Fanto and Karmel (1997) is the cost of complying with a new, possibly stricter, accounting standard. This result is in accordance with a survey undertaken by Saudagaran and Biddle (1992) who additionally claim an increased risk of lawsuits as a possible disadvantage. Consequently, stricter disclosure requirements in the listing country entail both benefits and risks that need to be considered and weighed. Because of their dependency on the specific listing countries, all studies referred to in above paragraphs have the potential to influence the listing location decision.

2.1.2 International IPOs vs. Seasoned Cross-Listings

Most of the aforementioned advantages and disadvantages of international offerings are equally true for international IPOs and for cross-listings. In fact, early research in the area of international listings does not make a clear distinction between foreign IPOs and seasoned equity offerings in foreign markets as pointed out by Caglio et al. (2013). A

possible explanation for this approach is provided by Pagano et al. (2002) who argue for the similarity between the general decision to go public and the more specific issue of listing abroad. However, Caglio et al. (2013) strongly reject the argument highlighting that it ignores the two primary differences between international IPOs and cross-listings. First, firms which launch an international IPO do not have a trading history. Second, all firms that decide to do an IPO in a foreign market are raising capital at the time of the offering. This clear distinction in their research allows Caglio et al. (2013) to examine the relationship between international IPOs and cross-listings. Their research clearly indicates that the reduction of information asymmetry through the equity offering is much higher for international IPOs than for cross-listings which can be directly linked to firms' missing trading history. It is also observable that companies that conduct a foreign IPO instead of a seasoned cross-listing have a tendency to be smaller in size, to operate in high-tech industries, and to have more pronounced growth opportunities. Additionally, Caglio et al. (2013) describe an increasing complexity of the relationships between originating and listing countries for international IPOs from 1995 to 2007. In contrast, the number of either cross-listing originating or listing countries declined during the same time period. The authors interpret their observation as a substitution of cross-listings by international IPOs. Possible explanations for this substitution process are the improved conditions for international IPOs which include inter alia increased globalization of investment banking services (Ljungqvist, Jenkinson & Wilhelm, 2003) or the rise of book building methods around the world (Jagannathan, Jirny & Sherman, 2000). Additionally, most previously described benefits of international listings have their positive effect immediately after the international offering. Firms might have adapted their behavior accordingly by listing their shares internationally as early as possible, i.e. at the time of the IPO.

2.1.3 Preferred Listing Markets for International IPOs

Claessens and Schmukler (2007) argue that "more developed countries with better macroeconomic, but worse institutional, conditions and more open economic firms have more international firms" (p. 812). These findings, applying to international listings in general, were confirmed by Caglio et al. (2013) in their study on international IPOs. Furthermore, they highlight that the preferred listing countries in international offerings are limited to a few countries and named the US, the United Kingdom (UK), and Singapore

as typical choices. This pattern is also in accordance with the aforementioned advantages of stricter disclosure requirements and superior analysts, as these are typically prevalent in well-developed markets. Consequently, these markets offer the highest potential with regard to implicit advantages of international offerings outlined earlier.

The selection of a capital market for a firm's foreign IPO was also examined by Moore et al. (2012) who pursued the issue from a comparative institutional perspective. They conclude that firms conduct their IPO in foreign capital markets with institutional environments that fit their own governance characteristics and third party affiliation. As a consequence, typical governance and external network characteristics, such as executive incentives and board independence, prestigious underwriters, and the degree of venture capitalist involvement, are significant predictors of a firms host capital market choice.

Finally, it is worth noting that some researchers claim a further differentiation of international IPOs to be necessary when it comes to research on where firms go public. Doidge, Karolyi and Stulz (2011) characterize a *foreign IPO* as an IPO in which a firm lists its shares exclusively in foreign markets. In contrast, a *global IPO* describes a listing in which a firm offers shares in at least one foreign country but also in its home market. This distinction is said to be relevant as Colak et al. (2014) emphasize "that several variables are important to the decision of having a global IPO, but not a foreign IPO, and vice versa" (p. 3). As an example, Colak et al. (2014) illustrate that the selection of the foreign market in a global IPO is much less influenced by the current "market heat"[4]. Concluding, Colak et al. (2014) point out that there are different preferences for foreign stock exchanges depending on whether the listing is a global or a foreign IPO. These findings reinforce their claim that the selection of a foreign market in a global IPO is based on different criteria. However, despite these slightly different preferences of listing countries, the prevailing opinion in existing academic literature is that the listing countries attracting the most foreign listings share common characteristics.

[4] Colak et al. (2014) calculate the difference in market heat between the domicile and listing nations as the "moving average of IPOs per country over the year prior to the IPO divided by the historical number of IPOs per year in each country" (p. 30).

2.2 Theories on IPO Underpricing

Academic literature is rich in attempts to explain the phenomenon of IPO underpricing. In the following paragraphs, we will briefly summarize theories that are relevant for the derivation of our hypotheses. The universe of theories on why underpricing persists can be organized into three broad blocks based on the major players involved in the IPO process who are deemed to cause positive first-day returns: The issuer, underwriters, and investors.

Some theories that describe underpricing as a result of the issuing firm's behavior proclaim that firms underprice their initial offerings due to asymmetric information (e.g. Leland & Pyle, 1977; Rock, 1986; Chemmanur & Fulghieri, 1994). Rock (1986) describes asymmetric information between a group of investors who possess information that is superior to other investors' and the issuing firm's. In his model, the group of informed investors crowds out uninformed investors in good issues if the shares are priced at their expected value. Therefore, firms need to underprice their issue to guarantee that uninformed investors participate, a requirement for full subscription. Other research interprets underpricing as a signal sent by better informed insiders to the investment community. Allen and Faulhaber (1989) argue that underpricing is, in parts, intentionally created to signal good future prospects for the company. They argue that only the best firms can bear the costly signal by recouping them in subsequent issues. Similarly, Grinblatt and Hwang (1989) state that firms signal their high intrinsic value by combining underpricing with the retention of a fraction of the newly issued shares. Additionally, Welch (1989) claims that firms issue their shares at a discount in order to obtain higher valuations in seasoned equity offerings.

Other theories describe underpricing as a form of compensation for future services provided by the underwriter. Loughran and Ritter (2004) argue that analyst coverage is expensive for investment banks and Cliff and Denis (2004) find that "underpricing is positively related to analyst coverage by the lead underwriter and to the presence of an all-star analyst on the research staff of the lead underwriter" (p. 2871).

Lowry and Shu (2002) find underpricing to be an outcome of issuing firms' risk aversion. They argue that firms employ underpricing as a form of insurance premium to avoid future lawsuits and support their notion with a positive relation between

underpricing and litigation risk. They further show that litigation risk can be significantly reduced through a discount on the offer price.

Moreover, a range of approaches explain underpricing with its implicit benefits for pre-IPO shareholders. Brennan and Franks (1997) state that firm owners use underpricing to reduce dilution of their decision power. They argue that underpriced issues are more likely to be oversubscribed and therefore less likely to produce new significant blockholders. Loughran and Ritter (2002) observe that the largest amounts were left on the table when firm managers saw their wealth increasing substantially through the IPO. If they were pre-IPO owners of their firm and retained considerable blocks of shares, they would benefit from first-day returns (Loughran & Ritter, 2002). Furthermore, this was frequently the case when both the offer as well as market price exceeded initial expectations (Loughran & Ritter, 2002). Siconolfi's (1997) notion that some newly issued shares were allocated to managers and venture capitalists provides additional supporting evidence for Loughran and Ritter's (2002) conclusions. Also, Barry (1989) proclaims that owners only care about underpricing if they suffer a wealth loss. This is not the case if they do not tender their pre-offer shares. Habib and Ljungqvist (2001) argue that owners could reduce underpricing if they wanted by promoting the IPO accordingly. Finally, Dandapani, Dossani, Prakash, and Reside (1992) bring forward the idea that differences in tax rates on ordinary income and capital gains might explain why owners could sympathize with underpricing. Given that the tax treatment of capital gains is still favorable in many countries around the world (cf. Ernst & Young, 2013), the argument has not lost its actuality; underpricing can allow firm owners to extract financial benefits through capital gains on retained shares. Note that many of the above theories argue that underpricing comes with certain benefits that go beyond the overcoming of asymmetric information and ensuring full subscription.

Numerous alternative explanations focus on the role and scope of action of the lead underwriter. Baron (1982) applies the concept of asymmetric information on the relationship between the firm and the investment bank. He argues that firms delegate the pricing decision to underwriters who then underprice the issue because such an offering seems less costly to them. Specifically, Saunders (1990) argues that underpriced issues are easier to market and bear less risk of being undersubscribed. More generally, Benveniste and Wilhelm (1997) and Sherman and Titman (2002) describe that banks

could theoretically reduce average underpricing, and therefore maximize expected proceeds, by allocating shares to regular investors who provide valuable information regarding the pricing decision. However, Loughran and Ritter (2002) argue that underwriters receive return services from investors for underpriced issues. Also, they argue that underwriters allocate shares as a function of past and future commission business (Loughran & Ritter, 2004). This is in line with the theory of Beatty and Ritter (1986) according to which underwriters enforce an equilibrium of underpricing due to their reputational capital at risk. The authors argue that investment banks on the one hand will lose investors as subscribers in future issues if they do not provide them with high enough first-day returns, but on the other hand will lose market share in the IPO business if they underprice issues too heavily on average. Accordingly, Carter and Manaster (1990), and Carter, Dark and Singh (1998) find that prestigious underwriters lead less heavily underpriced issues and argue that their reputation stands for less risky issues for which investors demand lower first-day returns. Finally, Tinic (1988) as well as Hughes and Thakor (1992) proclaim that underwriters' risk aversion resulting in underpriced issues might also be explained by the threat of potential lawsuits in case of an overpriced issue.

Lastly, some research explains the persistence of the phenomenon of positive first-day returns with investor behavior. For example, Benveniste and Spindt (1989) mention that institutional investors demand high underpricing to reveal their true interest in a stock issue which is closely related to previously mentioned theories on banks' behavior. Other theories incorporate aspects of behavioral finance. Ljungqvist, Nanda and Singh (2006) state that underpricing is partially driven by investors' overconfidence. Additionally, Ritter and Welch (2002) highlight the contribution of excessive optimism regarding the value of a newly issued stock. Similarly, Cornelli, Goldreich and Ljungqvist (2006) show that irrational, overoptimistic, small retail investors can drive first-day aftermarket prices upwards.

2.3 Derivation of Hypotheses

Even though some of the theories mentioned in the previous chapter provide reason to believe that underpricing might come with certain advantages, and thus be desired to some extent, Ritter (1987) and Lee, Lochhead, Ritter, and Zhao (1996) clearly describe

the phenomenon as a cost of going public, a cost borne by the firm. After all, Rock (1986) describes two principal reasons for a firm to go public: First, an IPO provides the opportunity for founders, venture capitalists and employees holding stock options to diversify their portfolio since they have usually invested considerable amounts in the enterprise. Second, it allows raising new funds that the firm can use for new investments. Therefore, it is not surprising that Dolvin and Jordan (2008) conclude that owners of a firm attempt to avoid underpricing through higher share retention in times of high underpricing.

Since the above mentioned diversification benefits for investors are independent of the decision in which country the IPO takes place, it seems reasonable to presume that the maximization of raised funds plays an important role when firms decide where the company's shares will be listed. Thus, we expect companies to avoid stock exchanges with high positive historical average first-day returns in the context of international IPOs. Therefore, we formulate our first main hypothesis regarding the impact of first-day returns as follows.

Hypothesis 1: *Historical first-day returns in any given country are negatively related to the probability that a firm undertakes an international IPO in this specific country.*

Recent papers on international listings such as Caglio et al. (2013) and Colak at al. (2014) broke the tradition of merely focusing on country-specific aspects as potential predictors for listing decisions. Instead, they incorporate firm characteristics and emphasize their importance. Moreover, there is an abundance of studies which examine the relation between firm level variables and underpricing of new issues[5]. Thus, it is appropriate to hypothesize that the impact of historical first-day returns is not homogeneous across all types of firms.

One of the most apparent firm characteristics is the size of a company. Previous research by Megginson and Weiss (1991), Ibbotson, Sindelar and Ritter (1994) and Carter, Dark and Singh (1998) describes a negative relation between firm size and

[5] Inter alia Megginson and Weiss (1991), Ibbotson, Sindelar and Ritter (1994), Rasheed, Datta and Chinta (1997), Mikkelson, Partch and Shah (1997), Carter, Dark and Singh (1998), Marshall (2004), and Yatim (2011).

underpricing. It is argued that the size of the company reduces the uncertainty associated with the IPO and therefore reduces asymmetric information and, ultimately, underpricing. Based on that, we assume that smaller companies are more interested in avoiding countries with high historical underpricing as they are more prone to it. Furthermore, we argue that the effect might be reinforced because large firms might be more likely to have ample resources and therefore to be less dependent on IPO proceeds to guarantee their investment capability.

Hypothesis 2a: *In their listing location decision, small firms are more averse to historical average first-day returns in any given country than large firms.*

Moreover, differences in the evaluation of underpricing in potential listing countries might arise from variation in firm profitability. Peristiani and Hong (2004) emphasize the quality of pre-issue profitability as a predictor of aftermarket survival. Consequently, high pre-issue profitability signals strength and goes hand in hand with a reduction of uncertainty. This reduction in information asymmetry can, as pointed out several times before, reduce the discount on the offer price. Analogously to the derivation of the previous hypothesis, we expect more profitable firms to be less sensitive to high average first-day returns than relatively unprofitable firms since they are exposed to a lower risk of being underpriced. This leads to our next hypothesis with regard to the interaction of first-day returns and firm characteristics.

Hypothesis 2b: *In their listing location decision, less profitable firms are more averse to historical average first-day returns in any given country than highly profitable firms.*

Another possible source for the proneness to underpricing is the capital structure of a firm. Applying capital structure signaling models to IPO underpricing, James and Wier (1990), Habib and Ljungqvist (2001), and Schenone (2004) all highlighted that receiving debt before issuing stock, signals high firm value to the market. Thus, information asymmetry is reduced resulting in lower IPO underpricing. This indicates that companies with high leverage are more independent in their foreign exchange listing decision as they are less susceptible to underpricing, our next hypothesis.

