

Pricing Initial Public Offerings in Europe: What has changed?

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Abstract. In this paper we examine what has changed in pricing IPOs with the introduction of new stock markets in Europe. We document that new market IPO firms are smaller, younger and riskier than main market IPO firms. They more frequently report losses in the year before the IPO and a larger fraction of new market issuers are from the Internet and technology sector. We report a 21.4 percentage point difference in the average first-day return of new market issues (34.5%) and the average first-day return of main market issues (13.1%). We investigate whether the difference in average first-day returns can be explained by changes in firm and offer characteristics, wealth incentives, market conditions and information externalities. We find that a larger fraction of risky IPO deals, higher price revisions and reduced incentives to control wealth losses have contributed to higher first-day returns on new stock markets.

JEL Classification: G30, G32

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1. Introduction

In 2000 more companies listed on European stock exchanges than in the United States. From January to December the NYSE and the NASDAQ hosted 445 IPOs, while in Europe over 500 companies went public¹. A large number of European companies went public on new stock markets designed for high-growth and high-tech fledgling companies². These new markets have recently been established around Europe: the French *Nouveau Marché* (first listing March 20, 1996), the German *Neuer Markt* (first listing March 10, 1997), *Euro.NM Belgium* (first listing April 11, 1997), the Dutch *Nieuwe Markt* (first listing March 25, 1997), the Italian *Nuovo Mercato* (first listing June 17, 1999) and *EASDAQ* (now *NASDAQ Europe*, first listing November 27, 1996).

In this study we analyze the pricing of 575 IPO firms on new stock markets (the French *Nouveau Marché*, the German *Neuer Markt*, *Euro.NM Belgium*, the Dutch *Nieuwe Markt*, the Italian *Nuovo Mercato* and *NASDAQ Europe*)³ and 432 IPO firms on the main stock markets (the French *Second Marché*, the German *Geregelter Markt* and *Amtlicher Handel*, the Belgian *Eerste Markt*, the Dutch *Officiële Markt* and the Italian *Mercato di Borsa*) from January 1995 to December 2001. It is widely documented that companies that go public sell their shares at an offer price that is lower than the first-day closing market price. This positive first-day offer-to-close return is commonly known as underpricing (throughout this paper we use first-day returns and underpricing as synonyms). We observe that the average first-day return on new stock markets (34.5%) is substantially larger than the average first-day return on main markets (13.1%). In this paper we investigate whether the 21.4 percentage point difference in first-day returns can be explained by changes in firm and offer characteristics, wealth incentives, market conditions and information externalities that have accompanied the introduction of new stock markets.

The existing literature suggests several explanations⁴. Companies that go public on the new stock markets tend to operate in risky entrepreneurial sectors, most notably the Internet. The information asymmetry between the issuing firm and investors is large. As a result, pricing the shares of these firms becomes more difficult and investors require underpricing to compensate them for the higher valuation uncertainty (Beatty and Ritter, 1986; Baron, 1982). Kukies (2000) shows that the creation of the German *Neuer Markt*

allowed young firm with high research intensity to go public, that otherwise would not have been able to obtain a public listing in Germany. This changed composition of firms going public may partially explain why first-day returns are higher on new markets than on main markets.

Alternatively, first-day returns may serve to compensate investors for their release of private information about their demand schedules during the bookbuilding process. In order to reward investors for their positive information, underwriters only partially incorporate collected private information in the final offer price. As investors pay a lower offer price than the full information price in the secondary market, they earn high first-day returns (Benveniste and Spindt, 1989). We find that the price revision, defined as the percentage difference between the offer price and the midpoint of the price range, is larger for new market issues than for main market issues. In the Benveniste-Spindt framework this predicts larger first-day returns for new market issuers to compensate investors for higher information production in the bookbuilding process.

Another explanation relates to the incentive to control wealth losses. Pre-IPO shareholders may suffer wealth losses when they sell shares at the IPO. If shares had been sold at the full information market price instead of the offer price, the proceeds to selling pre-IPO shareholders would have generally been higher. We document that pre-IPO owners of new market companies sell fewer shares at the offering than pre-IPO shareholders of main market companies. This gives pre-IPO owners of new market companies fewer incentives to control the wealth losses that are associated with high first-day returns. Arguably, pre-IPO shareholders of new market companies are therefore more complacent about high first-day returns. In this study we also control for changes in other determinants of first-day returns such as underwriter reputation, market conditions, information externalities. These factors have been related to first-day returns in several recent studies on IPO pricing.

Our contribution to the literature is threefold. First, we analyze a comprehensive sample of 1,007 European IPO firms on both new stock markets and main stock markets. Other studies have focussed on IPO pricing using a much smaller sample of only new market IPO firms (De Maeseneire and Manigart, 2002) or European Internet IPOs (Arosio, Giudici and Paleari, 2000). Second, we investigate pre-IPO ownership

structure and wealth losses. Pre-IPO ownership structure has not been analyzed in previous studies on IPO pricing in Europe (Ljungqvist and Wilhelm, 2002b; Ljungqvist, Jenkinson and Wilhelm, 2002). In this study, we fill this gap. Third, our paper builds on the emergent literature examining the question why IPO underpricing has increased over time. Analyzing U.S. data, Loughran and Ritter (2001) show that the increase in first-day returns in the bubble years 1999 and 2000 can be attributed to changes in the composition of firms going public. Ljungqvist and Wilhelm (2002a) find that the increase in first-day returns of U.S. IPOs during the bubble years can be explained by changes in wealth incentives to control underpricing. We take a similar approach to explain why the average first-day return on new stock markets is higher than the average first-day return on main stock markets.

The remaining part of our paper is organized as follows. In Section 2, we give an overview of the extant literature. In Section 3 we describe the sample and summary statistics. In Section 4 we document the differences in firm and offer characteristics, wealth incentives, market conditions, information externalities between new market and main market IPO firms. In Section 5 we provide the empirical results. We present our conclusions in Section 6.

2. A review of IPO pricing

2.1. Partial adjustment to private information

Pricing IPOs is a difficult task: the market is not certain about the quality of the IPO firm, while the issuing firm and its underwriter do not know the market demand for IPO shares. The problem facing an underwriter wanting to collect information useful to pricing an IPO is that investors have no reason to truthfully reveal their private demand during the pre-market phase. If potential investors know that showing an eagerness to buy IPO shares will drive up the offer price, they have little incentive to reveal their strong demand. Investors therefore need to be rewarded if they are expected to truthfully disclose their private demand schedules for IPO shares (Benveniste and Spindt, 1989).

The bookbuilding method has become the primary mechanism for pricing IPO shares in most countries (Sherman, 2002)⁵. In Continental Europe, this method has largely replaced the traditional fixed-price

offering and auction procedure (Ljungqvist, Jenkinson and Wilhelm, 2002). Under the bookbuilding method, the underwriter proposes a price range for the shares in the pre-market phase. Investors express their interest for IPO shares by placing non-binding orders at different prices within the price range. From these indications of interest, the underwriter can learn private information about investor demand that can be used when setting the final offer price of the IPO. Benveniste and Spindt (1989) argue that underwriters only partially adjust the offer price to positive information to reward investors for revealing their private demand schedules. On average, investors earn a high first-day return by paying a lower price for the stock than the full information market price in the secondary trading market.

The partial adjustment of the IPO price to strong demand has been widely documented for the United States. In a pioneering study, Hanley (1993) finds that issues where the offer price is above the maximum of the price range have higher first-day returns than those where the offer price is below the minimum of the price range. Ritter and Welch (2002) show that this empirical pattern has held for the U.S. IPO market throughout 1980-2001. When the offer price exceeds the maximum of the initial price range, which indicates strong demand for IPO shares, the average underpricing is 53%. When underwriters price the IPO within its initial price range, the average first-day return equals 12%. Those issues with an offer price below the minimum of the price range have an average first-day return of no more than 3%. Ljungqvist, Jenkinson and Wilhelm (2002) provide contemporary European evidence on the partial adjustment phenomenon. They too report that price revisions from the midpoint of the price range are positively related to IPO underpricing. When underwriters revise the IPO price upwards, an indication of positive information about investor demand, investors are compensated through higher first-day returns.

But IPO pricing differs between the United States and Europe. While IPO prices are frequently set outside the price range in the United States, IPO prices are rarely priced outside the price range in Europe. Aussenegg, Pichler and Stomper (2002) compare IPO pricing on NASDAQ with that on Germany's Neuer Markt during the period 1999-2000. They find that NASDAQ issues are often priced outside the price range with 50% being priced above the maximum of the range and 7.1% below the minimum of the range. In comparison, only 2.6% of Neuer Markt issues are priced below the minimum of the price range

while none is priced above the maximum of this range. No legal restrictions prevent underwriters from setting the offer price of German IPOs above the maximum of the price range. Similarly, Derrien and Womack (2002) report that for the 135 bookbuilt French IPOs during the years 1992-1998, only one was priced above the maximum of the price range, although this is not required in France. Derrien and Womack (2002) attribute these 'sticky' IPO prices to the weak competition among underwriters in the French IPO market compared to the strong competition in the U.S. IPO market. This increases the market power of the underwriter versus the IPO firm. French underwriters benefit their regular investors at the expense of the IPO firm by not setting the offer price above the maximum of the range.

2.2. Partial adjustment to public information

Loughran and Ritter (2002) report that IPO prices partially adjust to both private and public information. In particular, they report a positive relation between first-day returns and market returns during the 15 trading days prior to the IPO date. Because IPO prices only adjust partially to public information, first-day returns are predictable based on lagged market returns. This prompts the question why underwriters partially adjust IPO prices to positive market returns. At first glance, this comes at a cost to underwriters since a lower IPO price decreases their gross spread revenues that are typically a percentage of the IPO price. Loughran and Ritter (2002) argue that there are two advantages to underwriters. First, it makes their job of finding buyers for IPO shares easier, reducing their marketing costs (Baron, 1982). Second, investors engage in rent-seeking behavior and are willing to pay offsetting compensation to underwriters to gain favorable allocations on hot deals. For example, underwriters may benefit from high sales commissions that these investors pay when they sell their IPO shares afterwards.

Bradley and Jordan (2002) examine the extent to which IPO prices reflect a wider set of public information during 1990-1999. They find that the variation in first-day returns can be predicted using public information known before the IPO date such as the ratio of shares outstanding pre-IPO to shares filed in the IPO and price range amendments. Additionally, they report a positive relation between first-day returns and the 15-day market return on the NASDAQ composite. Lowry and Schwert (2001) report conflicting results. They

find that public information, measured as market returns for 50 trading days before the IPO, is not significantly related to first-day returns during 1985-1997. This suggests that public information is fully as opposed to partially incorporated into the IPO price. For Europe, De Maeseneire and Manigart (2002) document a positive relation between market returns in the month of the issue and first-day returns for a sample of 300 firms that went public on EASDAQ and Euro-NM markets before October 1999. Analyzing French issues, Derrien and Womack (2002) find a strong positive association between IPO underpricing and market returns during the three months before the date of pricing the issue. This finding suggests that French IPO prices only partially adjust to readily available public information.

2.3. Wealth losses to pre-IPO owners

When underwriters adjust offer prices only partially to private information about investor demand and/or public information, wealth losses occur for shareholders of the issuing firm. If shares would have been sold at the full information market price instead, the proceeds to selling pre-IPO shareholders would have been higher. Alternatively, the same proceeds could have been raised by selling fewer shares, resulting in less dilution to pre-IPO shareholders.

