

The Cost of Going Public: A European Perspective

Michele Meoli^{#1}, Katrin Migliorati^{#2}, Stefano Paleari^{#3}, Silvio Vismara^{#4}

^{#1}CCSE, University of Bergamo, Italy

University of Augsburg, Germany

University of Bergamo Viale G., Italy

¹michele.meoli@unibg.it; ²katrin.migliorati@unibg.it; ³stefano.paleari@unibg.it; ⁴silvio.vismara@unibg.it

Abstract-This paper questions whether the segmentation in the European IPO market plays a role in determining the cost of going public. Precisely, we compare the commissions charged by underwriters to firms listing on the stock markets of the four largest European economies. Coherently with previous results, we document the existence of a non-linear relationship between the cost-variables and the amount of capital raised with a different effect depending on the item cost considered. We find that the market structure affects the level of underwriter commissions and the prestige of the underwriter. We also investigate whether underwriters who charge high spreads are also able to leave more money on the table. Results are robust for endogeneity between underwriter commission and underpricing.

Keywords-IPOs; Going Public Decision; Underwriting Fees; European Stock Markets; Segmentation

I. INTRODUCTION

One of the most striking puzzles analysed both in the IPO literatures and in the business world is the level of underwriting fees. The attention was initially raised by the seminal work by [10], who find a higher clustered level of spreads (i.e., the 'seven percent solution') charged in the US markets. Reference [16] uses a number of different tests to conclude that the seven percent gross spreads are unlikely to be collusive and they are part of a standardized IPO contract where the true competition takes place on quality. Related issues show conflicting evidence on whether the market for underwriter services is competitive or oligopolistic. A recent contribution from [22] documents an evolution of the IPO underwriting market from price to non-price competition, which is mainly supported by the evidence of clustered gross spreads.

In this paper we focus on the European context, where competition is strictly related to the market segmentation. Internationally, as in [39], it has been documented the existence of a country effect on the clustering of gross spread at a national market level. In Europe, fees are lower and depend on the context of each market (e.g. [36], [32]). Recently, reference [1] supports a potential explanation for the gap between European and U.S. IPO fees with different nature in competition, with the conclusion that strategic pricing occurs in the U.S. but not in Europe.

The first contribution of this paper is to assess whether the fragmentation of the IPO market in Europe, on a country and market segment basis, affects the level of fees in European IPOs. Second, we compare different stock exchanges, thanks to a hand-collect data on the costs of going public that allows us to assemble a straightforward definition of 'underwriting costs'. The research shows that the underwriter compensation in Europe is related to a 'flat fee' and an 'underwriting commission' on which some determinants result in having different effect. Third, this paper considers the existence of simultaneous relationship among the underwriting

commission and the underpricing (e.g. [39], [24], [7]). A recent contribute in the literature suggests that gross spreads are complements rather than substitutes for underpricing in the US ([20]). We investigate whether European underwriters who charge high spreads are able to leave more money on the table.

The remainder of the paper is organized as follows. The section II provides a theoretical framework. In section III we present samples and variable descriptions. Next we show the empirical results. In addition, we examine the joint determination of underpricing and the underwriter commission by using 2SLS methodology. Finally, Section V gives a conclusion.

II. THEORETICAL BACKGROUND

The cost of going public relies on direct and indirect costs. Basically, the gross spread, which may eventually include warrants and over-allotment options, is the most relevant among direct costs. On the other side, the underpricing is an opportunity cost to a firm going public (e.g. [33]). Historically, a trade-off between these two cost-dimensions has been documented (e.g. [39]). Investment bankers and issuers may determine direct and indirect costs of new issues jointly, as suggested in [34] or [10]. A recent contribution by [20], based on a U.S. IPOs sample from 1980-2000, documented that gross spreads are complements rather than substitutes for underpricing after controlling for endogeneity between underpricing and gross spread by employing a 3SLS methodology.

Overall, gross spreads result is related with various factors. A key determinant is the IPO size typically proxied by the natural logarithm of gross proceeds. A negative relationship between these two variables has been documented in the US (e.g. [31], [17], [21], [4]). Possible explanations for this evidence regard the presence of fixed costs (related for example to prospectus preparation, investor marketing or legal advice) that turn out to be less significant as the offering that becomes larger and thus also the gross spread (measured in percentage terms), the view of size as a proxy for the risk, the higher level of competition among investment banks which are attracted by largest IPO as the costs to the bank vary relatively little with the size of the IPO. Some different results are also documented. For instance, reference [2] argues that any given issuer faces increasing gross spreads after an optimum size range. Specifically, they support a U-shaped function for the underwriter spread, which is theoretically justified for the presence of fixed costs that cause scale economies initially. But when the issue size increases, diseconomies of scale arise in the spread due to the rising of placement costs. Using European data, reference [7] finds support to the economies-of-scale hypothesis and shows a

negative relationship between the gross spread and the gross proceeds in the French market.

Another key difference between Europe and the US concerns the privatizations. Gross spreads are found to be significantly low for privatisation IPOs, even when controlling for the size effect ([36]). Privatisations imply a major control by the national government, whose bargaining power may lead to smaller gross spreads and to lower quality underwriting services in the issues managed by small local banks.

Some studies consider the roles of underpricing and gross spreads together with the participation ratio (the number of existing shares sold) and the dilution factor (shares newly created). Higher percentages of secondary and primary shares sold may lead to higher costs paid to underwriter to guarantee lower underpricing and limit losses ([15]). Reference [25] suggests that it is harder for issuers characterized by a larger percentage of sold shares to bargain to have less underpricing resulting in higher fees.

The effect of the underwriter reputation on gross spreads is ambiguous. Some contributes show that more prestigious underwriters charge higher fees due to their reputation (e.g. [19], [3], [4]), while other studies support a negative relation that stands against the idea of a 'fee premium' (e.g. [17], [23], respectively in IPO market and bond underwriting market). Reference [13], after controlling for endogeneity in issuer-

underwriter matching, finds that in corporate bond market, reputable banks obtain higher prices (higher quality services) but charge higher fees, with higher net proceeds as a result.

Building on this prior research, we therefore posit these following questions:

Research question 1: What relationship is there between the underwriting costs and its determinants?

Research question 2: Does the fragmentation of European stock markets affect the costs of going public?

Research question 3: Are higher spreads charged by IPO underwriters related to more money 'left on the table'?

