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THE UNDERWRITER:
A EUROPEAN PERSPECTIVE

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“Part of my job was to invent schemes to forecast the market [...]
My schemes invariably failed those tests. I didn't fully appreciate the lesson in this at the time, but it came to me later.”

(Eugene F. Fama)

To my family

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Contents

Abstract

Extending back at least to McDonald and Fisher (1973), the importance of a prestigious underwriter has attracted the attention of researchers in trying to empirically measure reputation. Most of this literature, however, relies on measures tailored on the US case. Nonetheless, Europe has been attracting attention in comparative terms to the US. Moreover, the number of cross-countries studies in Europe yields to an increased demand for measures as proxy of the reputation of underwriters, even out of the corporate finance field. Along with the empirical literature, underwriters have come under the attention of the public debate. With the beginning of the financial crisis in 2007/2008, financial markets were put under severe pressure. In this context, there has been an increasing attention on the payments charged by underwriters on issuers for the services provided to them. A series of reports by regulatory bodies criticizes the surge in underwriting fees and highlight many issues, with particular focus on the degree of competition and the efficiency of the system of capital raising. In such framework, this work aims at investigating the role of underwriters in the European markets during security issuance events, from three different micro-perspectives: reputation, underwriting fees and performance of companies taken public by underwriters.

Keywords: *stock exchanges, second markets, underwriter, IPOs, AIM, London Stock Exchange*

CHAPTER 1

1 Introduction

Firms going public are associated with uncertainty. Many studies have considered several instruments used by firms going public to reduce asymmetric information and to attract potential investors. In particular, extensive research has focused on affiliation by prestigious underwriters as a costly signal sent from issuing companies to potential investors (Carter and Manaster, 1990; Carter *et al.*, 1998).

Underwriters (i.e. investment banks) act as intermediaries between investors and issuing firms in Initial Public Offerings (IPOs) and in seasoned equity offerings (SEOs), also known as follow-on offerings. There are fundamentally two reasons why the role of underwriter is emphasized by the financial literature and the capital market industry. First of all, they act as 'certifying agents' in valuing IPOs (Beatty and Ritter, 1986). This role arises from information asymmetries that typically exist between insiders (the companies) and outsiders (the investors) in equity offerings. Secondly, they bear the greatest responsibility for the bundled offering of multiple services during security issuance events (Liu and Ritter, 2011).

In markets where consumers face some degree of uncertainty regarding the product or service quality, reputations play an important role. Hence, in pricing IPOs and providing services, underwriters put their reputational capital at stake. Underwriters are also in a repeated game with issuers that makes their reputation a valuable asset in the equity capital market (Chemmanur and Fulghieri, 1994). As a result, measures of such reputation have long been attracting the attention in the financial literature. The demand for rankings, often employed as proxy for reputation, has sparked interest recently, since an increasing number of cross-countries studies demand measures with whom proxy the reputation of underwriters taking companies public. However, previous studies employ measures tailored on the US, where approximately the same established investment banks take companies public on either the NYSE or NASDAQ. By contrary, underwriting market in Europe is a different story. Failing to control for country and market specificities could lead to incorrect conclusions.

With the beginning of the deepest financial crisis in 2007, financial markets were under severe pressure. These changes in the financial markets, put investment

banks under considerable regulatory scrutiny and public debate. The research and policy debate is in particular centred on understanding who is being paid and what is being paid for. Recently, as series of regulatory reports in UK have attempted to investigate whether underwriters are (or not) being paid as well as they should for taking risk and for other services, because of the surge in underwriting fees (i.e. payment charged on issuers by underwriters) on the onset of the financial crisis. While underwriters may have increased their rewards for the risk they were assuming, other factors could play a role in the fees story (OFT, 2011). For instance, certain banks could have strengthened their bargaining power thanks to their larger balance sheets that allow them to satisfy the increased need of capital became more important than ever during the financial crisis.

One distinct feature of IPOs is that they underperform in the long run. Since the work by Ritter (1991), an extensive body of literature have attempted to explain and empirically document this phenomenon (Fama and French, 1993). But, at the same time, an increasing number of recent studies highlight the skewed distribution of IPOs returns. For instance, Field and Lowry (2009) find that over the period 1980–2000, the top 100 IPOs earned over 1,000% in their first three years of trading. As a results, only investors able to not screen out potential top-performer IPOs, could rationally invest in this risky asset class.

In such framework, this work aims at assessing fundamental questions related to the role of underwriters in Europe from three perspectives. The remainder of this chapter highlights motivations and main findings of the papers presented in Chapter 2, 3 and 4 of this PhD thesis.

From a signal-based view of the firm, hiring prestigious investment banks is a costly signal sent to potential investors (Chemmanur and Fulghieri, 1994). In markets where consumers face some degree of uncertainty regarding the product or service quality, reputations play indeed an important role. In this framework, rankings are often used to measure the reputation of organizations providing complex services whose quality is difficult to assess for costumers (i.e. rankings of business schools). In particular, the

demand for measures of the reputation of underwriters has sparked interest recently, since an increasing number of cross-countries papers from different stream of literature have adopted underwriting ranking either as control or main variable. However, no previous study provides such measure.

The paper presented in Chapter 1 addresses this issue. To define what an optimal ranking measure would be on a pan-European basis is not a trivial problem for a several of reasons: (1) Europe underwriting market is not as integrated as the US (Abrahamson *et al.*, 2011); (2) existing measures of rankings are mostly tailored on the US case (Carter and Manaster, 1990); (3) indirect applications of US-based measures entail biases toward international banks and do not consider underwriters not operating in the US (Boulton *et al.*, 2011; Torstila, 2001, 2003; Moore *et al.*, 2010). All in all, ranking measures proposed so far to classify the underwriters seem to be unable to effectively and efficiently measure the reputation of underwriters taking companies public in Europe: tombstone measures cannot be directly applied in Europe; market shares measures cannot be effective when they ignore market segmentations.

This paper compares existing rankings of underwrites of European IPOs and proposes a new approach that considers the heterogeneity of underwriters on a country and market basis. We identify 261 underwriters that took 3,776 companies public between 1995 and 2010 on stock markets of one of the four largest European economies (France, Germany, Italy and the UK). We show that IPO markets in Europe are fragmented for underwriters. First of all, we document that the home bias prevails and only few underwriters operate also in US, yielding US-based measures to exclude most of underwriters taking companies public in Europe. This is particularly emphasized for IPOs listed on second-tier markets that account for most of IPOs in Europe from 1995 to 2009 (Vismara *et al.*, 2012). Second, we show that there are specificities in some second-tier markets even within the same stock exchange. Specifically, we document that underwriters on the Alternative Investment Market (AIM) in London and on the Marché Libre in France differ from other underwriters, in terms of size, age and revenues from the IPO business. Building on this findings, we propose a ranking based on the stock exchanges in UK, France, Germany and Italy, differentiating London AIM and Paris Marché Libre. Lastly, we validate our measure of reputation on the underpricing of European IPOs, in line with the certification hypothesis (Carter and

Manaster, 1990). These findings are robust to firm-specific characteristics, as prior studies have shown that issue and firm characteristics (i.e. issue size and firm risk) significantly affect the underpricing (Carter *et al.*, 1998). We find that our measure of reputation's reducing effect on underpricing is more significant than alternatives rankings.

All in all, the results presented in this paper show the existence of segmentations of the European stock exchanges for underwriters that we reckon should not be ignored by European underwriter rankings.

Taking a narrow perspective, examining the ability of companies to raise equity capital efficiently, means to study whether underwriters are (or not) being paid as well as they should for taking risk and for other services.

Extending back at least to Marsh (1994), the returns earned by underwriters and sub-underwriters in UK have been the subject of considerable regulatory scrutiny and public debate that yielded to a series of reports by various regulatory bodies (Director General of Fair Trading 1995, 1996; Monopolies and Merger Commission, 1999). Major concerns related to the level of underwriting fees relative to the changing exposure to risk, the level of competition among underwriters and the sharing of risks and rewards between lead underwriters and sub-underwriters. On the onset of the financial crisis in 2007/2008, the surge in underwriting fees reignited the equity capital debate. At the same time, average discount rose substantially compared to its historical average. The understandable severe pressure arising out of the financial crisis, unquestionably increased the risk associated with equity issuance and the costs of providing protection borne by companies. However, it is unclear whether this explanation can entirely account for the steep rise in underwriting fees. Recently, the Institutional Investor Council (IIC, 2010) conducted an inquiry on the practices and pricing procedures adopted during the capital raising processes. In this study, it criticizes the high level of fees charged by investment banks on companies for advising on share issues. Following this inquiry, the Office of Fair Trading (OFT) undertook in 2011 a market study into UK equity underwriting and associated services. The OFT market study finds that the market volatility cannot explain by its own the increase in underwriting fees. In short, such concerns among the financial press and public debate

raised questions for regulators about the best proposals and actions to adopt for achieving more cost effective outcomes. These issues are of particular interest because rights offerings are still widely used in most of the world out of the US. It would be therefore useful to understand what may explain the marked increase in underwriting fees. Do underwriters and institutional shareholders matter in the rise of underwriting fees story?

The paper presented in Chapter 3 addresses this issue by testing whether changes in the behaviour of two major financial players, institutional shareholders and underwriters, significantly explain a substantial part of the increase in fees.

The empirical investigation focuses on two major financial players, institutional shareholders and underwriters, and in particular on how these players may have changed their behaviour during the financial crisis. Adopting the institutional shareholder's perspective, we focus in particular on their characteristics in terms of turnover and increase in shares owned by them. This analysis helps us to understand whether their potential twin role as investors and as sub-underwriters, beside their nationality and their ownership, may explain the phenomenon. The extant literature on institutional shareholders in the SEO context suggests that institutional shareholders may play a superior informative role, i.e. reducing the level of fees (Chemmanur *et al.*, 2009), or a manipulative role, i.e. increasing the discount (Gerard and Nanda, 1993). However, previous literature fails to consider the fact that institutional shareholders can benefit from their roles as both investors in the issuing company (i.e. pushing for rise capital as cheaply as possible) and as sub-underwriters (i.e. pushing for higher fees). Adopting the underwriter's perspective, we focus in particular on their bargaining position relative to the issuers, beside the degree of competition in the investment bank industry and their reputation. Since the onset of the financial crisis, the need for capital adequacy has become more important than ever. As a result, certain banks can have strengthened their bargaining power and charge fees reflecting their unique competitive position. The role of institutional shareholders and underwriters before and during the financial crisis is indeed the main objective of this paper, and to the best of our knowledge, this is the first study that addresses this issue in setting underwriting fees.

We test theoretical hypotheses using a sample of 224 issues that raised new capital through rights issues or open offers over the period 2000-2010 in the UK capital

market. Our results show that during the financial crisis institutional shareholders with high turnover may increase their ownership to push for higher fees and benefit from sub-underwriting fees, ceteris paribus. As underwriters, underwriting fees are higher for issues underwritten by investment banks in a stronger position relative to issuers. And this effect is emphasized during the financial crisis. The evidence on potential conflicts of interest and on the relevance of bargaining power of underwriters is robust to control variables suggested by previous literature as potential determinants of underwriting fees (Eckbo and Masulis, 2007). Moreover, the results are confirmed when controlling for potential endogeneity between discount and fees, as suggested by Kim *et al.* (2010).

All in all, the results presented in this paper show the existence of potential conflicting alignment of incentives between institutional shareholders, underwriters and issuers. Along with the recent financial crisis that created demand for new capital, companies face more difficulties to negotiate a cost effective outcome when they buy equity underwriting services, ceteris paribus. Since our findings suggest that competition among underwriters is not a major concern in the rise of underwriting fees, underwriters may still compete on other dimensions (Liu and Ritter, 2011). At the same time, institutional shareholders and companies may reach cost outcomes most effectively and efficiently adopting pro-active behaviour. Issuers can reduce the knowledge and bargaining power gap, and commitments by large institutional shareholder with long-term investment horizon to sub-underwrite equity issues before they are announced may reduce the risk to opportunistic gain by other shareholders or underwriters. What we learn about rights issues during the crisis may provide similar guidelines to regulators when equity markets face higher demand for new equity capital driven by reasons other than the crisis.

Focusing on empirical results on the long-run performance of IPOs, the paper presented in Chapter 4 takes another look at the cross-section of IPO performance. We propose a new methodological approach to help investors screen IPOs for the high-performing tail of the returns distribution. While IPOs underperform as an asset class, the skewed distribution of returns offers the chance to gain extremely high rewards. The mean return usually exceeds the median because of a few big winners (Field and Lowry, 2009). We show that studying individual stocks by dichotomizing IPOs into top- and

non top-performers, instead of applying classic multivariate regression methods, allows to give investors an objective, quantitative tool for measuring the ex-ante probability that a given IPO is an extremely high performer, with respect to the average performance distribution.

Since Ritter (1991), an extensive body of literature documents the long-run performance of IPOs. Various explanations have been put forth to shed light on this phenomenon. Loughran and Ritter (1995) propose that IPOs are initially overvalued due to the presence of investors betting on long shots. Some other authors have suggested this anomaly in the pricing of IPOs is the result of preferences for stocks with high skewness (Barberis and Huang, 2008). Nonetheless it is a fact that, whatever the reason, IPOs do experience long-run underperformances. Empirically, several different methodologies have been employed to document this phenomenon (Ritter, 1991; Fama and French, 1993; Brav and Gompers, 1997; Schultz, 2003). By contrary, we contribute to the literature by proposing a logistic regression approach to forecast whether the firm is a top-performer using only publicly available information.

We test our forecasting tool using a sample of 1,053 IPOs that went public in Europe in the period 1995-2010 on one of the four largest European markets (France, Germany, Italy and the UK). We define issuers as "winner" IPOs if the firm buy-and-hold return (BHAR) outperforms the compounded return from an equal-weighted portfolio matched on size and book-to-market (Lyon, Barber, and Tsai, 1999). The empirical analyses build the forecasting model by (1) randomly excluding one observation from the sample, (2) estimating the model parameters and (3) computing the ex-ante probability that the out-of-sample observation is a winner-IPO.

To confirm the goodness of this empirical strategy, we document that "winner-IPOs" selected on the basis of our forecasting models out-perform non "winner-IPOs" at different cutoff probabilities and across different time horizons (i.e. one, two or three years after listing). Our findings show that an investor using our forecasting model would have a higher ratio of correct predictions (winner-IPOs classified as winner-IPOs) to the total number of IPOs classified as winner-IPOs (wrongly or rightly) compared to a naïve assumption that all IPOs in the sample are winners. Secondly, the average performance of the "winner-IPOs" portfolio is persistently higher that the average of the other portfolio (non "winner-IPOs"). We further test our methodological

approach with an alternative definition of “winner-IPOs”. Our empirical strategy is also robust to an alternative approach that consists in splitting the sample into an estimation and testing subsamples. All in all, the results presented in this paper show that the proposed methodology could provide a guideline for similar financial forecasting studies.

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CHAPTER 2

RANKING UNDERWRITERS OF EUROPEAN IPOs

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"If Goldman Sachs decided to cut its spreads,
few issuers would conjecture that is had become
a low-quality underwriter"

(Chen and Ritter)

Ranking underwriters of European IPOs

Abstract

The reputational capital of underwriters is a valuable asset in IPO markets. However, existing measures of reputation are tailored on the US, where approximately the same established investment banks take companies public on either the NYSE or NASDAQ. This paper documents a fragmentation in the underwriting market of IPOs in Europe and proposes a ranking based on the stock exchanges in UK, France, Germany and Italy, differentiating London AIM and Paris Marché Libre. We argue that this measure provides a better proxy for reputation, in that we find that, using a sample of 3,776 IPOs in the period 1995-2010, its reducing effect on underpricing is more significant than alternatives rankings.

Keywords: *Initial Public Offerings, underwriter, ranking, reputation, European markets*

JEL Classification: *G*15, *G*24, *G*30

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2.1 Introduction

The core idea of the signalling theory is concerned with overcoming information asymmetry between two parties that have access to different information. In markets where consumers face some degree of uncertainty regarding the product or service quality, reputations play an important role. Initial Public Offerings provide a fertile ground for research on signalling via reputable affiliations. Hiring prestigious investment banks is indeed a costly signal sent from issuing companies to potential investors. In turn, the pricing process put the reputational capital of the underwriters at stake. Rankings are often used to measure the reputation of organizations providing complex services whose quality is difficult to assess for costumers. For instance, rankings of business schools are of help for prospective students selecting an MBA program.

Recently, papers from different stream of literature have adopted underwriting ranking either as control or main variable. Beside finance, these include studies in accounting (Boulton *et al.*, 2011), entrepreneurship and small business management (Moore *et al.*, 2010; Chahine *et al.*, 2011), and strategic management (Bruton *et al.*, 2010). While in the US approximately the same established investment banks take companies public on either the NYSE or NASDAQ, in Europe the story is different. Measuring the reputation of underwriters of European IPOs requires taking into account country specificities as well as the segmentation of the exchanges. For instance, Evolution Securities took public 122 IPOs in London AIM (Alternative Investment Market) in the period 1995-2010. Nevertheless, it almost does not operate outside the AIM. Measuring the reputation of such underwriters specialised in a single (second-tier) market is challenging, though required by a growing number of papers, especially in cross-country studies (Torstila, 2001; Torstila, 2003; Engelen and van Essen, 2010; Banerjee *et al.*, 2011; Dash *et al.*, 2012).

Existing rankings of underwriters are tailored on the US. The recent ‘battle’ between Nasdaq and NYSE for listing Facebook took place when the underwriters were already chosen. This gives an idea of the US underwriting market as an integrated market, with companies going public selecting investment banks independently, or even before, of the listing market. Consistently, researchers have proposed one single classification of underwriters of US IPOs, not distinguishing between Nasdaq and NYSE. To this extent,

Abrahamson *et al.* (2011, pp.8) state that 'while the U.S. is clearly one market, Europe is not yet fully integrated'. This paper addresses this issue by comparing existing rankings of underwrites of European IPOs and proposing a new approach that consider the heterogeneity of underwriters on a country and market basis.

The Carter-Manaster (1990) measure ranks underwriters based on their placement in the IPO 'tombstone announcements', which are marketing brochures where banks deemed more reputable appear above those considered less prestigious. Such measure is not directly applicable to IPOs in Europe, where underwriting syndicates are not as large, and where there is not such thing as a 'tombstone announcement'. Moreover, its indirect application would over-weight US banks and would not rank underwriters dealing mostly with smaller companies. Considering a sample of companies going public in the stock exchanges of the four largest economies in Europe (France, Germany, Italy and the UK) in the period 1995-2010, we find that only 31.5% were listed by underwriters ranked in the Carter-Manaster ranking. Only 9.7% of IPOs has US at least one lead underwriter which is a US bank.

Alternative ranking approaches use measures based either (1) on the number of IPOs handled by each underwriter, which we refer to as *'equally weighted'* metric, or (2) on the money raised by each underwriter taking companies public, which we refer to as *'value weighted'* metric. The value weighted approach assumes that more reputable underwriters take larger companies public. In so doing, it underestimates the incentives to build and maintain reputation for underwriters that frequently match with smaller issuers. For instance, in the period 1995-2010, Europe Finance et Industrie took public 164 out of 267 IPOs on Paris Marché Libre (61.2%). However, the small size of these offers (average proceedings, 38.2€m) makes the reputation of this underwriter rather low, if measured in terms of capital raised (i.e. value weighted metric). Equally weighted rankings are more suitable for taking into account the reputation of underwriters focusing on second markets, that account for 77.5% of IPOs in Europe from 1995 to 2009 (Vismara *et al.*, 2012).

In this paper, we document the fragmentation of IPO markets in Europe for underwriters. First, there is a home bias, with 85.2% of the firms taken public by a domestic underwriter. Second, even within the same stock exchange, there are specificities in some second-tier market. Espenlaub *et al.* (2012) underline the peculiar

role of financial intermediaries in London AIM. In this non-regulated 'reputational market', companies are taken public by a Nominated Advisor (NomAd) that act as a 'decentralized regulator' that certifies and controls the quality of new listings. Admission documents are indeed not pre-vetted by the London Stock Exchange itself or the Financial Services Authority (FSA). They find that Nomad reputation has a significant impact on IPO survival. We document that these NomAds are mostly young and specialized financial boutiques that do not operate on London's main market and that IPOs are often a significant share of their business. Paris Marché Libre is also distinguished, as most of the companies are taken public on this market by a single investment bank, Europe Finance et Industrie. Using tests on the difference on several underwriter-specific variables and performing an analysis with propensity score matching, we build a ranking of underwriters in the stock exchanges in UK, France, Germany and Italy, differentiating London AIM and Paris Marché Libre.

We regress our measure of reputation on the underpricing of European IPOs, controlling for firm-specific characteristics, and find that its reducing effect on underpricing is more significant than alternatives rankings. We argue that European underwriter ranking should not ignore the segmentation of the European stock exchanges. The ranking proposed in this paper is effective in capturing the reputation of underwriters of IPOs in Europe. We report the list of the 261 underwriters taking companies public in Europe, and their rankings. This is of use for practitioners and scientists dealing with European IPOs, especially when comparing investment opportunities in different markets.

The remainder of this paper is structured as follows. In the next section, we review the literature on underwriters' reputation. Section 2.3 and section 2.4 describes the IPO market in Europe from the perspective, respectively, of the companies going public and of the underwriters. Section 2.5 builds our ranking measure that is tested on underpricing in section 2.6. Section 2.7 concludes.

2.2 Literature review

This paper focuses on the reputation of underwriters. The starting point of our analysis is built on the argument that the reputation of investment banks plays a relevant role in resolving information frictions in the new issues market (Beatty and Ritter, 1986;

Chemmanur and Fulghieri, 1994). The assumption common to these studies is that investors use the investment banks' reputation to assess the quality of the equity they market.

Existing literature proposes three main approaches to measure the reputation of underwriters: (1) tombstone measures; (2) market shares measures based on the number of IPOs handled (equally weighted); and (3) market shares measures based on the amount of money (proceeds) underwritten (value weighted). The tombstone measure, first developed by Carter-Manaster (1990), looks at the hierarchy of investment banks in the IPO 'tombstone announcements', where more prominent positions on this list reflect higher reputation (Carter, *et al.* 1998, Loughran and Ritter, 2004)[1]. Unfortunately, IPOs in Europe do not recur to 'tombstone announcements' and most of them are taken public by only one or very few underwriters. The Carter-Manaster measure is therefore simply not directly applicable in Europe. Indirect applications using the US-based rank are quite common in literature but entail biases toward international banks and do not consider underwriters not operating in the US.

Megginson and Weiss (1991) firstly used the market share of lead underwriter(s) as proxy for underwriter quality on a value weighted basis. Underwriters are ranked on the basis of their relative market share, calculated using the money raised underwriting IPOs (value weighted metric) or the number of deals handled (equally weighted metric) by each underwriter. Different versions of this approach are used, the common baseline being the cumulated market share in the underwriting market as proxy of reputation. Some studies use yearly moving average of the proceeds underwritten by a specific underwriter (Fernando *et al.*, 2005), while other define top-tier ranks (Aggarwal *et al.*, 2002; Kim *et al.*, 2010). However, in markets where the number of firms going public each year is small, such as Continental Europe, the effectiveness of dynamic reputation-based measures is reduced.

Several studies link reputable underwriters with better screening, and therefore with higher issuer-quality. Prestigious underwriters are associated to more successful IPOs (Fernando *et al.*, 2005), non-speculative issues (Tinic, 1988). Carter and Manaster (1990), Carter *et al.* (1998), Chan *et al.* (2008) and Dong *et al.* (2011) show that more reputable underwriters select less risky issuers, which in turn experience lower initial

[1]Jay Ritter provides an update version on his website, http://bear.warrington.ufl.edu/ritter/ipodata.htm.

day return. Hoberg (2007) finds that some underwriters persistently underprice their IPOs and gain market share over time. Some controversial findings are also documented. Loughran and Ritter (2004) show that top-tier underwriters are associated with more underpricing (spinning and analyst lust hypotheses).