Loughran and Ritter (2002) ask the question why pre-issue shareholders do not get upset about leaving money on the table. They provide a prospect theory explanation. Issuers evaluate gains and losses relative to the midpoint of the price range that they have anchored on. If underwriters increase the offer price above this midpoint of the price range, issuing firms are content because they get a higher IPO price than initially expected. Prospect theory entails that the bad news of leaving money on the table and the good news of the unanticipated increase in wealth is integrated into a single event. The wealth impact can more than offset the share of money left on the table. In general, the wealth gain for a pre-IPO shareholder from the price revision relative to the midpoint of the price range is greater than his or her share in the money left on the table when the following condition is met:

$$[\text{shares retained} + \text{secondary shares sold}][\text{OP}-\text{midpoint}] + \text{shares retained} [\text{P}-\text{OP}] >$$

$$[P-OP][\text{secondary shares sold} + \text{primary shares sold} (\text{shares retained/pre-IPO shares})]$$

where P is the market price, OP is the offer price, midpoint is the midpoint of the price range, primary shares are sold by the IPO firm, secondary shares are shares sold by the pre-IPO shareholder, pre-IPO shares are the shares outstanding for the entire firm, and shares retained are existing shares held by the pre-IPO shareholder after the issue. The left-hand term is the unexpected wealth gain, assuming that pre-IPO shareholders anchor on the midpoint of the price range. The term on the right is the pre-IPO shareholder's share in the money left on the table. The condition is generally satisfied unless the pre-IPO shareholder is selling a large number of his or her shareholdings in the IPO or if the offering is large relative to the pre-IPO number of shares.

Accordingly, Habib and Ljungqvist (2001) show that the incentive to reduce first-day returns and accompanying wealth losses increase in pre-IPO shareholders' participation ratio (the fraction of pre-IPO shares they sell in the offering) and in the dilution factor (the percentage increase in the number of shares outstanding after the IPO). Bradley and Jordan (2002) use a measure of 'share overhang' to examine the relation between first-day returns and dilution. They define overhang as the number of pre-IPO shares outstanding divided by the shares sold in the IPO that is indicated in the preliminary prospectus. Bradley and Jordan (2002) find that firms with greater overhang have the highest first-day returns. If the number of shares sold in the IPO is small relative to pre-issue shares outstanding, dilution is small and pre-IPO owners have few incentives to control first-day returns. Arosio, Giudici, Paleari (2000) analyze 86 Internet IPO firms listed on EASDAQ and Euro-NM markets from 1999 to May 2000. The average first-day return of European Internet IPO firms equals 76.4%. They argue that, consistent with prospect theory, issuers are content leaving large amounts of money on the table because they discover that they are much wealthier than earlier expected.

2.4. What explains the increase of first-day returns in the dot-com bubble?

Analyzing U.S. data, Loughran and Ritter (2001) document that the average IPO underpricing was 7% in the 1980s, before doubling to almost 15% during 1990-1998 and soaring to 65% during the internet bubble years of 1999-2000. They investigate why first-day returns have increased over time. They offer two explanations. First, the composition of IPO firms could have changed over time. This changing composition hypothesis is based on the assumption that riskier IPO firms will have higher first-day returns than less-risky IPO firms. If the proportion of risky IPO firms increases, the average first-day returns should increase (Ritter, 1984). Accordingly, Loughran and Ritter (2001) find that the percentage of technology firms going public has increased over time.

Second, agency problems between issuing firms and underwriters may explain why first-day returns have increased. This agency hypothesis argues that underwriting has become more profitable due to the increased tolerance of issuing firms to leave money on the table. These issuing firms are more willing to leave money on the table because of the increased importance of analyst coverage and larger unanticipated wealth increases. Although underwriters forego part of gross spread because of the lower IPO prices, they gain because of the offsetting compensation that investors are willing to offer in exchange for favorable allocations on hot deals. Loughran and Ritter (2001) show that part of the increased first-day returns can be attributed to these increased agency problems.

Ljungqvist and Wilhelm (2002a) investigate IPO pricing in the dot-com bubble during 1999-2000. They show that the increase in first-day returns can at least partially be accounted for by changes in pre-IPO ownership structure and insider selling behavior. According to Habib and Ljungqvist (2001) the extent to which pre-IPO owners care about first-day returns depends on how much they sell at the IPO and the extent to which their stakes are diluted by the newly issued shares. Ljungqvist and Wilhelm (2002a) find that this incentive structure to control first-day returns changed in the Internet bubble years. They find that CEO pre-IPO stakes declined from 22.8% of pre-issue shares in 1996 to 11.5% of pre-issue shares in 2000. This lower stake reduced their share in money left on the table and therefore their incentive to bargain over the IPO price with underwriters. The CEO would bear the entire effort cost of bargaining but would internalize only a small part of the benefit of lower first-day returns. Ljungqvist and Wilhelm (2002a)

also report that both the frequency and magnitude of secondary sales of existing shares changed during the Internet bubble years. Because insiders, especially CEOs, were selling fewer shares at the IPO price, they had little incentives to bargain over the IPO price.

2.5. Hot issue markets and information externalities

Lowry and Schwert (2002) study the cycles in both the number of IPO deals per month and the average first-day returns per month. They report that hot issue markets, defined as a month in which the first-day return is above the median month's average first-day return (Ibbotson and Jaffe, 1975), are followed by IPO waves during which the number of firms going public increases. Lowry and Schwert (2002) argue that potential issuing firms learn from the experience of other IPO firms and are more likely to follow with their own IPO if the average first-day return of previous deals was high.

Subrahmanyam and Titman (1999) argue that these information externalities play a more important role in new industries, such as the Internet sector, where costly information is less available. Hoffman-Burchardi (2001) and Benveniste, Busaba and Wilhelm (2002) model such information externalities. They show that potential issuing firms benefit from information about a common valuation factor that spills over from the IPO pricing of previous deals. If the first firm going public incurs the entire cost of compensating investors for costly information production, other firms subject to the same valuation factor can free ride on that information. This gives little incentive among firms to become the first mover. If underwriters have sufficient market power, they can solve this coordination problem by bundling IPOs within an industry. This allows for a more equitable sharing of the cost of information production over many firms, reducing the disincentive to any one of them to go public. Once one of the firms decides to go public, this triggers an IPO wave of industry-related firms in an attempt to benefit from the information externality. Underpricing is predicted to decrease in the size of the IPO wave because the cost of information production can be spread over more firms subject to a common valuation factor. Accordingly, Benveniste, Ljungqvist, Wilhelm and Yu (2002) find evidence that first-day returns in the United States are smaller, the more firms sharing a common valuation factor go public in short succession.

Ljungqvist, Nanda and Singh (2001) focus on IPO pricing in hot issue markets and offer a behavioral finance explanation. The demand side of the market consists of two types of investors; sentiment investors that, on occasion, have overoptimistic beliefs about future prospects of IPO firms and regular (institutional) investors with rational expectations. If there is insufficient demand from sentiment investors to sell the entire offering at the time of the IPO, perhaps because there are too many issuing firms trying to take advantage of the hot issue market, then underwriters need to sell part of the offering to regular investors. These regular investors are assumed to hold part of their IPO allocation as inventory and sell to newly arriving sentiment investors if the hot market persists. Because of the risk that the hot issue market ends before these regular investors have sold their stock to new sentiment investors, issuing firms cannot sell IPO shares at the price the sentiment investors are willing to pay. Higher first-day returns and favorable allocations serve to compensate potential inventory losses incurred by regular investors. In return, potential trading profits of regular investors are at least partly capitalized into a higher offer price than would otherwise be the case. In hot issue markets, underwriters, regular (institutional) investors and issuing firms therefore exploit excessive optimism among sentiment investors.

Loughran and Ritter (2002) document that, in the United States, first-day returns are positively related to the average first-day returns of previous deals. This is consistent with excessive optimism among sentiment investors. Bradley and Jordan (2002) construct an underpricing index to capture the effect of hot issue markets. The underpricing index is defined as the average underpricing for all IPOs from -10 to -1 days before the issue date. Bradley and Jordan (2002) report a positive relation between first-day returns and this underpricing index. For Europe, De Maeseneire and Manigart (2002) find a positive association between the first-day returns on EASDAQ and Euro-NM markets and the average first-day returns of the three previous IPO deals. They interpret this finding as consistent with the effect of hot issue markets.

3. Data and sample construction

We construct a large database of 1,245 admissions to trading on the Euronext Paris, the Frankfurt Stock Exchange, Euronext Brussels, Euronext Amsterdam, the Milan Stock Exchange and NASDAQ Europe

from January 1995 through December 2001. These admissions were identified from information provided by the stock exchanges. In constructing our sample, we exclude 66 financial companies (SIC codes 6000-6999), 13 spin-offs, 18 privatization issues and 134 companies previously listed elsewhere. We lack the prospectuses for 7 companies. The final sample therefore comprises 1,007 IPO firms that meet our sample criteria and for which we are able to obtain prospectuses from the company or *Disclosure Global Access*. This number includes 71 foreign issuers (Austria (17 IPOs), Denmark (1), Hungary (1), Ireland (3), Israel (13), Liberia (1), Luxembourg (2), South-Africa (1), Sweden (1), Switzerland (4), the United Kingdom (13) and the United States (14)).

Our sample consists of 575 IPO firms on new stock markets (the French *Nouveau Marché* (149 firms), the German *Neuer Markt* (314), *Euro.NM Belgium* (13), the Dutch *Nieuwe Markt* (14), the Italian *Nuovo Mercato* (39) and *EASDAQ/NASDAQ Europe* (46)) and 432 IPO firms on the main markets (the French *Second Marché* (187 firms), the German *Amtlicher Handel* (64) and *Geregelter Markt* (31), the Belgian *Eerste Markt* (33), the Dutch *Officiële Markt* (46) and the Italian *Mercato di Borsa* (71))⁶. For the new markets, the sample period starts when the market commenced operations (March 1996 for the *Nouveau Marché*, March 1997 for the *Neuer Markt*, April 1997 for *Euro.NM Belgium* and *Nieuwe Markt*, June 1999 for the Italian *Nuovo Mercato* and November 1996 for *EASDAQ/NASDAQ Europe*).

The Appendix compares the listing requirements for the stock markets that we consider in our analysis. The information is obtained from the stock exchanges. For new markets, the minimum book value of equity is generally equal to 1.5 million euro. The *Euro.NM Belgium* and the *Neuer Markt* require a minimum age equal to three years, while younger companies may list on the other new markets. Conversely, most main markets require a three-year track record of balance sheets. Companies with losses qualify for listing on all new stock markets. In general, the capital sold to the public must represent 20%/25% of the total equity. Only two main markets, the French *Second Marché* and the Dutch *Officiële Markt*, require a minimum float less than 20%. All new markets, except *EASDAQ*, require that at least 50% of the IPO shares must be newly issued. Such requirements are absent for the main markets. Lock-up provisions, that prevent insiders from selling their shares immediately after the IPO, have to be implemented in most new markets.

Lock-up provisions are not compulsory in four out of five main markets. Only the Dutch *Officiële Markt* requires a lock-up period of 180 days if companies fail to meet with profitability criteria. The next section investigates other differences between new and main market issues.

4. What has changed?

4.1. Firm characteristics

Table 1 reports summary statistics about the sample. The table shows medians in italics. We collect data from IPO prospectuses. Market prices are taken from *Datastream*. Panel A shows firm characteristics. Market capitalization, defined as the number of shares times the closing market price on the IPO date, averages €366 million (€110 million, evaluated at the median). The average (median) gross proceeds, measured as the number of shares sold at the IPO (excluding over-allotment option) times the offer price, equals €74 million (€27 million). The average (median) firm reports €122 million (€18.5 million) and €21 million (€23 million) in total assets and sales, respectively. On average, 18.5% of IPO firms are reporting negative earnings before interest, taxes, depreciation and amortization (EBITDA). These financial statement numbers are for the fiscal year before the IPO and were converted in euros where appropriate.

We also compute the standard deviation of the IPO firm's daily stock returns during the 60 trading day interval of 20 to 80 trading days after the IPO date. We adjust this ex-post measure of risk by subtracting the standard deviation of daily returns on the MSCI index for the country of listing (France, Germany, Belgium, the Netherlands and Italy) during the same period⁷. This ex-post proxy is problematic because it may be endogenous to the success of the bookbuilding effort (Sherman and Titman, 2001) and we therefore only use it here and not in subsequent analyses. We observe that average (median) market-adjusted volatility equals 2.5% (2.1%). Age may be considered to be a proxy for ex-ante risk (Ritter, 1984). We define age as the difference between the IPO year and the original founding year of the company. The average (median) issuer is 23 (13) years. Internet and technology firms are identified following the approach of Loughran and Ritter (2001)⁸. In our sample, 40.3% of issuing firms are from the Internet and technology sector⁹.