Hypothesis 2c: *In their listing location decision, firms with lower pre-offer leverage ratios are more averse to historical average first-day returns in any given country than highly leveraged firms.*

Furthermore, a frequently used firm characteristic to categorize firms within the context of IPO underpricing is the industry in which a firm operates, i.e. high-tech or low-tech. For example, Kim, Pukthuanthong and Walker (2008) examined the effect of leverage and pre-IPO insider ownership on IPO underpricing for high-tech and low-tech companies. They conclude that the effects differ significantly between firms operating in these industries. Even more directly, Hwang, Clarysse and Autio (2012) find a positive correlation between high-tech and underpricing. This correlation was attributed to high-tech firms' high research and development expenditures which increase information asymmetries and result in higher discounts on the offer price. These examples justify an investigation on whether high-tech firms view underpricing differently in their listing location decision than firms in other industries. Following the logic of earlier hypotheses, we expect that high-tech firms are more underpricing averse due to their higher risk to be underpriced. This is expressed as follows in our next hypothesis.

Hypothesis 2d: *In their listing location decision, high-tech firms are more averse to historical average first-day returns in any given country.*

As pointed out in the previous chapter, an international offering can also serve as a marketing tool. Specifically, it can increase brand awareness, generate additional customer demand, or improve the public perception of the company in general. In line with this, Stoughton et al. (2001) provide evidence for the relevance of international offerings in firms' strategies to gain market shares. Saudagaran (1988) shows that a particularly high proportion of foreign sales increases the probability that a company lists its shares abroad. He argues that companies use international offerings to increase visibility and benefit from free advertising in the foreign market. He thereby provides the foundation of our next hypothesis. We argue that firms with high commercial exposure to international markets are less sensitive to underpricing, because fund raising is not the primary purpose of the IPO.

Hypothesis 2e: *In their listing location decision, firms with high fractions of foreign sales are less averse to historical average first-day returns in any given country than firms primarily generating revenues in their home country.*

Finally, we examine the impact on the perception of underpricing by firm-specific characteristics that determine the nature of the international IPO. In the previous chapter, we shortly mentioned a differentiation of IPOs within the broad group of international IPOs: foreign vs. global listings. Thereby, we incorporate most recent research such as Colak et al. (2014) and Caglio et al. (2013). Additional reasoning for using the nature of the IPO as a firm characteristic is provided by Hasan, Kobeissi, and Wang (2011). They connect strategic motives with a firm's decision to offer equity in multiple markets. Given that a global IPO includes at least two legs, it is arguable that the international leg supports the creation of brand awareness, attracts the attention of international investors, and allows shopping for foreign disclosure standards while proceed goals are deemed to be guaranteed through the domestic tranche (Hasan et al., 2011). Therefore, we expect firms conducting global IPOs to be less concerned about historical first-day returns in potential listing markets.

Hypothesis 2f: *In their listing location decision, firms conducting a global IPO are less averse to historical average first-day returns in any given country.*

3. Data

Given the hypotheses outlined in the preceding chapter, the core of our data sample consists of data on international IPOs (including pre-offer firm level data) and average first-day returns for the countries analyzed in our study. The next two sections sketch the collection process and describe the data for each of the named data categories. Finally, we close the chapter by elaborating on the choice and measurement of control variables.

3.1 International IPO Data

Our study is based on international IPOs in the most important post-millennium international IPO markets. We therefore worked with the following definitions:

International IPO: IPO that includes listings in at least one foreign country as implicitly suggested by Caglio et al. (2013). This includes both foreign and global IPOs.

Global IPO: International IPO which goes public domestically and in at least one foreign country simultaneously, in line with Caglio et al. (2013). We also apply their approach of allowing 75 days to pass by between the domestic and the foreign IPO legs when identifying global IPOs. The definition is crucial to distinguish between global IPOs and cross-listings. For reasons outlined in section 2.1.2, we do not include the latter in our study.

Post-millennium: From January 1, 2000, to September 21, 2014[6]. We chose this timeframe for two reasons. First, it covers the years after 2010 which, to the best of our knowledge, have not been taken into consideration in existing literature on listing location decisions. Second, the covered timespan of roughly 15 years is comparable to data sets in previous studies (e.g. Colak et al., 2014; Caglio et al., 2013).

[6] Date of data query.

We obtained data on international IPOs from *Thomson Reuters Security Corporation´s Platinum Global New Issues (SDC Platinum)* database. It covers a wide range of information on new issues including offer- as well as firm-specific data. We cleaned obtained data for cross-listings as well as double entries and seasoned equity offerings which were mistakenly flagged as IPOs. In line with Caglio et al. (2013) we excluded real estate trusts, exchange-traded funds, closed end funds, and investment trusts. Moreover, private placements and spin-offs were excluded from our sample in accordance with Doidge, et al. (2011) and Moore, Bell, and Filatotchev (2010), respectively. Ultimately, we eliminated IPOs with proceeds of less than one million USD following the example of Colak et al. (2014) to avoid any sample bias through the inclusion of direct listings which *SDC Platinum* does not flag differently than actual IPOs. These listings of small firms consist of a two-step process, an initial exchange listing and a subsequent alternative registered offering (Colak et al., 2014). After excluding these data entries, we were left with a total of 16´543 IPOs based on which we identified the most important listing countries for international IPOs.

Appendix Table 1 lists all 45 international listing nations[7] in our data sample and ranks them based on the number of hosted international IPO legs as well as the total proceeds of according IPOs. It is apparent that the UK (34%), the US (24%), and Singapore (10%) account for 68% of all international IPO legs between 2000 and 2014. Also, only 17 countries hosted 10 or more international IPOs. Given the importance of the listing nations for our analysis we sense-checked withdrawn data by conducting manual research on 200 IPOs, thereby covering the entire time span of 15 years. Our observations are also consistent with the previously mentioned notion that a few countries dominate the market for international IPOs (cf. Claessens & Schmukler, 2007; Caglio et al., 2013). Ranking the countries by total proceeds of hosted international IPOs leads to a slightly different picture than by just looking at the number of IPO legs. For example, Singapore accounts for 10% of all IPO legs, but only 3% of their proceeds. Nevertheless, the degree of concentration is comparably high with around 70% of total proceeds from international IPOs being generated by IPOs in only three countries.

[7] We identified a total of 89 countries that hosted domestic and/or international IPOs during the covered time period.

Figure 1 below illustrates the concentration along both dimensions, number of IPO legs and according proceeds.

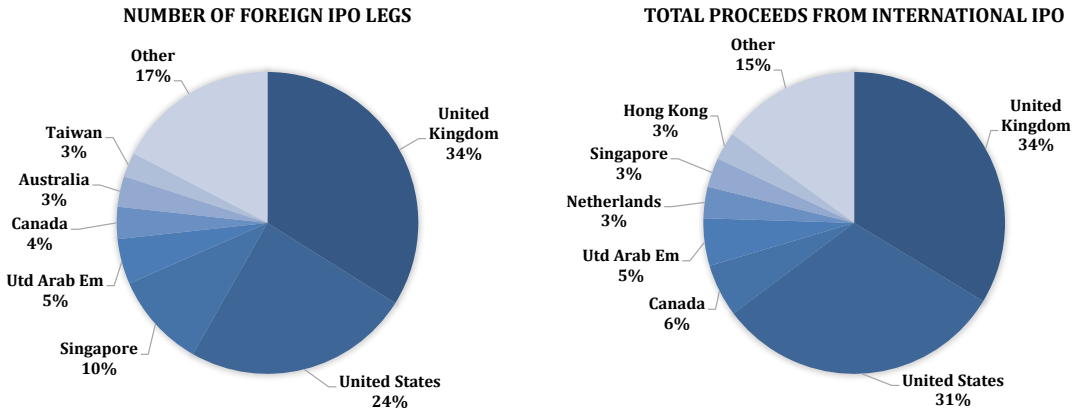

Figure 1: Geographic distribution of international IPO activity from 2000 to 2014 measured by total number of foreign IPO legs and according proceeds (own analysis).

Due to the differences in the two rankings, we took into consideration both aspects to identify the most important international IPO centers. Specifically, we deemed a country to be relevant for our study if it either hosted at least 30 international IPOs or slightly less, but with a material share in global proceeds. Thus, we decided to include Hong Kong since it hosted 27 international IPOs which, however, accounted for 3% of total proceeds from international IPOs. Note that we followed Caglio et al.'s (2013) reasoning that Chinese firms' IPOs conducted in Hong Kong after 1997, i.e. our entire data sample, cannot actually be considered international. While they argue that Hong Kong hosts few international IPOs net of China based firms and therefore exclude it from their data set, we conclude that their observation is not true for our sample that includes post 2007 years. As an additional exception, we excluded Taiwan and Luxembourg from our list despite their number of hosted IPOs. This is because neither country level data for Taiwan nor data on first-day returns for Luxembourg is readily available. Consequently, our final list of most important post-millennium international IPO host nations encompasses nine countries: Australia, Canada, France, Germany, Hong Kong, Singapore, the UK, the US, and the United Arab Emirates (UAE). These nine nations account for a total of 1´563 international IPO legs or 1'543 IPOs on aggregate – the difference is explained by IPOs which went public in multiple foreign countries simultaneously. Both the number of included countries as well as size of the IPO data set is comparable to the scope of similar studies.

Figure 2 presents the aggregate international IPO activity in the nine considered countries over time. It perfectly illustrates the impact of the recession following the burst of the dotcom bubble in 2001 and the 2007 financial crisis on (international) IPO activity. Both are followed by a drop in the number of IPOs.

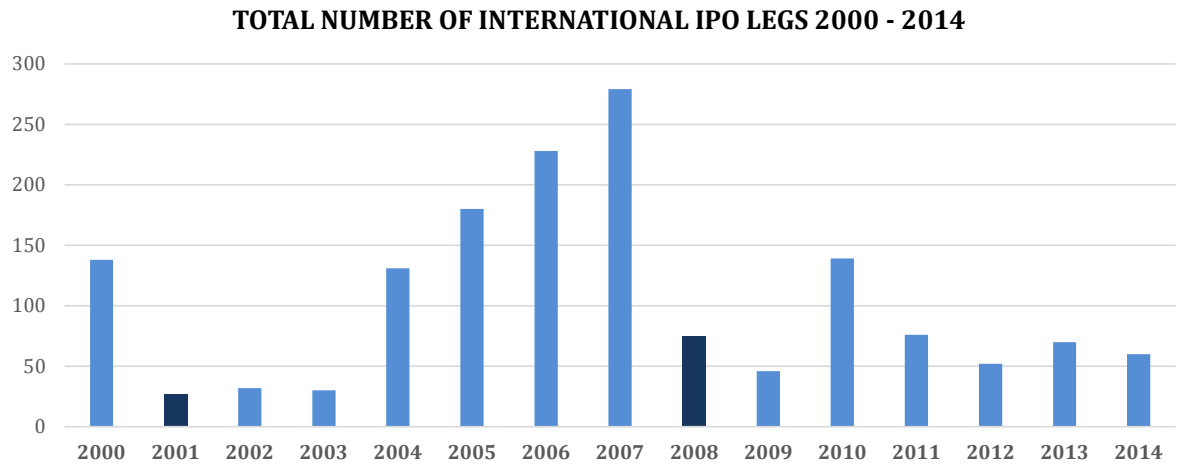

Figure 2: Aggregate number of international IPO legs per year in the nine countries considered in our study (own analysis).

Appendix Table 2 breaks down yearly international IPO activity by analyzed country. Again, the previously described drops in the number of listings become apparent in the table. Additionally, it illustrates that two new centers for international IPOs emerged over time: Hong Kong and the UAE. Furthermore, Germany seems to have lost its importance as a hosting nation for cross border IPOs. These two aspects are important reasons for why our data sample differs materially from previous studies that did not take into consideration data for the years after 2007 (cf. Caglio et al., 2013).

The size of our final IPO data samples to test our hypotheses, however, depends on the availability of data for firm level variables measured at the time just before the IPO. Specifically, we use total assets (*TotalAssets*), total revenues (*TotalRevenues*), and net income (*NetIncome*) as proxies for firm size to test Hypothesis 2a. Next, we use a profit margin defined as net income divided by total revenues (*ProfitMargin*) as well as return on assets (*ROA*) to measure profitability in the context of Hypothesis 2b. For Hypothesis 2c, we use the book debt-to-equity ratio (*DebtEquity*) as a measure for leverage. Moreover, we use a dummy variable indicating whether or not a firm's primary business is in the high-tech industry (*HiTech*) to test Hypothesis 2d. For Hypothesis 2e, we rely on the extent to which sales are generated abroad measured as foreign sales as a

percentage of total revenues (*ForeignSales*). Finally, another dummy variable serves the purpose of indicating whether a firm conducted a global or a foreign IPO (*Global*) to test Hypothesis 2f. *SDC Platinum* provides pre-offer data for *TotalAssets*, *TotalRevenues*, *NetIncome*, *DebtEquity*, and *HiTech*. Nevertheless, the data base is far from being complete and it does neither provide data on *ROA* nor on *ForeignSales*. To keep the data samples as large as possible and appropriate to test all our hypotheses, we complemented the intermediate, solely *SDC Platinum* based, data set with data from *Thomson Reuters' Worldscope* and *Datastream* databases where available. We thereby primarily used the measure at year-end before the IPO, but also accepted year-end figures of the year of the IPO for *TotalRevenues* and *NetIncome*, implicitly assuming that going public dramatically changes the balance sheet, but does not have an immediate impact on profit and loss statements. This leads to final sample sizes per firm level variable, which are presented in Table 1 below.

Table 1: Sample size by firm level variable and hypothesis.