2.3 The IPO market in Europe

We consider a sample of 3,776 companies that went public between 1995 and 2010 on stock markets of one of the four largest European economies. For France we consider the Paris Bourse until 2004 and Euronext afterwards (markets included are Premier Marché-Eurolist, Second Marché, Nouveu Marché, Marché Libre and Alternext)[2], in Germany the Deutsche Börse (Amtlicher Markt, Geregelter Markt, Neuer Markt and Freiverkehr Markt), in Italy the Borsa Italiana (MTA, Ristretto-Expandi, Nuovo Mercato, MAC-AIM Italia) and in UK the London Stock Exchange (Official List and AIM). The population of IPOs is drawn from the EURIPO database[3].

Table 2.1 presents the descriptive statistics by listing market. Most of the IPOs (1,666 out of 3,776) take place on the AIM. As shown by Vismara *et al.* (2012), 77.5% of the IPOs in Europe from 1995 to 2009 were on the second markets. This means that the vast majority of firms going public in Europe do not attract the attention of institutional and established underwriters that typically deal with main markets. Table 2.1 also show that the IPO market in Europe is a series of domestic markets, with 91.8% firms going public in one of the home markets.[4]

[2] We use the French Paris Bourse until the creation of Euronext with the merger of the four stock exchanges of Belgium, France, the Netherlands, and Portugal. Afterwards, we consider Euronext in its entirety. The French Premier Marché, the Second Marché, the Nouveau Marché merged into the newly created Eurolist on February 18, 2005 (Vismara *et al.*, 2012).

[3] See Vismara *et al.* (2012) for description of the database (www.euripo.eu). We start with a population of 3,857 European IPOs during 1995-2010. We exclude IPOs with missing information for our underwriter variables.

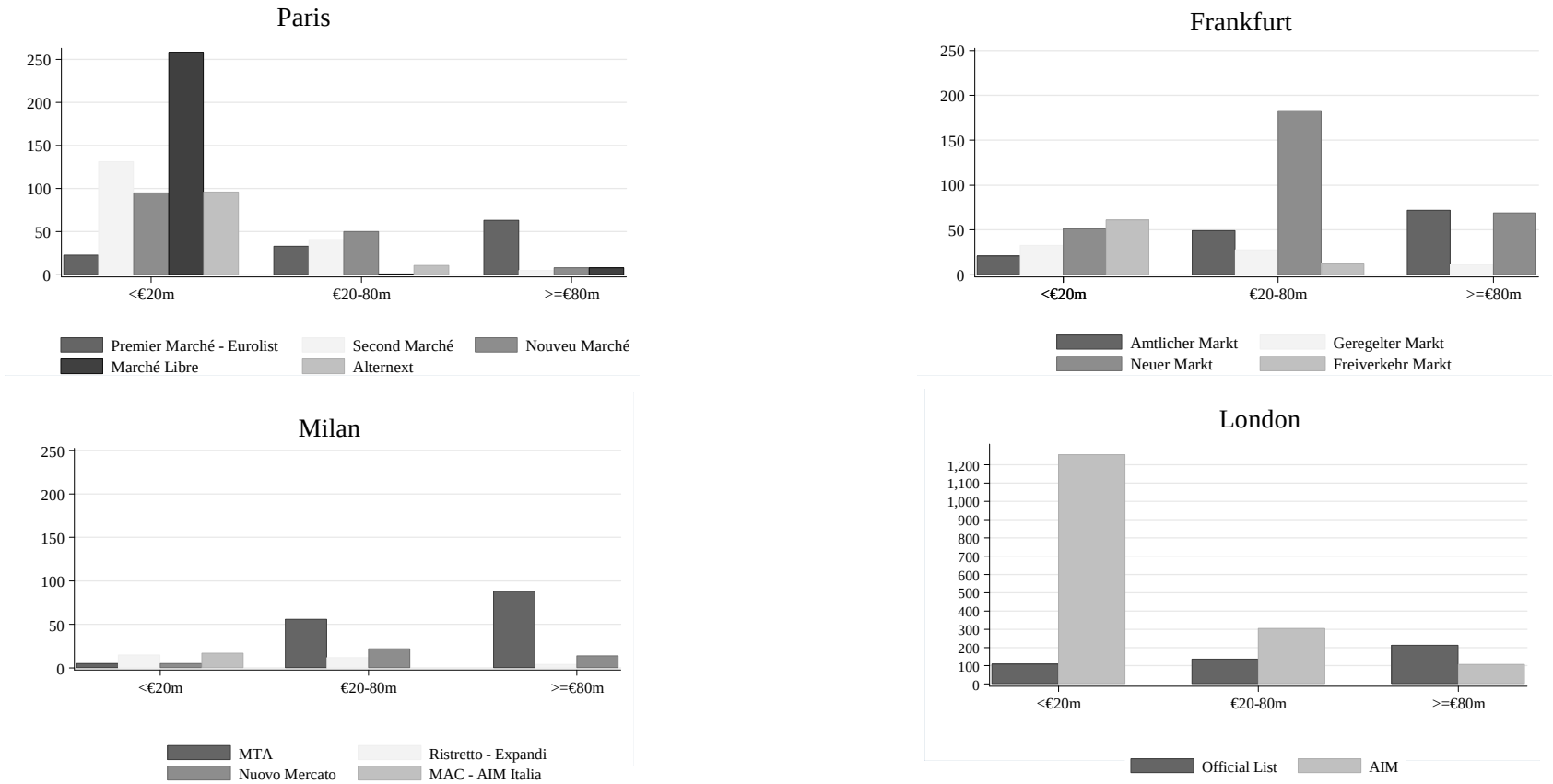
[4] The AIM is the only European market that has attracted significant international attention. In Table 2.1, we consider as domestic UK IPOs also those headquartered in tax-haven British Territories (e.g. Bermuda, British Virgin Islands, Guernsey, Isle of Man, Jersey, and the Cayman Islands). Considering these as 'foreign' IPOs , the percentage of domestic IPOs on the AIM would decrease to 83.4%.

Table 2.1 IPOs in Europe, by listing market

	IPOs	Domestic	Age (years)		Offer size (m€)		Secondary offer (%)		VC
Paris	*No.*	*%*	*mean*	*median*	*mean*	*median*	*mean*	*median*	*%*
Premier Marché - Eurolist	119	96.6	19.5	9.0	882.2	89.4	16.4	9.1	36.0
Second Marché	177	98.9	19.1	12.0	**17.1**	**9.0**	13.4	12.4	38.3
Nouveu Marché	153	98.0	**7.9**	**6.0**	**26.3**	**14.2**	**6.8**	3.7	38.3
Marché Libre	267	95.9	**13.0**	9.0	**38.2**	**1.0**	**8.2**	5.0	**17.3**
Alternext	107	97.2	12.9	8.0	9.0	**6.7**	**9.0**	5.8	46.2
Total	*823*	*97.2*	*14.3*	*9.0*	*149.7*	*7.1*	*10.3*	*7.7*	*32.1*
Frankfurt									
Amtlicher Markt	142	90.1	34.5	13.5	267.0	82.1	16.4	11.6	39.7
Geregelter Markt	72	88.9	**13.8**	**6.5**	**56.0**	**21.2**	9.7	6.2	29.2
Neuer Markt	303	88.4	**11.2**	**8.0**	**83.6**	**45.4**	**10.4**	6.6	48.8
Freiverkehr Markt	73	89.0	**14.0**	**6.0**	**12.3**	**7.0**	**5.1**	**0.0**	31.5
Total	*590*	*89.0*	*17.5*	*8.0*	*115.5*	*40.9*	*10.9*	*6.1*	*42.7*
Milan									
MTA	149	99.3	43.3	29.0	360.7	103.0	19.0	17.4	23.5
Ristretto - Expandi	31	100.0	26.5	16.0	33.2	**23.3**	**9.4**	**4.4**	23.8
Nuovo Mercato	41	100.0	**9.8**	**8.0**	138.0	52.1	**4.5**	**2.7**	35.9
MAC - AIM Italia	17	94.1	32.8	17.0	5.1	**5.6**	**0.6**	**0.0**	25.0
Total	*238*	*99.2*	*34.6*	*20.5*	*254.3*	*59.6*	*14.2*	*8.4*	26.0
London									
Official List	459	93.2	15.8	6.0	402.8	70.0	17.6	11.2	65.7
AIM	1,666	**88.7**	**6.2**	**2.0**	**24.6**	**7.7**	**4.3**	**0.0**	61.9
Total	*2,125*	*89.6*	*8.2*	*3.0*	*106.2*	*11.2*	*7.2*	*0.0*	*62.8*
Sample	*3,776*	*91.8*	*12.7*	*6.0*	*126.5*	*14.2*	*8.9*	*0.0*	*48.8*

The tests compare firms going public on each market versus companies going public on the main market of the corresponding stock exchange. Significant levels are based on t-statistics (mean), the Mann-Whitney U-test (rank), or a Z-test of equal proportions as required. In bold the significant values ($p < 0.01$).

Figure 2.1 Number of IPOs for different range of proceeds, by listing market at exchange-level



'Small' IPOs are deals up to 20m €, 'moderate' IPOs are deals with proceeds of 20 €m million up to 80 €m, and deals greater or equal to 80 €m are defined as 'large'.

For each country, we compare the firms going public on each market versus companies going public on the main market of the corresponding stock exchange. Companies going public are in median 6 years old at the time of IPO, with younger firms going public on second markets. The age is significantly smaller on the AIM, where companies are two years old. Predictably, older firms going public on main markets are also larger. In median, IPO proceeds (offer size) range from 1 €m in Paris Marché Libre to 104 €m in the Milan main market (MTA), adjusted for inflation (2010 purchasing power). In Figure 2.1, similarly to Chen and Ritter (2000), we categorize IPOs using different range of proceeds and define 'small' IPOs deals up to 20 €m; 'moderate' IPOs deals with proceeds of 20 €m up to 80 €m and companies with proceeds greater or equal 80€m are defined as 'large' deals. Almost all IPOs on Paris Marché Libre are small size IPOs (258 out of 267 IPOs).

Firms going public on second markets tend to offer newly issues shares, in line with the idea that companies listing on these markets need capital to fulfil growth and investment opportunities. The ratio of the shares placed by existing shareholders over the total shares offered at the IPO (secondary offer) is indeed typically lower for second than for main markets IPOs. The proportion of venture-backed companies on second markets is similar to that of companies on main markets. The only exception is Paris Marché Libre, with a sensibly lower proportion (17.3%) compared to Eurolist (36%). Of course, there are relevant country specificities. For instance, the fraction of venture-backed IPOs is higher in London (62.8%) than in Continental Europe (26% in Milan, 32% in Paris, and 43% in Frankfurt). Italian companies going public are older and larger, whereas the British ones are the youngest.

2.4 Underwriters of IPOs in Europe

Our sample of 3,776 IPOs is taken public by 261 different underwriters. Underwriters that have been acquired during the sampling period are treated as part of the new parent. The list of 261 underwriters, as well as the number of IPOs and the money raised by each of them, is reported in Appendix 2-A.1. Table 2.2 report the descriptive statistics, by listing market.[5]

[5] For a detailed description on rankings and how we deal with merge and acquisition see Appendix A.1 in Migliorati and Vismara (2012). This Appendix lists the name of the Underwriter name adjustment related

If we rely on the commonly used Carter-Manaster ranking, we find that very often companies go public in Europe without the support of a 'reputable' underwriter. This proxy of reputation is indeed calculated with reference only to US IPOs. Unfortunately, only about one third (31.5%) of our sample IPOs are associated with an underwriter present in at least one subperiod of this ranking, as updated in Jay Ritter's website. This means that using this ranking in European studies bear the risk of not considering the reputation of underwriters of most of the IPOs, besides underestimating the reputation of non-US underwriters. This limitation is particularly strong when considering second markets. For instance, only 5.9% of the IPOs on Paris Marché Libre, and 10.5% on London AIM are listed by underwriters in the Carter-Manaster ranking. If we consider that these two markets accounted for more than half of the IPOs in Europe over the last fifteen years (Vismara *et al.*, 2012), we realize that this is a major weakness in the use of Carter-Manaster ranking in Europe-based studies.

The underwriting industry in Europe is fragmented at a national level, as testified by the high proportion of IPOs underwritten by domestic banks (85.2%). Foreign banks very rarely take companies public, with the partial exception of US banks, that are involved in 9.7% of the IPOs. Predictably, main markets attract more international underwriters, with approximately 30% of the IPOs listed by US banks (from 28.6% in London Official List to 31.7% in Frankfurt Amtlicher Markt).

In order to have a better picture of the different markets within the single stock exchange, we compare the underwriters of firms going public on each market versus those of firms going public on the main market of the corresponding stock exchange. We find that underwriters of second, unregulated markets are often smaller and more specialised on in the IPOs business, compared to their counterparts on the main markets. This is particularly true for Paris Marché Libre and London AIM. These are unregulated markets where the quality of a listing company is certified by the reputational capital of the financial intermediaries that bring it to the market, rather than by the explicit rules and oversight of market authorities. On average, underwriters taking public companies

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to corporate events. The underwriters took companies public in UK, France, Germany and Italy in the period 1995-2010. Only lead and co-lead underwriters are considered. The markets are distinguished in London Official List, London AIM, Paris Euronext, Paris Marché Libre, Frankfurt, and Milan. For each of these markets, the authors report the ranking measure (standardized market shares), the number of IPOs, and the money raised. Underwriters that have been acquired during the sampling period are treated as part of the new parent (Corwin and Schultz, 2005).

on the Marché Libre are much younger than on Paris main market (19.8 vs 75.6 years old at the IPO). The specialisation in the IPO business is higher for Marché Libre underwriters. In median, the ratio between the value of the IPO business over the total amount of all deals made (equity, loan, bond and M&A) is 82.5% for underwriters of Marché Libre IPOs, whereas it is only 3.7% on Paris main market. Also, only 9.4% of Marché Libre IPOs are taken public by a commercial bank. This proportion is much larger in all the other markets in Paris (80% on the main market). Similarly, London AIM underwriters (NomAds) are smaller and younger than underwriters of Official List IPOs. The proportion of commercial banks is also much smaller on the AIM (9.8%) than on the main market (49%), whereas the specialisation in the IPO business is higher for the formers.

Basing on these peculiarities, we study the reputation of underwriters distinguishing between countries, and differentiating London AIM and Paris Marché Libre. The peculiar characteristics of these two unregulated second-tier markets put indeed a great deal of responsibility on the underwriters. While the admission documents of companies listing on the main markets of the regulated second markets (such as the new markets, or the Paris Second Marché) are checked by the respective national market regulatory authorities, these checks are delegated to the underwriters on AIM and Marché Libre. Coherently, their specialisation in the IPO industry is high. The characteristics of the underwriters on other second markets are instead not clearly differentiated, as testified in Table 2.2 by tests on the difference in means and medians comparing each market with the main market of the corresponding stock exchange.[6]

[6] We test the difference on mean considering moderate size IPOs (deals with proceeds of €20 million up to €80 million (Chen and Ritter, 2000). For exchange regulated markets we use small IPOs up to €40 million. For Italy, we consider all sample excluding IPOs underwritten by at least one foreign underwriter. Significant levels are based on Tukey's HSD-test (mean) or a z-test of equal proportions and Wilcoxon signed-rank test for the difference in medians as required. Tukey's HSD ("Honestly Significant Difference") test is based on the distribution of q, the studentized range, and the best for all-possible pair-wise comparisons when sample sizes are unequal or confidence intervals are needed.

Table 2.2 Underwriters of IPOs in Europe, by listing market

	Number of different underwriters	Carter-Manaster ranking (%)	Domestic (%)	US (%)	Commercial (%)	Co-lead (No.)	Subsidiaries (No.)	Age (years)	IPO Specialization mean (%)	IPO Specialization median (%)
Paris										
Premier Marché - Eurolist	43	67.0	80.0	31.3	80.0	1.8	1,405.2	75.6	5.7	3.7
Second Marché	31	**39.5**	87.6	**1.7**	88.7	1.1	1,128.8	63.6	7.2	1.6
Nouveu Marché	28	**47.1**	85.6	**8.5**	61.4	1.1	1,300.9	72.5	11.3	2.7
Marché Libre	47	**5.9**	94.5	**1.2**	**9.4**	1.0	810.0	**19.8**	**62.6**	**82.5**
Alternext	32	**12.4**	86.7	**0.0**	41.0	1.0	573.2	45.7	16.3	13.7
Total	*90*	*30.7*	*88.2*	*6.8*	*51.0*	*1.2*	*1,118.4*	*50.6*	*28.8*	*13.7*
Frankfurt										
Amtlicher Markt	32	74.8	74.1	31.7	85.6	1.5	1,331.8	106.9	5.5	2.7
Geregelter Markt	31	38.2	73.5	**13.2**	**66.2**	1.1	732.8	59.0	9.4	1.3
Neuer Markt	33	49.3	74.7	**9.2**	88.8	1.1	854.0	69.2	4.1	**0.7**
Freiverkehr Markt	20	**4.2**	90.3	**2.8**	**29.2**	1.0	58.0	**24.0**	19.4	17.3
Total	*56*	*48.5*	*76.3*	*14.2*	*78.0*	*1.2*	*847.7*	*73.0*	*6.9*	*1.3*
Milan										
MTA	35	87.2	94.6	31.5	91.9	1.8	1,380.4	64.9	5.4	3.3
Ristretto - Expandi	14	**25.0**	96.9	**0.0**	**62.5**	1.3	**239.4**	48.9	14.4	**10.5**
Nuovo Mercato	27	85.4	97.6	22.0	82.9	1.7	1,014.6	64.7	7.0	4.8
MAC - AIM Italia	9	**13.3**	100.0	**0.0**	73.3	1.0	**206.9**	86.9	5.9	7.7
Total	*42*	*73.8*	*95.8*	*23.6*	*85.2*	*1.7*	*1,073.4*	*64.0*	*7.1*	*3.9*
London										
Official List	77	64.7	67.2	28.6	49.0	1.2	1,712.9	60.1	7.7	6.3
AIM London	126	**10.5**	**90.2**	**2.3**	**9.8**	**1.0**	**127.4**	**22.2**	**18.0**	**16.2**
Total	140	*22.0*	***85.3***	*7.9*	*18.1*	*1.0*	*395.8*	*28.3*	*16.1*	*14.6*
Sample	*261*	*31.5*	*39.3*	*9.7*	*39.3*	*1.1*	*620.9*	*43.0*	*16.6*	*10.5*

The tests compare firms going public on each market versus companies going public on the main market of the corresponding stock exchange. Significant levels are based on Tukey's HSD-test (mean) or a z-test of equal proportions and Wilcoxon signed-rank test for the difference in medians as required. In bold the significant values ($p < 0.01$).

In Table 2.3, we conduct an alternative analysis to test fragmentation in the IPO underwriting market after accounting for firm and offer characteristics. Within the same national exchange, we compare underwriter characteristics by listing market ('treated sample') and the rest of the sample ('matching group'). We use nearest neighbour propensity scores based on several independent characteristics considered relevant to the analysis (Dehejia and Wahba, 2002). Specifically, we implement a propensity score matching model where the predictive variables are IPO proceeds (defined as the natural logarithm of the proceeds adjusted for inflation), age (defined as the natural logarithm of 1 plus the years since incorporation to IPO), listing year and industry (based on the 1-digit Industry Classification Benchmark (ICB) standard). We impose 0.01 as the tolerance level on the maximum propensity score distance (caliper) and the common support condition to avoid bad matches (Heckman *et al.*, 1997). This means that the matching observation for a treated firm is the closest in terms of propensity score with a maximum distance of control (caliper) and lies within the propensity range to delete observations for which matching quality is the most questionable (common support). We observe significant differences in average values for underwriters taking companies public on AIM and Marché Libre. Controlling for firm and offer characteristics, there are important differences among underwriters taking companies public in Europe for the AIM and the Marché Libre.

Table 2.3 Comparison of underwriter characteristics by listing market

Paris	Second Marché		Nouveau Marché		Marché Libre		Alternext	
	Treated	Matched	Treated	Matched	Treated	Matched	Treated	Matched
Carter-Manaster (%)	39.9	29.4	42.1	39.7	**11.9**	27.4	**12.4**	28.6
Domestic (%)	87.1	90.0	88.1	83.7	**95.2**	80.0	86.4	88.3
US (%)	1.2	5.0	6.3	8.9	0.0	3.8	0.0	4.9
Commercial (%)	**89.0**	46.3	59.5	56.1	**18.1**	66.3	40.8	50.5
co-lead	1.1	1.2	1.1	1.3	1.0	1.1	1.0	1.2
No. Subsidiaries	1,232.4	1,508.5	1,147.2	1,340.0	1,848.7	2,045.4	445.8	1,515.4
Age (years)	65.8	44.3	68.5	63.0	**22.2**	52.7	47.8	56.6
IPO Specialization (%)	**7.1**	30.9	11.4	21.3	**57.4**	9.7	16.1	25.9
Frankfurt	Geregelter Markt		Neuer Markt		Freiverkehr Markt			
	Treated	Matched	Treated	Matched	Treated	Matched		
Carter-Manaster (%)	35.7	45.7	49.1	50.9	**6.5**	34.8		
Domestic (%)	74.2	85.7	74.2	74.4	89.1	81.8		
US (%)	10.6	4.3	**4.4**	14.7	4.3	4.5		
Commercial (%)	65.2	72.9	**88.7**	68.6	**41.3**	81.8		
co-lead	1.1	1.1	**1.1**	1.3	1.1	1.1		
No. Subsidiaries	797.6	666.7	862.1	977.0	103.3	567.5		
Age (years)	65.8	90.3	64.7	75.9	**17.7**	77.6		
IPO Specialization (%)	9.2	8.0	**4.3**	8.5	**17.6**	5.5		
Milan	Ristretto - Expandi		Nuovo Mercato					
	Treated	Matched	Treated	Matched				
Carter-Manaster (%)	**25.9**	66.7	83.3	50.0				
Domestic (%)	100.0	85.2	100.0	100.0				
US (%)	0.0	18.5	8.3	18.2				
Commercial (%)	66.7	92.6	75.0	90.9				
co-lead	1.3	1.5	1.5	1.7				
No. Subsidiaries	**254.5**	1,347.8	865.2	1,329.7				
Age (years)	45.0	81.4	55.2	120.3				
IPO Specialization (%)	**12.6**	4.0	5.5	6.8				
London	AIM							
	Treated	Matched						
Carter-Manaster (%)	**15.2**	46.6						
Domestic (%)	**92.7**	73.1						
US (%)	**5.0**	15.8						
Commercial (%)	**10.0**	38.5						
co-lead	1.0	1.1						
No. Subsidiaries	**379.8**	1,230.7						
Age (years)	**27.9**	46.5						
IPO Specialization (%)	**17.0**	8.3						

The tests are for difference between the treated and the matching sample. Significant levels are based on t-statistics (mean) or a Z-test of equal proportions as required. In bold the significant values ($p < 0.01$).

2.5 Rankings

The Carter-Manaster approach can be applied to European IPOs only indirectly, by relying on US tombstone announcements. This leads to biases toward international banks and neglect most of the IPOs. Two alternative approached to measure the reputation of underwriters are based on market shares measures, relying either on the number of IPOs handled (equally weighted) or on the amount of money (proceeds) underwritten (value weighted). Table 2.4 ranks the top ten underwriters in Europe (Panel A) and in the US (Panel B), comparing NYSE and Nasdaq.[7] In Europe, eight out of ten underwriters are different players depending on whether the ranking is calculated using market share equally weighted (by number of IPOs) or value weighted (by proceeds). Only Commerzbank and JP Morgan Chase are indeed common to both pan-European rankings. Conversely, in the US, nine out of the top ten underwriters are always common to both NYSE and Nasdaq rankings, regardless of the metric approach. This means that while the US is clearly an integrated market for IPO underwriters, Europe is a different story.