[Please insert Table 1 about here]

We test whether differences exist between the firm characteristics of new market and main market issuers. We use a standard t -test for difference in means and the Wilcoxon/Mann-Whitney test for difference in medians. We find that the average new market issuer is significantly smaller than the average main market issuer as measured by market capitalization, gross proceeds, total assets or sales. However, the findings for market capitalization and gross proceeds are driven by a handful of large IPO deals on the main markets. Evaluated at the median, market capitalization and gross proceeds are significantly larger for new market issuers than for main market issuers. We also investigate loss-reporting frequency. On average, 30% of new market IPO firms report negative earnings versus 3% of main market IPO firms. Market-adjusted volatility is significantly larger for new market IPO firms than for main market IPO firms. This indicates that new market issuers are riskier than main market issuers. The average new market issuer is significantly younger (12 years) than the average main market issuer (37 years). Assuming that age is an ex-ante risk proxy, this reinforces that new market IPO firms are riskier than main market IPO firms. As a final point, we look at the presence of Internet and technology firms. We find that 60% of new market issuers are from the Internet and technology sector versus 14% of main market issuers. We investigate whether these differences in firm characteristics can explain the difference in first-day returns between new and main market issuers in Section 5. In the next section we investigate transaction characteristics.

4.2. Offer characteristics

Panel B of Table 1 shows offer characteristics. The average first-day return computed as the percentage difference between the first-day closing market price and the offer price, equals 25.3%. First-day returns are right-skewed with the median being 6.8%. During our sample period, 76 firms (7.5%) more than double in price on the first day of trading (i.e., first-day return is 100% or higher). When we compute the amount of money left on the table, defined as first-day return times gross proceeds, we find that the

average issuer leaves €9.9 million (€1.5 million) on the table. The large difference between the average and median shows that the most of the money left on the table comes from a small number of IPOs¹⁰.

Figure 1 plots the number of IPOs and the mean first-day return per month. We observe hot issue periods, namely April 1998 to September 1998, as well as February 1999 to May 1999, and December 1999 to April 2000. These hot issue periods are characterized by unusually high underpricing, followed by high IPO volumes periods, in which the mean first-day return is lower (see for example April 2000 to August 2000).

[Please insert Figure 1 about here]

The majority of issues (875; 86.9%) have been priced using the book building procedure, while in 49 cases the final offer price was fixed in the prospectus and in 83 cases the IPO was auctioned, primarily on the French *Second Marché*. This reflects the move from fixed-price offerings and auctions to bookbuilding as the key method for pricing IPOs in Continental Europe (Sherman, 2002). Considering 858 bookbuilt IPOs, we find that on the average the final offer price is revised upwards (2.5%) with respect to the midpoint price of the file range¹¹. Yet, no revision or downward revision with respect to the midpoint price is found in about 30% of the IPOs. The median price revision equals 5.4%. Final offer prices are rarely set outside the initial price range. There are 10 (1.1%) bookbuilt IPOs priced strictly above the maximum price of the range and 38 (4.4%) bookbuilt IPOs priced strictly below the minimum price of the range¹². IPO prices in Europe are ‘stickier’ than in the United States. Loughran and Ritter (2001) report that during 1990-1998 22.9% of U.S. IPOs had an offer price that exceeded the maximum of the price range. In the bubble years 1999-2000, 45% of U.S. IPOs had an offer price above the maximum of the price range.

We compute market index returns in the 50 trading day interval from 60 days to 10 trading days before the IPO date. We measure the index return by the MSCI Index of the country of listing (France, Germany, the Netherlands, Belgium or Italy). We end 10 days before the IPO date to take into account that the underwriter determines the offer price several days before the IPO date. Ljungqvist and Wilhelm (2002b) report that bookbuilt IPOs are priced 5 days before the IPO date in France and 3 days in Germany.

Derrien and Womack (2002) show that French issues are priced 8 days before the IPO in case of fixed-price offerings and 2 days before the IPO in case of auctions. Market returns during this interval therefore represent public information that the underwriter may have used in setting the offer price. The average (median) market index return is 4.4% (4.3%).

We calculate underwriter market share as the percentage market share of the lead manager in the local market (France, Germany, Belgium/NASDAQ Europe, the Netherlands and Italy). Following Ljungqvist and Wilhelm (2002b), market share is the sum of gross proceeds (excluding over-allotment option) in all local IPOs lead managed by bank j divided by the total proceeds raised in that local market during the sample period. When constructing the underwriter market share measure we consolidate local offices and take into account name changes of underwriters because of mergers and acquisitions in the underwriting industry¹³. We use the underwriter market share as a proxy for the underwriter's reputation capital in Section 5. We find that the average (median) market share of the lead manager is 7% (3.8%).

IPO volume can be viewed as a proxy for information externalities (Benveniste, Ljungqvist, Wilhelm and Yu, 2002). We determine IPO volume as the number of companies going public in each local market (France, Germany, Belgium/NASDAQ Europe, the Netherlands and Italy) during the 50 trading day interval from 60 to 10 trading days before the IPO date. It is therefore public information that underwriters may have taken into account when pricing the IPO. The average (median) IPO volume is 14.4 (10) companies. We also compute the number of IPOs firms active in the same Fama and French (1997) industry that went public in the local market during the 50 trading day window from 10 to 60 days before the IPO date. These industry-related IPO firms share a common valuation factor and therefore information externalities are expected to be more important (Benveniste, Ljungqvist and Wilhelm and Yu, 2002). We find that the average (median) industry peers going public equals 2.8 (0). Next, we calculate the mean contemporary underpricing in each local market during a 50 trading day window from 60 to 10 days before the IPO date to capture hot issue markets. Bradley and Jordan (2002) use the same proxy for the United States. The average (median) amounts to 29.1% (18.3%) average underpricing of previous IPO deals.

We compare the offer characteristics between new and main market issuers and test for difference in means and medians. We find that new market issues are significantly more underpriced than main market issues. In particular, new market issues have an average (median) first-day return equal to 34.5% (10.0%) versus an average (median) first-day return of 13.07% (4.9%) for main market issues. We also investigate the number of IPOs that double in price on the first day of trading (i.e. have a first-day return of 100% or higher). We observe that 69 (12%) of new market issues and 7 (1.6%) of main market issues double in price on the first trading day.

Bookbuilding is a more popular method for pricing IPOs on the new markets (555; 96.5%) than on the main markets (320; 74.1%). We are able to compute price revisions for 541 bookbuilt new market IPOs and 317 bookbuilt main market IPOs. We find that price revisions with respect to the midpoint of the price range are significantly higher for new market issues than for main market issues. This indicates that there was heavier demand for the IPO shares of new market issuers than for main market issuers. IPO prices are 'sticky' on both markets. Only 3 (0.5%) bookbuilt new market IPOs and 7 (2.2%) main market IPOs have an offer price that exceeds the maximum of the price range. IPOs with offer prices above the price range typically obtain a dual listing on NASDAQ and have a U.S. investment bank as their lead manager. There are 27 (5%) bookbuilt new market IPOs and 11 (3.5%) bookbuilt main market IPOs with an offer price below the minimum of the price range.

Panel B of Table 1 shows that there is no difference with regard to market returns prior to the IPO date between new market and main market issues. On the assumption that underwriter market share is a proxy for underwriter reputation, new market issues tend to be underwritten by less reputable underwriters than main market issues. IPO volume prior to the IPO date is significantly greater for new market IPOs than for main market IPOs. IPO industry volume is also significantly greater for new market issues than for main market issues. Information externalities may therefore be more important for pricing new market IPOs compared to main market IPOs. Because there is a higher fraction of Internet and technology firms going public on new markets, this finding is consistent with the prediction of Subrahmanyam and Titman (1999). They argue that information externalities are more important in the case of new industries, such as the

Internet, where costly information is less available. As a final point, we observe that the mean contemporary underpricing of previous IPOs is higher for new market than for main market IPOs. This is consistent with the idea that hot issue markets are more important for new market IPOs than for main market IPOs.

4.3. Pre-IPO ownership structure

Table 2 shows pre-IPO ownership structure. We obtain data for pre-IPO ownership structure from prospectuses. The average (median) insider stake equals 63.9% (74.4%) of pre-IPO shares. We define insiders as the CEO and his family, executive and non-executive directors and their family members and employees. Analyzing U.S. data during 1996-2000, Ljungqvist and Wilhelm (2002a) report an average (median) pre-IPO insider stake of 59.9% (63.6%). When we examine the pre-IPO stakes held by the CEO, we find an average (median) stake equal to 35.8% (28.9%) of pre-IPO shares. This suggests the presence of closely held firms that are managed by their founders. The pre-IPO CEO stake is substantially larger than the CEO stake found by Ljungqvist and Wilhelm (2002a) for the United States. They find an average (median) CEO stake of 20.6% (8.9%) of pre-IPO shares. Venture capitalists and private equity funds hold a pre-IPO stake in 400 (39.7%) sample companies. Conditional on venture capitalists owning a pre-IPO stake, the average (median) aggregate stake is 31.1% (26.3%) of pre-IPO shares. Ljungqvist and Wilhelm (2002a) show that 50.9% of U.S. IPO firms is venture-backed and the average (median) pre-IPO stake of venture capitalists equals 40.4% (37.9%).

[Please insert Table 2 about here]

We also investigate the pre-IPO ownership of corporations. In our sample, corporations own stakes in 235 (23%) companies. This includes equity-carve outs from parent companies and cases where large corporations, such as France Télécom and Siemens, own strategic stakes in smaller industry-related firms. Conditional on corporations owning pre-IPO shares, the average (median) stake is 43.4% (30.3%).

Ljungqvist and Wilhelm (2002a) report similar figures for U.S. IPO firms, with the average (median) pre-IPO stake of corporations equal to 41.6% (24.8%). Table 2 shows that financial investors own an average (median) pre-IPO stake of 21.5% (13.9%) in the 256 companies in which they own shares. Financial investors include banks, insurance companies, mutual funds and pension funds.

We measure pre-IPO ownership concentration by a Herfindahl index computed as the sum of the squared pre-IPO ownership stakes of the CEO, venture capitalists, corporations and financial investors. The Herfindahl index ranges from zero to one. A value of zero indicates a fragmented ownership structure with an infinite number of shareholders, while a value of one indicates a single pre-IPO shareholder. The average (median) level of ownership concentration equals 0.40 (0.32). Computing the same measure for the United States, Ljungqvist and Wilhelm (2002a) report an average (median) level of ownership concentration of 0.35 (0.25). Pre-IPO ownership is therefore more concentrated in Continental Europe than in the United States. Next, we compute the dilution factor, defined as the number of newly issued shares divided by the number of pre-IPO shares outstanding. We find that the average (median) dilution factor equals 26.8% (25%) of pre-IPO shares. The participation ratio, defined as the number of existing shares sold by pre-IPO shareholders divided by the number of pre-IPO shares, is 11.7% (8.5%).

We investigate differences in pre-IPO ownership structure between new market issuers and main market issuers. Table 2 shows that, evaluated at the median, pre-IPO insider stakes are significantly higher for main market companies than for new market companies. The difference is significant at the 10% level. CEO stakes are higher, evaluated at the median, for IPO firms on new markets than for IPO firms on main markets. We also find that a larger fraction of IPO firms is venture-backed on the new markets (significant at the 1% level). In particular, 45% of IPOs on the new markets is venture-backed versus 32.6% of IPOs on the main markets. However, there is no difference in the stakes of venture capitalists, conditional on venture capitalists being pre-IPO shareholders. Pre-IPO ownership of corporations is significantly more frequent and larger for main market companies than for new market companies. This reflects the larger number of equity-carve outs from parent companies that occur on the main markets. Pre-IPO ownership of financial investors is larger for IPO firms on main markets than for IPO firms on new markets, conditional

on financial investors being shareholders in the firm. The fraction of sample firms with a financial investor is not different between the two market types.