		Sample Sizes		
Hypothesis	**Firm Charachteristic**	**Proxy variable**	**# of IPOs**	**# of legs**
Hypothesis 1	N/A	N/A	397 - 1543	402 - 1563
Hypothesis 2a	Size	Total Assets	1 199	1 215
Hypothesis 2a	Size	Total Revenues	1 146	1 162
Hypothesis 2a	Size	Net Income	1 249	1 267
Hypothesis 2b	Profitability	Profit Margin	1 083	1 098
Hypothesis 2b	Profitability	ROA	745	755
Hypothesis 2c	Capital structure	Debt/Equity	1 027	1 037
Hypothesis 2d	Industry	High-tech industry affiliation dummy	1 543	1 563
Hypothesis 2e	Internationality	Foreign sales/Total Revenues	492	498
Hypothesis 2f	Global IPO	Global IPO dummy	1 543	1 563

Source: Own analysis

Appendix Table 3 to Appendix Table 11 provide descriptive statistics for each subsample, i.e. per firm level variable, and ranks the countries based on the average value of the specific measure sorted in descending order. On aggregate, the tables provide information that might be relevant in the context of this paper. It seems that the nine listing countries are not equally attractive to different types of firms; average values of all firm level variables differ substantially between the nations. For example, Hong Kong attracted larger firms on average, whereas Singapore hosted international IPOs of relatively small firms. Similarly, the share of foreign sales of firms going public in Hong Kong was the double of firms listing in the US, on average. These observations are in line with findings of recent papers such as Caglio et al. (2013) who find that some firm level

variables (e.g. total assets) are significant predictors for the listing location choice. However, it is important to note that the standard deviation of the firm variables is high in all countries and across all firm characteristics. Although there might be significant preferences of firms of a given type, there is no evidence for a strict pattern.

3.2 First-Day Returns

Data for first-day returns for each of the selected countries was obtained from *SDC Platinum*. Given that historical first-day returns will be used as a predictive variable, we extended our above mentioned data set on IPOs by three more years (1997 to 1999) to be able to assess their effects on IPOs in the early 2000s. The extended IPO sample records a total of 21'248 IPOs after filtering according to the same criteria mentioned above. Since first-day returns were available for only 53% of all IPOs in the *SDC Platinum* sample, the actual data sample used to estimate time-varying first-day returns encompasses 11'286 IPOs. Although the database offers the percentage change in stock price at the first trading day as a separate data category, we calculated first-day returns to sense-check the withdrawn data. Thereby, we defined first-day returns as follows

$$R_1 = \frac{P_1 - P_0}{P_0}$$

where R_1 is the first-day return expressed as a decimal, and P_0 and P_1 are the offering price and the closing price of the first trading day, respectively. To make sure the relevant data sample is not materially biased, we conducted manual research for IPOs with either extremely high or low first-day returns. By doing so, we double-checked first-day returns for 160 IPOs and adjusted them where publicly available documentation of the IPO contradicted database entries. Table 2 presents the equally weighted averages of first-day returns between 1997 and 2014 for each analyzed country.

Table 2: Average first-day returns by listing nation over the entire sample period, i.e. 1997 – 2014.

First-day Returns 1997 - 2014			
Country	**Avg.**	**Std. Dev.**	**Observations**
Utd Arab Em	3,11	3,49	36
United States	0,28	0,58	3 013
Singapore	0,25	0,43	363
Australia	0,19	0,44	961
Hong Kong	0,18	0,54	752
United Kingdom	0,14	0,29	1 123
Canada	0,11	0,31	246
France	0,05	0,23	205
Germany	0,05	0,14	103

Source: Own analysis

As expected given previous research, first-day returns differ substantially between the analyzed countries and standard errors are sizeable (cf. Loughran et al., 1994). Large standard deviations in first-day returns are at least partially explained by changes in IPO underpricing over time as described by Loughran and Ritter (2004). For the same reason, our proxy variable for first-day returns in any given country needs to be dynamic. We decided to define the variable UP as the three-year[8] moving average of first-day returns in a country, observed in the calendar year of the IPO. Note that we included all IPOs in a given country to compute the measure, i.e. domestic and international IPOs. Appendix Table 12 presents the variable's values for each observed country and year in our data sample. The table reconfirms that first-day returns vary substantially between countries. Also it reveals that they are not stable over time – consistent with the aforementioned notion by Loughran and Ritter (2004).

To assess the general reliability of our first-day returns data, we compared a subsample of our US data with Ritter's (2014) updated statistics on initial public offerings and obtained similar values. Table 3 below summarizes the comparison.

[8] We chose the three-year average following the example of Caglio et al. (2013) who use three-year averages for their historical variables.

Table 3: Sense-check of average first-day returns of IPOs in the US in our data sample.

Average First-day Returns in the US			
	Period	**Avg.**	**Observations**
Our analysis	1999 - 2000	64,98%	772
Ritter (2014)	1999 - 2000	64,50%	857
Our analysis	2001 - 2013	13,02%	1 298
Ritter (2014)	2001 - 2013	13,30%	1 343

Sources: Ritter (2014), own analysis

3.3 Selection and Measurement of Control Variables

As mentioned earlier, numerous previous studies on foreign listing location decisions focused on country level characteristics and thereby emphasized their relevance. Thus, we control for factors accounting for the regulatory environment, capital market and general economic conditions, local equity market characteristics, as well as the geographic location of the listing country.

Regulatory Environment

Several studies find financial disclosure requirements to be a significant predictor for listing location decisions (e.g. Saudagaran & Biddle, 1992; Saudagaran & Biddle, 1995; Huddart, Hughes, & Brunnermeier, 1999). As outlined in section 2.1, disclosure standards can affect the listing location decision in two ways. On the one hand, going public in a country with high disclosure standards represents a commitment to disclose accordingly and limits the entrepreneur's ability to extract private benefits. On the other hand, stricter disclosure requirements can lead to higher reporting costs (Saudagaran & Biddle, 1992) and therefore deter firms from listing in a given country. We therefore define the variable *Disclosure* as the listing nations´ disclosure score in the *World Bank´s* business extent of disclosure index.

Capital Market and General Economic Conditions

It is possible that firms also consider differences in market returns among potential foreign listing locations to benefit from favorable market conditions when going public. Therefore, and following the example of Caglio et al. (2013), we control for total market returns (*TotalMktRet*) in the calendar year prior to an IPO. We calculate total returns of major equity indices with data from *Datastream*. Appendix Table 13 lists the indices used

in this context. Additionally, Colak et al. (2014) control for the listing nation's GDP growth since Sarkissian and Schill (2012) showed the existence of a relation to foreign listing activity. We therefore add a control variable for the GDP growth rate in the year prior to an IPO (*GDPgrowth*). We obtained data from the *World Bank´s World Development Indicators* data set.

Local Equity Market Characteristics

In their study, Caglio et al. (2013) introduce a variable that describes the industry-dependence of listing location decisions. The variable is a proxy for comparative information generation advantages in the listing country (Subrahmanyam & Titman, 1999; Chemmanur & Fulghieri, 2006). We follow their example and define *IndustryIPO* as the percentage of IPOs of the same industry in the three calendar years preceding an IPO, in order to capture the share of similar IPOs within any given listing country. Industry affiliation is based on the two-digit SIC code. Colak et al. (2014) also control for the size of a country´s equity market to account for the possibility that a firm lists abroad due to a too small domestic market. We include a variable for total market capitalization (*MktCap*), although we observe firms conditionally on the decision to go public abroad in our study. We argue that if a firm goes public abroad for reasons related to the size of equity markets, it might as well strive for the largest available foreign market. Data is obtained from the *World Bank´s World Development Indicators* data set.

Geographic Location of Listing Country

Finally, we account for proximity (*Proximity*) despite contradictory findings in previous studies. While Sarkissian and Schill (2004) find it to be significant for cross-listing decisions, Caglio et al. (2013) cast doubt on its relevance in their study. We use Mayer and Zignago´s (2011) database which provides the distance between two countries measured in kilometers for almost all countries on earth. For the few pairs of countries lacking an according value, we referred to *DistanceFromTo,* a publicly accessible webpage[9].

[9] www.distancefromto.net

4. Methodology

In this section, we describe the empirical model used to test our hypotheses and justify our choice by shortly elaborating on the model's main shortcomings and advantages. Furthermore, we present and comment on the specification of the model for both main hypotheses. Finally, we briefly comment on collinearity in our regression models.

4.1 Choice of Empirical Model – Linear Probability Model

Since our explained variable is whether or not a firm went public in a given country, it takes the form of a dummy variable. This implies the use of a limited dependent variable model. Of the various models available, we chose the linear probability model (LPM) and used ordinary least squares (OLS) for estimation. The LPM predicts the probability of a treatment, i.e. a listing in a given country, with the slope parameters measuring the change in probability given a unit increase in the explanatory variable.

One of the model's most important shortcomings is that it allows estimated probabilities to take values above one and below zero; an issue that could be solved by estimating a non-linear model such as logit or probit which force estimated probabilities into the boundaries. Nonetheless, it is often argued that parameter estimates in LPMs are unbiased (e.g. Aldrich & Nelson, 1984). Therefore their sign is usually similar to their counterparts in maximum likelihood estimated non-linear models such as logit or probit (Pindyck & Rubinfeld, 1981). Another issue with the LPM concerns the distribution of error terms. Due to the binary nature of the dependent variable, the disturbance term cannot reasonably be assumed to be normally distributed (Maddala, 1983). We accounted for heteroscedasticity by using robust standard errors, thereby clustering at the firm level.

The LPM's main advantage lies in the interpretation of interaction effects. In a linear model, the sign of a multiplicative term of the two variables deemed to moderate each other's effects can simply be estimated with OLS (Jaccard, Turrisi & Wan, 1990). Also, statistical significance can be assessed with a t-test for the interaction term's parameter (Jaccard et al., 1990). Thus, a significant t-statistic for the interaction term's parameter implies a significant interaction effect of the two examined variables. It can be shown, however, that this is not the case for non-linear models (cf. Norton, Wang & Ai, 2004). As

will become apparent in the following subsection, we test our second major hypothesis using models with interaction terms. Hence, we chose to use the LPM rather than logit or probit due to its advantages regarding the analysis of interaction terms while the disadvantages are not relevant in the context of our study.

Nevertheless, we tested the model-independence of our results, despite above theoretical evidence. Specifically, we compared our results for main effects, i.e. in a model without interaction term, with outcomes when using a logit model. As expected, we obtained similar signs and statistical significance for all parameters. Nevertheless, estimates differed substantially with regard to economic significance. This being said, the thesis at hand aims at assessing the mere existence of effects, disregarding their magnitude. We therefore conclude that the LPM is an appropriate model in the context of our study.

4.2 Specification of Regression Models

We specified two linear multivariate regression models; one to assess the standalone impact of first-day returns on the listing location decision (i.e. Hypothesis 1), and one to test for an interaction of firm characteristics with first-day returns (i.e. Hypotheses 2a-f). Our first model takes the following form.

$$IPO_{i,j} = \alpha + \beta_1 UP_{j,t} + \beta_2 Control[1]_{j,t} + \cdots + \beta_7 Control[n]_{j,t} + \varepsilon_{i,j}$$

where α is a constant, $IPO_{i,j}$ is a dummy variable that indicates whether or not firm i went public in country j,$UP_{j,t}$ is the previously elucidated first-day return variable for country j observed at the time (t) of an IPO, and $\varepsilon_{i,j}$ is the error term. $Control[1\ to\ n]$ are n control variables discussed in section 3.3, but we additionally control for firm level variables. We thereby account for recent findings by Caglio et al. (2013) who, among other things, note that the probability for a firm to go public in the US increases with the size of proceeds. Since we predict first-day returns to have an impact on the listing probability, the according null hypothesis is that the estimated parameter $\widehat{\beta_1}$ does not differ from zero statistically significantly.

The second model includes a multiplicative interaction term and takes the following general form.

$$IPO_{i,j} = \alpha + \beta_1 Int + \beta_2 UP_{j,t} + \beta_3 Comp_{i,t} + \beta_4 Control[1]_{j,t} + \cdots + \beta_9 Control[6]_{j,t} + \varepsilon_{i,j}$$

where α, $IPO_{i,j}$, and $UP_{j,t}$ are the same variables as in the first model. $Control[1\ to\ 6]$, however, are only country-specific variables presented earlier. The variable Int is the interaction of first-day returns ($UP_{j,t}$) with a firm characteristic that suits the specific hypothesis in question ($Comp_{i,t}$). It takes the form of the product of the two potentially interacting variables. Jaccard et al. (1990) and Aiken and West (1991) emphasize the importance to include both components of the interaction term as separate variables. They both stress that individual and interaction effects can be confounded otherwise. Consequently, we include both $UP_{j,t}$ and $Comp_{i,t}$ in the regression. To determine whether or not the impact of first-day returns differs between types of firms, the interaction term is the relevant variable and its estimated parameter $\widehat{\beta_1}$ is assumed to be zero under the null hypothesis.

4.3 Assessment of Collinearity

Not only is the absence of collinearity an implicit assumption of OLS, one that can heavily bias parameter estimations if collinearity is high (cf. Belsley, Kuh and Welsch, 1980; Greene, 1993), but it is also a frequently discussed issue in the context of multiplicative interaction terms in linear regressions (Jaccard et al., 1990). Cronbach (1987) suggests to center variables prior to forming the multiplicative term, a procedure which tends to reduce the correlation between the interaction and main effect terms.

Against the backdrop of the above notions, we assessed the degree of collinearity in our models to make sure it does not materially affect our results. Specifically, we relied on variance inflation factors (VIF) which express the degree to which the variance in a given explanatory variable is explained by all other explanatory variables in the model. It is calculated as follows.

$$VIF_i = \frac{1}{1 - R_i^2}$$

where VIF_i is the VIF for the ith independent variable in a given model and R_i^2 is the goodness of fit statistic of a regression of the ith explanatory variable on all other independent variables in the regression model. Kutner, Nachtsheim, and Neter (2004) argue that VIF values of 5 or more indicate severe collinearity; a degree that none of our computed statistics for our independent variables is even close to (cf. Appendix Table 14). Given the low levels of collinearity in our models, we abstained from making use of Cronbach's (1987) approach of centering variables.

5. Results

Following, we will shortly state our results for main and robustness tests and compare them to our a priori hypotheses. A more elaborate discussion is held in chapter 6.

5.1 Hypothesis 1: Impact of First-Day Returns

As explained in chapter 4, we regressed a dummy variable, indicating whether a specific country has been chosen as a listing location or not, on the three-year moving average of first-day returns in afore-said country while controlling for several factors. Table 4 presents the results for regressions related to Hypothesis 1. Column (1) represents the most basic model which exclusively controls for country level variables, columns (2) to (10) depict results when controlling for one firm characteristic at a time, and column (11) captures results when controlling for all firm-specific variables. As we hypothesized, underpricing has a statistically significant impact on the listing location decision. But, contrary to what we expected, the sign is positive suggesting that firms are more likely to go public abroad in a country that saw high average first-day returns in the three years preceding the IPO.