III. SAMPLE AND RESEARCH METHODS

The sample of IPOs is drawn from the EURIPO database, as described in [38]. The period under consideration runs from January 1995 to December 2009. Part of the contribution of this study is to provide an updated analysis of how much is earned by the underwriter of an IPO in one of the four European stock exchanges. Based on these data, we consider an initial sample of 3,755 companies that went public in Germany, UK, France, or Italy. The final sample, with available full data, consists of 1,858 observations when considering information on 'underwriting costs' and 2,141 for 'total costs'. Details on how we collect information on cost-variables are given in Data Appendix A.

TABLE I
DEFINITION OF THE VARIABLES

Variable	Definition	Theoretical background and expectation
Underwriter prestige	Carter-Manaster rank	'Reputational discount' ([23]) vs higher quality services ([13]).
Underpricing	Difference between 1 st day and offer price (%)	Quality/price trade-off ([39]) vs a complementary hypothesis ([20]). Mixed effects due to underwriter prestige ([9]).
1/Issue Size	Inverse of Proceeds	Proxy for the fixed cost component of underwriter spreads: a positive relation is expected due to initial economies of scales ([12]).
Issue Size/MktCap	Proceeds over pre-issue MV	Proxy for the variable cost component of underwriting spreads: a positive sign is expected due to the increase of diseconomies of scale for rising placement costs as the issue size increases, ([12]).
Dilution factor	New shares sold (%)	Positive relationship supporting the signalling role ([7]).
Participatio ratio	Existing share sold (%)	The gross spread increases with the percentage of secondary shares sold (signalling role) and the effect is significantly higher compared to that of dilution factor ([7]).
Privatization	Dummy	The government bargaining power lead privatizations to smaller gross spreads ([36]).
Market momentum	Num of IPOs (-6mm) (%)	Control variable for market conditions on pricing IPO shares ([24]).
Market sentiment	Euromid index return (-15dd)	The market index in the 15 days prior to the offer date. Worse market conditions lead to harder bargaining by issuers resulting in lower costs ([25]).
Age	Date (listing – establish.) (yy)	Control variable proxy for the effect that younger firms are expected to be riskier.
Firm size	Ln(Asset)	Control variable proxy for the risk ([14]).
Leverage	Debt/Tot Asset	Control variable proxy for less growth-oriented firms ([28]).
Profitability	Ebit/Tot Asset	Control variable proxy for more efficient firms ([8]).

Underwriter prestige is based on Carter-Manaster underwriter reputation ranking as updated on the Jay Ritter's website. Underwriters without reported Carter-Manaster rankings are assigned a value of zero, reflecting their low level of involvement in new issue underwriting. In robustness checks we use as alternative measure the rank based on underwriter market share as in [27]. This rank is based on the IPO proceeds of offers underwritten by the lead underwriter j with respect to the total IPO proceeds of the original sample (expressed in percentage). Both underwriter prestige variables are constructed using all data available in Euripo database from 1995 to 2009. Market momentum is based on all data available in Euripo database from 1995 to 2009. Firm size is adjusted for inflation. In robustness checks profitability is defined in an alternative way, as ROA (EBITDA over total asset, as in [8]).

The definition and the theoretical background of the explanatory variables are summarized in Table 1.

The 'underwriting costs' is the main dependent variable in this study. It reflects the fees that firms pay to the underwriter when raising capital for the first time. In the following sections we discuss on its potential determinants.

A. Primary Explanatory Variables

The first explanatory variable is the underpricing. According to the literature, this factor has an ambiguous effect on the underwriter fees in a non-US context. We control the possibility of an endogenous relationship between these two item costs (e.g. [39], [24], [7]).

The extant evidence shows that IPO underwriter spread follows a U-shaped function of the amount of new capital raised: fixed costs cause scale economies initially but as issue size increases, diseconomies of scale arise in the spread due to rising placement costs (e.g. [2], [12]). To capture this effect, we include the inverse of issue size in terms of inflation-adjusted IPO proceeds and the ratio between the IPO Proceeds and the pre-issue market value of equity. The reputational capital of underwriters does matter in the pricing-fees game. We adopt different approaches to rank underwriters. Firstly, we apply a rank measure based on [5]¹. Secondly, we apply the measure based on the underwriter market share as proposed in [27].

B. Control Variables

Consistent with previous studies, empirical tests control three sets of variables related to firm and offering characteristics, market momentum, market specificity and country effects.

Firm and offering characteristics. We include firm size and age at the IPO as proxies for the risk (e.g. [14]); profitability and leverage to control issuer-specific characteristics (e.g. [39]). Finally, we include a privatization dummy variable to control the different specific political objectives (e.g. [36]).

Market momentum. The regression considers a set of determinants related to market conditions before the offering. Reference [25] develops a prospect theory, according to which, worse market conditions lead to harder bargaining by the issuers and result in lower costs. We define (1) the number of issues in the six months prior to the IPO year as a proxy for market momentum (e.g. [11]), (2) the market index in the 15 days prior to the offer date for the market sentiment and (3) the internet bubble dummy equal to 1 if the IPO occurs in January 1999–December 2000, zero otherwise (e.g. [26]).

Market specificity and country effects. We control industry (based on the 1-digit Industry Classification Benchmark), stock exchange and market segment-specificity (e.g. [38], [32]).

IV. EMPIRICAL RESULTS

A. Descriptive Statistics

Our first empirical analysis aims to investigate the role of European fragmentation from a cost perspective. We posit that the nature of European stock markets from both a country and segment bases does matter in the cost of going public with a particular focus on the fees charged by the underwriters ([30]). Preliminary evidence is provided by the statistics presented in Table 2. We report the mean of total costs and underwriting costs, and split them into flat fee and underwriting commission.

Descriptive statistics exhibit an average underwriting cost of 5.36% which results in being driven by a country-effect. We test for difference between a single country and the rest of the sample. Analyzing more details of the stock exchanges, we find an average underwriting cost of 3.89%, 4.90%, 3.98% and 5.64% for Paris B. / Euronext, Deutsche Börse, Borsa Italiana and London S.E.. This high value of London is basically explained by the relevance of flat fees for IPOs on

the AIM market. Focusing on the underwriting commission we get 2.87% on average, with Paris B. / Euronext, equal to 3.82%, Deutsche Börse has an average of 4.60%, Borsa Italiana gets 3.97% and London S.E. 2.45%. As documented in [36]² and in [1]³, we find the UK IPOs being relatively cheap, and German, French and Italian IPOs relatively expensive. Looking to the segment specificity, we find significantly higher costs for the London-based AIM: here, the investment bank (called ‘Nomad’) is meant to cover the critical role of seriously vetting and testing suitability. Moreover, in Germany⁴, Italy and Paris B. / Euronext we find higher costs for the second markets.⁵

Panel A of Table 3 includes the descriptive statistics for the explanatory variables employed in the basis regressions. Considering the sample in which underwriting cost is the dependent variable, the quality ranking of underwriters is equal to 2.12, which is strongly lower than prior results in U.S. but consistent with European contribution (e.g. [7]). This reflects the potential existence of a large number of less prestigious underwriters in non-U.S. markets, but it could also be related to biased reputation metrics that do not take into account the specificity of European markets. The underpricing is equal to 20.0% on average, and is positively skewed when compared to its median value of 10% (respectively 22.8% and 9.80% in [7]).