When investigating ownership concentration, we find that ownership is less concentrated (i.e., more fragmented) in new market IPO firms than in main market IPO firms. The dilution ratio, defined as newly issued shares divided by pre-IPO shares, is higher for the new market issuers than for the main market issuers. In part, this reflects the different listing requirement for new and main markets. Most new markets require that at least half of the IPO shares are newly issued (see Appendix). The participation ratio, calculated as the number of existing shares sold by pre-IPO shareholders in the IPO divided by pre-IPO shares, is significantly higher for main market issuers than new market issuers. This indicates that IPO firms on main markets sell more secondary shares in the IPO.

Our findings show that the incentives to control the amount of money left on the table (i.e., the underpricing) are different for the pre-IPO shareholders of new market companies than for the pre-IPO owners of main market companies. Dilution costs are higher on the new market than on the main market because of the higher fraction of newly issued shares. Other things equal, pre-IPO shareholders have more incentives to control the dilution costs if their pre-IPO ownership is higher (Habib and Ljungqvist, 2001). Given their higher median stock ownership, this gives CEOs of new market companies more incentives to control the dilution cost than CEOs of main market companies. Corporations and financial investors have larger pre-IPO ownership stakes and therefore more incentives to control dilution costs on the main markets. But dilution costs are not the only cost facing pre-IPO owners. On the margin, pre-IPO shareholders experience even higher wealth losses when they decide to sell shares in the IPO. We find that the participation ratio is higher on main markets. This gives pre-IPO shareholders of main market companies more incentives to control underpricing and bargain for higher offer prices than pre-IPO shareholders of new market companies. In the next subsection, we will examine pre-IPO shareholders' selling behavior more closely.

4.4. Pre-IPO shareholders' selling behavior

Table 3 shows the selling behavior of pre-IPO shareholders. Across the total sample, pre-IPO shareholders sell part of their shares at the IPO in 734 (72.9%) companies. Conditional on pre-IPO secondary sales, the average (median) size of secondary sales is 16% (11.7%) of pre-IPO shares. Ljungqvist and Wilhelm (2002a) show that only 27.5% of U.S. IPOs from 1996-2000 sold secondary shares with an average (median) size of 3.6% (0%) of pre-IPO shares. This shows that secondary sales are more important in Continental Europe than in the United States.

Insiders sell shares at the IPO in 586 (58.2%) companies. The conditional average (median) size of insider sales amounts to 8.9% (6.1%) of pre-IPO shares. The CEO sells shares at the IPO in 447 (44.3%) sample firms against only 9.7% of U.S. IPO firms with CEO sales reported by Ljungqvist and Wilhelm (2002a). Conditional on CEO sales, the average (median) CEO sells 5.8% (3.9%) of pre-IPO shares. There are 276 companies in which venture capitalists sell shares at the IPO. This constitutes 69% of the 400 sample firms that are venture-backed. The conditional average (median) size of venture capitalist sales equals 10.8% (6.8%). Again, the fraction of venture-backed IPOs with venture capitalist sales at the IPO is lower in the United States. Ljungqvist and Wilhelm (2002a) report that 14.5% of venture capitalists sell shares at the IPO.

[Please insert Table 3 about here]

Table 3 shows that there are 108 firms in which corporations sell shares at the IPO. This is 46% of sample firms in which corporation own pre-IPO shares. The conditional average (median) size of corporate sales is 13% (5.8%) of pre-IPO shares. Ljungqvist and Wilhelm (2002a) report that the fraction of corporate-backed IPOs with corporate sales at the IPO is 19.9% in the United States. We also examine the selling behavior of financial investors. Across the sample, financial investors sell shares at the IPO in 161 companies. This equals 62.9% of sample firms that are financial investor backed (i.e., in which financial investors own pre-IPO shares). The conditional average (median) size of the financial investors sales amounts to 9.6% (5%) of pre-IPO shares. Post-IPO insider stakes are defined as the post-IPO ownership

stake of insiders (CEOs, (non-) executive directors, employees) divided by the number of post-IPO shares outstanding. The average (median) post-IPO insider stake is 47.8% (53.2%).

We study differences between new market and main market issuers. We report that secondary sales are more common on main markets than on new markets. Pre-IPO shareholders sell shares at the IPO in 83.3% of main market companies and 65% of new market companies. Other than CEOs all shareholders are more frequent sellers at the IPO on main markets. Moreover, the size of secondary sales at the IPO is significantly larger on main markets than on new markets. Conditional on owning shares, all types of pre-IPO shareholders sell more shares at the IPO on main markets. Post-IPO insider stakes are lower than pre-IPO insider stakes because of the issuance of new shares (i.e., dilution) and insider sales at the IPO. Although insiders are selling less at the IPO on new markets, post-IPO insider stakes are lower on new markets than on main markets. This reflects that new market companies issue more new shares than main market companies. This dilutes the insider stakes more. Habib and Ljungqvist (2001) argue that selling at the IPO has a more important effect on the incentive to control IPO underpricing than if shareholder wealth losses come only from dilution through issuing new shares. Given that dilution is more important on new markets and secondary sales are more important on main markets, this predicts that the incentives to control underpricing are stronger on main markets. In the next section we will investigate whether these and other differences between the new and main markets can explain the difference in IPO underpricing.

5. The determinants of first-day returns

5.1. First-day return regressions

In Section 4.2 we have shown that the average first-day return for new market issues is 21.4 percentage points higher than the average first-day return for main market issues. In this section we investigate whether this large difference can be explained by changes in firm and offer characteristics, wealth incentives, market conditions and information externalities. We include a dummy variable in the regression that takes on the value one if the IPO firm went public on one of the new markets. When we regress first-day returns on this new markets dummy, we find that the coefficient is 0.214 and highly significant at the 1% level (t -

value=7.10). If the changes in firm and offer characteristics, wealth incentives, market conditions and information externalities can explain the difference in first-day return, the new market dummy should lose statistical significance once we control for these changes in the regression model. Table 4 shows the results of cross-sectional regressions using first-day returns as the dependent variable. We use White (1980) standard errors to compute t -statistics throughout this study. Columns [1] and [2] show regression results using the entire sample of 1,007 IPO firms.

We regress first-day returns on pre-IPO ownership variables. Dilution costs increase in the level of pre-IPO ownership (Habib and Ljungqvist, 2001). This predicts a negative relationship between first-day returns and pre-IPO ownership stakes. Although we find negative coefficients on CEO stakes, corporate stakes and stakes held by financial investors, these effects are not statistically significant at the conventional levels. We have also tried using the level of ownership concentration instead of the pre-IPO stakes as an independent variable (not reported). We find that the Herfindahl index is not significantly related to first-day returns (t -value=-0.50). The dilution factor, defined as the number of newly issued shares scaled by the number of pre-IPO shares, is significantly negative (significant at the 5% level). This indicates that the incentives to reduce first-day returns are larger the more new shares are issued at the IPO (i.e., the higher the dilution costs are).

[Please insert Table 4 about here]

Underpricing leads to larger wealth losses when pre-IPO shareholders are selling shares at the IPO. Wealth incentives to control underpricing are therefore larger if more shares are sold at the IPO. This predicts a negative relation between first-day returns and secondary sales at the IPO. Column [1] shows the results using the participation ratio, defined as the number of shares sold at the IPO divided by the number of pre-IPO shares. As expected, we find that the coefficient on the participation ratio is significantly negative. Column [2] shows the results for each category of shareholder. First-day returns are a negative function of the size of CEO sales at the IPO. This indicates that if CEOs are selling shares at the IPO they

have larger wealth incentives to bargain for a higher offer price and lower underpricing. There is also a negative relation between first-day returns and the size of corporate sales. If corporations are selling more shares at the IPO, they bargain for a higher offer price, which in turn leads to lower first-day returns. The signs for the coefficients on the size of VC and financial investor sales are negative but not significant. In unreported tests, we have also used the size of insider sales. Insiders include the CEO and his family, (non-) executive directors and employees. We find a negative and significant coefficient on insider sales (t -value=1.69).

We also include firm and offer characteristics. Information asymmetry theories of Beatty and Ritter (1986) and Baron (1982) argue that IPOs characterized by greater valuation uncertainty will be more underpriced. Higher first-day returns serve to compensate investors for the valuation uncertainty associated with risky IPO deals. The age of the IPO firm is used as a proxy for risk. It is argued that the greater the age of the firm, the lower the degree of risk (Ritter, 1984). Since we do not expect age to be linearly related to first-day returns, we use the natural logarithm of (one plus firm age) as our proxy for risk. However, we find no relationship between first-day returns and company age. A second ex-ante risk proxy is a dummy variables that equals one if the IPO firm reports negative EBITDA in the fiscal year before going public. Again, we do not find a significant relation between first-day returns and this risk proxy. In unreported tests, we replace the two ex-ante risk proxies by the ex-post market-adjusted volatility of stock returns during the 60 trading days from 80 to 20 days after the IPO date. We find that this ex-post risk proxy loads up with a negative coefficient that is significant at the 10% level (t -value=1.73). However, this ex-post risk proxy is endogenous to the success of the bookbuilding effort and we therefore do not tabulate the results.

The natural logarithm of total assets reported in the fiscal year before the IPO controls for size differences. Larger IPO firms can be viewed as less risky than smaller IPO firms (Ritter, 1984; Beatty and Ritter, 1986). This predicts a negative relation between first-day returns and total assets. In accordance with expectations, total assets is negatively related to first-day returns (significant at the 10% level). This shows that larger IPO firms have lower first-day returns than smaller IPO firms. We also incorporate an Internet and technology dummy into the regression models. This controls for the changed industry composition of

IPO firms during the sample period. Internet and technology firms can be considered to be riskier than other IPO firms and are therefore expected to have higher first-day returns. We find a highly significant coefficient on the Internet and technology dummy. Other things equal, Internet and technology firms experience first-day returns that are 11.5% higher than the first-day returns of other IPO firms.

Previous studies have found that underwriter reputation is an important determinant of first-day returns (Carter and Manaster, 1990; Carter, Dark and Singh, 1998). Prestigious underwriters may ‘certify’ IPO quality and therefore be associated with IPOs that have lower first-day returns. We proxy for underwriter prestige by underwriter market share of total gross proceeds in the local market¹⁴. We find that underwriters with larger market share are associated with lower first-day returns. Market conditions are included in the regressions as well. We measure market index returns for the local market during the 50 trading day window from 60 to 10 days before the IPO date. This reflects public information that the underwriter may have used in setting the final offer price. We find that there exists a positive and significant relation between first-day returns and lagged market returns from the pre-pricing period. This suggests that underwriters do not fully reflect public information about market returns in setting offer prices¹⁵. A one percentage point increase in market returns (e.g., from 4% to 5%) increases the first-day return by 1.24%. Our results are not sensitive to the length of this time window^{16,17}. To capture the effect of hot issue markets, we have included the mean contemporary underpricing of local market IPOs during the 50 trading window starting 60 and ending 10 days before the IPO date. We find that the contemporary underpricing of previous IPO deals has a significant impact on first-day returns. This is consistent with the effect of hot issues markets. To capture the effect of the dot-com bubble years 1999 and 2000 we also include a time dummy that takes on the value one if the IPO took place in 1999 or 2000. We find no significant coefficient on this bubble dummy.

To take into account information externalities we incorporate the number of IPOs in the local market during a 50 trading day interval from 10 to 60 days before the IPO date. We also measure the number of IPOs in the same Fama and French (1997) industry that went public in that time window. Underwriters can learn from the pricing of previous IPO deals and bundle industry IPOs together to spread the cost of information

production. This predicts that first-day returns are lower, the more firms go public in short succession (Benveniste, Busaba and Wilhelm, 2002). Accordingly, we find a negative association between first-day returns and IPO volume both at an aggregate and an industry level.