Furthermore, parameters for most control variables are highly statistically significant and consistent in their signs across regressions, thereby justifying their selection. *Disclosure* has a positive impact on the listing probability which reconfirms previous research on the topic. *TotalMktRet*, however, has a negative sign when significant. This implies that high market returns in the year preceding the IPO tend to reduce the probability of a firm going public in that specific country, though not statistically significantly across all samples. The second variable accounting for general economic conditions, *GDPgrowth*, confirms our expectations. Higher economic growth increases the listing probability. Similarly, firms are more likely to go public in countries where similar IPOs were conducted in the recent past since *IndustryIPO* has a positive sign. Also, firms seem to prefer going public in countries with large equity markets; *MktCap* has a positive sign. Therefore, both equity market characteristics seem to impact the decision as expected. Finally, *Proximity* has a negative sign, suggesting that a listing in any given country becomes less probable the bigger the geographic distance between a firm's home country and the listing nation.

Table 4: Results for regressions regarding Hypothesis 1. The table presents OLS estimates for linear probability models. We regressed a dummy variable, indicating whether a firm went public in a given country, on the three-year moving average first-day return in afore-said country, while controlling for several factors. Column (1) corresponds to the basic model in which we control only for country-specific variables listed in the left-most column. Results in columns (2) to (10) capture estimations for models in which we control for previously mentioned country factors plus the firm characteristic named above the column number. Finally, column (11) represents a model in which we control for all firm level variables used through columns (2) to (10). Robust standard errors are reported in brackets.

Regression Results Hypothesis 1: Impact of First-day Returns

Firm level control variable:	*None* (1)	*TotalAssets* (2)	*TotalRevenues* (3)	*NetIncome* (4)	*ProfitMargin* (5)	*ROA* (6)	*DebtEquity* (7)	*HiTech* (8)	*ForeignSales* (9)	*Global* (10)	*All* (11)
Main explanatory variable											
UP	**0,0335 *****	**0,0282 *****	**0,0317 *****	**0,0318 *****	**0,0316 *****	**0,0321 *****	**0,0293 *****	**0,0330 *****	**0,0333 *****	**0,0336 *****	**0,0317 *****
	(0,0023)	(0,0023)	(0,0027)	(0,0025)	(0,0028)	(0,003)	(0,0026)	(0,0023)	(0,0042)	(0,0023)	(0,0042)
Firm level control											
Comp		0,0000 *	0,0000 **	0,0000 **	0,0000	0,0009 **	0,0001	-0,0167 ***	0,0018	0,0049	N/A[a]
		(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0004)	(0,0000)	(0,0021)	(0,0032)	(0,0035)	
Regulatory environment											
Disclosure	0,0266 ***	0,0257 ***	0,0254 ***	0,0262 ***	0,0248 ***	0,0257 ***	0,0263 ***	0,0265 ***	0,0210 ***	0,0266 ***	0,0209 ***
	(0,0012)	(0,0012)	(0,0013)	(0,0012)	(0,0013)	(0,0016)	(0,0013)	(0,0012)	(0,0019)	(0,0012)	(0,0022)
General economic conditions											
TotalMktRet	-0,0303 ***	-0,0095	-0,0129 *	-0,0136 *	-0,0136 *	-0,0089	-0,0118	-0,0281 ***	-0,0033	-0,0306 ***	0,0015
	(0,0069)	(0,0071)	(0,0073)	(0,007)	(0,0075)	(0,0098)	(0,0078)	(0,0069)	(0,0115)	(0,0069)	(0,0127)
GDPgrowth	0,2166 ***	0,2911 ***	0,2725 ***	0,2220 ***	0,3008 ***	0,1799 ***	0,3413 ***	0,2264 ***	0,3388 ***	0,2153 ***	0,2742 ***
	(0,0543)	(0,0586)	(0,0606)	(0,0574)	(0,0622)	(0,0696)	(0,0644)	(0,0542)	(0,0774)	(0,0543)	(0,0858)
Local equity market variables											
IndustryIPO	0,5466 ***	0,4238 ***	0,4130 ***	0,4811 ***	0,3992 ***	0,4656 ***	0,4259 ***	0,5698 ***	0,3180 ***	0,5459 ***	0,4081 ***
	(0,0345)	(0,0356)	(0,0367)	(0,0363)	(0,0393)	(0,0464)	(0,0389)	(0,0355)	(0,056)	(0,0346)	(0,0664)
MktCap	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Geographic location											
Proximity	-0,0012 ***	-0,0011 ***	-0,0011 ***	-0,0011 ***	-0,0012 ***	-0,0010 ***	-0,0011 ***	-0,0012 ***	-0,0010 ***	-0,0012 ***	-0,0009 ***
	(0,0000)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)
Constant	-0,0938 ***	-0,1025 ***	-0,0966 ***	-0,1052 ***	-0,0915 ***	-0,1085 ***	-0,1021 ***	-0,0886 ***	-0,0854 ***	-0,0942 ***	-0,0928 ***
	(0,009)	(0,0096)	(0,01)	(0,0095)	(0,0103)	(0,012)	(0,0103)	(0,0091)	(0,0138)	(0,009)	(0,0156)
R^2	0,1250	0,1331	0,1405	0,1337	0,1425	0,1460	0,1331	0,1256	0,1865	0,1250	0,1868
Observations	13 887	10 791	10 314	11 241	9 747	6 705	9 243	13 887	4 428	13 887	3 573
Clusters	1 543	1 199	1 146	1 249	1 083	745	1 027	1 543	492	1 543	397

Legend: *p<0.1, **p<0.05, ***p<0.01,[a]not displayed for reasons of space

Source: Own analysis

5.2 Hypothesis 2: Interaction Effect

Through Hypotheses 2a to 2f, we hypothesized that some firms are more sensitive to underpricing in target listing countries in their listing location decisions than others. As illustrated in Table 5, our results provide support for varying influence of underpricing depending on three firm characteristics. Interaction terms of the first-day return variable and *HiTech*, *ForeignSales*, and *Global* are statistically significant at the five, one, and ten percent level, respectively. In Hypothesis 2d, we stated that firms primarily operating in a high-tech industry are more sensitive to underpricing when they decide on where to go public abroad. This is confirmed – the test statistic for the interaction term in column (7) is negative. Furthermore, Hypothesis 2e states that firms with more foreign sales are less sensitive to high average underpricing in a given target market. But, as becomes apparent in column (8), the test statistic is negative too. This suggests the exact opposite of what we expected. Similarly, the test statistic for the interaction term with *Global* in column (9) is negative which again contrasts our primer; in Hypothesis 2f we stated that firms conducting a global IPO were less sensitive to underpricing.

Interaction effects for all other firm variables lack statistical significance. Therefore, there is no evidence for either firm size, profitability, or the capital structure to moderate the impact of first-day returns on the listing probability. Furthermore, the test statistics' sign for firm size variables in columns (1) to (3) even contradict our expectation from Hypothesis 2a; large firms might be somewhat more underpricing averse. The sign for the interaction term in column (6) tends towards the hypothesized direction (Hypothesis 2c) that firms with less leverage care more about first-day returns, while the signs are not even consistent for the two profitability related interaction terms. Note, sign and significance of the control variables' parameters are similar to those estimated and summarized in Table 4.

Table 5: Results for regressions regarding Hypothesis 2a-f. Columns (1) to (9) report OLS estimates for a linear probability model in which we regressed a dummy variable, indicating whether a firm went public in a given country, on a multiplicative interaction term of the three-year moving average first-day return in afore-said country and a firm level variable named above the column number, while controlling for several country level factors listed in the left-most column. Robust standard errors are reported in brackets.

Regression Results Hypothesis 2: Interaction Effects

Moderating firm level variable:	*TotalAssets* (1)	*TotalRevenues* (2)	*NetIncome* (3)	*ProfitMargin* (4)	*ROA* (5)	*DebtEquity* (6)	*HiTech* (7)	*ForeignSales* (8)	*Global* (9)
Main explanatory variables									
Int	**-0,0000**	**-0,0000**	**-0,0000**	**-0,0001**	**0,0006**	**0,0002**	**-0,0090 ****	**-0,0317 *****	**-0,0099 ***
	(0,0000)	(0,0000)	(0,0000)	(0,0001)	(0,0013)	(0,0009)	(0,0041)	(0,0096)	(0,0052)
Comp	0,0000 **	0,0000 **	0,0000 *	0,0000	0,0007 *	0,0000	-0,0138 ***	0,0131 ***	0,0081 **
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0004)	(0,0001)	(0,0026)	(0,0047)	(0,0039)
UP	0,0282 ***	0,0322 ***	0,0318 ***	0,0314 ***	0,0321 ***	0,0291 ***	0,0352 ***	0,0460 ***	0,0345 ***
	(0,0024)	(0,0028)	(0,0025)	(0,0028)	(0,0031)	(0,0027)	(0,0029)	(0,0068)	(0,0025)
Regulatory environment									
Disclosure	0,0257 ***	0,0254 ***	0,0262 ***	0,0248 ***	0,0257 ***	0,0263 ***	0,0265 ***	0,0212 ***	0,0266 ***
	(0,0012)	(0,0013)	(0,0012)	(0,0013)	(0,0016)	(0,0013)	(0,0012)	(0,0019)	(0,0012)
General economic conditions									
TotalMktRet	-0,0095	-0,0129 *	-0,0136 *	-0,0134 *	-0,0089	-0,0118	-0,0285 ***	-0,0001	-0,0305 ***
	(0,0071)	(0,0073)	(0,007)	(0,0075)	(0,0098)	(0,0078)	(0,0069)	(0,0114)	(0,0069)
GDPgrowth	0,2910 ***	0,2723 ***	0,2221 ***	0,3006 ***	0,1801 ***	0,3412 ***	0,2262 ***	0,3469 ***	0,2162 ***
	(0,0586)	(0,0606)	(0,0574)	(0,0623)	(0,0696)	(0,0644)	(0,0542)	(0,0776)	(0,0543)
Local equity market variables									
IndustryIPO	0,4240 ***	0,4133 ***	0,4811 ***	0,3981 ***	0,4655 ***	0,4259 ***	0,5666 ***	0,3187 ***	0,5461 ***
	(0,0356)	(0,0367)	(0,0363)	(0,0391)	(0,0464)	(0,0389)	(0,0355)	(0,0557)	(0,0345)
MktCap	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Geographic location									
Proximity	-0,0011 ***	-0,0011 ***	-0,0011 ***	-0,0012 ***	-0,0010 ***	-0,0011 ***	-0,0012 ***	-0,0010 ***	-0,0012 ***
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Constant	-0,1026 ***	-0,0967 ***	-0,1052 ***	-0,0914 ***	-0,1086 ***	-0,1020 ***	-0,0895 ***	-0,0925 ***	-0,0947 ***
	(0,0096)	(0,01)	(0,0095)	(0,0103)	(0,012)	(0,0103)	(0,009)	(0,0136)	(0,009)
R^2	0,1331	0,1406	0,1337	0,1426	0,1460	0,1331	0,1257	0,1879	0,1251
Observations	10 791	10 314	11 241	9 747	6 705	9 243	13 887	4 428	13 887
Clusters	1 199	1 146	1 249	1 083	745	1 027	1 543	492	1 543

Legend: *p<0.1, **p<0.05, ***p<0.01

Source: Own analysis

5.3 Robustness of Results

We conducted robustness tests on three different subsamples, all based on the same econometric models discussed in section 4.2. First, we ran each regression on a subsample that excludes IPOs with international IPO legs to the UAE due to the country's extremely high average underpricing (cf. Table 2 in chapter 3.2). Then, we ran the regressions on two different time periods; for the years 2000 to 2007 as well as 2008 to 2014. Appendix Table 15 to Appendix Table 18 summarize the test statistics for each robustness test. We comment on comparisons in two steps: First, we discuss the robustness of statistically significant results from the main regressions elaborated on in sections 5.1 and 5.2. Then, we compare sign and significance of previously insignificant results.

5.3.1 Statistically Significant Results

The only significant result from our main regressions that is robust across all subsamples is the positive impact of first-day returns on the listing probability. In fact, it is statistically significant at the one percent level in all regressions. Comparing the results from robustness tests reveals that the sign of the interaction term including *HiTech* is consistent. Also, its test statistic is significant at the five percent level in the regression on the subsample without the UAE, and at the ten percent level in the according regression on IPOs between 2000 and 2007. Given that the sign is consistently negative, it could be that the smaller sample size for the years 2008 to 2014 led to the insignificance of the effect. Similar observations can be made for the interaction term including *ForeignSales*; the sign is consistent, but it loses its significance when the UAE are excluded. With regard to the time period related subsamples, it is significant at the one percent level for the years 2000 to 2007, but only at the ten percent level for the subsample comprising the post 2007 years. These results reinforce the conclusions regarding our hypotheses made in the subsections 5.1 and 5.2 above.

On the other hand, the test statistic for the interaction term including *Global* is insignificant in two of the subsamples and the sign is not consistent across the robustness tests – it is negative in the subsamples including the UAE, but turns positive in the test without the Middle Eastern country. Thus, results for *Global* are not robust across time and are sensitive to the selection of listing countries.

Finally, it is worth mentioning that the results obtained for control variables are generally consistent in sign and statistical significance. Nevertheless, the variables describing for capital market and general economic condition, *TotalMktRet* and *GDPgrowth*, are exceptions along both relevant dimensions, sign and significance. This being said, their signs are consistent across regressions conditional on being statistically significant at the five percent level.

To summarize, results regarding the impact of historical first-day returns are robust, the effect of the interaction terms including *ForeignSales* and *HiTech* are not persistently significant across robustness tests, and the impact of the interaction term for *Global* is highly sample-specific. Also, most control variables are robust for different time periods and the removal of the UAE from the group of listing nations.

5.3.2 Statistically Insignificant Results

As mentioned earlier, firm size did not appear to have an impact on underpricing sensitivity in the first series of regressions. Accordingly, it remains insignificant in the regressions on the UAE-free data sample. But, the signs for interaction terms including the variables *TotalRevenues* and *NetIncome* change. More interestingly, the results for the time period subsamples differ remarkably. Signs are consistent across size proxy within a subsample but differ between the two subsamples. Additionally, the negative signs of interaction term parameters related to *TotalAssets* and *TotalRevenues* are statistically significant for the years 2008 to 2014. They suggest that large firms are more sensitive to underpricing which contradicts Hypothesis 2a.