Much of the amount raised represents a capital increase. On average, initial owners sell only 8.41% of their shares (8.8% in [7]), while shares outstanding increases by 41.64% (26.3% in [7]). In line with this, 3.8% of the sample is purely secondary offerings, and 55.4% purely primary offerings. Descriptive statistics show that 24% of firms went public during the hot-issue period (1999-2000). Finally, the total number of IPOs completed in the previous six months, expressed as a percentage of the total number of sample listing firms, is 3.24%.

As in [1], we find that the same players have similar commission, which is around 3-4%. Deutsche Bank and ABN AMBRO are not presented in our list according to the rank of proceeds, but by checking the average commission we find 3.77% and 3.01% respectively (not reported in this Table), coherently with the values of 3.70% and 3.26% documented by [1]. Panel B lists the top ten banks using the stock market exchange as a benchmark. We document the presence of different players depending on the markets. Moreover, when the same bank operates in different markets, the power that drives the level of fees seems to be related to the benchmark more than to the bank (e.g. Goldman Sachs reports an average commission of 2.73%, 3.76%, 3.23% and 3.65% in Paris B. / Euronext, Deutsche Börse, Borsa Italiana and London S.E.).

² This study documents an average gross spread of 3.54% given by the average of values found in Belgium, Netherlands, Portugal and France (2.8%, 4.25%, 3.51% and 3.59%, respectively); an average gross spread of 4.65% in Germany; 3.64% in U.K. and 3.86% in Italy.

³ The authors check for difference across European countries using country dummies in the regression on spread and find the UK IPOs being relatively cheap, while German and French IPOs more expensive.

⁴ This study documents an average gross spread of 4.04% in Germany excl. Neuer Markt, while the Neuer Markt only gets 5.26%.

⁵ Nouveau Marché and Second Marché for France; Neuer Markt and Geregelter Markt for Germany; and Nuovo Mercato – Mtax and Expandi for Italy ([6]).

¹ We thank Jay Ritter for making his data publicly updated available at http://bear.warrington.ufl.edu/ritter/uw_rank8009.xls.

TABLE II THE COSTS OF GOING PUBLIC IN EUROPE

Panel A: Pan-European level								
Variable (%)	All		Main		Snd			
Total costs	17.5			16.81				6.69***
Underwriting costs	5.36			3.48***				5.04
Flat fee	2.41			0.73***				0.01**
Underwriting commission	2.87			2.71**				4.9***
Panel B: Stock-Exchange level								
	Paris B. / Euronext				Deutsche Börse			
Variable (%)	All	Main	Snd	Exch.	All	Main	Snd	Exch.
Total costs	5.46*	4.75***	8.14	8.28**	10.02***	9.12	7.30***	36.33***
Underwriting costs	3.89**	2.80***	5.25***	2.93	4.90	3.56***	5.25***	5.86
Flat fee	0.05***	0	0	0.39***	0.02***	0.10***	0***	0
Underwriting commission	3.82***	2.8***	5.22***	2.54*	4.6***	3.35***	5.04***	4.24
	Borsa Italiana				London Stock Exchange			
Variable (%)	All	Main	Snd	Exch.	All	Main	Snd	Exch.
Total costs	4.10***	3.26**	5.22**	-	19.69***	21.28	-	19.26
Underwriting costs	3.98***	3.73***	4.43***	-	5.64***	3.43***	-	6.28***
Flat fee	0.01**	0**	0.02**	-	3.13***	1.12***	-	3.71***
Underwriting commission	3.97***	3.73***	4.41***	-	2.45***	2.27**	-	2.51**

Underwriter fees in European IPOs are disclosed as total costs that refer to the total estimated expenses of the Placing, and underwriting costs that includes all fees which are paid to the underwriter (bookrunner). Specifically, this last item cost consists of a Flat fee, which refers to the corporate fee a firm pays to the investment bank and an Underwriting commission or spread that is calculated as a percentage of proceeds as disclosed in the prospectuses. Paris B. / Euronext stock exchange accounts for approximately 2% of the sample, Deutsche Börse for 10%, London S.E. for 80% and Borsa Italiana for 7%, respectively. This table reports descriptive statistics for the different dependent variables. See Data Appendix A for details on how we elaborate it. In columns "All" the stars refer to tests for difference between a single country and the rest of the sample. In columns "Main/Second and Exchange-regulated" the stars refer to tests for difference between a single market segment and the rest of the stock market considered. Underwriting costs are winsorized at the 2.5 and 97.5 percentiles to reduce the effect of outliers. Total costs are winsorized at the 1 and 99 percentiles to reduce the effect of outliers. Significance level at 1% (***), 5% (**) and 10% (*).

In Panel B of Table 3, we report correlations between underpricing and the cost-variables. A significant positive

correlation is found with the flat fee and a negative one with the underwriting commission.

TABLE III DESCRIPTIVE STATISTICS FOR CONTROL VARIABLES AND PEARSON CORRELATIONS

<i>Panel A: Descriptive statistics</i>						
Variable	Underwriting costs as dependent variable (obs. 1,858)			Total costs as dependent variable (obs. 2,141)		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
<i>Offering characteristics</i>						
Underwriter prestige	2.12	0.00	3.64	1.63	0.00	3.28
Underpricing	0.20	0.10	0.33	0.20	0.10	0.33
<i>Firm characteristics</i>						
Issue Size/MktCap	0.84	0.42	1.51	0.82	0.41	1.53
Dilution factor	41.64	33.33	30.18	40.42	32.21	30.29
Participation ratio	8.41	0.00	13.52	7.77	0.00	12.50
Privatization	0.48	0.00	0.50	0.43	0.00	0.50
<i>Market conditions</i>						
Market momentum	3.24	3.32	1.49	3.27	3.36	1.42
Market sentiment	0.00	0.01	0.03	0.00	0.01	0.03
Internet bubble	0.24	0.00	0.43	0.23	0.00	0.41
<i>Panel B: Pearson correlations</i>						
	Underwriting costs	Flat fee	Underwriting commission	Underpricing	Total costs	Underpricing
Underwriting costs	1				Total costs	1
Flat fee	0.84	1			Underpricing	-0.02
Underwriting commission	0.27	-0.19	1			1
Underpricing	0.07	0.11	-0.08	1		