Columns [3] and [4] show the regression results for the bookbuilding sample. We are able to retrieve data on the price range for 858 bookbuilt IPOs. There is a 22.3 percentage point difference between the average first-day returns for the 541 bookbuilt IPOs on new markets and 317 bookbuilt IPOs on main markets. Benveniste and Spindt (1989) argue that, in order to reward investors for their private information, underwriters only partially incorporate collected private information in the final offer price. The more valuable the private information is to pricing the IPO, reflected in a greater price revision, the higher first-day returns. We measure the percentage price revision with respect to the midpoint of the price range. As expected, we find that the price revision is positively related to first-day returns. A 10 percentage point increase in price revision results in a first-day return that is about 11.5 percentage points higher. We also observe that total assets and the dilution factor are no longer statistically significant for the bookbuilding sample, whereas they were significant for the entire sample. The dummy variable for the dot-com bubble years has become significant at the 5% level while it was insignificant in previous analyses. All other independent variables are of similar sign and significance as reported in Columns [1] and [2] for the whole sample.

What about our new markets dummy? After controlling for the other determinants of first-day returns, the coefficient on the new markets dummy has become insignificant. Across the entire sample, the new markets dummy accounts for only 5.8 to 6.6 percentage points of the 21.4 percentage point difference in first-day returns between new and main market issuers. For the bookbuilding sample, the new markets dummy explains 6.4 to 7.5 percentage points of the 22.3 percentage point difference in first-day returns between bookbuilt IPOs on new and main markets. We conclude that the remaining part of the higher first-day returns on new markets can therefore be explained by changes that occurred in issuer characteristics, wealth incentives, market conditions and information externalities that we documented in Section 4. Our findings are robust to fixed-time effects and including country of listing dummies for France, Belgium, the

Netherlands and Italy. We have also re-defined the sample to include main market issues only as from the date when the new market commenced operations. For example, for Germany we only include IPOs on the *Amtlicher Handel* and *Geregelter Markt* as from March 1997 (the time when the *Neuer Markt* had its first listing). Our findings remain unchanged. In the next subsection we focus on resolving problems with endogenous variables.

5.2. Endogeneity of price revisions and underwriter choice

The results in Section 5.1 may be subject to endogeneity problems. The regressions for the bookbuilding sample in Columns [3] and [4] of Table 4 treat price revisions as exogenous. The Benveniste-Spindt model suggests that price revisions and first-day returns should be estimated simultaneously, because the underwriter's pricing decision depends on how much money he has to leave on the table to ensure that investors truthfully reveal their demand for IPO shares during the pre-market phase of the bookbuilding process. Underwriter choice may also be an endogenous rather than exogenous variable. Habib and Ljungqvist (2001) show that treating the underwriter choice endogenously can change the relation between underwriter reputation and first-day returns.

We start by running OLS regressions using the price revision as the dependent variable. We use a sample of 858 bookbuilt IPOs. We measure price revisions as the percentage difference between the offer price and the midpoint of the price range. Results are shown in Column [1] and [2] of Table 5. We observe that price revisions are positively related to the size of CEO sales at the IPO. If CEOs are selling shares at the IPO, they have strong incentives to bargain for higher offer prices. More aggressive bargaining efforts result in larger price revisions. In particular, a one percentage point increase (e.g., from 10 to 11%) in CEO sales, increases the price revision by 0.15%. Ownership variables or sales by other pre-IPO shareholders are not significantly related to price revisions. This suggests that pre-IPO shareholders, other than the CEO, have little bargaining power vis-à-vis the underwriter.

[Please insert Table 5 about here]

Company age and the Internet and technology dummy are not significant in the price revision regressions. The coefficient on total assets is significantly negative, but only in Model [1]. This shows that larger firms have lower price revisions compared to smaller firms. Underwriters may learn more information in the pre-market phase for smaller firms than for larger firms, which results in larger price revisions. Underwriter market share is positively related to the price revision, but only in Model [2]. We argue that underwriters with large market shares have more experience and a larger network of investor clients. These underwriters are therefore better able to extract information during the bookbuilding process.

Columns [1] and [2] show that market conditions are key determinants of price revisions. All market condition variables are measured over during a 50 trading day window from 60 to 10 days before the IPO date. This implies that the underwriter could have taken this information into account when deciding on the final offer price. Market index returns are positively related to the price revisions. Market volatility, measured as the standard deviation of local market returns, and the average first-day return of previous IPO deals are also positively associated with price revisions. The coefficient on the dummy for the bubble years is significantly negative. This suggests that issuers were more complacent and willing to accept lower price revisions in that period. Information externalities are captured by IPO volume and IPO industry volume during a 50 trading day interval from 60 to 10 days before the IPO date. These variables are not significantly related to price revisions, however. Arguably, underwriters have already taken information externalities into account when setting the price range itself. The new market dummy is not statistically significant. This indicates that there are few differences between the price revisions of new market issues and main market issues.

Columns [3] and [4] of Table 5 present the results of the OLS regressions using the underwriter market share as the dependent variable. We use a sample of 858 bookbuilt IPOs. In Model [3] we investigate pre-IPO ownership stakes. Assuming that underwriters with larger market share are better able to control underpricing costs, pre-IPO owners have more incentives to choose a high reputation underwriter as their ownership stake is larger. We find that venture capitalists and corporate shareholders with larger stakes

tend to select underwriters with higher market share to control their dilution costs. We find a negative relation between underwriter market share and the pre-IPO ownership of financial and institutional investors. Other effects such as conflicts of interests may drive this result. If financial institutions own more shares in the IPO firm, they may force management to select an affiliated lead manager for the issue. We leave this question for future research. Pre-IPO shareholders have even stronger incentives to control underpricing if they sell shares at the IPO. However, looking at the sales by pre-IPO owners, we do not find any significant relation with underwriter choice. There is a significant and negative association between the size of sales by financial and institutional investors and underwriter market share.

Total assets are positively related to underwriter market share. If larger firms go public they tend to have larger offerings. They therefore need to hire underwriters with larger market share to distribute their larger number of IPO shares among investors. The other firm and offer characteristics are not related to underwriter market share. Market conditions are also unrelated to underwriter choice. The larger the number of IPOs in the 50 trading day interval from 60 to 10 days before the IPO date, the lower the market share of the underwriter. We infer that underwriters with lower market share are especially hired in periods when many firms want to go public. The new market dummy is not significant. This indicates that there is no significant difference between the market share of the lead manager of new market issues versus main market issues.

This brings us to the first endogeneity problem. Self-selection bias may cause the positive effect of underwriter market share on price revisions in Model [2] to be overstated. Ljungqvist and Wilhelm (2002a) argue that if companies with the most to learn from bookbuilding hire top underwriters, the positive correlation between underwriter market share and price revisions may not be causal but a result of the selection behavior of these firms. We therefore estimate a two-stage least squares (2SLS) version of Model [2]. We use the fitted values of a first-stage regression for underwriter market share on all independent variables of Model [3]. The 2SLS results are shown in Column [5] of Table 5. In general, we find similar results as before in Model [2]. Underwriter market share is positively and significantly related to price revisions. The coefficients on the size of CEO sales and the size of financial investor sales are

significantly positive. This implies that CEOs and financial institutions that sell shares at the IPO aggressively bargain for higher offer prices with the underwriter. In contrast to earlier findings, we document that price revisions are a positive function of IPO volume. If firms go public in short succession, underwriters may be in a better position to learn about common valuation factors. This may result in more informed pricing decisions.

We are now ready to return to our first-day return regressions. We estimate a 2SLS version of Model [3] of Table 4. Price revisions are dependent on how much money the underwriter has to leave on the table to compensate investors for disclosing private information in the bookbuilding process. We therefore use the fitted values from Model [5] of Table 5 as our instrument for price revisions. As before, we use the fitted values from Model [3] of Table 5 as our instrument for underwriter market share. The sample consists of 858 bookbuilt IPOs. Columns [5] and [6] of Table 4 show the results. We find that the participation ratio, defined as the number of existing shares sold at the IPO scaled by the number of pre-IPO shares, is negatively related to first-day returns. If pre-IPO shareholders sell more shares at the IPO, they have stronger incentives to control the wealth losses associated with higher first-day returns. In Model [6] of Table 4 we use the extent of sales by insiders (CEO, (non-) executive directors and employees) as an alternative independent variable. We find an inverse relation between insider sales at the IPO and first-day returns. If insiders are selling part of their shareholdings at the IPO, they have strong incentives to control underpricing costs. Internet and technology firms have higher first-day returns. Price revisions are no longer significantly related to first-day returns. On closer inspection, the effect of price revisions on first-day returns is asymmetric. The coefficient on upward price revisions is highly significant. Consistent with the Benveniste-Spindt framework, underwriters only partially adjust to positive information, reflected in upward price revisions. Underwriters fully adjust the offer price to negative information they learn in the pre-market phase. This is consistent with the U.S. evidence provided by Lowry and Schwert (2001). The market returns on the local market index remain positively related to first-day returns. Underwriter market share and first-day returns are unrelated. After taking into account endogeneity, the mean contemporary underpricing of previous IPO deals loses significance, however. This suggests that the price revision fully

incorporates the information spillover from the IPO pricing of previous deals. As before with Model [3], the bubble year dummy is significantly positive. IPO volume remains inversely related to first-day returns, but IPO industry volume loses its significance. What about our new markets dummy? The dummy remains statistically insignificant. We conclude that there is little special about new markets issues after controlling for changes in issuer characteristics, wealth incentives, market conditions and information externalities. After taking into account endogeneity, the new markets dummy explains only 2.2 to 3.2 percentage points of the 22.3 percentage point difference in first-day returns between bookbuilt IPOs on new and main markets.

6. Conclusions

This study investigates whether changes in firm and offer characteristics, wealth incentives, market conditions and information externalities can explain the 21.4 percentage point difference in the average first-day return of new market and main market issuers. Our sample consists of 575 IPO firms on new European stock markets (the French *Nouveau Marché*, the German *Neuer Markt*, *Euro.NM Belgium*, the Dutch *Nieuwe Markt*, the Italian *Nuovo Mercato* and *EASDAQ/NASDAQ Europe*) and 432 IPO firms on the main markets (the French *Second Marché*, the German *Amtlicher Handel* and *Geregelter Markt*, the Belgian *Eerste Markt*, the Dutch *Officiële Markt* and the Italian *Mercato di Borsa*) from January 1995 to December 2001. This section focuses on our main findings.

To begin with, we examine differences in firm characteristics. We find that new market IPO firms are smaller measured by total assets or sales than main market IPO firms. We also document that new market issuers are younger and riskier than main market issuers. They more frequently report losses in the year before the IPO and a larger fraction of new market issuers are from the Internet and technology sector. To some extent, this reflects the weaker admission criteria that apply to new markets compared to main markets. The changed composition of firms going public could explain why the average first-day returns on new markets is higher than on main markets. Information asymmetry theories of Beatty and Ritter (1986) and Baron (1982) predict that risky IPO deals have higher first-day returns to compensate investors for the

greater valuation uncertainty. The regression results show that, on average, IPO firms from the Internet and technology sector have first-day returns that are 11.5% to 14.8% higher than the first-day returns of other IPO firms. The higher fraction of technology firms going public on new markets therefore may help to explain why the average first-day return on new markets is larger than that on main markets.

We then examine changes in offer characteristics. We document that the price revision is larger for bookbuilt IPOs on the new markets than for bookbuilt IPOs on the main markets. This may reflect that underwriters of new market issues learn more valuable information about the private demand schedules of investors in the pre-market phase of bookbuilding than underwriters of main market issues. In the Benveniste-Spindt (1989) framework investors require compensation for truthfully revealing their private demand schedules by means of higher first-day returns. Accordingly, we find that (positive) price revisions are positively related to first-day returns. The larger price revisions on new markets may thus partially explain why the average first-day return on new markets is larger than on main markets.

We also examine the changes in wealth incentives. The incentives to reduce first-day returns and aggressively bargain for a higher offer price increase in pre-IPO shareholders' participation ratio (i.e., the percentage of pre-IPO shares they sell in the offering) and in the dilution factor (i.e., the percentage increase in the number of shares outstanding after the offering). We show that the new market issues issue more new shares at the IPO. This can be attributed to the admission rules that require that at least 50% of the shares sold at the IPO be newly issued. Pre-IPO shareholders of new market companies therefore face higher dilution costs. However, pre-IPO shareholders of new market companies are less frequent sellers of shares at the IPO than the owners of main market companies. If pre-IPO owners of new market companies decide to sell shares at the IPO, they sell fewer shares than the owners of main market companies. Habib and Ljungqvist (2001) show that selling shares at the IPO has a more important effect on the incentive to control first-day returns than if shareholder wealth losses only come from dilution through newly issued shares. This predicts that the incentives to reduce first-day returns are less strong on new markets. We show that the participation ratio is inversely related to first-day returns and that the size of CEO sales is positively related to the price revision. Because pre-IPO owners of new market companies

are selling fewer shares at the IPO, they experience less incentives to aggressively bargain about the offer price with the underwriter. As a result they are more complacent about high first-day returns than pre-IPO shareholders of main market companies.