Table 2.5 ranks the top ten underwriters in our sample of IPOs in Europe in the period 1995-2010.[8] There are six rankings. One for each stock exchange in London, Paris, Frankfurt, Milan, and differentiating London AIM and Paris Marché Libre.

Within the same national exchange, only one (Oddo & Cie) of the top ten underwriters in Paris (excluding Marché Libre) ranked using the equally weighted ranking (by number of IPOs) possess at least one of the top highest average equally weighted rankings on the Marché Libre. This striking gap narrows when we consider the value weighted approach: five out of the top ten underwriters are common to both

[7] When more than one underwriter underwrites an issue, the proceeds (and number of IPOs) are equally splitted among all lead banks, as in Aggrawal *et al.* 2002 and Abrahamson *et al.* 2011. With Europe we refer to the sample of 3,776 IPO in Paris, Frankfurt, Milan and London in the period 1995-2010, used throughout the paper. The US sample consists of 4,438 IPOs listed on NYSE or Nasdaq in the same period, from SDC Platinum. Eleven IPOs are excluded due missing underwriter name. Lehman Brothers was taken over by Nomura in 2008; Montgomery Securities and Robertson Stephens, and FleetBoston have all been acquired Bank of America; Donaldson, Lufkin & Jenrette by Credit Suisse; Schroders (investment banking division) by Citigroup. Merrill Lynch has been acquired by Bank of America in 2008 to form Bank of America Merrill Lynch.

[8] The lead underwriter rank is based on underwriter market share over the maximum sample value. This measure of underwriter quality is market-share based and is a continuous variable on [0,1] similar to Aggrawal *et al.* (2002). When more than one lead underwriter underwrites an issue, we split the proceeds (or number of IPOs) equally among all lead banks (Aggrawal *et al.* 2002, Abrahamson *et al.* 2011).

Marché Libre and Paris (excluding Marché Libre) rankings. This means that most of the IPOs taking place on the Marché Libre hire underwriters which are different from IPOs taking place on other markets in Paris, also in terms of IPO activity. This evidence is sharper for AIM-listed firms. Only one (Evolution Securities) of the top ten underwriters on the AIM ranked using the equally weighted ranking possess at least one of the top highest average equally weighted rankings on the Official List. This number slightly increases to two (Deutsche Bank and JPMorgan Chase) when we rank underwriters using the value weighted ranking. This means that NomAds are different players in comparison to underwriters on the Official List. Beside different characteristics in the nature of underwriters, they have relevant differences in terms of IPO activity. A relevant result shown in Table 2.5 relies on a peculiarity that characterizes the Marché Libre. Indeed, on this market Europe Finance et Industrie ranks highest in terms of total number of IPOs underwritten with a overwhelming market share equals to 61.2%. Lastly, roughly looking at the raw 'pan European' ranking in Table 2.4 with our proposed ranking in Table 2.5, it is clear that the former is not able to capture country specificities as well as the segmentation of the exchanges, with implication for the reputation argument. With an equally weighted approach (Table 2.4, Panel A) big international players, well-known as highly reputed underwriters, such as BNP Paribas, Morgan Stanley or Goldman Sachs, as well as national champion as Mediobanca (in Milan), are ignored from reputational rankings. With a value weighted approach (Table 2.4, Panel B) top financial boutiques such as Europe Finance et Industrie or Evolution Securities are ignored as well.[9]

[9] Appendix 2-A.1 reports the top 10 underwriters ranked by market shared equally weighted (by number of IPOs) in Panel A and value weighted (by proceeds) in Panel B, by listing market in Paris, Frankfurt and Milan.

Table 2.4 Top ten underwriters: Europe versus United States

	Europe			NYSE			Nasdaq		
Panel A: Equally weighted									
	Name	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*
1	Europe Finance et Industrie	178	1	BoA Merrill Lynch	282	1.00	BoA Merrill Lynch	441	1.00
2	Evolution Sec	147	0.83	Morgan Stanley	163	0.58	Credit Suisse	281	0.64
3	Dowgate CS	103	0.58	Goldman Sachs	150	0.53	JPMorgan	280	0.63
4	Commerzbank	100	0.56	Citigroup	136	0.48	Morgan Stanley	261	0.59
5	Collins Stewart	97	0.55	Credit Suisse	129	0.46	Goldman Sachs	218	0.49
6	KBC Peel Hunt	88	0.49	JPMorgan	81	0.29	Deutsche Bank	194	0.44
7	Landesbanken	77	0.43	UBS	75	0.26	Nomura	141	0.32
8	Deutsche Bank	71	0.40	Nomura	59	0.21	Citigroup	117	0.27
9	JPMorgan Chase	68	0.38	Wells Fargo	44	0.16	UBS	102	0.23
10	Brewin Dolphin	65	0.36	Deutsche Bank	38	0.13	Cowen	69	0.16
Panel B: Value weighted									
	Name	*Proceeds (m€)*	*Rank*	*Name*	*Proceeds (m€)*	*Rank*	*Name*	*Proceeds (m€)*	*Rank*
1	BNP Paribas	45,508	1	BoA Merrill Lynch	79,487	1.00	BoA Merrill Lynch	27,323	1.00
2	UBS	39,889	0.88	Goldman Sachs	59,865	0.75	Morgan Stanley	24,358	0.89
3	Morgan Stanley	38,224	0.84	Citigroup	58,052	0.73	Goldman Sachs	23,724	0.87
4	Goldman Sachs	34,062	0.75	Morgan Stanley	55,980	0.70	Credit Suisse	23,325	0.85
5	BoA Merrill Lynch	31,869	0.70	Credit Suisse	31,890	0.40	JPMorgan	16,250	0.59
6	Commerzbank	23,893	0.53	UBS	22,589	0.28	Citigroup	11,516	0.42
7	AIB CM	22,800	0.50	JPMorgan	19,677	0.25	Nomura	9,524	0.35
8	Credit Suisse	22,342	0.49	Wells Fargo	18,052	0.23	Deutsche Bank	9,168	0.34
9	Citigroup	19,616	0.43	Nomura	15,459	0.19	UBS	7,068	0.26
10	JPMorgan Chase	19,442	0.43	Deutsche Bank	6,709	0.08	Friedman Billings Ramsey	4,605	0.17

Rankings are standardized market shares.

Table 2.5 Ranking underwriters of European IPOs

Paris Euronext (no Marché Libre)				Paris: Marché Libre				Frankfurt				Milan				London Official List				AIM			
Panel A: Equally weighted																							
	Name	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*		*Name*	*No. IPOs*	*Rank*		*Name*	*No. IPOs*	*Rank*		*Name*	*No. IPOs*	*Rank*		*Name*	*No. IPOs*	*Rank*	
1	Crédit Mutuel-CIC	39	1	Europe Finance et Industrie	164	1		Landesbanken	77	1		Intesa Sanpaolo	61	1		UBS	38	1		Evolution Sec	123	1	
2	BNP Paribas	39	0.99	Weghsteen & Driege	18	0.11		Commerzbank	74	0.99		Mediobanca	23	0.37		JPMorgan Chase	37	0.99		Dowgate CS	98	0.80	
3	Crédit Agricole	37	0.94	Euroland Finance	7	0.04		DZ Bank	54	0.72		Unicredit	20	0.32		Evolution Sec	25	0.65		Collins Stewart	90	0.73	
4	Oddo & Cie	37	0.94	Aurel-BGC	7	0.04		Deutsche Bank	47	0.63		Credito Emiliano	14	0.23		Investec	23	0.61		KBC Peel Hunt	83	0.67	
5	Société Générale	33	0.86	Arkeon Finance	6	0.04		Unicredit	37	0.50		BNP Paribas	10	0.16		Credit Suisse	23	0.60		Ambrian Capital	64	0.52	
6	BFBP	33	0.83	Int'l Capital Bourse	5	0.03		Sal. Oppenheim	36	0.48		Intermonte Sec	9	0.14		BoA Merrill Lynch	22	0.57		WH Ireland	62	0.51	
7	Crédit du Nord	28	0.72	Invest Sec	4	0.02		Gontard & Metallbank	23	0.31		Unipol Gr Finanz.	8	0.13		Commerzbank	19	0.51		Landsbanki Sec	62	0.50	
8	Credit Lyonnaise	27	0.70	Abn Amro	3	0.02		VEM Aktienbank	23	0.31		Citigroup	7	0.11		Morgan Stanley	19	0.51		Grant Thornton	55	0.45	
9	KBC	22	0.56	Oddo & Cie	3	0.02		Concord Effekten	19	0.25		BoA Merrill Lynch	7	0.11		Goldman Sachs	19	0.51		Brewin Dolphin	53	0.43	
10	Natixis	19	0.47	Meeschaert	3	0.02		HSBC	16	0.21		GE Capital	6	0.10		Citigroup	15	0.39		Numis Sec	48	0.39	
Panel B: Value weighted																							
	Name	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*		*Name*	*Proceeds (b€)*	*Rank*		*Name*	*Proceeds (b€)*	*Rank*		*Name*	*Proceeds (b€)*	*Rank*		*Name*	*Proceeds (b€)*	*Rank*	
1	BNP Paribas	44.0	1	Goldman Sachs	2.67	1		Deutsche Bank	12.84	1		Mediobanca	15.51	1		UBS	28.37	1		Collins Stewart	5.80	1	
2	Crédit Agricole	11.1	0.25	Credit Suisse	2.42	0.90		Commerzbank	11.32	0.88		BoA Merrill Lynch	11.07	0.71		Morgan Stanley	24.99	0.88		Evolution Sec	2.64	0.46	
3	Société Générale	8.4	0.19	Société Générale	1.96	0.73		UBS	6.56	0.51		Intesa Sanpaolo	9.99	0.64		AIB CM	22.80	0.80		Numis Sec	2.34	0.40	
4	Lazard	7.0	0.16	UBS	1.75	0.66		Goldman Sachs	6.52	0.51		Unicredit	3.55	0.23		Goldman Sachs	17.97	0.63		KBC Peel Hunt	2.11	0.36	
5	Morgan Stanley	6.4	0.14	Europe Finance et Industrie	0.76	0.28		Morgan Stanley	4.85	0.38		Credit Suisse	3.28	0.21		BoA Merrill Lynch	17.23	0.61		Deutsche Bank	1.67	0.29	
6	Abn Amro	4.4	0.10	Abn Amro	0.28	0.11		Landesbanken	3.95	0.31		Goldman Sachs	3.07	0.20		Citigroup	15.07	0.53		JPMorgan Chase	1.53	0.26	
7	Goldman Sachs	3.8	0.09	Credit Lyonnaise	0.18	0.07		Unicredit	2.86	0.22		UBS	1.87	0.12		Credit Suisse	12.64	0.45		Smith & Williamson	1.26	0.21	
8	HSBC	3.2	0.07	Weghsteen & Driege	0.03	0.01		DZ Bank	2.32	0.18		Morgan Stanley	1.65	0.11		JPMorgan Chase	12.26	0.43		Grant Thornton	1.20	0.21	
9	Commerzbank	3.0	0.07	BNP Paribas	0.03	0.01		Sal. Oppenheim	2.22	0.17		JPMorgan Chase	1.61	0.10		Commerzbank	9.17	0.32		Cenkos Sec	1.18	0.20	
10	Credit Lyonnaise	2.5	0.06	Euroland Finance	0.01	0.00		JPMorgan Chase	2.17	0.17		Citigroup	1.54	0.10		Deutsche Bank	3.04	0.11		Dowgate CS	1.11	0.19	

In Table 2.6, we conduct an alternative analysis to further examine the fragmentation in the IPO underwriting market and our proposed equally weighted 'pan European' ranking. Within the same national exchange, we first develop an equally weighted ranking based on the number of IPOs underwritten by listing market. Then, for each underwriter we assume a market share equals to zero when the bank is missed for the market of interest, at an exchange-level. Finally, we estimate correlation coefficients for the 'segmented ranking' above described to examine which are the market strongly distant from (or closed to) other markets within the same stock exchange. We conduct this analysis for Europe (Panel A) and for the US (Panel B).[10] The results show that there is a high significant correlation among markets within each stock exchange in Europe, with the exception of Marché Libre in Paris (none of the ranking is correlated with at least one ranking of other markets) and the AIM in London (only significant at 10% but with a very low value, 0.170). As expected, for the US the story is different. NYSE and Nasdaq rankings result strongly and significantly correlated each others. This gives further support to our proposed fragmentation for the IPO underwriting market in Europe and support the well-accepted argument that US is clearly one integrated market (Abrahamson *et al.*, 2011).

[10] The sample of IPOs is made of 3,776 IPO in Europe (Paris, Frankfurt, Milan and London) in the period 1995-2010, used throughout the paper and 4,438 IPOs In US (NYSE or Nasdaq) in the same period, from SDC Platinum.

Table 2.6 Ranking correlation coefficients, by listing market

Paris		Premier Marché	(2)	(3)	(4)	(5)
(2)	Second Marché	0.316**	1			
(3)	Nouveau Marché	0.407***	0.484***	1		
(4)	Marché Libre	0.037	0.028	0.134	1	
(5)	Alternext	0.223**	0.188*	0.303**	0.119	1
Frankfurt		Amtlicher Markt	(2)	(3)	(4)	
(2)	Geregelter Markt	0.411**	1			
(3)	Neuer Markt	0.628***	0.794***	1		
(4)	Freiverkehr Markt	0.009	0.362**	0.168	1	
Milan		MTA	(2)	(3)	(4)	
(2)	Ristretto - Expandi	0.305**	1			
(3)	Nuovo Mercato	0.900***	0.349**	1		
(4)	MAC - AIM Italia	0.129	0.369**	0.203	1	
London		Official List				
	AIM	0.170*				
US		NYSE				
	Nasdaq	0.929***				

Significance level at 1% (***), 5% (**) and 10% (*).

2.6 Underwriter rankings and underpricing

The uncertainty in valuing IPOs places a great responsibility on investment bankers, which have an incentive to avoid IPO misvaluations and to build a reputation in valuing IPOs. If the firm is undervalued, its existing shareholders do not appreciate giving up part of the offer value ('money left on the table'); if the firm is overvalued, the risk is that of compromising the success of the offer and of displeasing the investors that will be cautious in subscribing to future IPOs underwritten by the same investment banks. These reputation incentives apply as far as underwriters deal repeatedly in the IPO market (i.e. act as 'repeated players'). The effects of these reputation-based incentives may instead be imperfect in markets where the number of firms going public is small. Moreover, the effectiveness of a reputational measure is much more imperfect in presence of country specificities as well as the segmentation of the exchanges.

In Table 2.7 we estimate regressions that examine underwriter reputation and IPO underpricing.[11] The underwriter certification/screening hypothesis predicts that

[11] As a robustness check we estimate regressions of Table 2.7 including year dummies instead of internet bubble dummy to control for any systematic effects on IPO underpricing over that year. We find that by using year dummies, our fragmented equally weighted ranking is still economically and statistically more significant (at 1% level) than the raw pan-European ranking (at 10% level).

issuers affiliated with more reputable underwriters are likely to reduce the underpricing (Carter and Manaster, 1990). The dependent variable is the underpricing, defined as the percentage difference between first day official price and offer price. We regress individually the underpricing on different underwriter reputation measures. Model 1 and 2 include our proposed 'pan-European' rankings equally and value weighted respectively. This rank is based on the stock exchanges in UK, France, Germany and Italy, differentiating London AIM and Paris Marché Libre. Model 3 and 4 include raw 'pan-European' rankings equally and value weighted. This rank is based on a pan-European basis ignoring country specificities as well as the segmentation of the exchanges. Lastly, model 5 includes Carter-Manaster (CM) ranking. As from Jay Ritter's website, CM ranking is provided for six sub-periods from 1980 to 2009. We first associate each underwriter with its Carter-Manaster value at the IPO year, if any. Then, for each IPO we take the maximum value of all CM rankings associated to its co-lead underwriters who brought that company public.

Most of the control variables have the significant expected influence on IPO underpricing. Across all model specifications that include a different underwriter reputation measure, IPO underpricing is rising with favourable market conditions, proxied by the market index return for the 15 trading days preceding the issue date and by the internet bubble dummy, and with the ratio of the shares placed by existing shareholders (although not significant). It is decreasing in the offering size and age of the issuer. These results are consistent with prior studies (Carter *et al.*, 1998). Times, industry e country dummies are also included to control for fixed effects in all model specifications.

Table 2.7 Underwriter reputation and the underpricing of IPOs

	Fragmented ranking						Integrated ranking						Carter-Manaster ranking		
	(1) Equally weighted			(2) Value weighted			(3) Equally weighted			(4) Value weighted			(5)		
	Coeff.	Beta	t-stat	Coeff.	Beta	t-stat	Coeff.	Beta	t-stat	Coeff.	Beta	t-stat	Coeff.	Beta	t-stat
Underwriter Ranking	-0.21***	-0.043	(-3.32)	0.22	0.021	(0.63)	-1.38*	-0.026	(-1.76)	-0.10	0.004	(-0.10)	0.01	-0.001	(0.03)
US Underwriter	0.05	0.022	(1.02)	0.04	0.020	(0.93)	0.04	0.022	(1.00)	0.05	0.023	(0.88)	0.04	0.022	(0.83)
Ln (Proceeds)	-0.03***	-0.105	(-5.54)	-0.03***	-0.099	(-5.48)	-0.03***	-0.096	(-5.15)	-0.03***	-0.093	(-5.01)	-0.03***	-0.094	(-5.28)
VC-backed	-0.01	-0.007	(-0.43)	-0.01	-0.004	(-0.29)	-0.01	-0.005	(-0.33)	-0.01	-0.004	(-0.28)	-0.01	-0.004	(-0.29)
Ln (1 + Age)	-0.04***	-0.091	(-6.08)	-0.04***	-0.093	(-6.13)	-0.04***	-0.093	(-6.12)	-0.04***	-0.093	(-6.10)	-0.04***	-0.093	(-6.09)
Secondary offer	0.06	0.018	(1.40)	0.05	0.017	(1.30)	0.05	0.017	(1.34)	0.05	0.017	(1.29)	0.05	0.017	(1.32)
Market index	1.37***	0.078	(5.31)	1.41***	0.080	(5.40)	1.39***	0.078	(5.36)	1.40***	0.079	(5.39)	1.40***	0.079	(5.40)
Internet bubble	0.20***	0.144	(7.49)	0.19***	0.139	(7.14)	0.20***	0.142	(7.34)	0.19***	0.139	(7.19)	0.19***	0.139	(7.09)
Industry dummies		Yes			Yes			Yes		Yes		Yes	Yes	Yes	
Country dummies		Yes			Yes			Yes		Yes		Yes	Yes	Yes	
Constant	0.79***		(7.69)	0.74***		(7.67)	0.75***		(7.26)	0.72***		(7.51)	0.73***		(7.58)
Adjusted R^2		5.48			5.37			5.40			5.33			5.33	

The dependent variable is the underpricing, defined as the percentage difference between first day official price and offer price. T-statistics are reported in parenthesis. In the column labelled “Beta”, economic significance of the coefficients is reported. Significance level at 1% (***), 5% (**) and 10% (*).

Of primary interest is that our fragmented equally weighted ranking is statistically significant at 1%, while the raw pan-European ranking is only significant at 10%. Moreover, all the other reputation measures are insignificant. As expected, CM ranking excludes from the sample more than half of the observations (68.9%). In Table 2.7, we also report the relative importance of each variable by calculating the economic significance of each estimated coefficient (Bris *et al.*, 2007). For each statistically significant coefficient, the economic significance is reported in brackets next to its t-statistics. Interesting, the underwriter reputation measure is relatively more important in model 1 than in model 3. One-standard deviation increase in our fragmented ranking causes underpricing to decrease by 0.043 (while its average is 0.17), while one-standard deviation increase in the raw pan-European ranking causes underpricing to decrease by only 0.026.

2.7 Conclusions

While the US market is clearly an integrated one, Europe is a different story. Mostly all of the top ten investment banks underwriting IPOs in U.S. are common to both NYSE and Nasdaq. In Europe, different underwriters take companies public in different markets. This paper documents the fragmentation of the IPO underwriting market in Europe. We examine the characteristics of investment banks (e.g. age, IPO relevance) that took public 3,776 IPOs in Paris, Frankfurt, Milan and London between 1995 and 2010.

We first document that the underwriting market of IPOs in Europe is a series of domestic markets. On average, the home bias prevails in 86.9% cases, with a very low presence of US banks (a mean of 6.9%). We also find that the proportion of IPOs with at least one underwriter associated with Carter-Manaster (CM) ranking is low (a mean of 31.5%). While a direct application of the CM system is simply not possible in Europe (where there is not such thing like a 'tombstone announcement'), an indirect application of this ranking lead to overweight international offering mainly placed on main markets. Within the same national exchange, our findings indicate significant differences in underwriter characteristics for underwriters taking companies public on the Marché Libre (in Paris) and AIM-listed companies (in London). Building on this fragmentation, we propose and develop a 'pan-European' ranking based on the stock exchanges in UK,

France, Germany and Italy, differentiating London AIM and Paris Marché Libre. Underwriters on the Marché Libre are younger investment banks with high value of importance of the IPO business over the total of their equity revenues (IPO relevance) and also over the total of their deals made - equity, loan, bond and M&A (IPO specialization). Moreover, Europe Finance et Industrie ranks highest using our ranking measure with an overwhelming market share equals to 61.2%. The different nature of underwriters on the AIM is related to different regulation on this 'unregulated market'. Here, companies are taken public by the so called 'Nominated Advisors' (NomAds), with no vetting by the listing authority. NomAds oversee the due diligence process, are actively involved in the preparation of the prospectus, ensure timely disclosure of all price sensitive material and have a role in the aftermarket. We find that NomAds, compared to underwriters of Official List-firms, are younger, smaller, specialized financial boutiques. Names as Ambrian Capital and WH Ireland rank highest on the AIM but are ignored by rankings on the Official List or based on a raw pan-European basis that ignore fragmentation in the IPO underwriting market.

In multivariate models of IPO underpricing that control for firm- and offering-characteristics other than time, industry and country fixed effects, we document significant explanatory power of our proposed fragmented ranking compared to other reputation measures. What we do show is that beside heterogeneity in the IPO sample, there are important differences in underwriter characteristics in Europe, differently from the US. Underwriter reputation measures included in cross-markets studies should account (at least) for country specificities as well as the segmentation of the exchanges in Paris (i.e. Marché Libre) and in London (i.e. AIM). Our paper thus adds significant new insights into the IPO underwriting market and finance literature on the reputation of underwriter in Europe, compared to the US case.