Sample contains 1,858 IPOs where underwriting costs are available and 2,141 where total costs are available, together with explanatory variables, over the period 1995-2009. All explanatory variables are defined in Table 1. See Data Appendix A for details on cost-variables. Observations are winsorized at the 2.5 and 97.5 percentiles to reduce the effect of outliers as in Graham et al. (2003). Significance level at 1% (***), 5% (**) and 10% (*). Correlations above .04 are significant at .05 level; above .06 are significant at .01 level in the sample based on 1,858 obs. Correlations above .04 are significant at .05 level; above .05 are significant at .01 level in the sample based on 2,141 obs. Underwriter prestige and Market momentum are based on all data available in Euripo database from 1995 to 2009. Dilution factor is winsorized at 10%.

We list the top ten banks by proceeds and we report the mean of underwriting flat fee, underwriting commission and

total costs. Panel A of Table 4 shows the results on a pan-European level.

TABLE IV TOP TEN EUROPEAN UNDERWRITERS BY PROCEEDS

Panel A: Top ten underwriters on a pan-European basis						
Rank	Underwriter	Flat fees (%)		Underwriting commissions (%)	Total Proceeds (€m)	Proceeds (%)
1	Goldman Sachs	0.98		3.52	33,536.36	20.08
2	Bank of America Merrill Lynch	0.00		3.25	24,144.91	14.46
3	Morgan Stanley	0.28		4.05	21,688.95	12.99
4	Citigroup	0.21		3.54	19,873.77	11.90
5	Mediobanca	0.00		3.60	18,924.54	11.33
6	Commerzbank	0.26		3.49	18,564.37	11.12
7	Credit Suisse Securities	0.12		3.60	17,161.35	10.28
8	UBS	0.38		3.38	16,193.77	9.70
9	JPMorgan	0.45		2.63	14,787.02	8.85
10	Intesa Sanpaolo	0.02		4.01	12,648.38	7.57
Panel B: Top ten underwriters by stock exchange						
Paris B. / Euronext				Deutsche Börse		
Rank	Underwriter	Spread (%)	Proceeds (%)	Underwriter	Spread(%)	Proceeds (%)
1	Société Générale	2.89	31.0	Deutsche Bank	3.96	34.7
2	Morgan Stanley	3.18	27.8	Commerzbank	4.17	26.5
3	Commerzbank	2.30	21.6	Goldman Sachs	3.76	25.4
4	Crédit Agricole	3.60	18.7	UBS	3.77	17.7
5	Goldman Sachs	2.73	17.9	Morgan Stanley	4.07	16.2
6	Credit Suisse	5.70	14.0	Credit Suisse	3.74	11.6
7	HSBC	3.01	13.8	JPMorgan	1.55	8.6
8	BNP Paribas	4.28	11.2	Unicredit	4.52	7.0
9	Credit Lyoaise	3.17	8.7	Landesbanken	5.15	6.6
10	Caixa	0.50	7.4	Bank of America Merrill Lynch	4.44	5.6
Borsa Italiana				London Stock Exchange		
Rank	Underwriter	Spread (%)	Proceeds (%)	Underwriter	Spread(%)	Proceeds (%)
1	Mediobanca	3.60	51.79	Goldman Sachs	3.65	23.7
2	Bank of America Merrill Lynch	3.35	37.94	Citigroup	2.68	19.8
3	Intesa Sanpaolo	4.01	34.62	UBS	3.18	11.3
4	Unicredit	3.95	12.16	JPMorgan	2.50	11.1
5	Goldman Sachs	3.23	9.62	Morgan Stanley	4.24	10.3
6	Credit Suisse	3.83	9.33	Credit Suisse	2.98	9.4
7	JPMorgan	3.34	8.69	Bank of America Merrill Lynch	3.15	9.3
8	Morgan Stanley	3.75	8.26	Commerzbank	2.22	8.9
9	UBS	3.56	7.17	Collins Stewart	3.13	4.1
10	Citigroup	3.81	6.36	Société Générale	2.01	4.1

The sample contains 1,985 IPOs, spanning the period 1995-2009 where underwriting costs and proceeds data are available. IPO proceeds exclude any over-allotment options and are reported in 2009 €. See Data Appendix A for details on cost-variables. This Table reports the top 10 underwriters ranked by proceeds on a pan-European basis in Panel A and by stock-exchange in Panel B. We sum the total proceeds according to the underwriter(s) for European IPOs. When more than one lead underwriter underwrites an issue, we give full credit (full proceeds) to co-leads. We include the deals transacted by underwriters that were acquired during the sample period into the total for the parent investment bank in the relevant market (e.g. Dresdner is acquired by Commerzbank in 2009). The reported mean cost-item (flat fees or underwriting commission (spread)) is the simple (unweighted) average across all the IPOs conducted by each investment bank. Cost-variables are winsorized at the 1 and 99 percentiles to reduce the effect of outliers.

B. The Cost of Going Public and its Determinants

Table 5 reports the results of the European IPO compensation defined using different cost-items. Specifically, models (1)-(4) include the ordinary least squares (OLS) regressions of total costs, underwriting costs, flat fee and

underwriting commission. All models in Table 5 exhibit considerable explanatory power with adjusted R² around 25%.