Throughout the paper, we take into account the effects of underwriter reputation, market conditions and information externalities. After controlling for endogeneity, we find that the market share of the underwriter is unrelated to first-day returns. However, we do find that the market share of the underwriter is positively associated with the price revision in the bookbuilding process. Arguably, underwriters with a large market share are better at extracting information in the bookbuilding process. We find that first-day returns are positively related to the average first-day returns of previous IPO deals and a dummy variable for the bubble years 1999 and 2000. This finding is consistent with presence of hot issue markets. However, the relation between first-day returns and the first-day returns of previous IPO deals disappears after controlling for endogeneity of the price revisions. Information externalities are important as well. We capture information externalities by the number of (industry-related) IPOs in the 50 trading day interval from 60 trading days before to 10 trading days before the IPO date. Underwriters can bundle IPOs in order to spread the costs of information production (Benveniste, Busaba and Wilhelm, 2002). We find that first-day returns are inversely related to the number of previous IPO deals. After controlling for endogeneity, we find that price revisions are larger when the number of previous IPO deals is larger and when the average first-day return of these deals was higher. This suggests that underwriters learn about common valuation factors from the pricing of previous deals.

We introduce a new market dummy that takes on the value one if the IPO took place on one of the new markets and zero otherwise. Across the entire sample, the new markets dummy accounts for only 5.8 to 6.6 percentage points of the 21.4 percentage point difference in first-day returns between new and main market issuers. For the bookbuilding sample, the new markets dummy explains 6.4 to 7.5 percentage points of the 22.3 percentage point difference in first-day returns between bookbuilt IPOs on new and main markets. After taking into account endogeneity, the new markets dummy explains only 2.2 to 3.2 percentage points of the 22.3 percentage point difference in first-day returns between bookbuilt IPOs on

new and main markets. We argue that the remaining part of the higher first-day returns on new markets can therefore be explained by changes that occurred in firm and offer characteristics, wealth incentives, market conditions and information externalities.

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Appendix 1a: Listing requirements of new markets

Stock market	Country	Company age and size	Issue size and IPO rules	Free float	Lock-up provisions
Neuer Markt	Germany	Three years; Equity book value higher than 1.5 million euro	Half of the offered shares must be newly issued; IPO proceeds higher than 5 million euro	25% or 10% if offer size is larger than 5 million euro (at least 100,000 shares)	Insiders must lock their shares for at least 6 months
Nuovo Mercato	Italy	One year; Equity book value higher than 1.5 million euro	Half of the offered shares must be newly issued; IPO proceeds higher than 5 million euro	20% (at least 100,000 voting shares)	Insiders must lock at least 80% of their shares for one year
EASDAQ (NASDAQ Europe)	Belgium	Equity book value equal to at least 10 million euro and gross income equal to at least 1 million euro, or equity book value equal to at least 20 million euro, or a market capitalization equal to 20 million euro, with sales larger than 50 million euro	No specific rules	20% owned by at least 100 shareholders	Insiders must lock at least 80% of their shares for 6 months
Nouveau Marché (Euronext Paris)	France	Equity book value higher than 1.5 million euro	Half of the offered shares must be newly issued; IPO proceeds higher than 5 million euro	20% (at least 100,000 voting shares)	Insiders must lock at least 80% of their shares for one year
Nieuwe Markt (Euronext Amsterdam)	The Netherlands	Equity book value higher than 1.5 million euro	Half of the offered shares must be newly issued; IPO proceeds higher than 5 million euro	20% (at least 100,000 voting shares)	Discretionary
Euro.NM Belgium (Euronext Brussels)	Belgium	Three years; market capitalization higher than 2 million euro	Half of the offered shares must be newly issued; IPO proceeds higher than 5 million euro	25% (in some cases 10%)	Insiders must lock their shares for one year (no fixed percentage of shares to be locked)

Appendix 1b: Listing requirements of main markets

Stock market	Country	Company age and size	Issue size and IPO rules	Free float	Lock-up provisions
Amtlicher Handel Geregelter Markt	Germany	Three years (no minimum age for Geregelter Markt); expected capitalization at least 1.25 million euro (equity par value at least 0.25 million euro for Geregelter Markt)	No specific rules	At least 25% o (20% on SMAX segment); no specific rules for the Geregelter Markt	Not compulsory
Mercato di Borsa	Italy	Three years; expected capitalization at least 5 million euro	No specific rules	At least 25% (35% on STAR segment)	Not compulsory
Second Marché (Euronext Paris)	France	Two years; expected market capitalization is recommended to be larger than 15 million euro	No specific rules	At least 10%	Not compulsory
Officiële Markt (Euronext Amsterdam)	The Netherlands	Three years; shareholders' equity must be at least 5 million euro; the company must have had at least three profitable financial years in the five years preceding the flotation ^a	No specific rules	At least 10%	Compulsory (180 days) only if companies fail to comply with the profitability criteria
Eerste Markt (Euronext Brussels)	Belgium	Three years; expected market capitalization at least 15 million euro	No specific rules	Not lower than 10% (25% recommended). Floating shares must represent at least 5 million euro	Not compulsory

^a The profitability criterium does not apply if the expected market capitalization is larger than 150 million euro

Table 1: Summary statistics

	All	New markets	Main markets	test for difference
Panel A: Firm characteristics				
Market capitalization ('000 euro)	365,879	285,581	472,757	1.72 [*]
	<i>109,672</i>	<i>126,698</i>	<i>88,570</i>	3.79 ^{***}
Gross proceeds ('000 euro)	74,304	54,198	101,065	2.78 ^{***}
	<i>27,000</i>	<i>28,223</i>	<i>24,297</i>	2.74 ^{***}
Total assets ('000 euro)	102,206	28,582	200,201	6.36 ^{***}
	<i>18,593</i>	<i>10,574</i>	<i>48,694</i>	16.52 ^{***}
Sales ('000 euro)	121,035	30,156	240,734	6.32 ^{***}
	<i>23,214</i>	<i>11,496</i>	<i>60,831</i>	17.50 ^{***}
EBITDA<0 (dummy)	18.57	30.09	3.24	11.53 ^{***}
Market-adjusted volatility (%)	2.48	3.38	1.27	17.94 ^{***}
	<i>2.09</i>	<i>3.04</i>	<i>1.00</i>	18.97 ^{***}
Firm age (years)	22.98	12.35	37.12	13.96 ^{***}
	<i>13.00</i>	<i>9.00</i>	<i>23.00</i>	14.63 ^{***}
Internet and technology (dummy)	40.32	60.00	14.12	16.56 ^{***}
Panel B: Offer characteristics				
First-day return (%)	25.30	34.50	13.07	6.58 ^{***}
	<i>6.76</i>	<i>10.00</i>	<i>4.92</i>	3.91 ^{***}
Price revision (%)	2.53	3.02	1.67	2.02 ^{**}
	<i>5.43</i>	<i>6.42</i>	<i>3.70</i>	4.99 ^{***}
Market return (%)	4.43	4.48	4.36	0.85
	<i>4.29</i>	<i>4.44</i>	<i>4.11</i>	0.99
Underwriter market share (%)	7.04	5.74	8.77	5.32 ^{***}
	<i>3.75</i>	<i>2.85</i>	<i>5.42</i>	4.95 ^{***}
IPO volume (#)	14.48	18.40	9.27	11.40 ^{***}
	<i>10.00</i>	<i>14.00</i>	<i>5.00</i>	11.63 ^{***}
IPO industry volume (#)	2.80	4.39	0.69	12.05 ^{***}
	<i>0.00</i>	<i>2.00</i>	<i>0.00</i>	11.72 ^{***}
Mean contemporary underpricing (%)	29.13	34.76	21.64	6.15 ^{***}
	<i>18.33</i>	<i>21.77</i>	<i>11.71</i>	8.56 ^{***}

Note: This table shows summary statistics. The first column presents means and medians for the entire sample of 1,007 European IPO firms that went public from January 1995 to December 2001. The second column presents means and medians for 575 IPO firms on new stock markets, while the third column provides means and medians for 432 IPO firms on main stock markets. We test whether differences exist between the firm characteristics of new market and main market IPO firms. We use a standard *t*-test for difference in means and the Wilcoxon/Mann-Whitney test for difference in medians. Medians are shown in italics. We compute **market capitalization** as the number of shares outstanding after IPO times the closing market price on the first trading day. **Gross proceeds** is defined as the number of shares sold in IPO (excluding over-allotment option) times the offer price. **Total assets** and **sales** are for the most recent financial year disclosed in the IPO prospectus. **EBITDA<0** is a dummy variable that equals one

if earnings before interest, taxes, depreciation and amortization is less than zero in the most recent financial year disclosed in the prospectus. **Market-adjusted volatility** is measured as the standard deviation of the firm's daily stock returns during the 60 trading day interval of 20 to 80 days after its IPO date minus the standard deviation of daily returns to the MSCI index for the country of listing (Germany, France, Italy, Belgium or The Netherlands) during the same period. **Firm age** is defined as the calendar year of the IPO minus the calendar year of founding as mentioned in the prospectus. **Internet and technology** is a dummy variable that takes on the value one if the IPO firm is active in the Internet and technology sector. We identify Internet and technology firms as described in footnote 8. **First-day return** is measured as: (first-day closing market price - final offer price)/final offer price. The **price revision** is measured as: (final offer price – midpoint of price range)/midpoint of price range. Price revisions are available for 541 new market issuers and 317 main market issuers. **Market return** is measured as the return of the MSCI index of the country of listing (Germany, France, Italy, Belgium or The Netherlands) over the 50 trading day interval from 60 to 10 days before the IPO date. **Underwriter market share** is the sum of gross proceeds (excluding over-allotment option) in all local IPOs lead managed by bank *j* divided by the total proceeds raised in the local market during the sample period. **IPO volume** is the number of companies going public on local market from 60 trading days before to 10 trading days before the IPO date. **IPO industry volume** is the number of industry-related firms going public in that period. **Mean contemporary underpricing** is the average first-day return of previous IPO deals during the 50 trading period of 60 days to 10 days before the IPO date. * significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

Table 2: Pre-IPO ownership structure

	All	New markets	Main markets	test for difference
Pre-IPO insider stakes (%)	63.87	63.71	64.09	0.17
	<i>74.41</i>	<i>68.79</i>	<i>79.54</i>	<i>1.73</i> *
CEO stakes (%)	35.79	36.82	34.42	1.12
	<i>28.91</i>	<i>30.21</i>	<i>24.02</i>	<i>2.62</i> ***
No. with VC stake	400	259	141	
Fraction with VC stake (%)	39.72	45.04	32.64	4.01***
VC stakes (%)	31.06	30.21	32.62	1.03
	<i>26.27</i>	<i>27.02</i>	<i>25.00</i>	<i>0.10</i>
No. with corporate stake	235	149	86	
Fraction with corporate stake (%)	23.33	25.91	19.91	2.23**
Corporate stakes (%)	43.38	35.69	56.69	4.52***
	<i>30.25</i>	<i>24.41</i>	<i>61.59</i>	<i>4.21</i> ***
No. with financial investor stake	256	146	110	
Fraction with financial investor stake (%)	25.42	25.39	25.46	0.03
Financial investor stake (%)	21.54	17.27	27.21	3.50***
	<i>13.94</i>	<i>11.94</i>	<i>17.13</i>	<i>2.79</i> ***
Ownership concentration	0.397	0.373	0.430	2.82***
	<i>0.315</i>	<i>0.271</i>	<i>0.386</i>	<i>1.85</i> *
Dilution factor	26.80	32.59	19.10	10.17***
	<i>25.01</i>	<i>30.00</i>	<i>14.00</i>	<i>14.72</i> ***
Participation ratio	11.67	7.47	17.25	12.07***
	<i>8.47</i>	<i>4.85</i>	<i>12.67</i>	<i>11.18</i> ***