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2-A.1 *Ranking by listing market*

Underwriter rankings in Paris, by listing market

	Premier Marché - Eurolist			Second Marché			Nouveu Marché			Marché Libre			Alternext		
Panel A: Equally weighted															
	Name	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*
1	BNP Paribas	12	1.00	BFBP	33	1.00	Oddo & Cie	24	1.00	Europe Finance et Industrie	164	1	Invest Sec	11	1.00
2	Société Générale	9	0.79	Crédit Mutuel-CIC	24	0.72	Credit Lyonnaise	14	0.60	Weghsteen & Driege	18	0.11	Crédit du Nord	10	0.91
3	KBC	8	0.70	Crédit Agricole	19	0.58	BNP Paribas	12	0.51	Euroland Finance	7	0.04	Société Générale	7	0.64
4	Abn Amro	7	0.57	BNP Paribas	13	0.38	Crédit Agricole	11	0.45	Aurel-BGC	7	0.04	Portzamparc Société de Bourse	7	0.64
5	Goldman Sachs	6	0.54	Credit Lyonnaise	13	0.38	Crédit du Nord	11	0.45	Arkeon Finance	6	0.04	Arkeon Finance	6	0.55
6	Crédit Agricole	6	0.52	WestLB	10	0.31	Crédit Mutuel-CIC	10	0.40	Int'l Capital Bourse	5	0.03	WestLB	6	0.50
7	Natixis	6	0.50	Société Générale	9	0.28	Société Générale	8	0.34	Invest Sec	4	0.02	Avenir Finance Corporate	6	0.50
8	Invest Sec	5	0.37	KBC	9	0.28	ING Bank	7	0.30	Abn Amro	3	0.02	Euroland Finance	6	0.50
9	Lazard	5	0.37	Crédit du Nord	8	0.23	Europe Finance et Industrie	6	0.26	Oddo & Cie	3	0.02	Natixis	5	0.45
10	JPMorgan Chase	4	0.34	Oddo & Cie	6	0.18	Natixis	6	0.26	Meeschaert	3	0.02	Oddo & Cie	5	0.45
Panel B: Value weighted															
	Name	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*
1	BNP Paribas	43.20	1.00	Société Générale	0.49	1.00	Société Générale	0.69	1.00	Goldman Sachs	2.67	1	Crédit du Nord	0.12	1.00
2	Crédit Agricole	10.54	0.24	BNP Paribas	0.42	0.86	Credit Lyonnaise	0.53	0.77	Credit Suisse	2.42	0.90	Natixis	0.12	0.97
3	Société Générale	7.20	0.17	Credit Lyonnaise	0.40	0.82	BNP Paribas	0.37	0.54	Société Générale	1.96	0.73	Invest Sec	0.08	0.67
4	Lazard	7.00	0.16	Crédit Agricole	0.33	0.69	Oddo & Cie	0.36	0.52	UBS	1.75	0.66	Crédit Mutuel-CIC	0.07	0.54
5	Morgan Stanley	6.35	0.15	Crédit Mutuel-CIC	0.28	0.57	Credit Suisse	0.31	0.45	Europe Finance et Industrie	0.76	0.28	Société Générale	0.06	0.48
6	Abn Amro	4.20	0.10	BFBP	0.22	0.45	Crédit Agricole	0.17	0.25	Abn Amro	0.28	0.11	Portzamparc Société de Bourse	0.06	0.48
7	Goldman Sachs	3.82	0.09	HSBC	0.13	0.26	Abn Amro	0.17	0.25	Credit Lyonnaise	0.18	0.07	Oddo & Cie	0.06	0.46
8	Commerzbank	3.04	0.07	Natixis	0.08	0.16	Crédit Mutuel-CIC	0.16	0.23	Weghsteen & Driege	0.03	0.01	Banque Degroof	0.04	0.34
9	HSBC	3.01	0.07	KBC	0.08	0.15	Europe Finance et Industrie	0.14	0.20	BNP Paribas	0.03	0.01	Kepler CM	0.04	0.33
10	Caixa	1.99	0.05	Oddo & Cie	0.06	0.12	Crédit du Nord	0.13	0.19	Euroland Finance	0.01	0.00	WestLB	0.04	0.31

2-A.1 *Ranking by listing market*—Continued

Underwriter rankings in Frankfurt, by listing market

	Amtlicher Market			Geregelter Market			Neuer Market			Freiverkehr Market		
Panel A: Equally weighted												
	Name	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*
1	Deutsche Bank	26	1.00	Landesbanken	7	1.00	Landesbanken	49	1.00	VEM Aktienbank	16	1.00
2	Commerzbank	22	0.86	Commerzbank	6	0.86	Commerzbank	46	0.94	Landesbanken	11	0.69
3	Landesbanken	8	0.31	DZ Bank	6	0.86	DZ Bank	44	0.90	Equinet	10	0.59
4	Morgan Stanley	8	0.30	Sal. Oppenheim	5	0.71	Unicredit	27	0.55	F.I.B.	9	0.53
5	Unicredit	7	0.28	Gontard & Metallbank	5	0.71	Sal. Oppenheim	23	0.47	Baader Wertpapierhandelsbank	6	0.38
6	UBS	7	0.28	VEM Aktienbank	4	0.57	Deutsche Bank	21	0.42	Concord Effekten	6	0.34
7	Sal. Oppenheim	7	0.26	Concord Effekten	4	0.57	Gontard & Metallbank	12	0.25	biw Bank	3	0.19
8	JPMorgan Chase	6	0.25	Unicredit	3	0.43	HSBC	10	0.19	DZ Bank	2	0.13
9	Gontard & Metallbank	6	0.23	HSBC	3	0.43	M.M. Warburg & Co. KGaA	7	0.14	CCB Community Bank	2	0.13
10	Goldman Sachs	5	0.20	Lazard	3	0.36	Concord Effekten	7	0.14	HSBC	1	0.06
Panel B: Value weighted												
	Name	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*
1	Deutsche Bank	10.14	1.00	Commerzbank	0.96	1.00	Commerzbank	5.71	1.00	Landesbanken	0.22	1.00
2	UBS	6.13	0.60	Morgan Stanley	0.34	0.35	Landesbanken	2.78	0.49	Equinet	0.14	0.65
3	Commerzbank	4.65	0.46	DZ Bank	0.33	0.34	Goldman Sachs	2.76	0.48	VEM Aktienbank	0.11	0.50
4	Goldman Sachs	3.69	0.36	JPMorgan Chase	0.26	0.27	Deutsche Bank	2.49	0.44	HSBC	0.08	0.34
5	Morgan Stanley	2.91	0.29	Sal. Oppenheim	0.24	0.25	DZ Bank	1.85	0.32	biw Bank	0.05	0.22
6	JPMorgan Chase	1.73	0.17	Unicredit	0.24	0.25	Unicredit	1.63	0.28	F.I.B.	0.04	0.19
7	Credit Suisse	1.44	0.14	Citigroup	0.22	0.23	Morgan Stanley	1.60	0.28	Concord Effekten	0.04	0.17
8	Citigroup	1.26	0.12	Deutsche Bank	0.22	0.22	Sal. Oppenheim	1.18	0.21	Crédit Agricole	0.04	0.16
9	BoA Merrill Lynch	1.08	0.11	VEM Aktienbank	0.19	0.20	BNP Paribas	0.63	0.11	DZ Bank	0.03	0.15
10	Unicredit	1.00	0.10	Landesbanken	0.16	0.16	HSBC	0.61	0.11	Baader Wertpapierhandelsbank	0.03	0.15

2-A.1 *Ranking by listing market*—Continued

Underwriter rankings in Milan, by listing market

	MTA			Ristretto - Expandi			Nuovo Mercato			MAC - AIM Italia		
Panel A: Equally weighted												
	Name	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*	*Name*	*No. IPOs*	*Rank*
1	Intesa Sanpaolo	44	1.00	Credito Emiliano	7	1.00	Intesa Sanpaolo	13	1.00	Unipol Gruppo Finanziario	5	1.00
2	Unicredit	16	0.37	Mediobanca	4	0.50	Mediobanca	3	0.23	MPS	2	0.40
3	Mediobanca	16	0.37	Intermonte Sec	4	0.50	JPMorgan Chase	2	0.17	Intermonte Sec	2	0.40
4	BNP Paribas	9	0.21	Banca Leonardo	4	0.50	Unicredit	2	0.15	Intesa Sanpaolo	2	0.40
5	BoA Merrill Lynch	7	0.15	Unipol Gruppo Finanziario	3	0.43	Banca Leonardo	2	0.13	GE Capital	2	0.40
6	Citigroup	6	0.14	Intesa Sanpaolo	3	0.36	Abn Amro	2	0.11	EnVent S.R.L.	1	0.20
7	Credito Emiliano	6	0.13	GE Capital	2	0.29	Credito Emiliano	2	0.11	Banca Akros	1	0.20
8	UBS	5	0.12	Unicredit	2	0.21	Banco Popolare	2	0.11	BpER	1	0.20
9	Deutsche Bank	4	0.09	Banca Akros	2	0.21	Intermonte Sec	1	0.10	UBI - Banca	1	0.20
10	Goldman Sachs	3	0.08	UBI - Banca	1	0.14	ING Bank	1	0.09			
Panel B: Value weighted												
	Name	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (b€)*	*Rank*	*Name*	*Proceeds (m€)*	*Rank*
1	Mediobanca	15.05	1.00	Credito Emiliano	0.25	1.00	Unicredit	1.27	1.00	Unipol Gruppo Finanziario	31.19	1.00
2	BoA Merrill Lynch	11.07	0.74	Mediobanca	0.22	0.87	Intermonte Sec	1.14	0.90	MPS	17.67	0.57
3	Intesa Sanpaolo	8.86	0.59	Intermonte Sec	0.13	0.52	Intesa Sanpaolo	1.02	0.80	Intermonte Sec	13.41	0.43
4	Credit Suisse	3.22	0.21	Intesa Sanpaolo	0.10	0.41	Banca Leonardo	0.35	0.27	EnVent S.R.L.	9.86	0.32
5	Goldman Sachs	2.97	0.20	Unipol Gruppo Finanziario	0.10	0.39	Mediobanca	0.24	0.19	Banca Akros	7.76	0.25
6	Unicredit	2.20	0.15	Unicredit	0.07	0.28	Abn Amro	0.24	0.19	Intesa Sanpaolo	6.06	0.19
7	UBS	1.87	0.12	Banca Leonardo	0.04	0.17	JPMorgan Chase	0.21	0.17	GE Capital	0.40	0.01
8	Morgan Stanley	1.65	0.11	Banca Akros	0.03	0.13	ING Bank	1.38	0.12	BpER	0.09	0.00
9	Citigroup	1.47	0.10	Banca Finnat Euramerica	0.02	0.07	Cowen & Co.	0.11	0.09	UBI - Banca	0.06	0.00
10	JPMorgan Chase	1.40	0.09	BpER	0.02	0.07	HSBC	0.11	0.09			

CHAPTER 3

THE RISE OF UK SEOs FEES DURING THE FINANCIAL CRISIS: THE ROLE OF INSTITUTIONAL SHAREHOLDERS AND UNDERWRITERS

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"Even if 'smart money' has all the information,
the interests of market participants often conflict."

(Paul Woolley)

3 The rise of UK SEO fees during the financial crisis: The role of institutional shareholders and underwriters

Abstract

This paper investigates the marked increase in underwriting fees for UK seasoned equity offerings (SEOs) since the onset of the financial crisis 2007/2008. We develop and test a number of hypotheses related to the role of institutional shareholders and underwriters. We find that a substantial part of the rise in fees relates to the increased bargaining power of underwriters and to the growing influence of institutional shareholders with short-term investment horizons. This evidence suggests the existence of conflicts of interest due to the dual role of institutional shareholders as investors and sub-underwriters. In contrast, the ownership of large shareholders and the reputation of the underwriters act on the opposite way. Lastly, the nationality of the institutional shareholders, the degree of concentration of the investment bank industry and the experience of the issuer, do not have an impact on underwriting fees.

Keywords: *SEOs, rights issues, underwriting fees, financial crisis, institutional investor*
JEL Classification: *G*21, *G*24

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3.1 Introduction

The process of raising equity capital in UK has been the subject of considerable regulatory scrutiny and public debate during the last two decades. A series of reports (Marsh, 1994; Director General of Fair Trading 1995, 1996; Monopolies and Merger Commission, 1999) by various regulatory bodies during the period from 1994 through 1999 highlight many issues, with particular focus on the fees charged for underwriting services and the possible use of deep-discounted non-underwritten rights issues. The surge in underwriting fees throughout the financial crisis reignited the equity capital debate. At the same time, average discounts rose to nearly 40% from a historical average of 30%. Such increases reflect the apparently higher risk faced by underwriters, as market volatility reached high levels and UK companies raised huge amounts of equity to recapitalise their fragile balance sheets. However, it is unclear whether this explanation can entirely account for the steep rise in underwriting fees or if other factors were involved.

This research is of particular interest because rights offerings are still widely used in most of the world out of the US (McLean and Zhao, 2011), and the global recent financial crisis offers a special setting to study the stability of markets in all countries. Hence, SEO results in the UK equity market are at least generalizable to similar equity markets such as Australia. Focusing on fees, some evidence suggests a trend towards higher levels across Europe. For instance, the Unicredit rights issue (a top bank listed in the Milan Stock Exchange) provided its underwriters (e.g. HSBC, Société Générale, and BNP Paribas) with an opportunity to generate substantial revenue.

Recently, the Institutional Investor Council (IIC, 2010) in UK published the results of its own inquiry criticising the high level of fees charged by investment banks on companies for advising on share issues. This reports uses feedback received from submissions and meetings with issuers, investment managers, investment banks, financial advisers and lawyers, and arises several issues. For example, a lack of evidence of competitiveness, a potential decline in the sub-underwriting capacity over the past decade, and a less well-informed position of companies relative to their bank advisers. Some concerns relate also to a lack of transparency on fees actually paid, with a trend that lending banks often acted as financial underwriters with an interest in the return of the individual deal, rather than as natural long-term owners. Its main

recommendations concern the more widespread use of tendering for underwriting and sub-underwriting contracts and the greater use of independent advisors.

In 2011, the Office of Fair Trading (OFT) undertook a market study into UK equity underwriting based on a survey and /or interviews to companies, investment banks, institutional investors and independent advisers. At the same time, the OFT report includes an econometric analysis on UK rights issues from 2000 through 2010 using, among others, Dealogic and interviews to two institutional investors as main sources of data. This study finds that the market volatility cannot explain by its own the increase in underwriting fees. In particular, the OFT report indicates that there are reasonable grounds for suspecting restricted or distorted competition, but stops short of referring the case to the Competition Commission. Instead, it argues that companies and their institutional shareholders could tackle the level of fees more effectively. Furthermore, the report draws attention to the relatively weak bargaining position of issuing companies compared to investment banks, due to their lack of experience in raising equity capital and their primary focus on speed, confidentiality, and successful take-up.

Do underwriters and institutional shareholders matter in the rise of underwriting fees story? The purpose of our paper is to understand the rise in the underwriting fees during the financial crisis. Using a sample of UK rights issues and open offers over the period from 2000 through 2010, we test whether changes in the behaviour of two major financial players, institutional shareholders and underwriters, may explain the marked increase in underwriting fees.

Since the onset of the financial crisis of 2007/08, financial markets were under severe pressure. Given heightened risks facing underwriters, levels of volatility and volume of issuance, both underwriters and institutional shareholders, as they own shares in companies, may have increased their reward for the risk they were assuming. On the other side, institutional investors who are prospective sub-underwriters may also have other incentives. Based on theory, empirical findings and evidence from recent regulatory reports, we structure two set of tests.

The first set pertains to the behaviour of institutional shareholder. Namely, we document whether their potential twin role as investors and as sub-underwriters, their nationality, and their ownership may explain the phenomenon. According to the

conflicts of interest hypothesis presented here, we find evidence that during the financial crisis institutional shareholders with high turnover may increase their ownership to push for higher fees and benefit from sub-underwriting fees, ceteris paribus. Consistent with prior studies, the presence of large shareholders mitigates underwriting fees according to the information production role.

The second set of hypotheses relates to the behaviour of underwriters. Namely, we look for the effect of the degree of investment bank concentration, the reputation of the underwriter, its bargaining power, and the experience gap between the underwriter and the deal underwritten. Consistent with the bargaining power hypothesis, underwriting fees are higher for issues underwritten by investment banks in a stronger position. This effect is emphasized during the financial crisis. We also find that top underwriters charge lower fees consistent with most of the extant empirical literature. However, we find that it is insignificant during the financial crisis. A potential lack of competitiveness or the experience gap between the issuer and the underwriter, instead, does not account for explanation into the underwriting fees story.

Our paper makes several specific contributions. First, we are able to examine the renewed reliance on right offerings during the financial crisis. Second, we compare the behaviour of institutional shareholders and underwriters in the equity underwriting market before and during the financial crisis and we test whether they may explain the puzzling increase in the underwriting fees. Third, as described earlier, the financial crisis is of particular interest being a global one. It can be useful to provide similar insights to equity markets in other countries. Lastly, what we learn about rights issues during the crisis may provide similar guidelines to regulators when equity markets face higher demand for new equity capital driven by reasons other than the crisis. Therefore, unlike previous research, this paper provides evidence of changes in the behaviour of institutional shareholders and underwriters during the financial crisis, documenting new insights into the raise of underwriting fees story.

The reminder of the paper is organized into the following sections. Section 3.2 provides a background on underwriting fees. Section 3.3 discusses the theory and develops our hypotheses. Section 3.4 describes the data and reports descriptive statistics. Section 3.5 presents our empirical findings. Conclusions are drawn in Section 3.6.

3.2 Background on underwriting fees

The recent debate on the level of underwriting fees is to a certain extent hampered by the inherent complexities in the issuing process and the lack of transparency on the composition of the total costs of underwriting. When raising capital, the issuer typically seeks certainty of funds via an intermediated underwriting process and pays the underwriter(s) for the 'bundled services' provided. More specifically, underwriting fees are the payment charged on issuers by underwriters and/or investing institutions (sub-underwriters) and/or existing shareholders acting as underwriters and/or placees. Thus, investment banks are expected to cover the underwriting risk, purchasing activity, due diligence, and transaction-specific and ongoing advice.

The underwriting fees are made up of three parts. The first component, the lead underwriter's fee, relates mainly to sponsoring and advice activities. In practice, the lead underwriter is at risk between the underwriting and sub-underwriting agreement (Marsh, 1980). The second component, the company's broker fee, relates to the distribution of the issue. The third component, a fee to third parties who sub-underwrite issues, guarantees that all unwanted shares are taken up. Rights issues or open offers must remain open for at least 10 business days (or 14 calendar days, if the company has not disapplied the shareholder pre-emption rights in section 561 of Company Act 2006). During this time, the shareholders decide whether to subscribe to the new shares, do nothing, or (in the case of rights issues) sell their rights ('nil-paid' rights). If the firm requires an Annual General Meeting to raise the sought amount of capital, then the process is extended by at least 2 weeks.

Several studies have examined underwriting fees across various determinants. Eckbo *et al.* (2007) provide an excellent literature survey on much of this evidence. First, underwriting fees are associated with variables related to companies' characteristics. For example, Kim *et al.* (2010) show that fees are an increasing function of firm profitability and a decreasing function of firm leverage. Altinkilic and Hansen (2003) find that SEO withdrawals are more likely when pre-offer abnormal returns are worse. Underwriting fees rise also with a firm's total risk (see e.g. Eckbo and Masulis, 1992), and they are positively but not always significantly correlated with firm- and market- risk variables (see e.g. Hansen and Torregosa, 1992; Armitage, 2000). Second, empirical studies show that underwriting fees are associated with the specific issue

characteristics. A consistent result is that underwriting exhibit a scale economy effect with diminishing marginal returns (see e.g. Altinkilic and Hansen, 2000; Drucker and Puri, 2005). Third, underwriting fees are also associated with economic conditions. Suzuki (2010) finds that the cumulative market adjusted return on the market index negatively affect total issue costs, while market volatility acts in an opposite way. Lastly, empirical studies show that underwriting fees are associated with financial institutions' structure. For example, Kim *et al.* (2010) find that the degree of concentration in the underwriting market has no effect on fees, while top underwriters charge lower fees. Focusing on shareholders' share, as in US, Armitage (2000) finds that the level of ownership of shareholders is negatively correlated with underwriting fees, for the UK case.

3.3 Hypotheses

3.3.1 *Institutional shareholders*

The extant literature in seasoned equity offerings documents that flotation costs increase with the information asymmetry among players in the corporate setting. As modelled by Myers and Majluf (1984), firms issue new shares when the market overvalues the shares relative to the beliefs of the insiders of the firm.

Eckbo and Masulis (1992) suggest higher ownership concentration and expected insider take-up as credible signals to mediate the costs of adverse selection. Similarly, for the UK case, Armitage (2000) finds a negative relation between ownership concentration and issue costs because in this case it is easier to organise and sell an issue. Considering the type of shareholders, institutional shareholders have been attracting an increasing attention. However, only few studies investigate their role in the context of SEOs. Chemmanur and Jiao (2005) suggest that institutional shareholders have an information production role. Because of their superior information, institutional shareholders buy shares, before and after the offering, in those SEOs about which they obtained favourable information. Conversely, Gerard and Nanda (1993) develop a model of informed trading around SEOs. In this framework, informed shareholders sell shares before the offering driving down the issuer price, with the aim to buy discounted shares after the SEO. Chemmanur *et al.* (2009) find that SEOs with greater pre-offer net

buying by institutional investors have higher institutional allocations, greater oversubscription, and lower SEO discounts, in support of the information production hypothesis.

More recently, Huang and Zhang (2011) find a negative relation between the pre-issue institutional ownership and discounts, supporting the presence of institutional shareholders as a proxy for the ease of marketing new shares. In line with this idea, in their working paper Autore and Kovacs (2011) provide evidence that higher spreads are associated with larger increases in institutional shareholder base. Surprisingly, no other studies investigate the role of institutional shareholders and underwriting fees, up to our knowledge. Furthermore, previous literature fails to consider the fact that institutional shareholders can benefit from their roles as both investors in the issuing company and as sub-underwriters. As investors, they may have an incentive to push for rise capital as cheaply as possible to ensure successful share issues. As sub-underwriters, they may have an incentive to push for higher fees, since sub-underwriting fees is a component of underwriting fees.[1]

This argument on potential conflicts of interest[2] is likely to have a greater impact during the financial crisis, since there has been an increase in the demand for underwriting services. Therefore, the first basic hypothesis for institutional shareholders is:

> *Conflicts of interest hypothesis, H1: Underwriting fees are higher for issues with institutional investors with relatively short investment horizons who increase their shares in the issuing firm after the offering.*[3]
>
> *Hypothesis H1-Crisis: The conflicts of interest are stronger during the financial crisis.*

[1] According with the OFT (2011), sub-underwriting is indeed usually performed by existing institutional shareholders of the issuing company, other institutional shareholders, other investment banks, lending banks, or hedge funds. Specifically, asset owners, rather than asset managers, act as sub-underwriters. They require authorisation from their clients, whether via the investment management agreement, regulation, or otherwise, to support an issue.

[2] Banks who own equity and debt in the same issuer may benefit from superior information about the company and use proceeds to repay their own debt. This alternative conflict of interest between the shareholder and debt holder is studied by Barucci and Mattersini (2008) and Xu (2009). Bodnaruk *et al.* (2009) provide evidence on the behaviour of banks advising the bidder as insiders when trading stocks of the target on the U.S. merger and acquisition market.

[3] Responses provided by institutional shareholders (pp. 94, OFT, 2011) suggest that sub-underwriters are likely to benefit from higher sub-underwriting fees when they sub-underwrite a greater proportion of the transaction than their existing shareholdings. In line with this, we consider the increase in stake by institutional shareholders.

In the asymmetric information framework of Eckbo and Masulis (1992), non-underwritten issues create adverse selection costs. Firms with lower expected level of current shareholder participation are likely to be underwritten, which may result in higher fees paid. Consistently with this framework, Bøhren *et al.* (1997) find that the trend away from pure rights to standby rights coincides with an increase in the share ownership owned by foreign investors. A similar shift from domestic to foreign investors has also characterized the UK market. From discussions with investors and advisors (IIC, 2010), the proportion of UK equities owned by UK institutional shareholders has declined from 60% in the mid-1990s to 40%. Traditionally, sub-underwriting in UK was carried out by domestic institutional investors such as insurance companies and pension funds with long term interests in their companies who had an incentive to ensure successful share issues. The shift of institutional shareholders' ownership from UK to foreign investors in recent years could have a direct impact on underwriting fees as the latter may be unwilling or unable to underwrite due to less flexibility in rules and regulations compared to domestic shareholders.