TABLE V DETERMINANTS OF FEES CHARGED BY IPO UNDERWRITERS

		(1) Total costs		(2) Underwriting costs		(3) Flat fees		(4) Underwriting Commission	
Explanatory Variables	Underwriter prestige	0.108	(0.532)	0.021	(0.931)	-0.040**	(-2.438)	0.055***	(4.525)
	Underpricing	-5.731***	(-3.712)	-0.564*	(-1.745)	-0.006	(-0.027)	-0.505***	(-3.727)
	1/Issue size (€m)	17.608***	(7.927)	4.940***	(8.029)	4.984***	(10.567)	-0.826***	(-6.499)
	Issue size/MktCap	0.836	(1.340)	0.001	(0.015)	0.026	(0.440)	-0.067*	(-1.944)
	Dilution (%)	-0.095***	(-3.751)	-0.015***	(-3.222)	-0.013***	(-3.472)	0.002	(0.969)
	Participation (%)	-0.370***	(-7.615)	-0.042***	(-6.273)	-0.026***	(-5.163)	-0.011***	(-3.468)
	Privatization	-3.713***	(-2.715)	0.167	(0.763)	0.520***	(3.173)	-0.332***	(-3.531)
	Market momentum	2.202***	(4.951)	0.158*	(1.948)	0.033	(0.548)	0.069**	(2.055)
	Market sentiment	2.839	(0.141)	-1.525	(-0.415)	0.972	(0.361)	-2.087	(-1.363)
Industry Dummies	Internet Bubble	0.019	(0.012)	-0.126	(-0.473)	0.052	(0.267)	0.038	(0.305)
	Industrials	-2.614*	(-1.795)	-0.008	(-0.030)	0.254	(1.235)	-0.084	(-0.721)
	Healthcare	-2.054	(-0.978)	0.587*	(1.700)	0.517*	(1.862)	0.252*	(1.677)
	Consumer services	-1.632	(-1.045)	-0.263	(-0.925)	0.196	(0.988)	-0.402***	(-3.447)
Stock Exchange Dummies	Telecommunications	-4.893*	(-1.719)	-0.172	(-0.263)	-0.391	(-0.944)	0.107	(0.392)
	Deutsche Börse	3.327	(1.356)	1.081***	(3.073)	0.206	(0.996)	0.258	(1.139)
	London S.E.	13.953***	(8.486)	0.411	(1.086)	1.218***	(4.518)	-0.745***	(-3.360)
	Borsa Italiana	-2.847*	(-1.957)	0.495*	(1.674)	0.254	(1.171)	0.269	(1.329)
Market Segment Dummies	Second	-9.150***	(-4.227)	0.811***	(2.856)	-0.092	(-0.684)	1.232***	(7.497)
	Exch-reg.	-8.266***	(-4.018)	1.398***	(5.142)	0.751***	(3.512)	0.534***	(4.574)
	Constant	11.730***	(5.026)	3.522***	(7.562)	0.184	(0.519)	3.106***	(11.627)
Observations		2,141		1,858		1,858		1,858	
Adjusted R ²		0.168		0.252		0.416		0.250	

See the legend to Table 3 for a description of the sample. IPO proceeds exclude any over-allotment options and are reported in 2009 €. See Data Appendix A for details on cost-variables. This Table reports the determinants of European IPO fees on a pan-European basis. We report only the significant Industry dummies. Internet bubble refers to the period from January 1999 to December 2000 (e.g. [26]). Robust t-statistics are in parentheses. Significance levels based on p-value of Wald tests at 1% (***), 5% (**) or 10% (*).

As documented by [36], we find support for the existence of diseconomies of scale for all the models presenting a significant positive relationship with the inverse of IPO proceeds, except for the model (4) based on the underwriter commission, which means that this item cost may be strictly related to the underwriter ability of raising capital. The positive association between underwriter commission and the underwriter prestige ($p=1\%$) supports this conclusion. The coefficient becomes negative when we consider flat fees ($p=5\%$) and statistical insignificant when we run the regression with respect to the underwriting costs.

Model (1) and model (4) show a significant negative relationship ($p=1\%$) between the dependent cost-item and the privatization dummy, while a positive association is found in model (3). This supports the idea that privatizations have even lower levels of total costs and underwriter fees than their large size implies, but with higher levels of flat fees, which are reasonably not related to the bargaining power of the government but simply more linked with the size of issuers.

Concerning market conditions, we find that when IPO volume is particularly high, the bank's opportunity cost of effort may increase ([2]) also, prompting issuers to offer higher commissions.

Finally, we find a negative coefficient for both dilution and participation ratio with the cost variable in the models suggesting that initial owners may consider their offerings less risky, and consequently pay a lower gross spread.

Concerning the controls for industries, the coefficients are mostly not significant. In all models, the dummy for healthcare takes a significant positive value. In Model (4) the dummy for consumer services takes a strongly significant

negative value as in [36]. When considering total costs as the dependent variable, the dummy for industrials and Telecommunications take a significant negative value.

C. Underwriter Fees and Underpricing

The underwriting commission could be simultaneously related to the underpricing ([39], [24], [7], [20]). A two simultaneous equation system is run to investigate this potential interdependency. We firstly identify the market sentiment variable as the instrument that affects the underpricing variable used as dependent one, but not the underwriting commission.

Table 6 reports the results. Specifically, Model (5) includes the ordinary least squares (OLS) regressions of the underpricing. Model (6) presents the two-stage least squares (2SLS) estimation of the simultaneous equations system that exhibits considerable explanatory power with adjusted R² equals to 27%. To test the endogeneity assumption, a t-test⁶ on the significance of the residuals is performed where the first stage of a two-stage least square (2SLS) provides an estimate of the underpricing variable by regressing on the exogenous variables. The second stage estimates the coefficients by treating the residual from the first stage as an

⁶ An alternative approach to the Hausman test is to include the residual from the reduced form equation into the primary equation and perform a t-test on its significance. This avoids any problems with the differences in the variance covariance matrices being non-positive definite that one can encounter in the original formulation of the test.

additional variable. The small p-value indicates that OLS is not consistent and we therefore perform an instrumental variable regression. Moreover, empirical tests confirm the

strength of the instrument (i.e. strongly correlated with the endogenous first-stage variable) that has a greater 10 F-test ([35]).

TABLE VI
UNDERWRITING FEES AND THE EFFECT OF UNDERPRICING: CONTROL FOR ENDOGENEITY

		OLS (5) Underpricing		2SLS (6) Underwriting commission	
<i>Explanatory Variables</i>	Underwriter prestige	0.006*	(1.750)	0.060***	(3.323)
	Underpricing	—	—	-3.629	(-1.635)
	Ln(IPO Proceeds)	-0.131***	(-7.791)	0.228	(0.755)
	Ln(IPO Proceeds)^2	0.012***	(5.146)	-0.026	(-0.896)
	Dilution (%)	0.002***	(5.841)	0.004	(1.000)
	Participation (%)	0.001***	(2.684)	-0.013***	(-2.876)
	Privatization	0.018	(1.334)	-0.257**	(-2.490)
	Market momentum	-0.009	(-1.334)	0.024	(0.639)
	Market sentiment	0.683***	(2.910)	—	—
	Internet Bubble	0.141***	(4.964)	0.448	(1.337)
<i>Industry Dummies</i>	Basic Materials	0.005	(0.153)	0.357*	(1.867)
	Industrials	-0.055***	(-2.643)	-0.203	(-1.205)
	Consumer Goods	-0.064**	(-2.327)	-0.283	(-1.265)
	Healthcare	-0.061**	(-2.104)	0.072	(0.368)
<i>Stock Exchange Dummies</i>	Consumer services	-0.070***	(-3.156)	-0.562***	(-2.855)
	Deutsche Börse	0.141***	(2.827)	0.667*	(1.686)
	London S.E.	0.101**	(2.473)	-0.435	(-1.337)
<i>Market Segment Dummies</i>	Borsa Italiana	0.034	(0.783)	0.323	(1.434)
	Second	0.124***	(3.467)	1.601***	(5.032)
	Exch-reg.	-0.018	(-0.899)	0.630***	(5.030)
	Constant	0.259***	(4.970)	2.726***	(4.241)
Observations		1,858		1,858	
Adjusted R²		0.136		0.265	