Note: This table shows pre-IPO ownership structure. The first column presents means and medians for the entire sample of 1,007 European IPO firms that went public from January 1995 to December 2001. The second column presents means and medians for 575 IPO firms on new stock markets, while the third column provides means and medians for 432 IPO firms on main stock markets. We test whether differences exist between the firm characteristics of new market and main market IPO firms. We use a standard *t*-test for difference in means and the Wilcoxon/Mann-Whitney test for difference in medians. Medians are shown in italics. Ownership data is hand-collected from prospectuses. **Insiders** include the Chief Executive Officer (CEO) and his family, (non-) executive directors and their family members and employees. **Venture capitalists** (VCs) are providers of venture capital or private equity funds. **Corporate shareholders** are industrial and commercial companies. **Financial investors** include banks, insurance companies, mutual funds and pension funds. All equity stakes of pre-IPO shareholders are expressed as a percentage of pre-IPO shares outstanding. **Ownership concentration** is measured using a Herfindahl index, calculated as the sum of squared equity stakes held by the CEO, venture capitalists, corporates and financial investors. The **dilution factor** is defined as the number of newly issued shares at the IPO divided by the number of pre-IPO shares outstanding. The **participation ratio** is defined as the number of existing shares sold by pre-IPO shareholders divided by the number of pre-IPO shares. * significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

Table 3: Pre-IPO shareholders' selling behavior

	All	New markets	Main markets	test for difference
No. with secondary sales	734	374	360	
Fraction with secondary sales	72.89	65.04	83.33	6.59***
Size of secondary sales (%)	16.00	11.49	20.70	9.75***
	<i>11.74</i>	<i>9.00</i>	<i>15.11</i>	<i>9.87***</i>
No. with insider sales at IPO	586	311	275	
Fraction with insider sales at IPO	58.19	54.09	63.66	3.06***
Size of insider sales at IPO (%)	8.94	6.60	11.58	6.86***
	<i>6.11</i>	<i>4.72</i>	<i>9.25</i>	<i>7.00***</i>
No. with CEO sales at IPO	447	253	194	
Fraction with CEO sales	44.39	44.00	44.91	0.29
Size of CEO sales (%)	5.80	4.36	7.68	6.16***
	<i>3.93</i>	<i>2.69</i>	<i>6.53</i>	<i>6.91***</i>
No. VC backed firms with VC sales at IPO	276	158	118	
Fraction VC backed firms with VC sales (%)	69.00	61.00	83.69	4.81***
Size of VC sales (%)	10.76	8.21	14.17	4.38***
	<i>6.78</i>	<i>6.24</i>	<i>9.14</i>	<i>3.22***</i>
No. corporate backed firms with corporate sales at IPO	108	58	50	
Fraction corporate backed firms with corporate sales (%)	45.96	38.93	58.14	2.88***
Size of corporate sales (%)	13.06	5.08	22.31	5.76***
	<i>5.80</i>	<i>2.81</i>	<i>14.99</i>	<i>5.63***</i>
No. financial investor backed firms with financial investor sales at IPO	161	75	86	
Fraction of financial investor backed firms with financial investor sales (%)	62.89	51.37	78.18	4.55***
Size of financial investor sales (%)	9.60	5.95	12.77	3.66***
	<i>5.00</i>	<i>3.62</i>	<i>9.88</i>	<i>4.00***</i>
Post-IPO insider stakes (%)	47.47	46.13	49.26	1.85*
	<i>53.20</i>	<i>50.36</i>	<i>58.22.</i>	<i>2.87***</i>

Note: This table shows pre-IPO shareholders' selling behavior. The first column presents means and medians for the entire sample of 1,007 European IPO firms that went public from January 1995 to December 2001. The second column presents means and medians for 575 IPO firms on new stock markets, while the third column provides means and medians for 432 IPO firms on main stock markets. We test whether differences exist between the firm characteristics of new market and main market IPO firms. We use a standard *t*-test for difference in means and the Wilcoxon/Mann-Whitney test for difference in medians. Medians are shown in italics. **Secondary sales** are existing shares being sold by pre-IPO shareholders at the IPO. Insiders, venture capitalists (VCs), corporate shareholders and financial investors are defined as before in Table 2. All sales are expressed as a percentage of pre-IPO shares outstanding. Post-IPO insider stakes are the number of shares held by insiders expressed as a percentage of post-IPO shares outstanding. . * significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

Table 4: First-day return regressions

Dependent variable:	First-day returns [1]	First-day returns [2]	First-day returns [3]	First-day returns [4]	First-day returns [5]	First-day returns [6]
Pre-IPO ownership						
CEO stake	-0.048 (-0.76)		-0.065 (-0.88)		-0.111 (-1.17)	-0.122 (-1.29)
Corporate stake	-0.021 (-0.30)		-0.041 (-0.54)		0.054 (0.40)	0.016 (0.12)
VC stake	0.044 (0.60)		0.063 (0.77)		0.187 (1.12)	0.096 (0.58)
Financial investor stake	-0.045 (-0.53)		-0.028 (-0.31)		-0.202 (-1.01)	-0.341 (-1.69)*
Sales at IPO						
Size of CEO sales		-0.436 (-1.77)*		-0.544 (-1.89)*		
Size of corporate sales		-0.334 (-3.02)***		-0.240 (-1.94)*		
Size of VC sales		-0.088 (-0.54)		-0.119 (-0.68)		
Size of financial investor sales		-0.145 (-0.68)		-0.177 (-0.85)		
Size of insider sales						-0.422 (-2.12)**
Dilution factor	-0.147 (-2.31)**	-0.133 (-2.20)**	-0.084 (-1.36)	-0.059 (-1.00)	-0.076 (-1.26)	-0.066 (-1.04)
Participation ratio	-0.317 (-3.14)***		-0.351 (-3.12)***		-0.316 (-2.76)***	
Firm and offer characteristics						
Log(1+age)	-0.017 (-1.02)	-0.020 (-1.23)	-0.011 (-0.57)	-0.014 (-0.72)	-0.005 (-0.21)	-0.005 (-0.24)
EBITDA<0 dummy	0.001 (0.02)	0.014 (0.27)	-0.001 (-0.01)	0.017 (0.32)	-0.005 (-0.09)	0.009 (0.15)
Log(total assets)	-0.022 (-1.81)*	-0.022 (-1.71)*	-0.020 (-1.42)	-0.019 (-1.39)	0.045 (0.64)	0.065 (0.92)
Internet and technology dummy	0.115 (2.66)***	0.115 (2.73)***	0.127 (2.76)***	0.127 (2.81)***	0.143 (2.71)***	0.148 (2.78)***
Underwriter market share	-0.266 (-1.69)*	-0.257 (-1.67)*	-0.350 (-2.08)**	-0.344 (-2.07)**	-4.375 (-1.08)	-5.199 (-1.27)
Price revision			1.157 (4.93)***	1.158 (4.88)***	0.708 (0.47)	1.724 (1.08)
Upward price revision					2.140 (3.11)***	2.150 (3.06)***
Market conditions						
Market returns	1.246 (5.90)***	1.240 (5.85)***	1.248 (5.20)***	1.237 (5.14)***	1.223 (3.74)***	1.034 (3.15)***
Mean contemporary underpricing	0.197 (2.87)***	0.194 (2.79)***	0.119 (1.65)*	0.117 (1.65)*	0.159 (1.63)	0.124 (1.21)
Bubble years (1999 and 2000)	0.056 (1.54)	0.061 (1.63)	0.091 (2.26)**	0.097 (2.32)**	0.085 (1.57)	0.110 (1.89)*

Information externalities						
IPO volume/10	-0.072 (-4.05)***	-0.071 (-4.02)***	-0.081 (-4.12)***	-0.081 (-4.09)***	-0.113 (-3.06)***	-0.123 (-3.23)***
IPO industry volume/10	-0.072 (-2.01)**	-0.074 (-2.05)**	-0.076 (-2.14)**	-0.078 (-2.18)**	-0.046 (-1.09)	-0.044 (-1.07)
New market dummy	0.058 (1.22)	0.066 (1.43)	0.064 (1.16)	0.075 (1.49)	0.022 (0.34)	0.032 (0.51)
Intercept	0.690 (4.40)***	0.668 (4.28)***	0.70 (3.58)***	0.57 (3.27)***	0.201 (0.50)	0.050 (0.13)
R ² adjusted	18.33%	18.21%	21.90%	21.68%	21.40%	21.26%
<i>F</i> -statistic	11.75***	12.20***	11.93***	12.30***	10.76***	10.687***

Note: This table shows the regression results using the first-day return as the dependent variable. Models [1] and [2] are estimated using the whole sample of 1,007 European IPO firms that went public from January 1995 to December 2001. Columns [3] to [6] are estimated for 858 bookbuilt IPOs. **Upward price revision** equals the price revision if positive and zero otherwise. **Bubble years** is a dummy variable that equals one if the IPO took place in 1999 or 2000 and zero otherwise. The **new market dummy** equals one if the IPO listed on one of the new stock markets and zero otherwise. All other regressors are defined as in previous tables. The 2SLS regression results are shown in Columns [5] and [6]. Here we use the fitted values from Model [5] of Table 5 as our instrument for price revisions and the fitted values from Model [3] of Table 5 as our instrument for underwriter market share. White (1980) heteroscedastic-consistent *t*-statistics are within parentheses. * significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

Table 5: Price revision regressions and underwriter choice regressions

Dependent variable:	Revision [1]	Revision [2]	Underwriter market share [3]	Underwriter market share [4]	Revision [5]
Pre-IPO ownership					
CEO stake	-0.013 (-1.01)		-0.008 (-0.73)		
Corporate stake	0.008 (0.60)		0.028 (1.66)*		
VC stake	-0.009 (-0.61)		0.058 (2.27)**		
Financial investor stake	-0.024 (-1.37)		-0.039 (-1.96)*		
Sales at IPO					
Size of CEO sales		0.147 (2.52)**		-0.008 (-0.12)	0.165 (2.71)***
Size of corporate sales		-0.041 (-1.02)		0.068 (1.20)	-0.076 (-1.55)
Size of VC sales		0.032 (1.05)		0.025 (0.53)	-0.015 (-0.42)
Size of financial Investor sales		0.038 (1.01)		-0.088 (-1.97)**	0.093 (2.03)**
Firm and offer characteristics					
Log(1+age)	-0.004 (-0.88)	-0.005 (-1.04)	-0.002 (-0.43)	-0.002 (-0.48)	-0.005 (-1.13)
Log(total assets)	-0.006 (-2.03)*	-0.005 (-1.60)	0.016 (6.02)***	0.017 (6.35)***	-0.017 (2.63)***
Internet and technology dummy	0.003 (0.38)	0.004 (0.59)	0.001 (1.38)	0.009 (1.23)	-0.001 (-0.08)
Underwriter market share	0.049 (1.39)	0.058 (1.69)*			0.747 (2.35)**
Venture-backing			-0.013 (-1.57)	0.002 (0.27)	
Market conditions					
Market returns	0.209 (5.27)***	0.199 (5.09)***	0.012 (0.38)	0.010 (0.30)	0.194 (4.88)***
Market volatility	1.502 (1.93)*	1.513 (1.92)*			1.429 (1.87)*
Mean contemporary underpricing	0.035 (3.18)***	0.035 (3.19)***	0.015 (1.43)	0.015 (1.42)	0.025 (2.45)**
Bubble years (1999 and 2000)	-0.022 (-2.90)***	-0.021 (-2.79)***	-0.006 (-0.81)	-0.005 (-0.62)	-0.017 (-2.31)**
Information externalities					
IPO volume/10	0.004 (1.23)	0.004 (1.41)	-0.007 (-2.99)***	-0.008 (-3.26)***	0.010 (2.31)**
IPO industry volume/10	0.002 (0.28)	0.002 (0.36)	0.006 (0.97)	0.007 (1.20)	-0.002 (-0.27)

New market dummy	-0.007 (-0.81)	-0.007 (-0.69)	-0.010 (-1.13)	-0.009 (-0.98)	-0.001 (-0.04)
Intercept	0.072 (1.92) [*]	0.043 (1.21)	-0.070 (-2.53) ^{**}	-0.080 (-2.93) ^{***}	0.108 (2.45) ^{**}
R ² adjusted	8.77%	9.11%	11.84%	10.45%	9.27%
F-statistic	6.15 ^{***}	6.37 ^{***}	9.22 ^{***}	8.15 ^{***}	6.84 ^{***}

Note: This table shows the regression results using the price revision as the dependent variable in Columns [1], [2] and [5] and underwriter market share in Columns [3] and [4]. All regressions are estimated for 858 bookbuilt IPOs. **Venture-backing** is a dummy variable that equals one if a venture capitalist owns shares in the IPO firm, zero otherwise. **Market volatility** is computed as the standard deviation of local market returns during the 50 trading day period from 60 to 10 trading days before the IPO date. **Bubble years** is a dummy variable that equals one if the IPO took place in 1999 or 2000 and zero otherwise. The **new market dummy** equals one if the IPO listed on one of the new stock markets and zero otherwise. All other regressors are defined as in previous tables. The 2SLS regression results are shown in Column [5]. We use the fitted values from Model [3] as our instrument for underwriter market share. White (1980) heteroscedastic-consistent *t*-statistics are within parentheses. ^{*} significant at the 10% level; ^{**} significant at the 5% level; ^{***} significant at the 1% level.