According to the conflicts of interest hypothesis presented here, institutional shareholders with high turnover may increase their ownership to benefit from sub-underwriting fees, ceteris paribus. However, since the shift from UK to foreign investors is more likely to decline the sub-underwriting capacity, we expect the effect of domestic institutional shareholders in reducing the level of underwriting fees. Since the trend has continued in recent years, we expect this effect to be stronger during the recent financial crisis. The second hypothesis is therefore:

> *Exposure to UK equities hypothesis, H2: Underwriter fees are lower for issues with a larger proportion of shares owned by domestic institutional shareholders.*

Higher ownership is associated with less agency problems and better post-issue performance (Chemmanur *et al.*, 2009; Demiralp *et al.*, 2011). Everything else equals, we expect the ownership owned by large shareholders to be negatively related with underwriting fees, due to their superior information and familiarity with the stock. Therefore, our third hypothesis for the institutional shareholders is:

> *Large shareholders hypothesis, H3: Underwriting fees are lower for issues with higher ownership owned by large shareholder.*

3.3.2 *Underwriters*

Hiring a reputable underwriter is an alternative credible signal to certify the value of the shares and to mitigate the adverse selection costs, consistent with the information asymmetries argument (Myers and Majluf, 1984). In this paper, we posit that the behaviour of underwriters may have changed during the financial crisis due to changing economic conditions mainly driven by the excess demand for underwriter services. Many studies examine underwriting fees across various dimensions related to investment banks. Building on previous research and recent evidence, we disentangle four features of the underwriters.

First, the survey from the OFT (2011) report suggests the experience gap between underwriters and issuing firms as one concern for the increased underwriting fees. Since the financial crisis occurred in 2007, the need for capital adequacy has become more important than ever. As a result, certain banks can have strengthened their bargaining power by simply having the resources to underwrite large issues and charge fees reflecting their unique competitive position. The surge in the demand for underwriting services in 2008-2009 can have a direct impact on the level of fees in spite of the notable increase in the number of underwriters participating in the market and the potential increase in competition. In short, the likely increase in the bargaining power of investment banks in recent years provides a suitable setting for testing the relative bargaining power of these players on issuers. Therefore, the first basic hypothesis for underwriters is:

> *Bargaining power hypothesis, H4: Underwriting fees are higher for issues with underwriters in a stronger bargaining position.*
>
> *Hypothesis H4-Crisis: The bargaining power of the underwriters is stronger during the financial crisis.*

Second, several researchers test whether lack of competition by investment banks may explain clustering in fees. While in the IPOs context some concerns on potential tacit collusion among banks have been arisen (Abrahamson *et al.,* 2011); in the SEOs context there is not such empirical evidence (Kim *et al.,* 2010). However, the recent marketed increase in underwriting fees put under greater scrutiny the efficiency of the equity underwriting market. For example, the Right Issues Fees Inquiry by the Institutional

Investor Council (2010) concludes that there is "little compelling evidence of sufficient price tension at both primary and subunderwriting level". The Office of Fair Trading report (2011) by contrast finds no evidence of high concentration among investment banks, both for equity underwriting and corporate broking services, during the period 2007-2009, despite confirming a considerable clustering in fees, recently. Moreover, this report shows a notable increase in the number of underwriters participating in the market and the potential increase in competition. This leads to the following hypothesis:

> *Investment bank concentration hypothesis, H5: Underwriting fees are not significantly associated with competition among investment banks.*

Third, the reputation of underwriters is crucial for investment banks who repeatedly provide equity underwriting services. Chemmanur and Fulghieri (1994) argue that prestigious underwriters charge a fee premium for their superior certification. In contrast to this model, Lee and Masulis (2009) show that reputable underwriters have less due diligence costs, hence charge lower fees. Fernando *et al.* (2005) develop a model showing that top underwriters gain from matching with issuers that are more active in the equity market and charge lower fees to maintain their reputational assets. In support of this, Kim et al (2010) and Jeon and Ligon (2011) find a negative relation between the underwriter reputation and fees. However, the survey from the OFT report (2011) suggests that speed, confidentiality and a successful take-up are key concerns of issuing firms, more than underwriting fees. Since the financial crisis entails greater demand for underwriting services, we expect that reputation is not any more significantly related with fees after late 2007. Therefore, our hypothesis for the reputation of underwriter is:

> *Underwriter reputation hypothesis, H6: Underwriting fees are negatively associated with the reputation of underwriter.*

Lastly, companies rarely involved in raising equity capital often fail to negotiate the prices they are asked to pay for equity underwriting services. Huang and Zhang (2011) report a negative relation between frequent issuers and the discount. Lack of experience may be due to the size of the company or lack of regular use of capital markets. We predict that issuers with regular equity activity are more familiar with the process, maintain better relation with investment banks, and can be more effective in negotiating

fees with their underwriters. Since the financial crisis entails greater demand for underwriting services, we expect this effect to be less strong during the financial crisis. This leads to the following hypothesis:

> *Issuers' experience hypothesis, H7: Underwriting fees are lower for issuers with relatively recent capital-raising experience.*

3.4 Data and descriptive statistics

3.4.1 *Data*

Our primary data source for seasoned equity issues between 2000 and 2010 is the London Stock Exchange website (Statistics, 'further issues summary' file). We also use this file to obtain information on the sector, subsector, issue price, and money raised. The Perfect Information database provides scanned prospectuses and regulatory news for the issues. Prospectuses are used to double-check the definitions of the flotation methods[4] and to hand-collect data on fees. When a prospectus is not available, we drop the issue from the sample (e.g., Toronto-Dominion bank [01/11/2001] and Koninklijke KPN N.V. [12/12/2001]). Regulatory news UK documents provide data on the post-offer subscription rate.

We use DataStream as the main source of data for earnings before interest and taxes, interest expenses on debt, Industry Classification Benchmark (ICB) codes, and daily price data for the VFTSE and FTSE all-share index, with the aim to measure market volatility in alternative ways. The VFTSE reflects market expectations of the future monthly volatility of the UK benchmark equity index FTSE100, which comprises the 100 largest companies on the London Stock Exchanges and represents 80% of the UK market. We use Thomson One Banker to source the following information for shareholders, at the closest quarter before and after the announcement date: name, type, subtype, country, turnover, and ownership. The Risk Measurement Service published by

[4] From prospectuses, open offers are defined with the term 'placing with clawback' when new shares are bought by existing holders and said to be 'clawed back' from the placees; or 'placing and open offer' when shares are conditionally placed with new investors subject to existing shareholders exercising their rights to apply for new shares. Conversely, open offers (and rights issues) are combined with a placing when placees commit unconditionally to acquire the shares. Specifically, existing shareholders may renounce their entitlements in advance before the issue is publicly announced. These shares are called 'placed firms' and can be placed without subject to clawback. In other cases, rights issues or open offers can be accompanied by a private placing of shares, which will not be offered pro rata to existing shareholders and will not be part of the rights issue or open offer.

London Business School's Institute of Finance and Accounting (Dimson and Marsh, 1993-2009) provides the following information, at the closest quarter before the announcement date: beta, specific risk, annual abnormal return, and standard deviation of returns on the share. We check the definition of the flotation methods as described in Appendix 3-A.2. Detailed information on the data collected from the prospectuses on the use of proceeds and how we deal with the underwriters' names are also reported in Appendix 3-A.2.

Table 3.1 provides details for our sample selection criteria. We begin with all seasoned equity issues on the London Stock Exchange from 2000 through 2010. The sample is limited to companies listed on main market and announcements of rights issues or open offers, pure or combined with a placing. AIM-quoted companies are not included in this study because this exchange has a different regulatory regime.[5] Also excluded are pure placings, since they are not combined with a general offer to shareholders and different factors can be expected to affect their costs (Armitage, 2000). Moreover, in a pure placing, there is normally no prospectus[6] (Armitage, 2010) and this leads opaque firms to choose the placement method (Wu, 2004). Data on underwriting fees could not be found for 5 non-underwritten issues and 7 issues did not disclose this information in the prospectus. We further exclude 2 issues due to missing data on post-offer take-up. A total of 224 SEOs meet these criteria.

Table 3.1 Sample selection criteria

Criterion	Number
SEOs on LSE from 2000 through 2010, less AIM-quoted companies, transaction not as pure or combined rights issues or open offers:	
Rights issues and open offers from 2000 through 2010	238
Issues not underwritten	5
No disclosure of underwriting fees in the prospectus	7
Final sample	226
Missing take-up	2
Final reduced sample	224

[5] The Alternative Investment Market (AIM) is an exchange-regulated market (a multilateral trading facility) with its own light-touch regulations, different from regulated markets. Section 85 of the Financial Services and Markets Act (2000) and Prospectus Rule 1.2.1 require that offers of securities to be traded on a *regulated* market in the UK have to publish a prospectus.

[6] Section 86 of the Financial Services and Markets Act (2000) states that offers are exempt from publishing a prospectus if they are made only to qualified investors (i.e. banks and institutional investors) and if the additional shares are fewer than 10% of those already in issue. This means that most placings of less than 10% of the existing equity do not require a prospectus.

3.4.2 *Sample characteristics*

Table 3.2 reports sample characteristics for the full sample period and segmented by the financial crisis date. Following Aebi *et al.* (2011), we define the beginning of the crisis on July 1, 2007. This Table also shows disaggregated statistics for rights issues and open offers. For both flotation methods, we include pure issue and issue eventually combined with a placing, according to whether any shares are placed with a firm before the announcement.[7]

Several points are worth noting. First, the number of issues raising capital and the size of some of their transactions increased markedly during the financial crisis. After July 1, 2007, the average amount raised by 134 issues is closed to £1 billion, compared to around £300 million raised by 90 issues before the financial crisis. Second, rights issues are much larger in volume and much higher in number than any other type of offer, consistent with the findings of the IIC inquiry and the OFT report. Third, there is a significant increase in both types of flotation methods from 2008 through 2010. Whereas between 2000 and July 1, 2007, there are fewer than 10 rights issues (5 open offers) per year raising less than £142 million (£13m) on average per year, from 2008 through 2010, there were more than 20 rights issues (20 open offers) that raised more than £400 million on average (£200) per year. Fourth, the trend in the estimated total expenses[8] reflects an increase of 1% of the total proceeds during the financial crisis. Lastly, although the main reason for equity issues declared in the prospectus before the financial crisis was acquisition, most of the equity issues occurring after July 1, 2007 related to the need for balance sheet restructuring.[9] This illustrates the increased demand for underwriting services during the financial crisis and the renewed reliance on rights offerings and open offers. Appendix 3-A.5 reports the correlations among explanatory

[7] Market cap is defined as the market capitalisation of the issuer on the date of SEO. Proceeds is defined as the number of shares issued multiplied by offer price. Expenses is defined as the estimated expenses reflecting the total costs of the issue taken from the prospectus, expressed in £ million and as a percentage of the gross proceeds. Market capitalisation, expenses, and proceeds are adjusted for inflation. Financials is defined as a dummy variable taking the value of unity for financial issuers, based on 1-digit Industry Classification Benchmark (ICB) equals 8. Acquisition, Balance sheet, or Investment are defined as the proportion of issuers with 'acquisition', 'balance sheet repair', or 'investment program or growth opportunities', respectively, as the reason declared in the 'Use of proceeds' section of the prospectus.

[8] Under the sections of 'Summary' and 'Additional Information', the prospectus includes an estimate of the total costs and expenses of and incidental to the offering (including FSA listing fees, professional fees and expenses, costs of printing and distribution of documents, etc.) payable by the Company.

[9] The prospectus reports the reason of issue under the section 'Use of (net) proceeds', 'Background to and reason for [...]' or 'Notes about the reason or the use of the proceeds'.

variables for the pre- and financial crisis period.

Table 3.2 Sample characteristics

		Full period			Pre-crisis			Crisis		
		All	Rights issues	Open offers	All	Rights issues	Open offers	All	Rights issues	Open offers
Market cap (£B)	Mean	2.63	3.65	1.19	1.33	1.71	0.44	3.51	5.45	1.50
	Median	270.37	534.08	138.17	326.76	455.76	207.91	238.10	543.99	97.84
Proceeds (£MM)	Mean	719.36	888.37	481.31	328.76	424.65	105.01	981.71	1,317.99	635.25
	Median	120.57	217.30	50.00	123.12	164.68	55.52	109.56	260.31	49.64
Expenses ($MM)	Mean	22.48	30.03	11.83	11.53	14.17	5.36	29.83	44.73	14.48
	Median	6.06	9.24	3.13	5.04	6.48	2.88	6.46	13.55	3.20
Expenses (%)	Mean	5.79	5.11	6.76	5.10	4.75	5.93	6.26	5.44	7.11
	Median	5.00	5.00	6.00	5.00	4.00	6.00	5.00	5.00	6.00
Financials (%)		28.13	58.73	41.27	20.00	61.11	38.89	33.58	57.78	42.22
Use of proceeds										
Acquisition (%)		27.68	72.58	27.42	68.25	81.40	18.60	14.18	52.63	47.37
Balance sheet (%)		44.20	55.56	44.44	24.44	45.45	54.55	57.46	58.44	41.56
Investment (%)		27.68	72.58	27.42	36.67	66.67	33.33	35.07	42.55	57.45
No. of observations		224	131	93	90	63	27	134	68	66

3.4.3 *Descriptive characteristics*

Table 3.3 presents descriptive statistics for the various firm and offer characteristics of issues underwritten in the full sample period (2000-2010) and across two sub-periods, pre- and during the financial crisis. Following Aebi *et al.* (2011), we define the crisis period from July 1, 2007. We define Crisis a dummy taking the value of unity for issues whose announcement date is from July 1, 2007 to December 31, 2010. Variable definitions are reported in Appendix 3-A.1. The issues in the two periods are different on several dimensions. Only six of the 20 variables do not change significantly during the crisis period compared to the pre-crisis period. First, the variable distress (Distress), a dummy variable taking a value of unity for issues with interest cover ratio (EBIT over the interest expense on debt) less than one. Second, the ownership owned by domestic institutional shareholders (Ownership UK sh.). Third, the ownership owned by large

shareholders (Ownership large sh.), measured as the proportion of the issuer's shares owned by shareholders with stake of 10% or more. Fourth, top underwriters defined as a dummy variable taking a value of unity for issues with at least one of the lead underwriter(s) among the top 5 underwriters ranked by market shares based on proceeds. Fifth, the variable for the experience of the issue, defined as the natural logarithm of gross proceeds (adjusted for inflation), which is multiplied by 1 if the issue has had at least 2 issues among the sample and by zero otherwise. Lastly, Beta, defined as the sensitivity of the share to market moves.

The univariate analysis results show that the financial crisis has a significant impact across the entire landscape of the equity-issuing process. After July 1, 2007, the demand for underwriter services (Demand), defined as the natural logarithm of the sum of gross proceeds yearly based, increases significantly from 8.27 to 10.6. Average underwriting fees (Underwriting fees), defined as fees paid to the banks, broker, investing institutions, existing shareholders and/or placees and expressed as percentage of gross proceeds, are 3.2% in the pre-crisis period, compared to average underwriting fees of 3.9% in the crisis period. Similar results are found for the discount (Discount), defined as the offer price discount in relation to the market price as at the day before the announcement, that is 27.9% in the pre-crisis period, compared to 38.9% in the crisis period. This evidence on underwriting fees and discount is consistent with the recent IIC inquiry (2010) and the OFT report (2011).

After July 1, 2007, the average issuing firm is more likely to belong to the financial industry (Financials), defined as a dummy variable taking a value of unity for financial issuers with 1-digit Industry Classification Benchmark (ICB) equals 8, and to have been lower annual abnormal return (Annual abnormal return), defined as the issuer performance over the past year. On average, financial issues (Financials) and issuer performance (annual abnormal return) are 20% and 13.9 in the pre-crisis period, compared to 33.6% and -15.0 in the crisis period.

On average, market volatility (Market volatility), measured as the UK implied volatility index (VFTSE)[10] 30 days before the announcement date, increases in the crisis period, while the degree of concentration in the investment bank industry

[10] VFTSE reflects market expectations of the future monthly volatility of the UK benchmark equity index FTSE100, which comprises the 100 largest companies on London Stock Exchanges and represents 80% of the UK market.

(Concentration), measured as the Herfindahal index using the sum of squares of the market shares of underwriters in terms of proceeds, shrinks. Average market volatility (Market volatility) and the average degree of concentration (Concentration) are 16.9% and 0.16 in the pre-crisis period, compared to 28.8% and 0.10 in the crisis period. This is consistent with the OFT study that shows an increase in market volatility after 2007 and a pronounced fall during 2009 (Fig. 5.7 pp. 54 OFT, 2011), and shows evidence that the equity underwriting market is not particularly concentrated, using the value of equity issues in which a particular underwriter participated from 2000 through 2010.

The descriptive statistics show that the financial crisis entails higher demand for equity underwriting services.[11] We argue that in presence of excess demand and high utilisation of the available equity underwriting capacity, concentration may shrink.[12] This idea is consistent with the model developed by Fernando *et al.* (2005), showing that in presence of relatively active markets less-reputable underwriters will have a higher probability of matching with an issuer. This is further supported by the significant and negative correlation coefficient (-0.69) between demand and concentration variables in the financial crisis reported in the Appendix 3-A.5 (Panel B).

[11] This is further supported by the significant and positive correlation coefficient between demand and crisis variables (0.79 at 1% level, unreported).
[12] The OFT report supports this prediction, revealing a significant growth in the shares of relatively small corporate brokers (pp 47-48).

Table 3.3 Descriptive statistics

		Full period	Pre-crisis	Crisis	Test of differences
Underwriting fees (%)	Mean	3.63	3.21	3.91	-3.76***
	Median	3.75	3.01	4.00	-3.53***
Discount (%)	Mean	34.48	27.90	38.90	-3.63***
	Median	35.00	28.50	45.00	-3.64***
Open offer dummy (%)	Mean	41.52	30.00	49.25	-2.87***
	Median	0.00	0.00	0.00	-2.87***
Take-up (%)	Mean	79.41	83.70	76.52	2.08**
	Median	91.00	95.00	89.00	2.14**
Proceeds (£MM)	Mean	719.36	328.76	981.71	-2.13**
	Median	120.57	123.12	109.56	-0.62
Annual abnormal return (%)	Mean	-3.41	13.87	-15.01	3.46***
	Median	-15.00	6.50	-23.00	5.49***
Market volatility (%)	Mean	23.98	16.89	28.75	-10.10***
	Median	22.47	14.31	25.99	-9.85***
Distress dummy (%)	Mean	41.52	40.00	42.54	-0.38
	Median	0.00	0.00	0.00	-0.38
Financials (%)	Mean	28.13	20.00	33.58	-2.23**
	Median	0.00	0.00	0.00	-2.22**
Conflicts of interest (%)	Mean	1.03	0.53	1.37	-2.02**
	Median	0.25	0.26	0.22	-0.465
Ownership UK sh. (%)	Mean	49.10	48.89	49.23	-0.11
	Median	49.36	50.46	49.36	-0.3
Ownership large sh. (%)	Mean	16.80	16.88	16.75	0.05
	Median	12.32	12.48	12.32	-0.008
Bargaining power	Mean	11.55	2.40	17.70	-4.32***
	Median	2.56	1.14	5.86	-6.34***
Concentration	Mean	0.13	0.16	0.10	14.76***
	Median	0.12	0.15	0.09	12.89***
Top UW dummy (%)	Mean	50.00	45.56	52.99	-1.09
	Median	50.00	0.00	100.00	-1.09
Experience	Mean	1.04	0.75	1.23	-1.55
	Median	0.00	0.00	0.00	-1.415
Demand	Mean	9.67	8.27	10.62	-19.11***
	Median	10.09	8.04	11.10	-10.95***
Beta	Mean	1.08	1.05	1.10	-1.30
	Median	1.09	1.07	1.12	-1.11
Specific risk	Mean	39.48	43.79	36.58	3.06***
	Median	37.00	41.00	33.00	2.95***
Std deviation	Mean	0.43	0.47	0.40	3.01***
	Median	0.40	0.44	0.37	2.88***

The column entitled Test of differences reports test statistics based on two-sample *t*-test's or *z*-test's for differences in means, and the Wilcoxon-Mann-Whitney test for differences in medians. Significance level at 1% (***), 5% (**) and 10% (*).

3.5 Empirical findings

3.5.1 *The rise of underwriting fees: research design*

The starting point of our analysis is the financial crisis. To departure from prior studies, we use a multivariate methodology to show the effect of the crisis on the underwriting fees, ceteris paribus the traditional determinants of underwriting costs. As the first step of our analysis, we conduct the following multivariate ordinary least square (OLS) regression:

$$Y_i = \beta_0 + \beta_k \text{Traditional determinants} + \beta_j \text{Discount} + \beta_{k+j+1} \text{Crisis} + \varepsilon_i \quad (3.1)$$

where the dependent variable, Y_i, is the underwriting fees discussed above and expressed as a percentage of the gross proceeds.

Traditional determinants include some of the firm and offer variables discussed in section 3.4.3.: Annual abnormal return, Market volatility, Distress and Financials. Traditional determinants also include the following variables. Open offer, defined as a dummy variable taking the value of unity for open offer issues. Take-up, defined as the percentage of valid acceptance by existing shareholders after the issue. Size, defined as the inverse of the natural logarithm of the 2010 inflation-adjusted (£MM) value of the gross proceeds, and Relative size, defined as the market capitalisation of the issuer on the date of the SEO divided by the gross proceeds. Discount is defined as the offer price discount in relation to the market price as at the day before the announcement.

The second step of our analysis estimate through a multivariate methodology the behaviour of the institutional investors and underwriters in explaining the rise of UK SEOs fees, ceteris paribus the traditional determinants. In order to take explicitly into account the impact of the financial crisis, we interact each variable motivated by our hypotheses with two dummy variables: the pre- and the crisis dummies. The Pre-crisis dummy takes the value of unity for issuers whose announcement date is before July 1, 2007. The Crisis dummy takes the value of unity for issuers whose announcement date is from July 1, 2007 to the end of the sample period, December 30, 2010, (Aebi *et al.*, 2011). Therefore, for each variable motivated by our hypothesis, comparing the coefficient of the interaction term between the variable of interest and the pre-crisis dummy with the coefficient of the interaction term between the variable of interest and

the crisis dummy, allow us to disentangle the impact of the financial crisis on the behaviour of institutional shareholders and underwriters. As the second step of our analysis, we conduct the following multivariate ordinary least square (OLS) regression:

$$Y_i = \beta_0 + \beta_k \text{ Traditional determinants} + \beta_j \text{ Discount} + \beta_{k+j+1} \text{ Conflicts of interest*Crisis} + \beta_{k+j+2} \text{ Conflicts of interest*Pre-crisis} + \beta_{k+j+3} \text{ Ownership UK sh.*Crisis} + \beta_{k+j+4} \text{ Ownership UK sh.*Pre-crisis} + \beta_{k+j+5} \text{ Ownership large sh.*Crisis} + \beta_{k+j+6} \text{ Ownership large sh.*Pre-crisis} + \beta_{k+j+7} \text{ Concentration*Crisis} + \beta_{k+j+8} \text{ Concentration*Pre-crisis} + \beta_{k+j+9} \text{ Top UW dummy*Crisis} + \beta_{k+j+10} \text{ Top UW dummy*Pre-crisis} + \beta_{k+j+11} \text{ Bargaining power*Crisis} + \beta_{k+j+12} \text{ Bargaining power*Pre-crisis} + \beta_{k+j+13} \text{ Experience*Crisis} + \beta_{k+j+14} \text{ Experience*Pre-crisis} + \varepsilon \quad (3.2)$$

where the dependent variable, Y_i, traditional determinants, Discount, Crisis and Pre-crisis variables are discussed above.