This table controls for the simultaneous determination between the underpricing and the underwriting commission. We report only the significant Industry dummies. Robust t-statistics are in parentheses. Significance levels based on p-value of Wald tests at 1% (***), 5% (**) or 10% (*).

D. Robustness Checks

We perform some additional tests to give robustness to our results. Concerning the existence of a non-linear relationship between cost-variables and the amount of new capital raised, we run the regressions adopting as square value and alternative measures the natural logarithm of IPO proceeds. Empirical results showed in Appendix B confirm what have been already discussed in Table 5. The cost variable is negatively related to the capital raised, but positively related above a certain threshold percentage of IPO proceeds. This non-linear relationship, with the opposite sign, is found in model (10), supporting the idea that the underwriting commission captures only the variable parts of the costs.

Regressions results in Appendix C outline the same conclusion when controlling also for firm characteristics. As expected we find a significant negative coefficient between the underwriter commissions and both the age and leverage, supporting the idea that commissions increase uncertainty in valuation: younger firms are riskier while the presence of credit relationships can reduce valuation uncertainty ([18]). Finally, based on the market share of the underwriter, when testing the regressions and using it as proxy for the underwriter prestige the measure, this variable is found significantly related only with the underwriter commission at p=5% (the results are available upon request).

V. CONCLUSIONS

This paper provides evidence of the costs of going public in Europe with a unique overview of the stock exchanges of the four largest economies, namely France, Germany, Italy, and the UK. As suggested by [38], the European segmentation is puzzling from the perspective of the stock exchanges. Practitioners should take into account market and country proxies when calculating expected underwriting costs and its components. We find the UK IPOs (especially private placing taking place on the AIM) to be relatively cheap, and German, French and Italian IPOs relatively expensive. Moreover, segment specificity of the market does matter. This is related to the different role played and to the different services provided by IPO underwriters. Higher costs are also shown for the 'second markets' in Germany, Italy and Paris B. / Euronext.

Empirical results show a different effect of underwriter prestige and privatization dummy on underwriter fees with respect to other cost-variables. A positive association is documented between underwriting commission and the underwriter prestige that becomes negative when considering the flat fees and loses its significance when running the regression with respect to underwriting costs. According to [36] the privatization variable is of particular interest. This paper supports that privatizations have lower total costs and underwriting commission but higher flat fees. Our interpretation for this result relies on the idea that on one side

the bargaining power of national governments does matter, and that on the other side flat fees set ex-ante are reasonably more linked with the size of issuers. Coherently with the literature, we document the existence of a non-linear relationship between the cost-variables and the amount of capital raised, but there is still a difference in the direction of this relationship for the underwriter commission with respect to the other cost-dependent variable. Finally, we investigate the existence of interdependency between underpricing and underwriting fees by confirming a negative sign between them but resulting in only limited statistical significance.

ACKNOWLEDGMENT

The authors are grateful to Chao Chen and Jean-François Gajewski, participants at the 18th Annual Conference of the 2011 Multinational Finance Society for valuable comments and suggestions.

APPENDIX A

DATA

The primary variable of interest in this study is the level of profit an underwriter gets at the time of an IPO on European markets. The definition we adopt for ‘underwriting costs’ is straightforward to make a comparative analysis among the four main European stock market exchanges. Specifically, the variable is given by the sum of two components. First, a *Flat fee* (“[...] the underwriter will be paid a fee of” or “The

Company has agreed to pay the underwriter a fee of [...]”). In case the subscription commission is included in the flat fee, the value here considered is the total flat fee minus the subscription fee. Second, the *Underwriting commission* (“[...] The Company has agreed to pay the underwriter a commission of 3% on the Value of the Placing Shares”, or “The Company has agreed to pay the underwriter a commission of 0.75 per cent on an amount equal to the aggregate number of Subscription shares multiplied by the Placing Price. The Vendors have agreed to pay the underwriter a commission of 0.75 per cent on an amount equal to the aggregate number of sale shares times the placing price”). We expressed all the cost-variables as a percentage of the IPO proceeds. We also collect information on the total estimated expenses related to the issue (*Total costs*).

Based on these considerations, we construct a unique dataset, which comprises information coming from different databases and hand-collected data. In particular, information on IPO underwriter fees was taken from the prospectuses. Data on IPOs comes from Thomson One Banker’s database and Euripo database (refer to [38] for a description). Firm characteristics are obtained from prospectus and Euripo database. Information on costs are hand-collected data, and DEALogic database is employed to check for what we defined the underwriting commission.