The results from robustness tests on profitability measures yield similarly changing results. While the interaction term including *ROA* has positive, but insignificant test statistics across all regressions, *ProfitMargin* changes in sign and significance. In particular, the positive test statistic of the interaction term in the regression on the subsample without the UAE is significant at the one percent level, suggesting that more profitable firms are indeed less concerned about potential losses in proceeds due to underpricing as formulated in Hypothesis 2b.

Unlike firm size and profitability, leverage does not have a significant moderating effect on the impact of first-day returns in either of the robustness tests. Despite the

results' lack of statistical significance it is noteworthy that the sign of the relevant test statistic is negative in tests on the subsample without the UAE and the one for the years 2000 to 2007, while the positive sign observed in the regression on the complete data sample matches the subsample covering the period from 2008 to 2014.

Concluding, since the two firm characteristics size and profitability seem to have significant moderating effects on the impact of first-day returns in some of the robustness tests, insignificant results described in sections 5.1 and 5.2 lack robustness.

6. Discussion of Results

As outlined in chapter 5, the regression results for some of our main variables of interest are only robust to a limited extent. However, given the nature of our robustness tests and the consistent results for control variables across these tests, we deem it appropriate to incorporate evidence from all regressions when discussing the results for both major hypotheses in the sections that follow.

6.1 A (Somewhat) Puzzling IPO Underpricing Frenzy

Against our expectations, historical first-day returns in any given country seem to significantly increase the listing probability in that specific country in the context of international IPOs. And, these results are robust for all tests on subsamples. In other words, it seems that companies seek markets with higher underpricing when they go public abroad. In our derivation of Hypothesis 1 in section 2.3, we stated that firms try to avoid underpricing because it represents lost potential proceeds that could have been invested in positive net present value projects. We thereby relied on a widespread perception of IPO underpricing; a perception based on academic literature on the costs of going public. Nevertheless, our findings might be explained with, and provide supporting evidence for, several theories on the causes of IPO underpricing.

The fact that the impact of underpricing is significantly positive has several implications. First of all, and most obviously, first-day returns do not seem to be perceived as a negative phenomenon by firms that go public abroad. This is in line with numerous IPO underpricing theories that see firms underpricing their issues to get in favor of certain benefits. As outlined in chapter 2.2, first-day returns might be the currency for access to certain investors, publicity in a specific geographic region, attested compliance with disclosure requirements, higher valuation in seasoned equity offerings, a guarantee for international analyst coverage, and insurance against potential lawsuits. Additionally, pre-IPO shareholders benefit to the extent they retain their shares and/or get to buy additional shares at the IPO offer price. Note that traditional theories which claim underpricing to be a burden to be borne in order to overcome asymmetric information cannot contribute to the explanation of our results. If they applied, one would expect firms to choose the market with the least dramatic information imbalance to keep

the cost as low as possible. Also, it is noteworthy that the above conclusion might implicate severe corporate governance issues depending on the actual reason for firms' underpricing affinity in international IPOs and the exact structure of the issue. Namely, if managers get to buy newly issued shares, and pre-IPO owners retain insignificant fractions. First-day returns would exclusively enrich investors who bought at the offer price, while the actual firm owners would forgo capital gains.

Furthermore, the results also imply that firms do not seem to see themselves in the position to fully control first-day returns on their new issues. If they did, we would expect the regression results to be insignificant and the sign to be more or less random. A country's underpricing track record would not matter at all since firms could determine existence and magnitude of first-day returns themselves. This in turn provides supporting evidence for all those theories that emphasize the importance of factors other than the issuing firm itself. From an investment-banking based theoretical perspective, going public in a country with high average underpricing would then for example implicate exposure to investment banks that give their loyal commission business clients preferential treatment, capitalize on greenshoe options, and systematically avoid litigations. Arguing with behavioral theories, firms would aim at realizing an underpriced issue by exposing themselves to irrational, overconfident, and overoptimistic investors.

This being said, our regression outcomes could be the result of a selection bias in firms that go public in general. According to Gao, Ritter and Zhu (2013), IPOs are no longer the most efficient transaction to raise investment funds for firms and to diversify entrepreneurs' wealth portfolios. They argue that firms with these intentions nowadays tend to prefer reaching out to a strategic buyer than listing the company on a stock exchange. Thus, it could be that firms which still decide to go public often do so for any other purpose mentioned previously, including the purpose of extraction of private benefits of corporate managers – another string of reasoning for governance issues in the context of international IPOs.

6.2 Moderating Impact of Firm Characteristics

Our results provide some evidence that the impact of first-day returns does indeed depend on firm characteristics. To follow the logic and structure of our hypotheses, we discuss findings regarding the interaction effects by briefly elaborating on the results for

each sub-hypothesis with respect to firm size, profitability, leverage, industry, commercial exposure to foreign markets, and type of international IPO.

6.2.1 Did Large Firms Develop a Fear of Underpricing Over Time?

Our contradictory results for the impact of firm size on underpricing sensitivity in the listing location decision provide two major pieces of evidence. Firstly, underpricing aversion seemed to have existed and increased with firm size in the years 2008 to 2014. Secondly, firm size dependent underpricing sensitivity does not seem to be constant over time.

Not only can we not affirm Hypothesis 2a for the time period from 2008 to 2014, but the opposite seems to be the case – the listing probability in a country with high average underpricing decreases significantly with the size of a firm. In light of the findings regarding the general impact of historical first-day returns on the listing probability, the key question is why the attractive aspects of underpricing and/or the consequences of forgone proceeds change with firm size. Obviously, our hypothesis-constituting arguments that smaller firms are more prone to be underpriced and therefore more alert, and that large firms' ample resources result in ignorance to some degree, do not seem to hold.

One potential reason why beneficial traits of underpricing do not materialize to the same extent for large firms is that large firms are more likely to get analyst coverage and access to target investors without rewarding anyone with discounted offer prices. Several papers show that large firms enjoy more analyst coverage (cf. Bhushan, 1989; Rajan & Servaes, 1997; Barth, Kasznik & McNichols, 2001; Bradley, Jordan & Ritter, 2003), supporting our hypothesized explanation. Moreover, the previously introduced argument of IPO activity being at least partially driven by the extraction of private benefits can play a role as well. Himmelberg, Hubbard and Palia (1999) state that large firms are less likely to have ownership structures with substantial managerial shareholding. This could also partially explain the higher underpricing aversion.

Another possible explanation could be the bigger absolute losses of large firms at any given level of first-day return. This loss might be particularly severe if large firms rely more on proceeds from IPOs for their investments. Several studies found that large firms

are significantly more sensitive to internal cash flows in their investment decisions (cf. Kadapakkam, Kumar, Riddick, 1998; Soumaya, 2012). With specific investment plans, they might therefore be less willing to abandon IPO proceeds because it relativizes the size of their internal cash flows.

The second interesting implication in regression results with regard to firm size, is the change in sign and significance between the subsamples covering the years 2000 to 2007 and 2008 to 2014, respectively. While firm size does not seem to have had a significant impact on the perception of underpricing in potential listing countries in the first period, results are significant at the five percent level for two of the three size proxies in the later period. The substantial difference in test statistics between the two subsamples is particularly interesting against the backdrop of the most recent financial crisis. It peaked in the early phase of our second time related subsample and has been affecting the world economy ever since. For this, or any other timing related reason, it must be that the above introduced size-related aspects did not affect the perception of first-day returns when firms went public abroad in the early 2000s or that our arguments of large firms' ample resources and small firms' underpricing aversion due to higher exposure, used to derive Hypothesis 2a, had at least some impact. A change in sensitivity could have been caused by the availability of funds. Since the beginning of the credit crisis, central banks around the world depressed interest rates to a minimum, desperately aiming at a reanimation of financial markets. Given the scarcity of debt financing, one could argue that large firms became more prudent when choosing where to go public abroad, afraid they would not get the necessary funds through their international IPO. This would implicitly assume that small firms' ability to raise funds did not change, a certainly debatable assumption.

6.2.2 Results for Profitability – Does Firm Nationality Matter?

The only statistically significant result of tests for Hypothesis 2b stems from a subsample which excludes the UAE from the list of the most important international IPO markets. This result suggests that firms with higher profit margins at the time of the offering are less sensitive to first-day returns, not to say they seek it even more. Again, we record two major takeaways: One regarding the examined relationship, and another regarding the importance of firm nationality.

On the one hand, the robustness test provides at least partial evidence for a relation between profitability and underpricing sensitivity for reasons elaborated on when we derived the hypothesis. This would imply that profitable firms benefit even more from advantages underpricing comes with. Alternatively, the observed effect could be the illustration of theories claiming that underpricing is often used to signal superior intrinsic value. It is reasonable to assume that high profitability increases the likelihood for the firm to have great future prospects. Therefore, profitable firms might be even more willing to find markets in which average underpricing is high to send the strongest possible signal.

On the other hand, there is matter to believe that firms of a given profitability level perceive underpricing differently due to reasons somehow related to firm nationality. We conclude this from the fact that the removal of one listing nation and according IPOs from the data sample leads to a change in the sign of the test statistic as well as a change in significance, from insignificant to significant at the one percent level, if compared with the main regression statistics in Table 5. Some support is provided from an analysis of originating countries of international IPOs in our data set. A vast majority of international IPOs in the UAE were conducted by firms headquartered in Saudi Arabia. Also, the effect of nationality is only partially controlled for by the significance of geographic distance in our regression models. It is possible that nationality might be described more precisely by including a second proximity variable such as cultural proximity.

6.2.3 No Moderating Effect of Pre-Offer Leverage

None of our tests for the impact of leverage were significant. This, of course, suggests that there is actually no relationship; firms' capital structures do not seem to have an impact on how they perceive first-day returns in the context of international IPOs. The phenomenon as such might be equally desirable for all firms, independent of their leverage.

Following the logic of potential explanations for why firms seem to look for high underpricing markets, a general explanation for the lacking effect of leverage must be that returns of underpricing accrue to all firms and/or owners, while the consequences of forgone proceeds are not more adverse for firms with either degree of leverage. Since underpricing as such seems to be appreciated by firms going public abroad, our reasoning

to get to Hypothesis 2c is unlikely to have any explanatory power. We argued that firms with higher leverage were less sensitive since they tend to be less underpriced, due to a positive signal regarding intrinsic value sent through pre-offer debt. In a world in which the implicit underlying assumption that underpricing is perceived negatively by firms does not hold, one would have been more likely to argue for the exact opposite. At some point, higher leverage might have damped the positive attributes of underpricing if forgone proceeds' utility had gotten more important to serve high debt levels – a hypothesis that cannot be confirmed by our results either.

Another reason for the absence of a significant interaction effect could be the inability of the pre-offer leverage ratio to characterize a firm adequately. After all, a ratio of balance sheet items is a snapshot in time and will dramatically change once the firm is publicly listed (Dudley & James, 2013), or at least lose in relevance once an observable market leverage exists. Furthermore, it can be argued that leverage is often the result of other firm characteristics such as profitability, ownership, or industry. Kim et al. (2008) find that leverage only reduces the underpricing of low-tech but increases it for high-tech companies, thereby providing support for the notion that leverage as an isolated measure might not have as much of an impact as industry affiliation in the context of IPOs.

6.2.4 High-Tech Firms Avoid Underpricing

Our results provide supporting evidence that high-tech firms actually are sensitive to underpricing in their international listing location decision in the hypothesized way. The hypothesis was derived based on the argument that high-tech firms are more underpriced on average, and therefore keener on avoiding it. This might hold under the assumption that underpricing as such is generally deemed to be worrisome by firms. Given that we found historical average first-day returns to increase the probability of a listing in a given market, there must be other reasons for why firms primarily operating in high-tech industries are more averse.

Again, higher aversion must be based on the fact that the general reasons for firms to underprice might not be as beneficial to high-tech firms. Similarly to large firms, companies with more intangible assets receive more analyst coverage (Barth et al., 2001). Therefore, those theories explaining IPO underpricing by focusing on implications regarding analyst coverage and investor access might not apply for high-tech firms.

Furthermore, the theoretical cost of underpricing, i.e. forgone proceeds, might actually be costly to those firms. As we emphasized when we derived Hypothesis 2d, high-tech firms are heavily dependent on successful research and development. Not only is it the key to competitive advantage in tech industries, but, these advantages are often short-lived requiring continuous investment (cf. Rao, 2005). Additionally, Kim et al. (2008) state that high-tech companies face higher cost of financial distress due the composition of their assets. Forgone proceeds might therefore weigh even more in dynamic, technology driven industries. Furthermore, our findings are in line with Lowry and Shu (2002). They find that the risk of a lawsuit in the context of an overpriced IPO is lower for high-tech firms. In light of their theory that underpricing serves as an insurance for litigations, our results seem to exemplify lower willingness to accept underpricing as a safety buffer given their lower risk of a lawsuit.

In conclusion, our observations for high-tech firms support the widespread negative connotation of underpricing from a corporate perspective. Simultaneously, our findings regarding industry affiliation provide further supportive evidence for those IPO underpricing theories emphasizing the roles of investment bankers and investors. If firms had the control over underpricing, high-tech firms would not have to avoid countries with high average underpricing, and we would expect insignificant test statistics for the interaction effect in the regression model.

6.2.5 Do Foreign Sales Erode Benefits from Underpricing?

Although the results of our main regression suggest a highly statistically significant reduction in the listing probability as a function of the interaction between commercial exposure to foreign markets and underpricing in the listing market, the robustness test on the sample excluding the UAE relativizes the alleged insight. A thorough look at the descriptive statistics contributes much to the explanation of why the latter test result is not significant. While IPOs in the UAE were the most underpriced on average (cf. Table 2), the average foreign firm conducting its international IPO in the UAE generated only 10% of total sales abroad, the lowest average of all countries in the data sample (Appendix Table 10). Thus, it is not surprising that removing all IPOs of firms with low foreign sales to the country with the highest average underpricing triggers a loss of significance of the test result.