The following variables motivated by our hypotheses are already discussed in section 3.4.3. The ownership owned by domestic shareholders (Ownership UK sh.) motivated by hypothesis H2. The ownership owned by large shareholders (Ownership large sh.) motivated by hypothesis H3. The degree of concentration in the investment bank industry (Concentration) motivated by hypothesis H5. The reputation of the underwriters (Top UW dummy) motivated by hypothesis H6, and the experience of the issuer (Experience) motivated by hypothesis H7. The independent variables also include the followings two determinants. The variable for potential conflicts of interest for institutional shareholders (Conflicts of interest), motivated by hypothesis H1, is defined as the increase in shares owned by each institutional shareholders times their weighted turnover. First, within each issue, we measure the weighted turnover of each shareholder *k* multiplying the turnover of each shareholder by his/her pre-offering ownership. Second, for each issue *i*, we define the conflict of interest variable as the weighted average of the increase and the weighted turnover. For each shareholder *k*, increase is calculated as the difference between post- and pre-ownership at the closest

quarter before and after the announcement date, and is set to 0 in the case of negative differences. Figure 3.1 provides an example on how we build this variable.[13]

Figure 3.2 Conflicts of interest variable

Step 1

For each shareholder *k*:

		Weighted turnover	
Shareholder	Increase	Turnover	Ownership-pre offering
Shareholder_1	0.16%	71.85%	0.04%
Shareholder_2	5.62%	30.88%	2.33%
…	…	…	…
Shareholder_k	…	…	…

Step 2

For each issue *i*:

$$\text{Conflicts of interest} = \frac{\sum_{1}^{k} \text{Increase} * \text{Weighted Turnover}}{\sum_{1}^{k} \text{Weighted Turnover}}$$

The variable for the experience gap between underwriters and issuing firms (Bargaining power) motivated by our hypothesis H4 is defined as the ratio of the sum of proceeds of issuers handled by each underwriter over the proceeds of the deal of interest, yearly based.

3.5.2 *The rise of underwriting fees: multivariate analysis*

Table 3.4 presents the regression estimation results for underwriting fees.[14] Model 1 reports results using traditional variables and the crisis dummy, as shown in equation (3.1) of section 3.5.1. Model 2 reports results using traditional variables and the variables motivated by our hypotheses disentangling for the impact of the financial crisis, as shown in equation (3.2) of section 3.5.1.

[13] This figure shows an example on the construction of the variable conflicts of interest. First, within each issue, we measure the weighted turnover of each shareholder *k* multiplying the turnover of each shareholder for his/her pre-offering ownership. Second, for each issue *i*, we define the conflict of interest variable as the weighted average of the increase and the weighted turnover. For each shareholder *k*, increase is calculated as the difference between post- and pre-ownership at the closest quarter before and after the announcement date, and is set to 0 in the case of negative differences. Investor turnover is calculated after analyzing its previous 12 quarters (36 months) of portfolio holdings. High, moderate or low turnover rate is respectively greater than 100%, 50% or less than 50%, and is indicative of a shorter, medium, or longer investment horizon.

[14] Heteroscedasticity consistent *t*-statistics are reported in parentheses.

The empirical results of Model 1 show that the financial crisis entails the marked increases in fees, as suggested by the coefficient of the crisis dummy that is significantly positive. This says that issues raising equity capital during the financial crisis have higher level of underwriting fees and this phenomenon is not fully explained by the traditional variables. During the financial crisis, the overwhelming demand for underwriting services push underwriting fees to higher levels.

The coefficients of the traditional variables are generally consistent with prior studies of SEO fees. Underwriting exhibits a scale economy effect with diminishing marginal returns. The coefficient of Size is significantly positive while negative (although not significant) is the coefficient of Relative size, indicating that underwriter fees are higher for smaller issues, and for relatively large issues, the costs of the underwriters increase and more certification is needed to offset the adverse selection effect (Altinkilic and Hansen, 2000; Drucker and Puri, 2005). The coefficient on Open offer dummy is not significant, meaning that the underwriting fees do not depend on the flotation method, which is consistent with findings by Armitage (2000). Consistent with prior literature, our findings show higher fees for lower quality firms (Suzuki, 2010; Kim *et al.*, 2010). The coefficient on Annual abnormal return is significantly negative, while the coefficient of Distress dummy is significantly positive.

The empirical results of Model 2 provide evidence in favour of hypothesis H1, H3, H4, H5 and H6. First, consistent with the idea that institutional shareholders may benefit from their twin role as both investors in the issuing company and as sub-underwriters, underwriting fees are higher for issues with institutional investors with relatively short investment horizons, as implied by the significantly positive coefficient on the interaction term Conflicts of interest*Crisis (H1, conflicts of interest hypothesis). As predicted, this effect is driven by the financial crisis (H1-crisis hypothesis). Second, higher values of ownership owned by large shareholders mitigate the agency problems in the corporate setting, and thus reduce the level of underwriting fees, ceteris paribus. This effect is significant at 10% in the crisis period only, weakly supporting H3 (large shareholders hypothesis). This is evidence that institutional shareholders may still have a role into the reduction of information asymmetries before and during the crisis period. Third, underwriters in a stronger position charge higher fees (H4, bargaining power hypothesis), and this effect is stronger during the financial crisis (H4-crisis hypothesis),

as implied by the significantly positive coefficients on the interaction terms Bargaining power*Crisis and Bargaining power*Pre-crisis, at 1% and 10% levels, respectively. Fourth, underwriting fees are not significantly associated with competition by investment banks, overall the sample period (H5, investment bank concentration hypothesis). This result is consistent with empirical literature (see e.g. Kim *et al.*, 2010) and the conclusions by the OFT report, indicating that the levels of concentration into equity underwriting does not appear to be unduly high. To further analyze this issue, we list the top 10 underwriters by market shares calculated using the gross proceeds or the number of uses underwritten by each investment bank and we present the results in the Appendix 3-A.3 and Appendix 3-A.4. Fifth, the coefficient on the interaction term Top UW dummy*Pre-crisis is significantly negative, while the coefficient on the interaction term Top UW dummy*Crisis is insignificant. Interestingly, this implies that firms making equity offerings with prestigious underwriters are associated with lower fees but only in the pre-crisis period (H6, underwriter reputation hypothesis). This result contrast the Chemmanur and Fulghieri's model (1994) but it is consistent with most empirical literature (see e.g. Lee and Masulis, 2009; Kim *et al.*, 2010). However, we also show that this result is insignificant during the crisis period. This says that underwriters are in conflicts of interest in period characterized by the excess of demand for underwriting services that may lead to higher level of underwriting fees.

It is worthwhile to put the magnitude of the coefficients into perspective. The estimated coefficient on the interaction term Conflicts of interest*Crisis in Table 3.4 indicate that one standard deviation increase in the Conflicts of interest variable boots the fees by 17.8% in the crisis period. The estimated coefficients on the interaction term Bargaining power*Crisis and Bargaining power*Pre-crisis in Table 3.4 indicate that one standard deviation increase in the Bargaining power variable boots the fees by 15.7% in the crisis period and 11.3% in the pre-crisis period, respectively.

Finally, the coefficients of the interactions terms of Ownership UK sh. and Experience are not significant. This says that our H2 (exposure to UK equities hypothesis) and H7 (issuers' experience hypothesis) are not supported. Overall, these patterns suggest that traditional variables are not able by their own to explain the rise in underwriting fees during the financial crisis.

Table 3.4 Determinants of UK SEO fees and the impact of the financial crisis

	Model 1		Model 2	
Constant	2.55***	(4.80)	3.67***	(4.41)
Discount	1.01*	(1.93)	0.90	(1.59)
Open offer dummy	0.13	(0.65)	0.08	(0.38)
Take-up	-0.01	(-0.02)	-0.15	(-0.30)
Size	1.78***	(3.29)	1.39***	(2.65)
Relative size	-0.03	(-1.52)	-0.03	(-1.59)
Annual abnormal return	-0.44**	(-2.49)	-0.49***	(-3.60)
Market volatility	-0.60	(-0.67)	0.03	(0.03)
Distress dummy	0.39**	(2.14)	0.32*	(1.70)
Financials	-0.24	(-1.27)	-0.22	(-1.07)
Crisis	0.56**	(2.57)		
H1, Conflict of interest				
Conflicts of interest*Crisis			8.16***	(2.82)
Conflicts of interest*Pre-crisis			13.62	(1.29)
H2,Exposure to UK equities				
Ownership UK sh*Crisis			0.60	(1.36)
Ownership UK sh.*Pre-crisis			0.04	(0.06)
H3,Large shareholders				
Ownership large sh*Crisis			-1.12*	(-1.75)
Ownership large sh*Pre-crisis			-1.30	(-1.38)
H4,Bargaining power				
Bargaining power*Crisis			0.01***	(3.73)
Bargaining power*Pre-crisis			0.07*	(1.68)
H5,Investment bank concentration				
Concentration*Crisis			-7.92	(-1.47)
Concentration*Pre-crisis			-3.89*	(-1.66)
H6,Underwriter reputation				
Top UW dummy*Crisis			-0.01	(-0.05)
Top UW dummy*Pre-crisis			-0.77**	(-2.42)
H7,Issues' experience				
Experience*Crisis			-0.03	(-0.68)
Experience*Pre-crisis			0.06	(0.99)
No. of observations	224		224	
Adjusted R^2	0.20		0.27	

The dependent variable is defined as UK SEO underwriting fees. Significance level at 1% (***), 5% (**) and 10% (*).

3.5.3 *The rise of underwriting fees: robustness checks*

Our results are robust to various checks. First, we change the definition of the financial crisis. We define the crisis period to last from 2008 through 2010. Second, we also measure the Conflicts of interest variable as the increase in shares owned by

institutional shareholders times their turnover (i.e. we do not weight the increase in shares for the ownership pre-offering of the institutional shareholders). Third, we include the natural logarithm of the number of co-lead underwriters among the set of explanatory variables. Two recent studies provide insights on the issue whether co-managers may have any effect on fees. Jeon and Ligon (2011) find a quadratic (first increasing then decreasing) relation between the number of co-managers and fees and interpret this result as the presence of synergies among underwriters. Huang and Zhang (2011) also document similar findings. Fourth, we substitute market volatility (Market Volatility) with two alternative risk measures, beta (Beta), defined as the sensitivity of the share to market moves, and specific risk (Specific risk) defined as the risk of non-market related fluctuations in the share price, taken from Dimson and Marsh's Risk Measurement Service. Fifth, we include year dummies as alternative measure for the concentration of the equity underwriting market. These time dummies also capture any systematic effects on fees over that year. Sixth, we include the Balance sheet repair variable, defined as a dummy taking the value of unity for issues with 'balance sheet repair' declared in the 'Use of proceeds' section of the prospectus, to control for the reason behind the equity offering. Table 3.5 reports the results of the paper for each of the robustness checks and presents them from Model 1 to Model 6, respectively.[15] The results are statistically similar throughout all these model specifications.

[15] In Model 1, crisis (Crisis) is defined as a dummy variable taking the value of unity for issues whose announcement year is equals 2007, 2008 or 2009. In Model 2, the conflicts of interest variable (Conflicts of interest) is defined as the increase in shares owned by institutional shareholders times their turnover (we do not weight for the ownership pre-offering of the institutional shareholders). In Model 3, we include the natural logarithm of the number of co-lead underwriters (Ln (No. co-leads)). In Model 4, we substitute market volatility (Market Volatility) with two alternative risk measures, beta (Beta), defined as the sensitivity of the share to market moves, and specific risk (Specific risk) defined as the risk of non-market related fluctuations in the share price, taken from Dimson and Marsh's Risk Measurement Service. In Model 5, we include year dummies as alternative measure for the concentration of the equity underwriting market. In Model 6, we include the Balance sheet repair variable, defined as a dummy taking the value of unity for issues with 'balance sheet repair' declared in the 'Use of proceeds' section of the prospectus, to control for the reason behind the equity offering. Heteroscedasticity consistent *t*-statistics are reported in parentheses

Table 3.5 Determinants of UK SEO underwriting fees and the robustness checks

	Model 1 Crisis		Model 2 Conflicts of interest		Model 3 Co-leads		Model 4 Risk variables		Model 5 Year dummies		Model 6 Balance sheet repair	
Constant	3.25***	(3.89)	3.59***	(4.28)	3.52***	(4.18)	2.10**	(2.36)	2.16***	(2.63)	3.65***	(4.31)
Discount	0.80	(1.34)	1.01*	(1.78)	0.83	(1.44)	0.85	(1.57)	0.75	(1.30)	0.88	(1.54)
Open offer dummy	0.00	(0.02)	0.14	(0.66)	0.10	(0.43)	-0.01	(-0.04)	0.04	(0.15)	0.08	(0.35)
Take-up	-0.04	(-0.08)	-0.11	(-0.22)	-0.13	(-0.27)	-0.21	(-0.42)	-0.11	(-0.22)	-0.14	(-0.29)
Size	1.44***	(2.79)	1.38**	(2.58)	1.47***	(2.67)	0.85	(1.56)	1.60***	(3.29)	1.40***	(2.64)
Relative size	-0.03	(-1.52)	-0.03	(-1.55)	-0.03	(-1.64)	-0.03*	(-1.77)	-0.03	(-1.56)	-0.03	(-1.49)
Annual abnormal return	-0.48***	(-3.60)	-0.37**	(-2.14)	-0.50***	(-3.64)	-0.48***	(-3.73)	-0.34**	(-2.37)	-0.48***	(-3.46)
Market volatility	-0.44	(-0.47)	0.07	(0.07)	-0.01	(-0.01)			0.24	(0.23)	0.00	(0.00)
Distress dummy	0.38**	(2.04)	0.33*	(1.78)	0.31	(1.63)	0.17	(0.92)	0.36*	(1.85)	0.32*	(1.69)
Financials	-0.21	(-1.04)	-0.20	(-0.99)	-0.20	(-0.98)	0.08	(0.41)	-0.26	(-1.25)	-0.22	(-1.07)
Conflicts of interest*Crisis	6.89**	(2.32)	0.54*	(1.93)	8.17***	(2.76)	6.75**	(2.56)	6.21**	(2.36)	8.10***	(2.81)
Conflicts of interest*Pre-crisis	7.86	(0.74)	0.53	(0.52)	14.01	(1.31)	15.62	(1.36)	14.15	(1.31)	13.58	(1.28)
Ownership UK sh*Crisis	0.34	(0.75)	0.46	(1.03)	0.61	(1.38)	0.52	(1.24)	0.15	(0.36)	0.61	(1.36)
Ownership UK sh*Pre-crisis	0.25	(0.41)	0.08	(0.12)	0.11	(0.16)	0.21	(0.34)	0.54	(0.83)	0.06	(0.09)
Ownership large sh*Crisis	-0.65	(-1.00)	-1.06	(-1.61)	-1.10*	(-1.74)	-1.42**	(-2.27)	-1.04	(-1.62)	-1.13*	(-1.76)
Ownership large sh*Pre-crisis	-1.69**	(-2.06)	-1.31	(-1.41)	-1.26	(-1.36)	-1.53**	(-2.00)	-1.72*	(-1.80)	-1.29	(-1.38)
Bargaining power*Crisis	0.01***	(3.42)	0.01***	(3.83)	0.01***	(3.92)	0.01**	(2.59)	0.01***	(3.36)	0.01***	(3.67)
Bargaining power*Pre-crisis	0.08**	(2.08)	0.07*	(1.69)	0.08*	(1.82)	0.08*	(1.89)	0.06	(1.64)	0.07*	(1.67)
Concentration*Crisis	-1.35	(-0.23)	-7.36	(-1.31)	-7.21	(-1.34)	-3.95	(-0.75)			-7.70	(-1.40)
Concentration*Pre-crisis	-1.84	(-0.78)	-4.19*	(-1.79)	-3.59	(-1.53)	-2.75	(-1.25)			-3.85	(-1.63)
Top UW dummy*Crisis	-0.01	(-0.02)	-0.02	(-0.09)	-0.11	(-0.40)	-0.14	(-0.55)	-0.22	(-0.83)	-0.03	(-0.11)
Top UW dummy*Pre-crisis	-0.79**	(-2.60)	-0.75**	(-2.18)	-0.82**	(-2.49)	-1.08***	(-3.52)	-0.73**	(-2.25)	-0.77**	(-2.39)
Experience*Crisis	-0.03	(-0.68)	-0.03	(-0.64)	-0.03	(-0.75)	-0.04	(-0.83)	-0.04	(-0.79)	-0.03	(-0.67)
Experience*Pre-crisis	0.04	(0.64)	0.05	(0.93)	0.06	(1.07)	0.08*	(1.66)	0.06	(0.88)	0.06	(0.99)
Ln (No. co-leads)					0.16	(0.96)						
Beta							0.93**	(2.48)				
Specific risk							0.02**	(2.42)				
Year dummies									Yes			
Balance sheet repair											0.04	(0.23)
N	224		224		224		224		224		224	
Adjusted R^2	0.27		0.26		0.27		0.33		0.29		0.27	

The dependent variable is UK SEO underwriting fees. Significance level at 1% (***), 5% (**) and 10% (*).

Table 3.6 Endogeneity between underwriting fees and discount.

	Model 1 Underwriting fees OLS		Model 2 Discount OLS		Model 3 Underwriting fees 3SLS		Model 4 Discount 3SLS	
Constant	4.32***	(13.21)	0.36***	(5.36)	3.05***	(3.61)	0.08	(0.60)
Discount	0.91**	(2.05)			-0.14	(-0.10)		
Underwriting fees (%)			0.03**	(2.10)			0.03	(0.86)
Instrumental variables								
Ownership large sh.					-1.32***	(-2.93)		
Std deviation					2.09***	(3.57)		
Take-up							0.24***	(5.14)
Open offer dummy					-0.28	(-0.64)	-0.21***	(-8.40)
Size					0.96*	(1.71)	0.12	(1.40)
Relative size					-0.03	(-1.17)	-0.01***	(-3.07)
Annual abnormal return					-0.55***	(-3.50)	-0.04*	(-1.82)
Market volatility					0.88	(0.86)	0.12	(0.97)
Distress dummy					0.13	(0.72)	-0.01	(-0.14)
Financials					-0.07	(-0.37)	-0.02	(-0.84)
Crisis					0.19	(0.63)	0.12***	(3.55)
Conflicts of interest					7.70**	(2.52)	0.97**	(2.28)
Ownership UK sh.					0.24	(0.55)	-0.20***	(-4.48)
Bargaining power					0.01***	(2.96)	0.01	(0.32)
Concentration	-8.01***	(-3.97)	-0.85**	(-2.49)	-4.58*	(-1.87)	0.18	(0.50)
Top UW dummy					-0.39**	(-1.97)	0.04	(1.51)
Experience					0.01	(0.10)	0.01	(0.58)
No. of observations	224		224		224		224	
Adjusted R^2	0.10		0.06		0.62		0.62	

This table reports the results of 3SLS regressions of UK underwriting fees and discount. Significance level at 1% (***), 5% (**) and 10% (*).

Finally, in addition to univariate tests and multivariate regressions, we control for a possible endogeneity between underwriting fees and discount. Kim *et al.* (2010) recently show that there is endogeneity between these two issuing costs. We estimate 3SLS regressions of underwriting fees and discount. In order to identify valid instruments we find in the first stage those variables that affect discounts but not fees and vice versa. In our system of equations, we include as instrumental variables for underwriting fees the ownership owned by large shareholders (Ownership large sh.) and the standard deviation (Std deviation), defined as the standard deviation of percentage returns on the share. The instrumental variable for discount is the take-up ratio (Take-up). Table 3.6 presents the regression estimation results.[16] In Model 1 and Model 2 we perform the OLS regressions predicting underwriting fees and discount, respectively, to test the joint endogeneity of the two issuing costs. In Model 3 and Model 4 we perform the 3SLS regressions predicting underwriting fees and discount, respectively, ceteris paribus a large set of explanatory variables. These results also confirm that higher underwriting fees are associated with potential conflicts of interest of the institutional shareholders and with a stronger bargaining position of the underwriters. The presence of large shareholders and top underwriters mitigates these effects.

3.6 Conclusions

In this paper, we investigate the surge in underwriting fees on the onset of the financial crisis in 2007/2008, an issue that has become the subject of considerable public debate for regulators and the academic community. Our main contribution to the extant literature relies on the analysis of the behaviour of institutional shareholders and underwriters during this recent financial crisis. We validate our conflict of interest hypothesis during the crisis, confirming that underwriting fees are higher for issuers having institutional investors with relatively short investment horizons. This result

[16] This table reports the results of 3SLS regressions of underwriting fees and discount. In Model 1 and Model 2 we perform the OLS regressions predicting underwriting fees and discount, respectively, to test the joint endogeneity of the two issuing costs. In Model 3 and Model 4 we perform the 3SLS regressions predicting underwriting fees and discount, respectively, including a large set of explanatory variables. Instrumental variables for underwriting fees are the ownership owned by large shareholders (Ownership large sh.), defined as the proportion of the issuer's shares owned by shareholders with stake of 10% or more, and the standard deviation (Std deviation), defined as the standard deviation of percentage returns on the share. The instrumental variable for discount is the take-up ratio (Take-up), defined as the existing shareholders percentage of valid acceptance after the issue. Adjusted R^2 is as defined in Greene (1993). Heteroscedasticity consistent *t*-statistics are reported in parentheses.

suggests that institutional shareholders may have an incentive, as sub-underwriters, to push for higher fees.

Consistent with the bargaining power hypothesis, we find that underwriting fees are higher for issuers in a weaker bargaining position in relation to the underwriter. The effect of the bargaining power is stronger during the crisis period. Since the onset of the financial crisis 2007/2008, the need for capital adequacy has become crucial and, as a result, banks may have strengthened their bargaining power because of the availability of the resources to underwrite large issues.

Lastly, during the financial crisis, large shareholders are still able to reduce the impact of information asymmetry, while the reputation of the underwriters does not affect the level of fees, although being still significantly negative in the pre-crisis period, as modelled by Fernando *et al.* (2005). Our results hold also after controlling for several robustness checks and for endogeneity between underwriting fees and discount.

A lack of transparency and guidelines as to how the fee is determined are found to be significantly exploited by institutional investors and underwriters. As a result, their interests may not fully align with those of the issuers'. When companies raise equity capital, they usually hire one or more underwriters to provide a package of services to guarantee and perform the share issue. Since the beginning of the financial crisis, the increase in the demand for new capital has put considerable pressure on the available existing underlying capacity. Under these circumstances issuers put their priorities into speed, confidentiality and success of the offering rather than on the fees charged by the investment banks. Underwriters, instead, strength their bargaining power and maintain their reputational capital with no charging any more significantly lower fees. This is emphasised by the fact that underwriting fees are the result of the bargaining power between underwriters and issuers, once underwriters are selected. Hence, issuers face a trade-off between paying higher fees and the choice of switching underwriter that can be negatively interpreted by the market and potentially expensive for the company. Long-term incentives of the institutional investors may be weakened in such context where they sub-underwrite issues, strengthened by high demand and a potential shortfall into underwriting capacity.

Such conflicts of interest raise questions for regulators and financial intermediaries about the best proposals and actions to adopt for achieving more cost

effective outcomes. Among the options suggested by the Office of Fair Trading (2011), our findings indicate that competition is not a major concern in the rise of underwriting fees. Underwriters may still compete on other dimensions, in line with the model developed by Liu and Ritter (2011). A detailed breakdown on the proposed fees and sub-underwriting fees by underwriters may stimulate a gradual reduction in underwriting fees. Furthermore, issuers can reduce the knowledge and bargaining power gap by seeking more advice from their large shareholders with long-term investment horizon and by increasing the number of underwriters that they have relationships with. Lastly, commitments by large institutional shareholder with long-term investment horizon to sub-underwrite equity issues before they are announced may reduce the risk to opportunistic gain by other shareholders or underwriters.

Overall, we conclude that the recent financial crisis created demand for new capital and, ceteris paribus, companies face more difficulties to negotiate a cost effective outcome when they buy equity underwriting services, due to potential conflicting alignment of incentives between institutional shareholders, underwriters and issuers. Our findings provide new insights on the behaviour of institutional shareholders and underwriters when fees are set during the process of raising equity capital, and may be of relevance to other financial intermediated markets.