APPENDIX B

ROBUSTNESS CHECK ON U-SHAPED COST FUNCTION

		(7) Total costs		(8) Underwriting costs		(9) Flat fees		(10) Underwriting commission	
Explanatory Variables	Underwriter prestige	-0.143	(-0.628)	0.027	(1.089)	-0.022	(-1.283)	0.043***	(3.316)
	Underpricing	-5.485***	(-3.642)	-0.441	(-1.301)	-0.045	(-0.186)	-0.406***	(-3.067)
	Ln(IPO Proceeds)	-	(-)	-	(-9.179)	-	(-)	0.656***	(9.040)
	Ln(IPO Proceeds)^2	11.737***	(10.282)	2.529***	(7.864)	2.874***	(13.759)	-0.077***	(-6.814)
	Dilution (%)	1.821***	(8.147)	0.319***	(7.864)	0.357***	(11.995)	-0.002	(-1.061)
	Participation (%)	-0.071***	(-3.333)	0.016***	(4.185)	0.011***	(3.789)	-0.017***	(-5.189)
	Privatization	-0.356***	(-6.948)	0.038***	(5.615)	0.016***	(3.386)	-0.298***	(-3.159)
	Market momentum	-3.691***	(-2.774)	0.083	(0.372)	0.407**	(2.488)	0.044	(1.322)
	Market sentiment	2.331***	(5.123)	0.216**	(2.574)	0.111*	(1.845)	-2.447	(-1.609)
	Internet Bubble	8.844	(0.440)	-0.112	(-0.030)	2.575	(0.962)	0.100	(0.801)
Industry Dummies	Basic Materials	-0.806	(-0.488)	-0.509*	(-1.842)	-0.330*	(-1.669)	0.333*	(1.738)
	Industrials	-1.264	(-0.505)	-0.394	(-0.969)	-0.342	(-1.189)	-0.030	(-0.257)
	Consumer Goods	-2.564*	(-1.785)	-0.174	(-0.609)	0.075	(0.364)	-0.073	(-0.432)
	Healthcare	-3.077*	(-1.908)	0.013	(0.032)	0.156	(0.484)	0.262*	(1.747)
	Consumer services	-1.100	(-0.526)	0.591*	(1.728)	0.544**	(2.074)	-0.330***	(-2.875)
Stock Exchange Dummies	Telecommunications	-1.901	(-1.200)	-0.451	(-1.541)	-0.023	(-0.114)	0.143	(0.543)
	Deutsche Börse	-6.238**	(-2.107)	-0.446	(-0.655)	-0.637	(-1.453)	0.213	(0.911)
	London S.E.	3.467	(1.336)	1.226***	(3.329)	0.390	(1.625)	-0.772***	(-3.310)
	Borsa Italiana	14.537***	(8.574)	0.654	(1.620)	1.469***	(4.801)	0.218	(1.025)
Market Segment Dummies	Second	-2.756*	(-1.722)	0.714**	(2.204)	0.504**	(1.978)	1.163***	(6.889)
	Exch-reg.	-5.989**	(-2.475)	1.170***	(3.663)	0.310*	(1.861)	0.690***	(5.764)
	Constant	-7.616***	(-3.767)	1.086***	(3.865)	0.289	(1.286)	2.091***	(7.066)
Observations		2,141		1,858		1,858		1,858	
Adjusted R²		0.173		0.218		0.411		0.269	

See the legend to Table 5. This Table verifies the existence of a non-linear relationship between cost-variables and the amount of new capital raised using the natural logarithm of IPO Proceeds and its square value. We report only the significant Industry dummies. Robust t-statistics are in parentheses. Significance levels based on p-value of Wald tests at 1% (***), 5% (**) or 10% (*).

APPENDIX C
ROBUSTNESS CHECKS ON UNDERWRITER COMMISSION AND FIRM CHARACTERISTICS.

(11) Underwriting commission			
<i>Explanatory Variables</i>	Underwriter prestige	0.049***	(3.051)
	Underpricing	-0.012	(-0.081)
	Ln(IPO Proceeds)	0.607***	(4.024)
	Ln(IPO Proceeds)^2	-0.115***	(-5.246)
	Dilution (%)	0.004	(1.407)
	Participation (%)	-0.008	(-1.636)
	Privatization	-0.522***	(-3.217)
	Market momentum	-0.071	(-1.468)
	Market sentiment	-2.492	(-1.043)
	Internet Bubble	0.291*	(1.773)
<i>Industry Dummies</i>	Healthcare	0.359*	(1.653)
	Telecommunications	0.869**	(2.227)
	Deutsche Börse	-0.130	(-0.588)
<i>Stock Exchange Dummies</i>	London S.E.	-0.783**	(-2.160)
	Borsa Italiana	0.078	(0.393)
<i>Market Segment dummies</i>	Second	0.822***	(3.867)
	Exch-reg.	0.380	(1.518)
<i>Firm Characteristics</i>	Age	-0.114*	(-1.905)
	Firm size	0.048	(0.952)
	Leverage	-0.005**	(-2.577)
	Profitability	-0.002	(-1.347)
	Constant	2.874***	(3.282)
<i>Observations</i>			734
<i>Adjusted R²</i>			0.274

This Table includes the regressions run for the underwriter commission including firm characteristics for 734 IPOs over the period 1995-2009. We report only the significant Industry dummies. Robust t-statistics are in parentheses. Significance levels at 1% (***), 5% (**) or 10% (*).

APPENDIX D
VARIANCE INFLATION FACTORS FOR THE EXPLANATORY VARIABLES APPLIED IN THE REGRESSIONS

	VIF	1/VIF
London S.E.	8.32	0.12
Deutsche Börse	4.73	0.21
Borsa Italiana	4.17	0.24
Exch-reg.	2.63	0.38
Second	2.46	0.41
Internet Bubble	1.94	0.51
Dilution (%)	1.91	0.52
Issue size/MktCap	1.67	0.60
Underwriter prestige	1.67	0.60
Market momentum	1.63	0.61
Industrials	1.45	0.69
Participation (%)	1.45	0.69
Consumer services	1.4	0.71
Privatization	1.28	0.78
1/Issue size (€m)	1.27	0.79
Basic Materials	1.21	0.82
Healthcare	1.21	0.83
Consumer Goods	1.19	0.84
Underpricing	1.15	0.87
Oil gas	1.14	0.88
Utilities	1.1	0.91
Telecommunications	1.08	0.93
Market sentiment	1.01	0.99
Mean VIF		2.05

This Table reports the variance inflation factors for the explanatory variables used in the regressions, considering the sample based on 1,858 IPOs where underwriting costs are available. The VIF using the 2,141 IPOs where total costs are available are not reported being even more robust (The maximum value reached is 3.28).