Nonetheless, the regressions related to Hypothesis 2e convey interesting information. First, they add to the discussion about the impact of firm profitability regarding the potential role of firm nationality for which we refer to section 6.2.2. Second, the sign of the test statistic in the robustness test without the UAE is the same as in the main regression results where the statistic is highly significant. Thus, there is at least some evidence for the conclusion suggested by the main regression results. The question that arises is what factors could cause firms with high exposure to foreign sales markets to show evasive behavior in fear of high IPO underpricing.

By definition, internationally selling firms have a reputation in at least one foreign country before they go public. Therefore, Pagano, et al. (2002) argue that a trust relationship to local investors often exists already ahead of the actual listing. Consequently, signaling through underpricing becomes less important. Additionally, Malloy (2005) argues that geographically proximate analysts are more accurate in their forecasts than their more distant counterparts. The author explains the observation with an information advantage due to local analysts' possibility to collect first-hand information from management via personal connections or the opportunity to talk to local employees and customers. This is also the case for local investors to some extent. Asymmetric information between insiders and potential investors might therefore be less of a concern, further reinforcing the argument that signaling is less valuable. The geographic proximity is also affecting the degree of analyst coverage that firms enjoy. O'Brien and Tan (in press) pointed out the existence of a positive relation between geographic proximity and analyst coverage which cannot surprise considering their information advantage for locally present companies. Therefore, firms with a high share of foreign sales might be less willing to compensate investors and investment banks with a discount on the offer price because the benefits that could explain the overall acceptance of substantial underpricing provide them with little marginal utility.

6.2.6 Inconsistent Evidence for Global IPO Firms

Our results on the overall sample provide some evidence that firms conducting a global IPO are more prone to avoid high underpricing markets, results that contradict our initial hypothesis. These results ask for potential explanations as to why firms conducting global IPOs care more about giving up on potential proceeds. One possible answer could lie in

studies conducted on differences in underpricing between domestic and international IPOs. For example, Francis, Hasan and Li (2001) found that international IPOs are significantly more underpriced on average than domestic IPOs. A global IPO can be interpreted as an attempt to capitalize on the benefits of an international IPO while avoiding the higher underpricing. In that case it would make sense to look for a foreign equity market with a history of low first-day returns.

Nevertheless, the low significance level on the overall sample in combination with the insignificant results from the robustness test without the UAE might just as well indicate the inexistence of any interaction between underpricing and firm characteristics captured by the global IPO dummy. After all, it could be that firms conducting a global IPO choose the type of IPO in order to go public abroad while paying tribute to their roots and local image. In that case, there would be no reason for underpricing in foreign markets to influence these specific companies in any different way than it affects firms in their decision process in general. Alternatively, it could be that arguments in favor and against an underpriced issue of firms that conduct a global IPO balance each other out.

Furthermore, it is interesting to note that sign and statistical significance change when the UAE are removed from the data sample – as was the case for profitability and foreign sales. The entirety of tests for the impact of whether a firm chooses a global or a foreign IPO provides further evidence for the existence of an important impact of firm nationality on firm type and/or underpricing as predictors for the listing location decision.

7. Conclusion

Despite the increasing importance of international IPOs in recent years, only little academic literature specifically addresses the listing location decision in this context. Most existing papers on international listings focus on cross-listings which Caglio et al. (2013) find to be significantly different from international IPOs in terms of firm characteristics and factors affecting the location choice. Existing papers on where firms go public abroad discuss the impact of various country and firm characteristics. But, to the best of our knowledge, the role of historical first-day returns in the listing location decision in international IPOs has not been examined as of the date of this study. In our thesis, we try to fill this gap by studying international IPOs in nine of the most important countries for cross border IPOs between 2000 and 2014: Australia, Canada, France, Germany, Hong Kong, Singapore, the UK, the US, and the UAE. We follow the research questions of whether first-day returns in a given listing market have an impact on the listing probability, and whether this impact depends on the type of firm. Specifically, we examined the relation between the listing decision and the three-year moving average of first-day returns as well as moderating effects of firm size, profitability, capital structure, industry, foreign sales dependency, and a firm's decision to go public in a global or foreign IPO. Empirical tests based on a linear probability model lead to several findings which we explain by drawing on IPO underpricing theories.

First of all, we find a significant positive relation between historical average first-day returns and the listing probability in any given country. Our results suggest that firms are more likely to list in markets where IPOs are more heavily underpriced and are robust for different subsamples. Furthermore, we conclude that firms going public abroad do not have full control over the underpricing of their issue. These findings contradict the widespread perception that positive first-day returns primarily represent lost proceeds for firms and imply that underpriced issues are desirable for firms that go public abroad. Therefore, they implicitly provide supporting evidence for theories that claim firms intentionally underprice their stock at issue for various reasons, but also for theories that emphasize the importance of investment banks and investors when explaining the persistent phenomenon of positive first-day returns.

Moreover, we find partial evidence for high-tech firms to be less keen on underpricing their issue. Again, results are robust across multiple subsamples. Given that the standalone effect of underpricing is positive, we attempt to explain our observation with high-tech firms' continuously high investment needs to achieve and maintain competitive advantage and resulting aversion of giving up on IPO proceeds through a discounted offer price. Additionally, we argue that positive side effects of underpricing are less beneficial to high-tech firms than to firms operating in other industries.

Furthermore, test results for a subsample on international IPOs between 2008 and 2014 indicate that underpricing sensitivity increases with the size of a firm. However, this effect cannot be detected on the entire sample, therefore suggesting time variance in underpricing sensitivity. Also, even though none of the tests for any of the other firm characteristics yielded significant results, the fact that numerous results for interaction terms changed substantially when we run our tests on a subsample excluding the UAE indicates a potential interaction between our main explanatory variable and firm nationality.

In summary, our study provides relevant insights into both examined research questions. First-day returns in a given market do indeed have an impact on the listing probability in that country in the context of international IPOs, but the relation is positive. Also, there is reason to believe that the effect is heterogeneous across types of firms given results for tests accounting for the moderating impact of industry affiliation and firm size. Furthermore, our results provide signs for time-varying underpricing sensitivity and potential interactions with firm nationality.

Despite their statistical significance, our findings underlie a range of limitations beyond limited robustness of certain estimates. Most importantly, the results heavily depend on data selection and variables controlled for. Since we only used international IPOs for which required data was readily available from relevant databases due to time constraints, we incorporated these databases' potential implicit selection bias and measurement errors when compiling data. Moreover, we excluded Luxemburg and Taiwan from the list of analyzed countries, despite their relatively high numbers of hosted foreign IPOs, due to the lack of issue- and country-specific data. As the example of the robustness test excluding the UAE shows, results can depend on the countries

included in the data sample. Also, the observed time period was arbitrarily chosen. We cannot guarantee that results would have been similar, had we observed a longer or different period. Additionally, we test for interaction effects using multiplicative terms in our regression model. Thus, the model can only capture the existence of an interaction effect if the relationship is bilinear in nature, i.e. the effect of one variable changes as a linear function of the moderating variable (cf. Jaccard et al., 1990).

Nevertheless, our study provides a solid basis for further research on a previously unexplored predictor for international listing decisions. Obviously, future research might aim at confirming our findings while eliminating the above listed limitations. Specifically, subsequent studies on the subject could extend the observed time frame, expand the data gathering process, control for additional country as well as firm characteristics, take IPOs in Luxembourg and Taiwan into consideration, and test for non-linear interaction effects. But, future studies could also build on our conclusions. First and foremost, research efforts could focus on reasons for first-day returns' positive impact on the listing probability in international IPOs. Another potential string of research could follow the suggestion that high-tech firms are more underpricing averse. Again, the identification of reasons could provide guidance. Also, some of our results led to new hypotheses regarding relations between first-day returns and firm characteristics. For one, it would be interesting to know whether underpricing sensitivity changes over time, and if so, for what firms and for what reasons. For another, our robustness test on the sample excluding the UAE suggests potential other firm characteristics such as nationality to be important with regard to the perception of first-day returns. Ultimately, it would be interesting to discuss these and more detailed findings in light of implications for (potential) listing countries and all parties involved in international IPOs.

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Appendix

Appendix Table 1: Listing countries of international IPOs between 2000 and 2014 ranked by number of IPO legs and total proceeds of according IPOs.

Intl. IPO Legs 2000 - 2014		
Listing country	**# of legs**	***% share***
United Kingdom	622	*34%*
United States	446	*24%*
Singapore	187	*10%*
Utd Arab Em	89	*5%*
Canada	63	*3%*
Australia	60	*3%*
Taiwan	48	*3%*
Germany	38	*2%*
Luxembourg	33	*2%*
France*	31	*2%*
Poland	29	*2%*
Hong Kong	27	*1%*
Norway	25	*1%*
Spain*	24	*1%*
South Korea	16	*1%*
Netherlands	13	*1%*
Malaysia	10	*1%*
Switzerland	9	*0%*
Japan	7	*0%*
Belgium	6	*0%*
Sweden	5	*0%*
New Zealand	5	*0%*
South Africa	4	*0%*
Brazil	4	*0%*
Austria	3	*0%*
Ireland-Rep	3	*0%*
Italy	3	*0%*
Israel	2	*0%*
Qatar	2	*0%*
Greece	2	*0%*
Iceland	2	*0%*
Czech Republic	2	*0%*
Philippines	2	*0%*
Papua New Guinea	1	*0%*
Ghana	1	*0%*
Colombia	1	*0%*
Portugal	1	*0%*
Chile	1	*0%*
Turkey	1	*0%*
Hungary	1	*0%*
Russian Fed	1	*0%*
Egypt	1	*0%*
Bahrain	1	*0%*
Denmark	1	*0%*
Morocco	1	*0%*
Total	**1 834**	***100%***

Source: Own analysis

Total Proceeds From Intl. IPO Legs 2000 - 2014		
Listing country	**Proceeds ($ mil)**	***% share***
United Kingdom	111 100	*34%*
United States	102 563	*31%*
Canada	18 669	*6%*
Utd Arab Em	16 766	*5%*
Netherlands	11 068	*3%*
Singapore	10 397	*3%*
Hong Kong	9 953	*3%*
Germany	7 636	*2%*
Australia	4 627	*1%*
France*	4 321	*1%*
Poland	3 893	*1%*
Spain*	3 247	*1%*
Luxembourg	3 172	*1%*
New Zealand	2 994	*1%*
Belgium	2 904	*1%*
Czech Republic	2 265	*1%*
Taiwan	1 791	*1%*
Norway	1 546	*0%*
Austria	1 321	*0%*
Philippines	1 296	*0%*
Japan	1 238	*0%*
Switzerland	1 224	*0%*
Bahrain	1 133	*0%*
Brazil	741	*0%*
Sweden	569	*0%*
Italy	500	*0%*
South Korea	498	*0%*
Morocco	383	*0%*
Greece	309	*0%*
Colombia	278	*0%*
Chile	269	*0%*
Malaysia	252	*0%*
Qatar	219	*0%*
Iceland	184	*0%*
Egypt	180	*0%*
Ghana	82	*0%*
Turkey	78	*0%*
South Africa	74	*0%*
Ireland-Rep	69	*0%*
Denmark	59	*0%*
Hungary	50	*0%*
Russian Fed	18	*0%*
Papua New Guinea	13	*0%*
Israel	7	*0%*
Portugal	2	*0%*
Total	**329 961**	***100%***

Source: Own analysis

Appendix Table 2: Number of international IPO legs per country between 2000 and 2014.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
United Kingdom	30	5	12	7	64	93	123	127	35	5	30	28	22	21	20	622
United States	73	13	9	6	30	37	39	60	12	15	56	24	14	28	30	446
Singapore	5	7	4	12	24	31	28	38	15	7	9	3	1	2	1	187
Utd Arab Em	0	0	0	0	4	5	12	24	5	11	10	5	4	5	4	89
Canada	0	0	1	2	4	9	10	9	4	3	10	7	2	2	0	63
Australia	4	0	1	2	2	3	5	10	1	2	13	4	5	5	3	60
Germany	19	0	2	0	1	1	6	3	0	1	2	1	1	1	0	38
France	6	1	2	0	1	1	4	6	2	1	3	0	0	3	1	31
Hong Kong	1	1	1	1	1	0	1	2	1	1	6	4	3	3	1	27
Total	**138**	**27**	**32**	**30**	**131**	**180**	**228**	**279**	**75**	**46**	**139**	**76**	**52**	**70**	**60**	**1 563**

Source: Own analysis

Appendix Table 3: Descriptive statistics for data used to test Hypothesis 2a (*TotalAssets*).

Data Sample Hypothesis 2a (*TotalAssets*): Total Assets in million USD					
Listing country	**Observations**	**Avg. ($ mil)**	**St. Dev. ($ mil)**	**Max ($ mil)**	**Min ($ mil)**
Hong Kong	26	6 034,2	21 341,6	107 309,8	0,1
Canada	47	3 001,9	20 006,6	137 238,0	0,2
Germany	25	2 499,5	8 309,2	40 675,5	2,3
United States	405	2 079,5	13 464,1	177 873,7	0,5
Australia	48	1 224,9	7 419,7	51 446,7	0,1
Utd Arab Em	42	1 171,1	4 030,9	25 607,3	65,4
United Kingdom	421	1 126,7	7 231,0	115 195,8	2,1
France	20	813,2	1 980,5	8 358,0	1,0
Singapore	181	219,9	951,6	10 484,5	0,7
Total data sample	**1 215**	**1 515,3**	**10 400,5**	**177 873,7**	**0,1**

Source: Own analysis

Appendix Table 4: Descriptive statistics for data used to test Hypothesis 2a (*TotalRevenues*).

Data Sample Hypothesis 2a (*TotalRevenues*): Total Revenues in million USD					
Listing country	**Observations**	**Avg. ($ mil)**	**St. Dev. ($ mil)**	**Max ($ mil)**	**Min ($ mil)**
Hong Kong	23	1 154,7	2 398,0	8 551,5	3,3
United States	399	641,7	2 244,7	27 616,2	0,0
Germany	27	634,0	1 728,5	7 692,8	0,7
France	20	435,6	1 107,2	4 593,9	0,0
United Kingdom	405	395,1	1 331,2	10 196,0	0,0
Australia	38	280,4	987,6	5 657,0	0,0
Utd Arab Em	50	207,4	265,4	1 228,6	0,0
Singapore	168	193,4	703,1	7 100,1	0,0
Canada	32	58,6	190,0	1 047,3	0,0
Total data sample	**1 162**	**450,8**	**1 639,4**	**27 616,2**	**0,0**

Source: Own analysis

Appendix Table 5: Descriptive statistics for data used to test Hypothesis 2a (*NetIncome*).