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Appendix

3-A.1 *Definition of the variables used in this study*

Variables	Definitions
Annual abnormal return	Performance of the share over the past year relative to the market as a whole. Measured as the difference between the actual return on the share (percentage capital appreciation plus dividend yield) and the percentage return available over the same period from an investment in a diversified portfolio with the same beta (Altinkilic and Hansen 2003; Suzuki 2010; Dimson and Marsh, 2009). Proxy for issuer's quality
Beta	The sensitivity of the share to market moves (Dimson and Marsh, 1993-2009)
Bargaining power	Sum of proceeds of issuers handled by each underwriter in each year over the proceeds of each deal. In the case of co-leads, the mean of the proceeds is used. Proxy for the underwriter bargaining position
Concentration	Herfindahl index, proxy for the investment bank concentration. Defined as the sum of the squared annual lead banks market share, computed using proceeds of SEOs handled by each underwriter (Kim *et al.*, 2010). Proceeds are equally split among co-leads
Conflicts of interest	For each issuer *i*, this variable equals the increase in shares by the institutional shareholders times their weighted turnover. For each shareholder, the weighted turnover is defined as the turnover times the pre-offering ownership. Increase is calculated as the difference between post- and pre-ownership at the closest quarter before and after the announcement date, and is set to 0 in the case of negative differences. Higher values are proxies for short-term horizon institutional investors
Crisis dummy	Dummy variable taking the value of unity for issuers whose announcement date is from July 1, 2007 to the end of the sample period, December 30, 2010, (Aebi *et al.*, 2011)
Demand	Natural logarithm of the sum of gross proceeds adjusted for inflation, yearly based. Proxy for the demand of underwriting services. We equally split proceeds in the case of co-leads (Abrahamson *et al.*, 2011)
Discount	Offer price discount relative to the market price on the day before the announcement (Altinkilic and Hansen, 2003)
Distress	Dummy variable taking a value of unity for issues with interest cover ratio (EBIT/Interest Expense on Debt) less than 1 (Hoshi *et al.*, 1990). Proxy for issuer quality
Experience	Natural logarithm of gross proceeds adjusted for inflation times 1 if the issue has had at least 2 issues among the sample, zero otherwise (Huang and Zhang, 2011). Proxy for the experience of companies

3-A.1 *Definition of the variables used in this study*—Continued

Variables	Definitions
Financials	Dummy variable taking value of unity for financial issues (1-digit ICB industry equals 8)
Underwriting fees	Fees paid to the banks, broker, investing institutions, existing shareholders and/or placees, expressed as a percentage of the gross proceeds. They include underwriting fees and sub-underwriting fees (Armitage, 2000)
Market volatility	UK implied volatility index (VFTSE) at 30 days before the announcement date. VFTSE reflects the market expectations of the future monthly volatility of the UK benchmark equity index, FTSE100, which comprises the 100 largest companies on the London Stock Exchanges and represents 80% of the UK market
Open offer dummy	Dummy variable taking a value of unity for open offer issues (Armitage, 2000)
Ownership large sh.	Proportion of the issuer's shares owned by shareholders with stake of 10% or more measured at the closest quarter before the announcement date (Armitage, 2000)
Ownership UK sh.	Proportion of the issuer's shares owned by shareholders whose country is equals 'UK' or 'Virgin Islands (UK)', measured at the closest quarter before the announcement date
Pre-crisis dummy	Dummy variable taking the value of unity for issuers whose announcement date is before July 1, 2007 (Aebi *et al.*, 2011)
Relative size	Market capitalization of the issuer at the date of the SEO divided by the gross proceeds adjusted for inflation (Altinkilic and Hansen, 2000)
Size	Inverse of the natural logarithm of the 2010 inflation-adjusted (£MM) value of the gross proceeds of the issue (Altinkilic and Hansen, 2000; Kim *et al.*, 2010)
Specific risk	The risk of non-market related fluctuations in the share price (Dimson and Marsh, 1993-2009)
Std deviation	Standard deviation of percentage returns on the share (Dimson and Marsh, 1993-2009)
Take-up	The existing shareholders percentage of valid acceptance after the issue (Armitage, 2002)
Top UW dummy	Dummy variable taking a value of unity for issues with at least one of the lead underwriter(s) among the top 5 underwriters ranked by market shares based on proceeds (Abrahamson *et al.*, 2011)

3-A.2 *Data construction*

We apply various checks to the data. With respect to the flotation method, some anomalies are corrected. For example, Alexon group (05/03/2010), Hampson Industries (02/02/2010), Sportech (26/01/2010), and Vernalis (11/02/2010) are not present in the London Stock Exchange (LSE) but are included in the sample, being defined as 'placing and open offer' according to the prospectus. HSBC Infrastructure is eliminated because it is listed as 'placing' in LSE but 'placing and offer for subscription' on the prospectus. Skyepharma (01/09/2008), Sportech (07/11/2007), UK Coal (16/09/2009), and Unite Group (17/09/2009) are defined as 'placing' by the LSE but 'placing and open offer' according to the prospectus, and are included in our database as 'open offer'.

From the prospectuses, we hand-collect the issue reason, as reported in the section 'Use of (net) proceeds', 'Background to and reason for [...]', or 'Notes about [...]'. Reasons for issue are categorized as (1) Acquisition (e.g., 'Nestor intends to use the proceeds of the Rights Issue, amounting to £30.4 million net of expenses primarily to fund its acquisition strategy'), (2) Balance sheet repair (e.g. Avis Europe, 'The Rights Issue will significantly strengthen the Group's balance sheet'), or (3) Capital investment programme or growth opportunities (e.g. 'The funds raised [...] are expected to provide the Company with flexibility to take full advantage of such opportunities as they arise').

With respect to underwriters, we correct the names as follows (Full details are available from the authors). First, we check for variations in spelling, punctuation marks, capital letters, or abbreviation. For instance, Altium Capital Limited and Altium are variations of the same bank. Second, we consider banks that are acquired as part of their new parent. For example, Bridgewell Securities was acquired in 2007 by Landsbanki Islands (now in moratorium) because of the acquisition of Bridgewell Group.

3-A.3 *Top ten underwriters by proceeds*

	All sample			Rights Issues			Open Offers		
Rank	Underwriter	Proceeds (£MM)	Fees (%)	Underwriter	Proceeds (£MM)	Fees (%)	Underwriter	Proceeds (£MM)	Fees (%)
1	JPMorgan Chase	14.89	3.62	JPMorgan Chase	16.72	3.56	UBS	22.61	1.90
2	UBS	12.51	3.17	Goldman Sachs	11.18	3.06	BoA Merrill Lynch	21.36	2.61
3	BoA Merrill Lynch	10.16	3.60	UBS	9.05	3.42	RBS Hoare Govett	17.34	3.27
4	Goldman Sachs	9.44	2.90	HSBC	8.64	4.14	JPMorgan Chase	9.56	3.77
5	RBS Hoare Govett	7.43	3.87	BoA Merrill Lynch	6.33	4.01	Goldman Sachs	4.33	2.25
6	HSBC	6.64	3.99	Deutsche Bank	6.25	2.83	Barclays	3.91	1.84
7	Deutsche Bank	4.86	2.93	Morgan Stanley	5.50	2.66	Credit Suisse	3.81	3.25
8	Credit Suisse	4.60	3.84	Citigroup	5.05	3.47	Citigroup	2.87	3.03
9	Citigroup	4.49	3.38	Credit Suisse	4.87	4.14	Numis Securities	2.30	3.37
10	Morgan Stanley	4.21	2.82	RBS Hoare Govett	4.04	3.97	HM Treasury	2.13	1.50

3-A.4 *Top ten underwriters by number of SEOs*

	All sample			Rights Issues			Open Offers		
Rank	Underwriter	SEOs (No.)	Fees (%)	Underwriter	SEOs (No.)	Fees (%)	Underwriter	SEOs (No.)	Fees (%)
1	JPMorgan Chase	11.56	3.62	RBS Hoare Govett	14.59	3.97	Numis Securities	11.08	3.37
2	RBS Hoare Govett	10.11	3.87	JPMorgan Chase	14.24	3.56	Investec	8.51	4.15
3	Numis Securities	7.26	3.33	UBS	7.64	3.42	JPMorgan Chase	7.80	3.77
4	UBS	5.16	3.17	Citigroup	4.71	3.47	KBC Peel Hunt	7.09	3.76
5	Investec	4.57	4.34	BoA Merrill Lynch	4.68	4.01	Singer Capital Markets	5.32	4.11
6	KBC Peel Hunt	3.92	4.19	Numis Securities	4.55	3.23	Piper Jaffray	4.79	3.72
7	BoA Merrill Lynch	3.73	3.60	Deutsche Bank	4.45	2.83	Altium Capital	4.26	3.72
8	Citigroup	3.52	3.38	HSBC	3.79	4.14	RBS Hoare Govett	3.81	3.27
9	Commerzbank	3.29	2.95	Commerzbank	3.74	3.00	Evolution Securities	3.46	4.64
10	Deutsche Bank	2.86	2.93	Credit Suisse	3.08	4.14	Cenkos Securities	3.19	3.99

3-A.5 *Correlations among explanatory variables*

Panel A. Pre-crisis (No. of observations 90)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Discount	1																		
2	Open offer dummy	-0.52***	1																	
3	Take-up	0.27***	-0.41***	1																
4	Size	0.11	0.01	-0.29***	1															
5	Relative size	-0.14	0.16	-0.07	0.33***	1														
6	Annual abnormal return	-0.08	-0.09	0.00	-0.14	0.06	1													
7	Market volatility	0.11	-0.02	-0.11	-0.09	-0.29***	0.05	1												
8	Distress dummy	0.02	0.06	-0.32***	0.24**	-0.04	-0.14	0.07	1											
9	Financials	-0.23**	0.10	-0.16	-0.16	-0.29***	-0.07	0.32***	0.10	1										
10	Conflicts of interest	-0.16	0.23**	-0.21*	0.10	-0.05	-0.10	-0.10	0.23**	0.19*	1									
11	Ownership UK sh.	-0.10	-0.11	0.21**	-0.15	-0.00	-0.01	-0.09	-0.19*	0.11	-0.01	1								
12	Ownership large sh.	0.04	-0.03	-0.07	0.11	0.15	0.15	-0.14	0.08	-0.13	0.07	0.03	1							
13	Bargaining power	-0.08	-0.15	0.09	0.00	0.22**	0.03	-0.10	-0.06	-0.16	0.04	0.21*	0.05	1						
14	Concentration	0.05	0.06	-0.22**	-0.11	-0.15	0.17	0.28***	-0.12	0.09	-0.05	-0.23**	-0.06	-0.10	1					
15	Top UW dummy	0.33***	-0.45***	0.34***	-0.33***	-0.23**	0.00	0.15	-0.11	0.04	-0.15	0.09	-0.30***	0.19*	0.17	1				
16	Experience	-0.00	-0.01	0.08	-0.09	-0.15	0.02	0.22**	-0.12	0.09	-0.08	-0.02	0.00	-0.14	0.09	-0.02	1			
17	Demand	0.11	0.02	-0.22**	-0.06	0.03	-0.08	0.18*	0.08	-0.07	0.14	-0.06	-0.09	-0.02	-0.12	0.12	-0.04	1		
18	Beta	0.15	-0.25**	0.14	-0.01	0.05	-0.11	-0.20*	0.15	-0.20*	-0.11	0.01	-0.08	0.09	-0.15	0.35***	-0.08	0.05	1	
19	Specific risk	0.06	0.01	-0.27**	0.40***	0.12	0.10	-0.10	0.38***	-0.20*	0.01	-0.19*	0.17	0.01	-0.04	-0.08	-0.19*	0.00	0.33***	1
20	Std deviation	0.08	-0.01	-0.24**	0.39***	0.12	0.08	-0.11	0.38***	-0.20*	0.00	-0.19*	0.17	0.01	-0.05	-0.04	-0.19*	0.00	0.40***	1.00***

Correlation coefficients are among the explanatory variables for the pre-crisis period. Significance level at 1% (***), 5% (**) and 10% (*).

3-A.5 *Correlations among explanatory variables*—Continued

Panel B. Crisis (No. of observations 134)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Discount	1																		
2	Open offer dummy	-0.64***	1																	
3	Take-up	0.49***	-0.44***	1																
4	Size	-0.10	0.41***	-0.17**	1															
5	Relative size	-0.27***	0.14	-0.02	0.02	1														
6	Annual abnormal return	-0.04	-0.12	0.11	-0.12	0.04	1													
7	Market volatility	0.13	-0.12	0.09	-0.15*	-0.10	-0.01	1												
8	Distress dummy	-0.09	0.24***	-0.15*	0.27***	0.03	-0.13	-0.06	1											
9	Financials	-0.01	-0.10	-0.06	-0.31***	0.10	-0.10	0.28***	0.12	1										
10	Conflicts of interest	0.16*	-0.02	-0.14*	0.15*	-0.03	0.38***	-0.06	0.10	-0.14	1									
11	Ownership UK sh.	-0.30***	0.09	0.07	-0.11	-0.01	0.00	-0.16*	-0.10	-0.01	-0.25***	1								
12	Ownership large sh.	-0.20**	0.23***	-0.13	0.09	-0.13	0.02	-0.05	0.04	-0.07	0.15*	0.34***	1							
13	Bargaining power	0.13	-0.05	0.13	0.06	-0.02	-0.10	-0.05	0.07	-0.07	-0.09	0.06	-0.02	1						
14	Concentration	-0.32***	0.18**	-0.25***	0.26***	0.06	0.22**	-0.31***	0.03	-0.11	0.17*	-0.08	0.07	-0.16*	1					
15	Top UW dummy	0.26***	-0.39***	0.24***	-0.49***	0.02	0.10	0.26***	-0.19**	0.16*	-0.17**	-0.04	-0.18**	0.26***	-0.32***	1				
16	Experience	-0.10	0.08	-0.10	-0.18**	0.20**	-0.01	0.13	-0.10	0.29***	-0.06	0.03	0.15*	-0.17**	-0.01	0.12	1			
17	Demand	0.26***	-0.18**	0.11	-0.35***	-0.12	-0.16*	0.25***	-0.10	0.22**	-0.04	0.08	-0.06	0.18**	-0.69***	0.32***	0.07	1		
18	Beta	0.16*	-0.08	0.18**	-0.06	0.02	-0.04	-0.07	-0.18**	-0.29***	-0.00	0.09	0.11	0.22***	-0.27***	0.26***	0.03	0.20**	1	
19	Specific risk	-0.05	0.38***	-0.01	0.51***	-0.03	-0.02	-0.33***	0.29***	-0.41***	0.26***	-0.02	0.21**	0.17*	0.06	-0.25***	-0.18**	-0.13	0.23***	1
20	Std deviation	-0.03	0.36***	0.02	0.50***	-0.02	-0.02	-0.34***	0.27***	-0.43***	0.25***	-0.01	0.22**	0.18**	0.02	-0.23***	-0.17*	-0.10	0.31***	0.99***

Correlation coefficients are among the explanatory variables for the crisis period. Significance level at 1% (***), 5% (**) and 10% (*).

CHAPTER 4

FORECASTING WINNER IPOs

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"The inability to predict outliers implies
the inability to predict the course of history"

(Nassim Nicholas Taleb)

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4 Forecasting winner IPOs

Abstract

IPOs underperform on average. Nevertheless, the skewed distribution of returns offers the chance to gain extremely high rewards (e.g., identifying the "next Microsoft", as discussed by Loughran and Ritter, 1995). Hinging on this argument, this paper proposes a new method to help investors screen IPOs for the high-performing tail of the returns distribution. Using a straightforward definition of "winner IPOs" based on buy-and-hold abnormal returns, this study employs logistic regression to forecast whether a firm is still a top performer 1, 2 or 3 years after listing, relying only on publicly available information. Investors using our forecasting model would always have an adjusted rate of successful predictions higher compared to a naïvely classification that consider all IPOs as "winners".

Keywords: *IPOs, forecast, long-run performance*
JEL Classification: *G*02

4.1 Introduction

The long-run performance of Initial Public Offerings (IPOs) is poor (Ritter, 1991). Nevertheless, IPO returns are much more volatile than most stocks. Among IPOs, the mean return usually exceeds the median because of a few big winners. Over the period 1980–2000, the top 100 IPOs earned over 1,000% in their first three years of trading (Field and Lowry, 2009). However, only investors confident in their ability to identify such winners rationally invest in this asset class.

Investing in IPOs is essentially an exercise in forecasting low-probability events. However, potential investors should be aware of two cognitive fallacies that can lead to poor decisions. First, people tend to place high subjective valuations on very positive outcomes with low probabilities, and therefore reveal a preference for gambles with skewed payoff distributions. The lottery is a classic example of this fallacy, as players happily accept a small sunk cost in exchange for the negligible chance of a large payoff. Second, people place more weight on options that come to mind easily. Although there are thousands of stocks for sale, investors flock to those which have recently been in the news rather than systematically searching through all options. This phenomenon is called “attention-driven buying” (Barber and Odean, 2008). Both fallacies are present among investors in all asset classes, but their effects are aggravated in the IPO setting. Investors routinely ignore IPOs with little publicity, and spend large sums betting on the small chance that over the long term, their IPO will be an extreme winner. The goal of this research is to give investors an objective, quantitative tool for measuring the ex-ante probability that a given IPO is an extremely high performer, with respect to the average performance distribution.

Many different methodologies have been employed to investigate the long-run performance of IPOs. Recently, a number of studies have emphasized the positive skewness of IPO returns (meaning that the right-hand tail of the distribution is fat, so extreme positive outcomes are more likely than in a normal distribution) (Field and Lowry, 2009). Consequently, classic multivariate regression methods based on a normal distribution do not accurately predict the probability of observing extreme outcomes. We contribute to the IPO literature by proposing a logistic regression approach with a binary dependent variable, to forecast whether the firm is a top-performer using only publicly available information. Logistic regression is based on a distribution with

considerably heavier tails than the normal distribution, so can predict the probability of extreme IPO outcomes more accurately.

In our model, the binary dependent variable takes the value one for "winner" IPOs or zero for "non-winner" IPOs. An issuer is defined as a "winner" if the IPO buy-and-hold return (BHAR) outperforms the compounded return from an equal-weighted portfolio matched on size and book-to-market. This definition of a winner has two main advantages. First, it is a broad concept that can be applied to different contexts, such as other countries or asset classes (e.g., private equity or venture capital backed stocks). Second, it is flexible enough to be tested using different horizons (years after the event of interest).

The empirical setting of our paper is the European market. In a sample of 1,053 companies that went public between 1995 and 2009 in Europe, we find that by using our forecasting model, "winners" are correctly identified in the 80% of cases, depending on the cutoff chosen to classify its continuous output probability into "winners" and "non-winners". As expected, for any given cutoff probability, the predictive ability of our forecasting model is greater for shorter time horizons. Market momentum, our proxy for periods with a larger-than-average number of new issues, actually reduces the probability that an IPO is a "winner" at medium and long time horizons (2 or 3 years after the listing). On the other hand, a firm's size and profitability boost its chances of being a winner. The underwriter's reputation significantly increases the probability of being a "winner-IPO" in the short term (1 year after listing), but this factor loses significance for longer time horizons.

The remainder of the paper proceeds as follows. Section 4.2 reviews related research. We present the model in Section 4.3. Section 4.4 applies the model to European IPOs over the period 1995-2010, and the results are presented in Section 4.5. Section 4.6 concludes.

4.2 Related research

Since Ritter (1991), many studies have examined the long-run underperformance of IPOs. Various explanations have been put forth to shed light on this phenomenon. Loughran and Ritter (1995) propose that IPOs are initially overvalued due to the presence of investors betting on long shots, suggesting that very large samples over a

long period of time are required for investors to adequately estimate their chances of success. Alternatively, the long-run underperformance may be due to a preference for stocks with high skewness (Barberis and Huang, 2008). In other words, some investors overprice a positively skewed security, which makes them earn a negative average excess return.

Empirically, several different measures and methodologies have been employed to proxy post-IPO performance. Examples include cumulative abnormal returns and buy-and-hold returns (Ritter, 1991), three-factor returns (Fama and French, 1993), matching of IPO firms (Brav and Gompers, 1997), and the calendar time approach (Schultz, 2003). All these studies look at the underperformance of IPO firms. In contrast, we contribute to the literature by investigating the presence of top performers. The cited papers differ from ours in several other important aspects. Most importantly, while they study cross-sectional variations in the average long-term performance, we focus on individual stocks in the positive tail of the distribution.

Our analysis focuses on the possibility of identifying winners using only public information available prior to the offering. Recently, Field and Lowry (2009) emphasized how readily available public information may enable investors to better predict IPO performance over several horizons. Bhabra and Pettway (2003) reported that prospectus information is useful for predicting whether the firm survives. However, unlike our study, they do not test their approach with out-of-sample predictions, and do not focus on the top performers.

4.3 Sample and methodology

4.3.1 *Sample*

Our sample consists of 1,053 companies, all of which first listed between 1995 and 2010 on one of the four largest European markets (France, Germany, Italy and the UK).[1] The EURIPO[2] database is our primary source of information, providing

[1] The total population of IPOs meeting these criteria is 3,755. We reduced the number of companies to 3,217 by excluding financials and investment trusts, to avoid sample selection bias (Demers and Joos, 2007). Second, given the different nature of social service providers, we do not include utilities (62 IPOs) and privatizations (1,230 IPOs, of which 994 belong to the utility industry). Lastly, we are left with 1,053 with no missing accounting data.

prospectuses and other data describing the offers and issuers. Stock market index prices and IPO stock prices are obtained from Datastream. Accounting data are taken from both Datastream and prospectuses.

4.3.2 *Methodology*

To define the outcome of an IPO (that is, being a "winner" or "non-winner"), we discretize abnormal returns estimated on an equal-weighted, style-adjusted basis. We use firm size and book-to-market portfolio as the benchmark for this calculation. Then, we apply a logistic regression approach characterized by heavier tails to better capture the frequency of extreme winners that raise the average.

The methodology consists of splitting the sample into two sub-samples: the estimation set and the testing set. The first is used to estimate the parameters of the model. The second sample is used to compare real outcomes Y with the estimated values of the dependent variable ($\widehat{Y}$), using the model parameters:

$$\widehat{Y} = \widehat{Prob}(Y = 1|X) = 1(\hat{\beta}^{T}X). \quad (4.1)$$

$\widehat{Y}$ is a continuous variable, which can be interpreted as the estimated probability of being a "winner-IPO". On the other hand, Y is a binary variable that represents whether the issuer is a "winner-IPO" according to its abnormal returns. X represents the set of explanatory variables used in our empirical analysis, and $\hat{\beta}^{T}$ is the vector of estimated coefficients.

To ensure that our model does not simply rationalize uninformative patterns in the estimation sample, we use out-of-sample observations to test its predictions. Specifically, we employ the jackknife method: (1) randomly exclude one observation from the sample (2) estimate the model parameters (3) compute the ex-ante probability that the out-of-sample observation is a winner-IPO. Using this methodology, in each repetition we get *n* different estimations, *n* testing samples, and *n* forecasting models. For each variable we report the average of the *n* different estimates to finally get the coefficients of the IPO forecasting model.

Following the standard approach in the failure prediction literature (Demers and Joos, 2007), we use only a subset of explanatory variables selected by the Akaike

[2] www.euripo.eu, see Vismara *et al.* (2012) for a description of the database and selection of IPOs.

Information Criteria (AIC). This parsimonious technique strikes a balance between the complexity of the model and its ability to describe the data. The t-statistic is based on heteroskedasticity-corrected standard errors.

As a robustness check we also split the sample. We randomly select two-thirds of the companies as the estimation subsample, using the remaining one-third to perform the out-of-sample verification.[3]

To assess the goodness of fit of the forecasting model we apply two alternative approaches. The Hosmer-Lemeshow statistic is distributed as a chi-squared; small p-values for this statistic indicate a poor fit. Secondly, we use a contingency table. This approach cross-classifies each binary response variable ("winner" or "non-winner") with its forecasted value. Since the forecasted probability is a continuous value in the range 0-1, we first dichotomize it using a threshold c. If the estimated probability, $\widehat{Y}$, is greater than c, we translate the forecast into the value 1; otherwise, we assign it the value zero. Formally:

$$\widehat{\text{Prob}}(Y = 1) > c \rightarrow \widehat{Y} = 1 \tag{4.2}$$

$$\widehat{\text{Prob}}(Y = 1) \leq c \rightarrow \widehat{Y} = 0 \tag{4.3}$$

Recall that Y is the abnormal return estimated on an equal-weighted, style-adjusted basis. If the return is positive, the variable Y takes value 1; otherwise it takes the value 0. $\widehat{Y}$ is the estimation of Y through the forecasting model, and represents the forecast probability of being a winner IPO. We then discretize this continuous value into a binary prediction, using the arbitrary threshold c. To give robustness to this approach, we apply sensitivity analyses changing the cutoff thresholds.[4]

[3] The results, available from the authors, confirm the results obtained with the jackknife procedure.