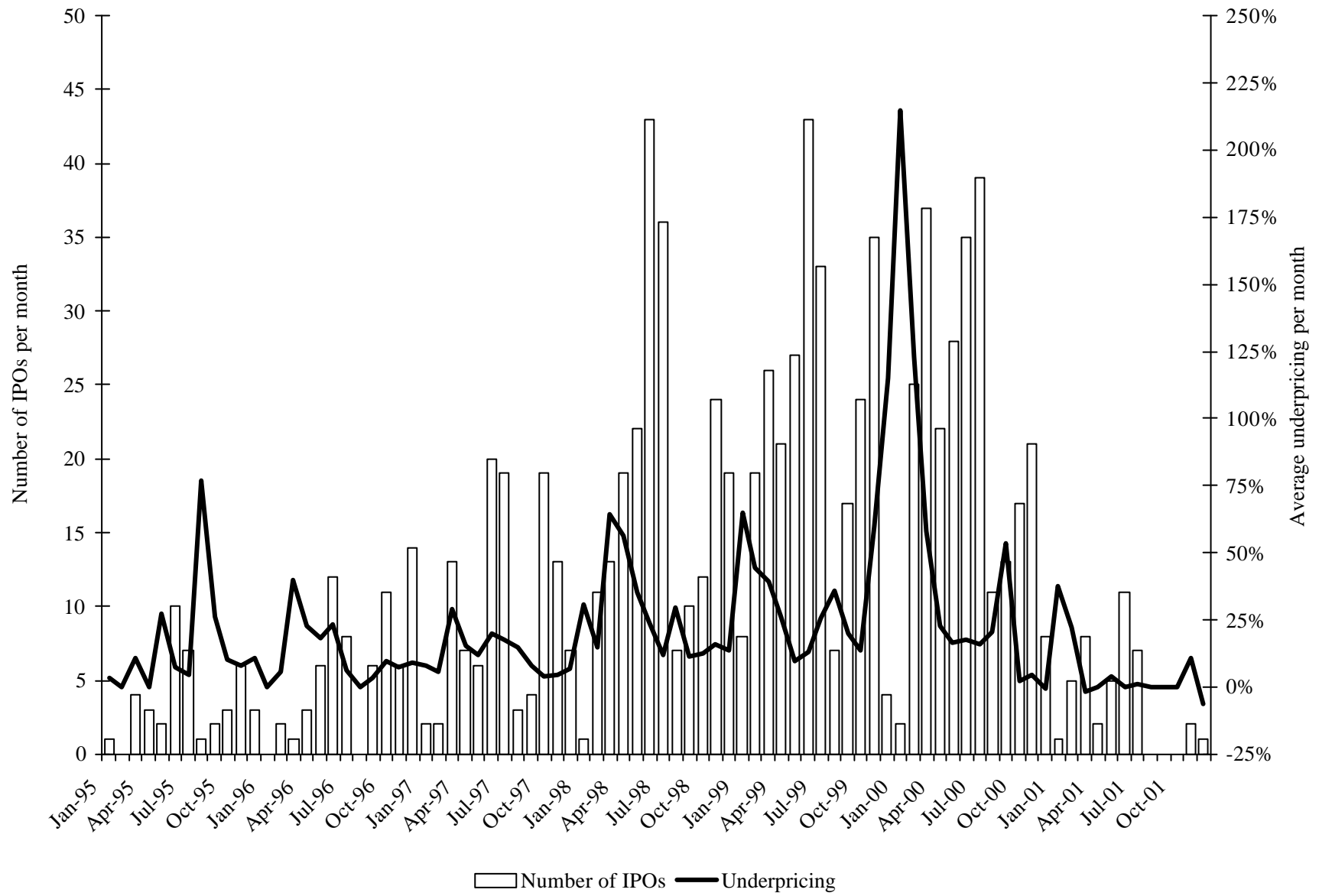


Figure 1: Number of IPOs and average underpricing per month

Footnotes

¹ For the first time in recent history, Europe has overtaken the United States in the capital raised by IPO firms. In 2000, IPO firms raised \$125.9 billion in the United States (AMEX, NYSE and NASDAQ) against \$171.5 billion in Europe (EU15 countries). Figures are taken from *F.I.B.V. Annual Statistics*.

² Kukies (2000) finds that the number of IPOs increases significantly after the creation of a new stock market with strict transparency rules, both in a cross-section and in a time series using German data.

³ The French *Nouveau Marché*, the German *Neuer Markt*, *Euro.NM Belgium*, the Dutch *Nieuwe Markt* and the Italian *Nuovo Mercato* were members of the Euro-NM network. However, the Euro-NM initiative failed to establish operating links between the member markets. The network was disbanded on 31 December 2000, leaving full autonomy to the single national markets.

⁴ A review of IPO pricing theories is presented by Ritter and Welch (2002). They classify theories based on whether the theory assumes asymmetric information or symmetric information. The former can in turn be classified into theories in which issuers are more informed than investors and into theories in which investors are more informed than the issuer.

⁵ The United Kingdom is an exception. Ljungqvist and Wilhelm (2002b) show that U.K. IPOs are rarely priced using the bookbuilding procedure. Instead, placings (fixed-price offerings) are a common method of bringing securities to listing. Placings are not registered for offering to the public at large but only to institutional investors or wealthy individuals. In contrast, French, German and Italian IPOs are typically priced using the bookbuilding procedure and have retail tranches for private investors. We therefore do not consider the United Kingdom in our study.

⁶ Following Derrien and Womack (2002), we do not consider the French *Premier Marché*. They report that most IPO activity in France took place on the *Second Marché* and *Nouveau Marché* with only a few large or special offerings, such as privatizations, being made on the *Premier Marché*.

⁷ Similar to Ljungqvist and Wilhelm (2002b) EASDAQ IPOs are classified as Belgian throughout the paper because these firms are subject to Belgian law and regulations. We start 20 days after the IPO date to avoid problems with price stabilization that may occur in the initial 20 trading day period (see Ljungqvist, 1997).

⁸ High-tech companies are active in SIC codes 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3674 (semiconductors), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812, 4813 (telephone equipment), 4899 (communications services) and 7370, 7371, 7372, 7373, 7374,

7375, 7378 and 7379 (software). We collect SIC codes from *Global Vantage* and *Worldscope Disclosure*. We identify European Internet firms using the list provided by Knauff, Roosenboom and Van der Goot (2002). They provide a list of 138 European Internet IPOs based on membership of the *Bloomberg European Internet Index* and talks with investment bankers.

⁹ Ljungqvist and Wilhelm (2002a) report that 54.6% of U.S. IPO firms during 1996-2000 report negative earnings per share and 57.5% are from the Internet and technology sector. The average (median) age of U.S. IPO firms during this period equals 13.6 years (7 years).

¹⁰ Loughran and Ritter (2001) report similar findings for U.S. IPOs. They find that the average (median) amount of money left on the table increased from \$8.3 million (\$2 million) during 1990-1998 to \$77.7 (\$25.2) million in 1999-2000. Most of the amount of money left on the table therefore comes from a minority of IPOs. During 1990-1998, 1.2% of U.S. IPOs doubled in price on the first day of trading. During the bubble years 1999-2000, 22.7% of U.S. IPOs doubled in price on the first trading day.

¹¹ We could not identify the bookbuilding range for 17 IPOs reducing the bookbuilding sample from 875 to 858 firms.

¹² There are 18 Italian IPOs (16.4% of all IPOs in that market) with an offer price below the minimum price. Several Italian IPOs that listed after April 2000 had a downward revision of their offer price, which was appreciated by the market as a signal of prudence, and not interpreted as a negative feedback from book building activity. For example, in June 2000 the Italian company CHL S.p.A. offered shares at 30 euro, against a minimum file price of 45 euro. Yet, the first-day price has been 84.51 euro (+181.7%).

¹³ Our underwriter market share measure identifies the following top three underwriters for each local market. France: BNP Paribas, Crédit Lyonnais, Société Générale, Germany: Deutsche Bank, Dresdner Bank and DG Bank, Belgium/NASDAQ Europe: Fortis Bank, Goldman Sachs and Bank Brussel Lambert (part of ING), the Netherlands: Goldman Sachs, ABN AMRO and ING Barings, Italy: San Paolo IMI, IntesaBCI and Mediobanca. These underwriters, other than the Italian banks, are all mentioned on the list of most active underwriters by Ljungqvist, Jenkinson and Wilhelm (2002).

¹⁴ We have also included a dummy variable that identifies the top 3 underwriters in each local market (see footnote 13 for the names of these underwriters). We find a negative relationship between first-day returns and this prestigious underwriter dummy.

¹⁵ We must be careful interpreting this result. Theoretically, imagine an informed investor's signal is more positive the more favorable the market environment (say the NPV of the project increases with the business cycle). To induce such investor to reveal her signal truthfully, she must be offered underpriced

shares, and underpricing increases in the value of the signal. Because the positive correlation between market environment and the value of the signal, we find a positive correlation between underpricing and market returns. The appropriate test here would have to control for the value of the signal in order to wash out the correlation effect, which in practice is hard.

¹⁶ Analyzing international data, Ljungqvist and Wilhelm (2002b) report that first-day returns are not related to the returns on the local market index between the setting of the IPO's price range and its final pricing. This is at odds with our findings and the results of Derrien and Womack (2002) for France and Loughran and Ritter (2002) for the United States. The difference between our results and the results of Ljungqvist and Wilhelm (2002b) may be due to different sample composition. They analyze 641 IPOs from 1992 to July 1999 for which they have both allocation and price range information. Their sample consists of 237 French IPOs, 141 German IPOs, 231 U.K. IPOs and 32 U.S. IPOs. According to their Table 2 these IPOs tend to be significantly larger than the average firm going public during that time period. The sample of Ljungqvist and Wilhelm (2002b) is thus less dominated by risky IPO deals on new markets and IPOs from the dot-com bubble years 1999-2000 than our sample. Assuming that IPO prices in Europe are sticky (i.e., cannot easily be set outside initial price range) and that it is more difficult to set the price range for risky deals in highly volatile markets, underwriters of riskier IPO deals may have not been able to adjust offer prices fully to reflect all publicly available information. This may explain why the market returns load up with a positive and significant coefficient in our regressions but not in the regressions of Ljungqvist and Wilhelm (2002b).

¹⁷ We have also measured local market returns, mean contemporary underpricing of local IPOs, IPO volume and IPO industry volume for shorter time windows such as from day 6 to 30 trading days before the IPO date. The results remain unchanged.