REFERENCES

- [1] M. Abrahamson, T. Jenkinson, and J. Howard, "Why Don't U.S. Issuers Demand European Fees for IPOs?," *Journal of Finance*, vol. 66, pp. 2055-2082, Dec. 2011.
- [2] O. Altinkilic, and R. S. Hansen, "Are There Economies of Scale in Underwriting Fees? Evidence of Rising External Financing Costs," *Review of Financial Studies*, vol. 13, pp. 191-218, Jan. 2000.
- [3] R. P. Beatty, and J. R. Ritter, "Investment banking, reputation and the underpricing of initial public offerings," *Journal of Financial Economics*, vol. 15, pp. 213-232, Jan.-Feb. 1986.
- [4] R. P. Beatty, and I. Welch, "Issuer expenses and legal liability initial public offerings," *Journal of Law and Economics*, vol. 39, pp. 545-602, Oct. 1996.
- [5] R. B. Carter, and S. Manaster, "Initial public offerings and underwriter reputation," *Journal of Finance*, vol. 45, pp. 1045-1068, Sep. 1990.
- [6] L. Cassia, S. Paleari, and S. Vismara, Ed., *The Valuation of Firms Listed on the Nuovo Mercato: The Peer Comparables Approach*, ser. *The Rise and Fall of Europe's New Stock Markets (Advances in Financial Economics)*. Emerald Group Publishing Limited, 2004, vol. 10.
- [7] S. Chahine, "Underpricing versus gross spread: new evidences on the effect of sold shares at the time of IPOs," *Journal of Multinational Financial Management*, vol. 18, pp. 180-196, Apr. 2008.
- [8] T. J. Chemmanur, and I. Paeglis, "Management quality, certification, and initial public offerings," *Journal of Financial Economics*, vol. 76, pp. 331-368, May 2005.
- [9] C. R. Chen, and N. J. Mohan, "Underwriter spread, underwriter reputation, and IPO Underpricing: a simultaneous equation analysis," *Journal of Business Finance and Accounting*, vol. 29, pp. 521-540, Apr.-May 2002.
- [10] H. Chen, and J. R. Ritter, "The seven percent solution," *Journal of Finance*, vol. 55, pp. 1105-1131, Jun. 2000.
- [11] G. M. Cogliati, S. Paleari, and S. Vismara, "IPO Pricing: Growth Rates Implied in Offer Prices," *Annals of Finance*, vol. 7, pp. 53-82, Feb. 2011.
- [12] S. Drucker, and M. Puri, "On the benefits of concurrent lending and underwriting," *Journal of Finance*, vol. 60, pp. 2763-2799, Dec. 2005.
- [13] L. H. Fang, "Investment bank reputation and the price and quality of underwriting services," *Journal of Finance*, vol. 60, pp. 2729-2761, Dec. 2005.
- [14] G. Giudici, P. Roosenboom, Ed., *Pricing initial public offerings on Europe's new stock markets*, ser. *Initial Public Offerings: An International Perspective (Advances in Financial Economics)*. Emerald Group Publishing Limited, 2004, vol. 10.
- [15] M. A. Habib, A. P. Ljungqvist, "Underpricing and Entrepreneurial Wealth Losses in IPOs: Theory and Evidence," *Review of Financial Studies*, vol. 14, pp. 433-458, Apr. 2001.
- [16] R. S. Hansen, "Do Investment Banks Compete in IPOs?: The Advent of the '7% Plus Contract'," *Journal of Financial Economics*, vol. 59, pp. 313-346, Mar. 2001.
- [17] C. James, "Relationship-specific assets and the pricing of underwriter services," *Journal of Finance*, vol. 47, pp. 1865-1885, Dec. 1992.
- [18] C. James, and P. Wier, "Borrowing relationships, intermediation and the cost of issuing public securities," *Journal of Financial Economics*, vol. 28, pp. 149-171, Nov.-Dec. 1990.
- [19] B. Klein, K. Leffler, "The role of market forces in assuring contractual performance," *Journal of Political Economy*, vol. 89, pp. 615-641, Aug. 1981.
- [20] D. Kim, D. Palia, and A. Saunders, "Are Initial Returns and Underwriter Spreads in Equity Issues Complements or Substitutes?," *Financial Management*, vol. 39, pp. 1403-1423, Dec. 2010.
- [21] I. Lee, S. Lochhead, J. R. Ritter, and Q. Zhao, "The costs of raising capital," *Journal of Financial Research*, vol. 19, pp. 59-74, Spring 1996.
- [22] X. Liu, and J. R. Ritter, "Non-Price competition and IPO underpricing," *Journal of Financial Economics*, vol. 102, pp. 579-601, Dec. 2011.
- [23] M. Livingston, and R. E. Miller, "Investment bank reputation and the underwriting of nonconvertible debt," *Financial Management*, vol. 29, pp. 21-34, Summer 2000.
- [24] A. P. Ljungqvist, "Conflicts of Interest and Efficient Contracting in IPOs," New York University, Working Paper, 2003.
- [25] T. Loughran, and J. R. Ritter, "Why don't issuers get upset about leaving money on the table in IPOs?," *Review of Financial Studies*, vol. 15, pp. 413-443, Jan. 2002.
- [26] T. Loughran, and J. R. Ritter, "Why has IPO underpricing changed over time?," *Financial Management*, 33, 5-37, Autumn 2004.
- [27] W. L. Megginson, and K. A. Weiss, "Venture capitalist certification in initial public offerings," *Journal of Finance*, vol. 46, pp. 879-904, Jul. 1991.
- [28] S. C. Myers, "Determinants of corporate borrowing," *Journal of Financial Economics*, vol. 5, pp. 147-175, Nov. 1977.
- [29] S. Paleari, and S. Vismara, "Over-optimism when pricing IPOs," *Managerial Finance*, vol. 33, pp. 352-367, 2007.
- [30] S. Paleari, S. E. Pellizzoni, and S. Vismara, "The going public decision: Evidence from the IPOs in Italy and in the UK," *International Journal of Applied Decision Sciences*, vol. 1, pp. 131-152, 2008.
- [31] J. R. Ritter, "The costs of going public," *Journal of Financial Economics*, vol. 19, pp. 269-281, Dec. 1987.
- [32] J. R. Ritter, "Differences between European and American IPO Markets," *European Financial Management*, vol. 9, pp. 421-434, Dec. 2003.
- [33] J. R. Ritter, "Equilibrium in the IPO market," *Annual Review of Financial Economics*, vol. 3, pp. 347-374, Dec. 2011.
- [34] C. W. Smith, "Investment Banking and the Capital Acquisition Process," *Journal of Financial Economics*, vol. 15, pp. 3-29, Jan.-Feb. 1986.
- [35] D. Staiger, and J. H. Stock, "Instrumental variables regression with weak instruments," *Econometrica*, vol. 65, pp. 557-586, May 1997.
- [36] S. Torstila, "What determines IPO gross spreads in Europe," *European Financial Management*, vol. 7, pp. 523-541, Dec. 2001.
- [37] S. Torstila, "The Clustering of IPO Gross Spreads: International Evidence," *Journal of Financial and Quantitative Analysis*, vol. 38, pp. 673-694, Sep. 2003.
- [38] S. Vismara, S. Paleari, and J. R. Ritter, "Europe's Second Markets for Small Companies," *European Financial Management*, forthcoming, 2012.
- [39] J. C. Yeoman, "The optimal spread and offering price for underwritten securities," *Journal of Financial Economics*, vol. 62, pp. 169-198, Oct. 2001.