Data Sample Hypothesis 2a (*NetIncome*): Net Income in million USD					
Listing country	**Observations**	**Avg. ($ mil)**	**St. Dev. ($ mil)**	**Max ($ mil)**	**Min ($ mil)**
Hong Kong	25	105,3	230,9	859,9	-85,8
Germany	28	55,3	160,7	791,7	-11,1
France	21	40,9	97,2	290,4	-39,4
Utd Arab Em	53	35,7	74,0	483,7	-38,8
United Kingdom	464	34,7	163,3	1 834,9	-405,0
United States	410	33,2	164,3	1 660,4	-659,5
Singapore	171	17,5	48,8	521,3	-26,0
Canada	48	8,6	46,5	219,7	-38,1
Australia	47	-6,8	74,7	91,0	-487,6
Total data sample	**1 267**	**31,4**	**145,7**	**1 834,9**	**-659,5**

Source: Own analysis

Appendix Table 6: Descriptive statistics for data used to test Hypothesis 2b (*ProfitMargin*).

Data Sample Hypothesis 2b (*ProfitMargin*): Profit Margin in Decimals						
Listing country	**Observations**	**Avg.**	**Median**	**St. Dev.**	**Max**	**Min**
Singapore	167	0,20	0,17	0,15	0,88	0,0
Utd Arab Em	49	-17,74	0,15	81,42	0,54	-547,3
Hong Kong	23	-0,09	0,10	0,70	0,39	-2,3
United States	386	0,90	0,09	34,06	661,64	-53,7
Germany	27	-0,59	0,06	2,22	0,42	-11,1
United Kingdom	369	-11,76	0,06	84,89	46,06	-1 175,0
France	19	-914,23	0,03	3 938,26	0,90	-17 176,3
Australia	34	-18,42	-0,05	55,95	0,54	-277,8
Canada	24	-16,33	-0,23	47,41	17,72	-215,4
Total data sample	**1 098**	**-21,16**	**0,09**	**521,40**	**661,64**	**-17 176,3**

Source: Own analysis

Appendix Table 7: Descriptive statistics for data used to test Hypothesis 2b (*ROA*).

Data Sample Hypothesis 2b (*ROA*): Return on Assets in Decimals						
Listing country	**Observations**	**Avg.**	**Median**	**St. Dev.**	**Max**	**Min**
United States	268	-0,1	0,20	2,1	2,1	-33,6
Canada	30	-0,4	0,14	1,4	1,9	-5,7
France	14	-0,1	0,11	0,4	0,2	-1,0
Germany	12	0,0	0,08	0,4	0,3	-1,1
Australia	18	-0,2	0,07	0,8	0,7	-2,7
United Kingdom	278	-0,2	0,05	1,1	1,3	-11,5
Hong Kong	20	0,0	0,00	0,2	0,3	-0,8
Singapore	82	0,2	-0,04	0,2	0,7	0,0
Utd Arab Em	33	0,1	-0,15	0,3	0,4	-1,3
Total data sample	**755**	**-0,1**	**0,08**	**1,5**	**2,1**	**-33,6**

Source: Own analysis

Appendix Table 8: Descriptive statistics for data used to test Hypothesis 2c (*DebtEquity*).

Data Sample Hypothesis 2c (*DebtEquity*): Debt-to-equity Ratio in Decimals					
Listing country	**Observations**	**Avg.**	**St. Dev.**	**Max**	**Min**
Hong Kong	25	1,5	5,2	26,1	0,0
United Kingdom	351	1,4	10,5	167,2	0,0
Canada	36	0,8	2,0	11,1	0,0
United States	344	0,7	2,4	35,0	0,0
Singapore	173	0,7	2,7	34,2	0,0
Utd Arab Em	43	0,6	1,8	11,7	0,0
Germany	17	0,5	1,2	3,9	0,0
France	15	0,5	0,6	1,7	0,0
Australia	33	0,4	0,6	3,0	0,0
Total data sample	**1 037**	**1,0**	**6,4**	**167,2**	**0,0**

Source: Own analysis

Appendix Table 9: Descriptive statistics for data used to test Hypothesis 2d (*HiTech*).

Data Sample Hypothesis 2d (*HiTech*): Percentage Share of High-tech Firms		
Listing country	**Observations**	**% share**
Germany	38	61%
United States	446	54%
France	31	39%
Australia	60	28%
Singapore	187	27%
United Kingdom	622	25%
Hong Kong	27	19%
Canada	63	10%
Utd Arab Em	89	9%
Total data sample	**1 563**	**33%**

Source: Own analysis

Appendix Table 10: Descriptive statistics for data used to test Hypothesis 2e (*ForeignSales*).

Data Sample Hypothesis 2e (*ForeignSales*): Percentage Share of Sales Generated Abroad					
Listing country	**Observations**	**Avg.**	**St. Dev.**	**Max**	**Min**
Hong Kong	13	70%	38%	100%	0%
Germany	7	63%	37%	100%	0%
Australia	9	61%	40%	100%	0%
France	8	57%	39%	100%	0%
Singapore	67	51%	44%	100%	0%
United Kingdom	143	46%	43%	100%	0%
United States	215	35%	40%	100%	0%
Canada	13	12%	28%	100%	0%
Utd Arab Em	23	10%	24%	100%	0%
Total data sample	**498**	**41%**	**42%**	**100%**	**0%**

Source: Own analysis

Appendix Table 11: Descriptive statistics for data used to test Hypothesis 2f (*Global*).

Data Sample Hypothesis 2f (*Global*): Percentage Share of Global IPOs		
Listing country	**Observations**	**% share**
Australia	60	28%
United States	446	15%
Canada	63	14%
France	31	13%
United Kingdom	622	11%
Germany	38	5%
Hong Kong	27	4%
Singapore	187	2%
Utd Arab Em	89	1%
Total data sample	**1 563**	**11%**

Source: Own analysis

Appendix Table 12: Three-year moving average of first-day returns (*UP*) by analyzed country and year.

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	0,60	0,66	0,35	0,20	0,20	0,20	0,17	0,19	0,23	0,25	0,26	0,15	0,11	0,10	0,07
Canada	0,08	-0,04	-0,03	-0,01	0,09	0,19	0,13	0,14	0,12	0,12	0,13	0,09	0,09	0,08	0,09
France	-0,01	-0,01	0,00	0,11	0,11	0,05	0,00	0,03	0,05	0,07	0,09	0,04	0,09	0,09	0,10
Germany	0,27	0,27	0,27	-0,10	-0,10	-0,08	0,07	0,07	0,07	0,07	0,06	0,06	0,01	-0,01	-0,02
Hong Kong	0,00	-0,27	0,18	0,18	0,17	0,14	0,09	0,12	0,17	0,22	0,19	0,12	0,11	0,08	0,20
Singapore	-0,24	-0,15	-0,01	0,19	0,35	0,31	0,20	0,18	0,28	0,34	0,33	0,08	0,18	0,19	0,27
United Kingdom	0,38	0,04	0,08	0,07	0,15	0,15	0,17	0,16	0,16	0,14	0,12	0,11	0,10	0,10	0,11
United States	0,36	0,53	0,61	0,45	0,13	0,12	0,12	0,12	0,12	0,12	0,14	0,13	0,13	0,12	0,16
Utd Arab Em	0,00	0,00	0,00	0,00	0,00	0,00	4,43	2,83	5,45	3,94	3,80	1,78	1,86	0,35	0,08

Source: Own analysis

Appendix Table 13: List of used equity indices for the control variable *TotalMktRet*.

Country	Equity Index
Australia	S&P/ASX 200
Canada	S&P/TSX Composite
France	CAC 40
Germany	DAX 30 Performance
Hong Kong	Hang Seng
Singapore	Straits Times
United Kingdom	Financial Times Stock Exchange All-Share
United States	Dow Jones Industrials Average
Utd Arab Em	ADX General

Appendix Table 14: Variance inflation factors (VIF). Columns (1) to (10) report VIFs for all variables used in our main regression models. R^2 are reported in brackets.

Variance Inflation Factors Per Regression Model										
Monitoring firm level variable:	*None* (1)	*TotalAssets* (2)	*TotalRevenues* (3)	*NetIncome* (4)	*ProfitMargin* (5)	*ROA* (6)	*DebtEquity* (7)	*HiTech* (8)	*ForeignSales* (9)	*Global* (10)
Main explanatory variables										
Int		1,16	1,25	1,23	2,11	1,14	1,13	1,46	2,04	1,25
		(0,14)	(0,2)	(0,18)	(0,53)	(0,13)	(0,11)	(0,31)	(0,51)	(0,2)
Comp		1,14	1,16	1,18	2,11	1,14	1,13	1,23	1,17	1,15
		(0,12)	(0,14)	(0,15)	(0,53)	(0,12)	(0,11)	(0,19)	(0,14)	(0,13)
UP	1,30	1,33	1,40	1,36	1,31	1,36	1,32	1,63	2,24	1,41
	(0,23)	(0,25)	(0,29)	(0,26)	(0,24)	(0,27)	(0,24)	(0,39)	(0,55)	(0,29)
Regulatory environment										
Disclosure	1,29	1,29	1,29	1,29	1,29	1,34	1,30	1,29	1,30	1,29
	(0,22)	(0,22)	(0,22)	(0,23)	(0,23)	(0,25)	(0,23)	(0,22)	(0,23)	(0,22)
General economic condition										
TotalMktRet	1,01	1,01	1,01	1,01	1,01	1,02	1,01	1,02	1,03	1,01
	(0,01)	(0,01)	(0,01)	(0,01)	(0,01)	(0,02)	(0,01)	(0,02)	(0,03)	(0,01)
GDPgrowth	1,04	1,03	1,03	1,03	1,03	1,04	1,03	1,04	1,04	1,04
	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)	(0,04)	(0,03)	(0,04)	(0,04)	(0,04)
Local equity market variables										
IndustryIPO	1,01	1,01	1,02	1,01	1,02	1,02	1,01	1,07	1,03	1,01
	(0,01)	(0,01)	(0,02)	(0,01)	(0,02)	(0,02)	(0,01)	(0,06)	(0,03)	(0,01)
MktCap	1,08	1,08	1,08	1,08	1,09	1,10	1,08	1,08	1,09	1,08
	(0,07)	(0,08)	(0,08)	(0,08)	(0,08)	(0,09)	(0,08)	(0,07)	(0,09)	(0,07)
Geographic location										
Proximity	1,01	1,01	1,01	1,01	1,01	1,01	1,01	1,01	1,01	1,01
	(0,01)	(0,01)	(0,01)	(0,01)	(0,01)	(0,01)	(0,01)	(0,01)	(0,01)	(0,01)

Source: Own analysis

Appendix Table 15: Results for Robustness Test 1. The table presents OLS estimates for linear probability models. We regressed a dummy variable, indicating whether a firm went public in a given country, on the three-year moving average first-day return in afore-said country, while controlling for several factors. Column (1) corresponds to the basic model in which we control only for country-specific variables listed in the left-most column. Results in columns (2) to (10) capture estimations for models in which we control for previously mentioned country factors plus the firm characteristic named above the column number. Finally, column (11) represents a model in which we control for all firm level variables used through columns (2) to (10). Robust standard errors are reported in brackets.

Robustness Test 1: Impact of First-day Returns Excl. UAE

Firm level control variable:	*None* (1)	*TotalAssets* (2)	*TotalRevenues* (3)	*NetIncome* (4)	*ProfitMargin* (5)	*ROA* (6)	*DebtEquity* (7)	*HiTech* (8)	*ForeignSales* (9)	*Global* (10)	*All* (11)
Main explanatory variable											
UP	**0,2901 *****	**0,2943 *****	**0,2905 *****	**0,2871 *****	**0,2913 *****	**0,3077 *****	**0,3132 *****	**0,2905 *****	**0,2205 *****	**0,2900 *****	**0,2984 *****
	(0,0226)	(0,0269)	(0,027)	(0,0262)	(0,028)	(0,0346)	(0,0307)	(0,0227)	(0,0408)	(0,0226)	(0,0427)
Firm level control											
Comp		0,0000	0,0000 *	0,0000 ***	0,0000	0,0011	0,0000	-0,0210 ***	0,0020	0,0038	N/A[a]
		(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0004)	(0,0001)	(0,0022)	(0,0029)	(0,0035)	
Regulatory environment											
Disclosure	0,0338 ***	0,0289 ***	0,0290 ***	0,0305 ***	0,0281 ***	0,0292 ***	0,0297 ***	0,0338 ***	0,0250 ***	0,0338 ***	0,0234 ***
	(0,0015)	(0,0016)	(0,0017)	(0,0016)	(0,0018)	(0,0021)	(0,0017)	(0,0015)	(0,0024)	(0,0015)	(0,0027)
General economic conditions											
TotalMktRet	-0,0512 ***	-0,0352 ***	-0,0410 ***	-0,0450 ***	-0,0431 ***	-0,0376 ***	-0,0402 ***	-0,0468 ***	-0,0235 *	-0,0517 ***	-0,0230
	(0,0084)	(0,009)	(0,0089)	(0,0089)	(0,0092)	(0,0129)	(0,0097)	(0,0083)	(0,0141)	(0,0084)	(0,0175)
GDPgrowth	-0,2037 ***	0,0459	0,0233	-0,0578	0,0742	-0,1098	0,0982	-0,1906 ***	0,1897 *	-0,2052 ***	0,0923
	(0,0735)	(0,081)	(0,0847)	(0,08)	(0,0872)	(0,0971)	(0,0885)	(0,0737)	(0,1082)	(0,0736)	(0,1224)
Local equity market variables											
IndustryIPO	0,4774 ***	0,4102 ***	0,3482 ***	0,4270 ***	0,3207 ***	0,4460 ***	0,3976 ***	0,5107 ***	0,2764 ***	0,4771 ***	0,4028 ***
	(0,0344)	(0,0379)	(0,0367)	(0,037)	(0,0389)	(0,0477)	(0,0415)	(0,0356)	(0,0578)	(0,0345)	(0,0713)
MktCap	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Geographic location											
Proximity	-0,0012 ***	-0,0011 ***	-0,0012 ***	-0,0011 ***	-0,0012 ***	-0,0010 ***	-0,0012 ***	-0,0012 ***	-0,0010 ***	-0,0012 ***	-0,0009 ***
	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)
Constant	-0,1705 ***	-0,1499 ***	-0,1451 ***	-0,1580 ***	-0,1364 ***	-0,1612 ***	-0,1536 ***	-0,1657 ***	-0,1375 ***	-0,1708 ***	-0,1403 ***
	(0,0116)	(0,0124)	(0,013)	(0,0123)	(0,0135)	(0,0147)	(0,0127)	(0,0117)	(0,0171)	(0,0116)	(0,0191)
R^2	0,1348	0,1416	0,1495	0,1412	0,1519	0,1571	0,1443	0,1356	0,1992	0,1348	0,2024
Observations	11 640	9 256	8 768	9 568	8 272	5 696	7 872	11 640	3 752	11 640	3 040
Clusters	1 455	1 157	1 096	1 196	1 034	712	984	1 455	469	1 455	380

Legend: *p<0.1, **p<0.05, ***p<0.01,[a]not displayed for reasons of space

Source: Own analysis

Appendix Table 16: Results for Robustness Test 2. Columns (1) to (9) report OLS estimates for a linear probability model in which we regressed a dummy variable, indicating whether a firm went public in a given country, on a multiplicative interaction term of the three-year moving average first-day return in afore-said country and a firm level variable named above the column number, while controlling for several country level factors listed in the left-most column. Robust standard errors are reported in brackets.