[4] An alternative approach is provided by the Receiver Operating Characteristic (ROC) curve (Hosmer and Lemeshow, 2000). The ROC curve generalizes the contingency table analysis by providing information on the performance of a model for all possible cut-off values. By construction, the ROC curve assumes a value within the range (0:1) and provides a measure of ability of the model to discriminate between winner and non-winner IPOs. The slope of the ROC at each point on the curve is the ratio of the probabilities of getting a winner-IPO and a non winner-IPO. If the ROC curve value is equal to 0.5, it is equivalent to a coin toss process and the model of interest does not have any discriminatory power. A predictive model, in this sense, should get a ROC value greater than this threshold.

4.3.3 *Definition of winner IPOs*

As the aim of this study is to propose a practical approach to forecasting IPO performance and picking the top IPOs, we need to find a definition of "winner-IPO" that is suitable for each observation.

Our definition uses an investment portfolio as a benchmark. We calculate the style-adjusted, compounded abnormal return as the difference between (1) the IPO's buy-and-hold average return (BHAR) and (2) the compounded return from an equal-weighted portfolio matched on size and book-to-market.[5]

As robustness checks, we employ three alternative definitions of "winner" IPOs (unreported results). First, a "winner-IPO" is an issuer that over-performs the median of the sample. In the second and third definitions, a "winner-IPO" is an issuer whose stock returns are greater than the returns of a benchmark, adjusted for a 'volatility premium'. In the second definition, we benchmark against the FTSE Euromid index, while in the third definition we use an Industry Euromid index return based on the issuer's 1-digit ICB Industry (Industry Classification Benchmark). In both cases the stock performance[6] is calculated for stock *i* over horizon *T* as the difference between the raw return of stock *i* and the raw return of the index.

The 'volatility premium' mentioned in the previous paragraph controls for ex-ante uncertainty. Following the literature, we define the volatility parameter for issuer *i* as the standard deviation of daily stock returns over the same time interval as the dependent variable. As suggested by Alberg, Shalit and Yosef (2008), an asymmetric GARCH model with fat-tailed densities improves the overall estimation of the conditional variance. Hence, we run separately for each firms the AR-GJPARCH (1,1) (Glosten, Jagannathan, and Runkle) model with a skewed Student's *t*-distribution[7]. This

[5] We select 25 portfolios independently sorted on size and book-to-market. Individual stocks are re-assigned to equally-weighted portfolios every June on the basis of breakpoints for size and book-to-market. They are grouped in quintiles of the three variables. All portfolios are rebalanced annually at the end of June, to mimic the experience of an average investor.

[6] The return of issuer *i* is calculated from the log-ratio between the closing price of the stock *i* at the end of the time horizon and the price at the 22nd day of trading after the IPO, consistent with the existing literature (Ritter, 1991; Carter, Dark and Singh, 1998). Stock performances are measured in terms of 1, 2 or 3-year returns (252, 504 and 756 trading days, respectively).

[7] This model outperforms GARGH (the generalized ARCH model that catches the dynamic of the conditional variance), EGARCH (the exponential GARCH model that accommodates the asymmetric relation between stock returns and volatility changes, characterized by positivity of conditional variance)

model takes the "leverage effect" into account, allowing for different impacts of the asymmetric component when returns are positive or negative.[8]

This new methodology has the strong advantage of defining the dependent variable (in our case, "winner-IPO") in a flexible way. Therefore, the forecasting tool we develop can be applied to other contexts, such as different countries or assets (i.e., private equity or venture capital backed stocks). In other words, it can be tested using different benchmarks, thresholds (volatility parameters) and horizons (years after the event of interest).

4.3.4 *Variables*

A primary focus of this paper is the definition of "winner-IPOs". To this purpose, we consider a number of explanatory variables that have been proven to be associated with IPO performance by previous research. Table 4.1 describes the expected impacts and theoretical backgrounds of the [9]variables used in this study.

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and APARCH (the asymmetric power ARCH model that couples the flexibility of a varying exponent with the asymmetry coefficient). However, the results obtained by our model are confirmed when using these models.

[8] To estimate conditional volatility, we use G@RCH 2.0, a package in the Ox Metrics econometric software. To test for the presence of a leverage effect in the time series, we implement the Sign Bias Test, the Negative Sign Bias Test and the Positive Sign Bias Test: the significance of the coefficients investigating possible misspecification of the conditional variance equation is tested. To test for the correct distribution, we implemented the adjusted Pearson chi-squared goodness of fit test, which compares the empirical distribution of the innovations with the theoretical one. The tested distribution is supported by the data when accepting the null hypothesis.

[9] Financial accounting variables refer to one year previous to the initial public offering. Tobin's Q is defined during the issuer's offer year. Age, leverage, profitability and Tobin's Q are Winsorized at the 2.5th and 97.5th percentile to reduce the effect of outliers.

Table 4.1 Variable definitions and theoretical background

Variable	Formula	Theoretical background and expectation
Age	$Date_{listing} - Date_{establish.}$	On average, younger IPOs perform worse (Ritter, 1991) but may gain higher rewards.
Size	Ln($Assets$)	Natural logarithm of assets in € million, adjusted for inflation. Larger offerings are associated with better performance (Loughran and Ritter, 1995).
Leverage	$\frac{Debt}{Assets} * 100$	The probability of bankruptcy increases with leverage for all firms (Demers and Joos, 2007).
Profitability	$ROI = \frac{Ebit}{TotalAssets}$	Proxy for firms with greater efficiency and/or earning ability, which are expected to be more successful (Chemmanur and Paeglis, 2005).
Tobin's Q	$\frac{MV(E) - BV(E) + BV(A)}{BV(Assets)}$	Market-to-book ratio. For the numerator, we take the book value of total assets, subtract the book value of equity, and add the market value of equity. Indicator of how potential investors value the firm. The higher this ratio, the more of the firm's value arises from investors' willingness to gamble on its intangible assets.
Market momentum	$\frac{Num\_IPO_{t=-6mm}}{Tot\_Num\_IPO} * 100$	The empirical literature points to worse performance during hot markets, due to investors' overoptimism (Loughran and Ritter, 1995).
15day	$\mathrm{r}(Index_{t-15gg})$	The market index over the 15 days prior to the offer date. A favourable market sentiment is expected to lead to successful IPOs, as it reflects new investment opportunities (Lowry, 2003).
Underwriter rank	$\sum_{i=1}^{N} \frac{\#\ IPO_j}{\#\ IPO}$	For each IPO *i*, the underwriters *j* are ranked by market share, defined as the fraction of IPOs (Migliorati and Vismara, 2012) in which an underwriter was involved. A prestigious underwriter is associated with successful IPOs (Carter, Dark, and Singh, 1998).
VC backed	$Dummyvariable$	Venture capitalists have a positive effect on long-run performance (Megginson and Weiss, 1991).
Internet bubble	$Dummyvariable$	Set to one if the listing year is between January 1999 and December 2000 (Loughran and Ritter, 2004).
BHAR	$BHAR_{i,T} = \left[\prod_{t=1}^{\min(T,delist)} (1 + R_{i,t})\right] + \left[\prod_{t=1}^{\min(T,delist)} (1 + R_{M,t})\right]$	Stock price performance measured in terms of 1-, 2-, and 3-year Buy-and-Hold Abnormal Returns. These are calculated for stock *i* for horizon *T* as shown by the formula. $R_{i,t}$ is the return on stock *i* at time *t*, and $R_{M,t}$ is the raw return of the Industry Euromid index, where the industry of the target IPO is based on its 1-digit ICB (Industry Classification Benchmark) code. All returns are adjusted for dividends and other payouts. Min (*T*, delist) is the earlier of the 1-, 2-, or 3-year anniversary or the delisting date. Substantial returns are expected for top IPOs within the first three years of trading (Field and Lowry, 2009).

Table 4.2 Descriptive statistics

Variable	Mean	Median	Min	Max	Skewness	Kurtosis	Std Dev
Age	15.76	9.00	0.00	110.00	2.85	11.86	20.10
Assets	112.23	11.06	0.00	5,100.00	7.61	69.71	456.95
Leverage (%)	21.86	20.82	4.79	39.43	0.06	1.35	14.16
Profitability (%)	9.76	9.60	0.81	18.77	0.03	1.46	7.07
Tobin's Q	1.79	1.84	1.55	2.00	-0.22	1.40	0.18
Market momentum (%)	3.42	3.46	0.40	7.40	0.62	3.50	1.42
15day (%)	0.00	0.01	-0.12	0.09	-0.70	4.26	0.03
Underwriter rank (%)	9.99	4.90	0.00	62.16	2.67	8.75	16.34
VC backed (%)	40.55	0.00	0.00	100.00	0.38	1.15	49.12
Internet bubble (%)	37.04	0.00	0.00	100.00	0.54	1.29	48.31
BHAR (1-year)	-0.25	-1.42	18.16	5.22	46.70	1.38	-0.25
BHAR (2-year)	-0.50	-1.54	5.09	2.54	12.23	0.80	-0.50
BHAR (3-year)	-0.61	-2.00	24.23	9.78	134.54	1.55	-0.61

Table 4.2 presents summary statistics on the explanatory variables. The sample contains a wide variety of companies in terms of age, size, and the role of financial intermediaries. This sample population is consistent with the characteristics of European IPOs documented by Vismara *et al.* (2012). In terms of buy-and-hold returns (BHARs), the positive skewness means that the right tail of the distribution is fat and that extreme positive outcomes are more likely than in a standard normal distribution.

4.4 Empirical results

First, we present the set of univariate tests. We compare the explanatory variables of "winner" and "non-winner" IPOs at 1, 2, and 3 years after listing in Panels A, B, and C of Table 4.3 respectively. We test differences in means by using a t-test or z-test, as required, and test differences in medians using the Wilcoxon/Mann-Whitney U-tests (rank).

As expected, across all time horizons, "winner" IPOs are significantly more profitable than "non-winner-IPOs". The significance of the division in profitability increases with the time horizon. Moreover, 2 and 3 years after the IPO, "winner" IPOs are significantly larger and have significantly lower values of Tobin's Q in comparison to "non-winner" IPOs.

Table 4.3 Difference in means and median for winner and non winner-IPOs

Panel A: 1-year after IPO						
	Non Winner-IPOs (*n*=687)		Winner-IPOs (*n*=366)		Test for difference	
Variable	Mean	Median	Mean	Median	T/Z-test	ranksum
Age	16.14	9.00	15.04	9.00	0.84	-0.30
Assets	104.36	11.06	126.99	11.04	-0.77	-0.42
Leverage (%)	22.00	20.82	21.61	20.79	0.42	0.49
Profitability (%)	9.50	9.41	10.25	10.10	-1.66*	-1.68*
Tobin's Q	1.79	1.84	1.80	1.84	-0.78	-0.69
Market momentum (%)	3.47	3.46	3.33	3.38	1.59	1.61
15day (%)	0.27	0.56	0.42	0.60	-0.85	-0.72
Underwriter rank (%)	8.92	4.55	11.99	5.53	-2.92***	-3.04***
VC backed (%)	0.41	0.00	0.39	0.00	0.85	0.85
Internet bubble (%)	0.35	0.00	0.40	0.00	-1.67*	-1.67*
Panel B: 2-year after IPO						
	Non Winner-IPOs (*n*=758)		Winner-IPOs (*n*=295)		Test for difference	
Variable	Mean	Median	Mean	Median	T/Z-test	ranksum
Age	15.65	9.00	16.05	9.00	-0.29	-1.04
Assets	87.92	10.88	174.68	11.44	-2.78***	-1.08
Leverage (%)	21.74	20.56	22.19	21.24	-0.47	-0.65
Profitability (%)	9.42	9.31	10.64	10.54	-2.52**	-2.61***
Tobin's Q	1.80	1.85	1.78	1.79	2.08**	2.04**
Market momentum (%)	3.51	3.54	3.19	3.22	3.40***	3.52***
15day (%)	0.27	0.56	0.46	0.67	-1.02	-0.53
Underwriter rank (%)	9.65	4.90	10.87	4.97	-1.09	-0.46
VC backed (%)	0.42	0.00	0.38	0.00	1.07	1.07
Internet bubble (%)	0.38	0.00	0.35	0.00	0.75	0.75
Panel C: 3-year after IPO						
	Non Winner-IPOs (*n*=799)		Winner-IPOs (*n*=254)		Test for difference	
Variable	Mean	Median	Mean	Median	T/Z-test	ranksum
Age	15.69	9.00	15.97	9.00	-0.19	-1.82*
Assets	92.62	10.02	173.91	15.11	-2.48**	-2.67***
Leverage (%)	21.80	20.75	22.06	21.06	-0.25	-0.30
Profitability (%)	9.33	9.17	11.11	10.75	-3.52***	-3.52***
Tobin's Q	1.80	1.85	1.77	1.78	2.18**	1.85*
Market momentum (%)	3.49	3.52	3.22	3.25	2.61***	2.84***
15day (%)	0.34	0.56	0.25	0.52	0.45	0.79
Underwriter rank (%)	9.60	4.90	11.20	4.97	-1.36	-0.79
VC backed (%)	0.42	0.00	0.35	0.00	2.05**	2.05**
Internet bubble (%)	0.39	0.00	0.30	0.00	2.55**	2.55**

The column entitled Test of differences reports test statistics based on two-sample *t*-test's or *z*-test's for differences in means, and the Wilcoxon-Mann-Whitney test for differences in medians. Significance level at 1% (***), 5% (**) and 10% (*).

In terms of market characteristics, rapid run-ups in valuations driven by favourable market conditions negatively affect the probability of being a "winner-IPO" over medium or long time horizons. Specifically, market momentum reduces the probability to be a "winner-IPO" measured at 2 and 3 years after the IPO (at better than 1% significance, in both means and medians). Similarly, the internet bubble reduces the probability of being a "winner-IPO" 3 years after the offering (at better than 5% significance, in both means and medians) but increases the probability 1 year after the listing (at better than 10% significance).

Lastly, in terms of the ability of third-party intermediaries, being affiliated with a prestigious underwriter increases the probability of being a "winner-IPO" 1 year after the offering (1% significance, in both means and medians), while being venture-backed acts in the opposite way over long time horizons (5% significance, 3 years after the listing).

Overall, these results suggest that at shorter time horizons, variables like underwriter prestige and market conditions significantly affect the probability to be a "winner" IPO, while fundamentals-related variables such as profitability, firm-size or Tobin's Q (that is a proxy for overvaluation) are more relevant at longer time horizons.

While the univariate analysis summarized in Table 4.3 documents some key differences between the characteristics of "winner" and "non-winner" IPOs, a multivariate analysis is required to forecast winners and determine which explanatory variables are really important to long-run performance. As previously described, our parsimonious, logit-based forecasting model (see "Methodology") uses the jackknife method to maximize utilization of the sample.[10] First, we randomly exclude one observation from the sample. Second, we perform a logistic regression to estimate the coefficients of the independent variables. Third, using the estimated coefficients, we predict the out-of-sample probability that the excluded observation is a "winner-IPO". We repeat this procedure

[10] The logistic distribution is mathematically formulated as follows:

$$\mathrm{Prob}(\mathrm{Y}=1|\mathrm{X}) = \frac{e^{\beta^{\mathrm{T}}\mathrm{X}}}{1+e^{\beta^{\mathrm{T}}\mathrm{X}}} = +1\beta^{\mathrm{T}}\mathrm{X})$$

Where X is the vector of independent variables and β is the vector of their coefficients. After the first estimation, based on the method of maximum likelihood, we obtain the fitted parameters. The second step is the computation of the forecasting values using those estimated parameters, as follows: $\widehat{\mathrm{Y}} = \widehat{\mathrm{Prob}}(\mathrm{Y}=1|\mathrm{X}) = 1\hat{\beta}^{\mathrm{T}}\mathrm{X})$. The result is the forecasted probability of being a "winner-IPO".

for all the sample observations, and for each explanatory variable we take the mean of all regressions to obtain the coefficient of the final forecasting model.

The results of the regressions are shown in Table 4.4. Models (1), (2) and (3) report the regression results 1, 2 and 3 years after listing respectively. These models include only a subset of the independent variables described in Table 4.1, selected by the AIC technique[11] to ensure a parsimonious estimation.

The multivariate analysis confirms the importance of the variables pointed out in the previous section. Across all three time horizons, market momentum is statistically significant and has a negative effect on the probability of being a "winner" IPO. One year after listing, the coefficient of our proxy for underwriter prestige is positive and highly significant (better than 1%). However, underwriter prestige no longer predicts winners 2 and 3 years after the IPO. Size and profitability become relevant 2 years after listing, and both have a positive impact on the probability of being a "winner-IPO".

The last section of Table 4.4 reports the model performance. Small *p*-values for the reported Hosmer-Lemeshow[12] goodness-of-fit statistic indicate that there is insufficient evidence in the sample data to support the alternative hypothesis that the models do not fit the data well. Moreover, all three models have areas under the ROC curve greater than the critical threshold of 0.5.

[11] To select the best subset of predictors, the AIC technique is performed up to the minimization of the AIC value.
[12] Details of this statistic are described in Section 3.2, "Research methodology".

Table 4.4 Parsimonious forecasting model

	(1) 1-year		(2) 2-year		(3) 3-year	
Intercept	-0.62	(-2.45)	0.51	(0.58)	-1.53***	(-3.54)
Size	—		0.11**	(2.12)	0.22***	(3.91)
Profitability	—		2.16**	(2.02)	3.35***	(2.84)
Tobin's Q	—		-0.63	(-1.51)	—	
Market momentum	-9.22*	(-1.74)	-22.34***	(-3.81)	-11.8*	(-1.91)
15day	2.37	(0.99)	—		—	
Underwriter rank	1.44***	(2.91)	—		—	
VC backed	—		—		-0.29*	(-1.72)
Internet bubble	0.07	(0.39)	0.32	(1.56)	-0.11	(-0.48)
Log Likelihood	-667.8		-572.0		-519.6	
Pseudo R^2 (%)	8.35		8.36		10.6	
Hosmer-Lemeshow χ^2	13.32		6.79		5.09	
Hosmer-Lemeshow *p*-val	0.1012		0.5594		0.748	
ROC area	0.601		0.694		0.7232	

The dependent variable is one for 'winner-IPOs'. Significance level at 1% (***), 5% (**) and 10% (*).

Table 4.5 reports the results of the out-of-sample analyses.[13] First, we test the predictive ability of the models using different cutoff probabilities (Table 4.5). That is, we compare the *true* probability of each IPO being a "winner", to its ex-post, out-of-sample forecasted probability. We define the rate of correct predictions as the ratio between the number of times the out-of-sample company is correctly identified as a "winner" and the total number of winner-IPOs in the sample. The forecasting ability of the model depends on the cutoff chosen for discretizing the continuous forecast probability. For example, we correctly forecast "winner" IPOs 81.15% of the time when using a cutoff equal to 0.25. As expected, for a given cutoff probability, the models with shorter time horizons are more powerful.

We adjust the winner-IPO correct prediction rate for type II errors: the number of predicted winner-IPOs that were not winner-IPOs. The adjusted prediction rate is defined as the ratio of correct predictions (winner-IPOs classified as winner-IPOs) to the total number of IPOs classified as winner-IPOs (wrongly or rightly). This result shows that our forecasting model significantly out-performs a naïve assumption that all IPOs in the sample are winners. For instance, an investor using our forecasting model would

[13] In unreported results, we perform the same analysis using the forecasting model that includes the full set of explanatory variables. The complete model produces the same results.

have an adjusted rate of successful predictions between 42.92% and 49.44%, compared to a naïve investor's 34.76%.

Table 4.5 Out-of-sample analyses applied to the parsimonious model

Year	Cutoff	Winner-IPOs correct rate (%)	Error Type II	Adjusted rate (%)	Naïf rate (%)	Winner IPOs		Non Winner-IPOs		Test of differences
						N	BHAR	N	BHAR	t-stat
1										
	0.25	81.15	57.49	42.92	*34.76*	692	0.19	361	-0.02	2.36**
	0.30	77.60	50.80	44.87		633	0.21	420	-0.01	-2.52**
	0.35	69.13	42.94	46.17		548	0.21	505	0.02	-2.24**
	0.40	59.56	32.45	49.44		441	0.31	612	-0.02	-3.78***
2										
	0.25	72.20	50.00	31.46	*28.02*	454	-0.25	349	-0.37	-1.97**
	0.30	61.69	38.52	33.74		369	-0.21	434	-0.38	-3.00***
	0.35	50.17	27.44	36.76		286	-0.16	517	-0.38	-3.90***
	0.40	32.54	17.15	37.62		189	-0.08	614	-0.37	-4.45***
3										
	0.25	64.96	34.29	37.59	*24.12*	439	-0.07	614	-0.48	-4.36***
	0.30	54.72	26.28	39.83		349	0.03	704	-0.48	-5.05***
	0.35	42.52	19.77	40.61		266	-0.01	787	-0.41	-3.72***
	0.40	30.71	12.64	43.58		179	0.12	874	-0.40	-4.10***

The column entitled Test of differences reports test statistics based on two-sample *t*-test's or *z*-test's for differences in means. Significance level at 1% (***), 5% (**) and 10% (*).

Finally, we report the average performance of two equal-weighted portfolios of stocks selected as "winner-IPOs" or not "winner-IPOs" on the basis of our model. We find a marked difference in the average equal-weighted buy-and-hold returns of the two portfolios. The average performance of the "winner-IPOs" portfolio is persistently higher for all cutoff probabilities tested, and across all time horizons. For instance, using a cutoff probability of 0.25, the average performance of the "winner-IPOs" portfolio is 19% while the other portfolio shows returns of –2% (the difference is significant at better than the 1% level). Note that both portfolios contain winners and losers, since the selection of stocks is based entirely on the model forecast. However, the "winner-IPO" portfolio contains a higher proportion of winners.

4.5 Conclusions

While the previous literature on IPO performance is rich, limited research has been devoted to the conditions of success for newly listed companies. Several methodologies have been employed to measure IPO performance, but most of them focus on the distribution average. This paper proposes a methodology based on a quantitative definition of "winner" IPOs, and employs logistic regressions to forecast the out-of-sample probability that an issuer is a "winner" 1, 2 or 3 years after listing, using only publicly available information.

Cherry-picking "winner IPOs" would provide extremely high rewards, because the mean return usually exceeds the median (a few large winners raise the average). Employing a binary model for IPO success allows us to identify a small number of cases ("top performers") that lie in the right-hand tail of the distribution, a much easier task than trying to predict the returns of individual IPOs. To this end we apply a logistic regression, whose distribution has considerably heavier tails than a normal regression.

As in Bhabra and Pettway (2003) and Field and Lowry (2009), readily available public information may be useful for identifying first with better IPO-performance or survival probabilities. The empirical analysis of this paper shows that IPOs listed with favourable "market IPO", a proxy for periods with significantly more new issues, are less likely to be winners at medium or long time horizons (2 or 3 years after the offering). Firm size and profitability act in the opposite direction, increasing the probability to be winner at in the long term. In the short term, being affiliated with a prestigious underwriter has a positive effect on the probability to be a winner.

The methodology used in this research could provide a guideline for similar financial forecasting studies. For instance, an important challenge for investors is to convince themselves that when screening stocks, they are not leaving out firms that will significantly out-perform in the following years, compared to a control portfolio.

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