Robustness Test 2: Interaction Effects Excl. UAE

Moderating firm level variable:	*TotalAssets* (1)	*TotalRevenues* (2)	*NetIncome* (3)	*ProfitMargin* (4)	*ROA* (5)	*DebtEquity* (6)	*HiTech* (7)	*ForeignSales* (8)	*Global* (9)
Main explanatory variables									
Int	**-0,0000**	**0,0000**	**0,0001**	**0,0001** ***	**0,0102**	**-0,0002**	**-0,1051** **	**-0,1302**	**0,0265**
	(0,0000)	(0,0000)	(0,0001)	(0,0000)	(0,0166)	(0,0009)	(0,0429)	(0,0922)	(0,0496)
Comp	0,0000	0,0000	0,0000	-0,0000 ***	-0,0002	0,0001	-0,0067	0,0197	0,0000
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0021)	(0,0001)	(0,006)	(0,0127)	(0,0076)
UP	0,2946 ***	0,2846 ***	0,2845 ***	0,2916 ***	0,3087 ***	0,3135 ***	0,3431 ***	0,2854 ***	0,2850 ***
	(0,0272)	(0,0279)	(0,0264)	(0,028)	(0,0349)	(0,0309)	(0,0329)	(0,0493)	(0,0256)
Regulatory environment									
Disclosure	0,0289 ***	0,0291 ***	0,0305 ***	0,0281 ***	0,0292 ***	0,0297 ***	0,0334 ***	0,0248 ***	0,0339 ***
	(0,0016)	(0,0017)	(0,0016)	(0,0018)	(0,0021)	(0,0017)	(0,0016)	(0,0024)	(0,0015)
General economic conditions									
TotalMktRet	-0,0352 ***	-0,0409 ***	-0,0450 ***	-0,0431 ***	-0,0377 ***	-0,0402 ***	-0,0494 ***	-0,0246 *	-0,0513 ***
	(0,009)	(0,0089)	(0,0089)	(0,0092)	(0,0129)	(0,0097)	(0,0084)	(0,0142)	(0,0084)
GDPgrowth	0,0459	0,0246	-0,0581	0,0743	-0,1094	0,0982	-0,1964 ***	0,1865 *	-0,2043 ***
	(0,0811)	(0,0847)	(0,08)	(0,0872)	(0,0971)	(0,0885)	(0,0738)	(0,1077)	(0,0736)
Local equity market variables									
IndustryIPO	0,4102 ***	0,3481 ***	0,4272 ***	0,3208 ***	0,4463 ***	0,3976 ***	0,5128 ***	0,2789 ***	0,4764 ***
	(0,0379)	(0,0367)	(0,0369)	(0,0389)	(0,0478)	(0,0416)	(0,0355)	(0,0573)	(0,0346)
MktCap	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Geographic location									
Proximity	-0,0011 ***	-0,0012 ***	-0,0011 ***	-0,0012 ***	-0,0010 ***	-0,0012 ***	-0,0012 ***	-0,0010 ***	-0,0012 ***
	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)
Constant	-0,1499 ***	-0,1448 ***	-0,1577 ***	-0,1367 ***	-0,1616 ***	-0,1536 ***	-0,1689 ***	-0,1447 ***	-0,1707 ***
	(0,0124)	(0,013)	(0,0123)	(0,0135)	(0,0148)	(0,0127)	(0,0116)	(0,0176)	(0,0116)
R^2	0,1416	0,1496	0,1412	0,1519	0,1571	0,1443	0,1360	0,1996	0,1348
Observations	9 256	8 768	9 568	8 272	5 696	7 872	11 640	3 752	11 640
Clusters	1 157	1 096	1 196	1 034	712	984	1 455	469	1 455

Legend: *p<0.1, **p<0.05, ***p<0.01
Source: Own analysis

Appendix Table 17: Results for Robustness Test 3. Column (1) reports OLS estimates for a linear probability model in which we regressed a dummy variable, indicating whether a firm went public in a given country, on the three-year moving average first-day return in afore-said country for IPOs conducted between 2000 and 2007. In models (2) to (10) we regressed the dummy variable on a multiplicative interaction term of the historical moving average first-day return and a firm level variable for IPOs of the same time period. In both types of models we controlled for several country level factors listed in the left-most column. Robust standard errors are reported in brackets.

Robustness Test 3: Impact of First-day Returns & Interaction Effects 2000 - 2007

Moderating firm level variable:	*None* (1)	*TotalAssets* (2)	*TotalRevenues* (3)	*NetIncome* (4)	*ProfitMargin* (5)	*ROA* (6)	*DebtEquity* (7)	*HiTech* (8)	*ForeignSales* (9)	*Global* (10)
Main explanatory variables										
Int		**0,0000**	**0,0000**	**0,0000**	**0,0000**	**0,0001**	**-0,0004**	**-0,0091 ***	**-0,0313 *****	**-0,0044**
		(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0016)	(0,0003)	(0,005)	(0,0115)	(0,0069)
Comp		-0,0000	0,0000	0,0000	0,0000	-0,0002	0,0001 **	-0,0087 ***	0,0186 ***	0,0073 *
		(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0013)	(0,0000)	(0,0031)	(0,0058)	(0,0043)
UP	0,0325 ***	0,0272 ***	0,0285 ***	0,0293 ***	0,0287 ***	0,0332 ***	0,0278 ***	0,0347 ***	0,0428 ***	0,0331 ***
	(0,0031)	(0,0033)	(0,0036)	(0,0032)	(0,0037)	(0,0042)	(0,0036)	(0,0039)	(0,0099)	(0,0033)
Regulatory environment										
Disclosure	0,0304 ***	0,0302 ***	0,0295 ***	0,0307 ***	0,0289 ***	0,0311 ***	0,0307 ***	0,0303 ***	0,0272 ***	0,0304 ***
	(0,0014)	(0,0015)	(0,0016)	(0,0015)	(0,0016)	(0,0021)	(0,0016)	(0,0014)	(0,0023)	(0,0014)
General economic conditions										
TotalMktRet	-0,0432 ***	-0,0140	-0,0175 *	-0,0199 **	-0,0183 *	-0,0149	-0,0149	-0,0415 ***	0,0013	-0,0435 ***
	(0,0097)	(0,0095)	(0,0099)	(0,0094)	(0,0102)	(0,0147)	(0,0105)	(0,0097)	(0,0158)	(0,0097)
GDPgrowth	0,3605 ***	0,4923 ***	0,5010 ***	0,3965 ***	0,5369 ***	0,3849 **	0,6564 ***	0,3632 ***	0,7448 ***	0,3620 ***
	(0,1018)	(0,1135)	(0,1184)	(0,1127)	(0,1223)	(0,1493)	(0,1232)	(0,1019)	(0,1775)	(0,1019)
Local equity market variables										
IndustryIPO	0,3437 ***	0,2972 ***	0,2967 ***	0,3252 ***	0,2872 ***	0,3314 ***	0,3112 ***	0,3613 ***	0,1838 ***	0,3433 ***
	(0,0314)	(0,0345)	(0,0338)	(0,034)	(0,035)	(0,0468)	(0,0378)	(0,0337)	(0,0511)	(0,0314)
MktCap	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Geographic location										
Proximity	-0,0013 ***	-0,0012 ***	-0,0013 ***	-0,0012 ***	-0,0013 ***	-0,0012 ***	-0,0013 ***	-0,0013 ***	-0,0013 ***	-0,0013 ***
	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)
Constant	-0,0998 ***	-0,1200 ***	-0,1147 ***	-0,1200 ***	-0,1098 ***	-0,1354 ***	-0,1272 ***	-0,0975 ***	-0,1294 ***	-0,1008 ***
	(0,0107)	(0,0117)	(0,012)	(0,0114)	(0,0124)	(0,0144)	(0,0121)	(0,0107)	(0,016)	(0,0106)
R^2	0,1204	0,1332	0,1394	0,1314	0,1410	0,1518	0,1399	0,1208	0,1880	0,1205
Observations	9 243	6 921	6 741	7 254	6 435	3 861	5 985	9 243	2 673	9 243
Clusters	1 027	769	749	806	715	429	665	1 027	297	1 027

Legend: *p<0.1, **p<0.05, ***p<0.01

Source: Own analysis

Appendix Table 18: Results for Robustness Test 4. Column (1) reports OLS estimates for a linear probability model in which we regressed a dummy variable, indicating whether a firm went public in a given country, on the three-year moving average first-day return in afore-said country for IPOs conducted between 2008 and 2014. In models (2) to (10) we regressed the dummy variable on a multiplicative interaction term of the historical moving average first-day returns and a firm level variable for IPOs of the same time period. In both types of models we controlled for several country level factors listed in the left-most column. Robust standard errors are reported in brackets.

Robustness Test 4: Impact of First-day Returns & Interaction Effects 2008 - 2014

Moderating firm level variable:	*None* (1)	*TotalAssets* (2)	*TotalRevenues* (3)	*NetIncome* (4)	*ProfitMargin* (5)	*ROA* (6)	*DebtEquity* (7)	*HiTech* (8)	*ForeignSales* (9)	*Global* (10)
Main explanatory variables										
Int		**-0,0000 ****	**-0,0000 *****	**-0,0000**	**-0,0001**	**0,0026**	**0,0020**	**-0,0082**	**-0,0278 ***	**-0,0174 *****
		(0,0000)	(0,0000)	(0,0000)	(0,0001)	(0,0023)	(0,0032)	(0,0072)	(0,0159)	(0,0061)
Comp		0,0000 ***	0,0000 ***	0,0000 *	0,0000	0,0009	0,0001	-0,0114 **	0,0083	0,0062
		(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0006)	(0,0012)	(0,0045)	(0,0083)	(0,0068)
UP	0,0310 ***	0,0241 ***	0,0315 ***	0,0305 ***	0,0294 ***	0,0266 ***	0,0234 ***	0,0323 ***	0,0404 ***	0,0321 ***
	(0,0037)	(0,0037)	(0,0045)	(0,0041)	(0,0045)	(0,0049)	(0,0046)	(0,0042)	(0,0098)	(0,0038)
Regulatory environment										
Disclosure	0,0184 ***	0,0166 ***	0,0162 ***	0,0169 ***	0,0154 ***	0,0170 ***	0,0166 ***	0,0183 ***	0,0097 ***	0,0184 ***
	(0,0021)	(0,0022)	(0,0023)	(0,0022)	(0,0024)	(0,0027)	(0,0025)	(0,0021)	(0,0032)	(0,0021)
General economic conditions										
TotalMktRet	-0,0197 *	-0,0099	-0,0145	-0,0123	-0,0132	-0,0064	-0,0137	-0,0200 **	-0,0007	-0,0196 *
	(0,0102)	(0,0116)	(0,0117)	(0,0114)	(0,0124)	(0,0147)	(0,013)	(0,0101)	(0,0188)	(0,0102)
GDPgrowth	0,0637	0,1200	0,0956	0,0919	0,1497	0,0450	0,0914	0,0623	0,1707	0,0624
	(0,0854)	(0,0955)	(0,0971)	(0,0924)	(0,1017)	(0,1127)	(0,1039)	(0,0853)	(0,1293)	(0,0854)
Local equity market variables										
IndustryIPO	0,9283 ***	0,6519 ***	0,6689 ***	0,7723 ***	0,7143 ***	0,6295 ***	0,6582 ***	0,9335 ***	0,6384 ***	0,9275 ***
	(0,0717)	(0,0714)	(0,0833)	(0,0749)	(0,1003)	(0,0854)	(0,0822)	(0,0725)	(0,1215)	(0,0717)
MktCap	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***	0,0000 ***
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Geographic location										
Proximity	-0,0009 ***	-0,0008 ***	-0,0009 ***	-0,0008 ***	-0,0009 ***	-0,0008 ***	-0,0008 ***	-0,0009 ***	-0,0007 ***	-0,0009 ***
	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0001)	(0,0002)	(0,0001)
Constant	-0,0720 ***	-0,0653 ***	-0,0600 ***	-0,0696 ***	-0,0552 ***	-0,0636 ***	-0,0565 ***	-0,0678 ***	-0,0405	-0,0727 ***
	(0,0169)	(0,0179)	(0,019)	(0,0177)	(0,0199)	(0,0214)	(0,021)	(0,0169)	(0,0262)	(0,0168)
R^2	0,1589	0,1518	0,1618	0,1584	0,1663	0,1483	0,1373	0,1594	0,2110	0,1590
Observations	4 644	3 870	3 573	3 987	3 312	2 844	3 258	4 644	1 755	4 644
Clusters	516	430	397	443	368	316	362	516	195	516

Legend: *p<0.1, **p<0.05, ***p<0.01

Source: Own analysis