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Why are the French so different from the Germans? Underpricing of IPOs on the Euro New Markets

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Why are the French so different from the Germans? Underpricing of IPOs on the Euro New Markets

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IPOs on the EuroNMs have shown very high underpricing. The majority of these IPOs possess specific characteristics such as lock-up agreements, venture-capital financing, ownership by the underwriter and over-allotment options. We study how these characteristics influence the underpricing of firms listed on the two largest EuroNM stock exchanges, the *Neuer Markt* of Germany and the *Nouveau Marché* of France. We find that the high underpricing in these two markets – contrary to the evidence on the US – is not driven by insiders' selling behaviour. However, the large underpricing is caused by the high degree of riskiness of the issuing firms and by the partial adjustment phenomenon of offer prices to compensate institutional investors for the truthful revelation of their demand for the shares. In contrast, venture-capital involvement does not affect underpricing. For France, lock-up agreements act as substitutes to underpricing, but not so for Germany. We also explore the reasons for the large difference in underpricing between the German and the French IPOs: German firms are more underpriced because they are more risky, have larger price revisions, have less stringent VC lock-up contracts and mostly go public during the hot issue period when the general level of underpricing in all IPO markets is substantially higher.

JEL codes: G14, G24

Key words: IPOs, underpricing, venture capital, high technology, European New Markets, lock-up agreements.

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Why are the French so different from the Germans? Underpricing of IPOs on the Euro New Markets

I. Introduction

The literature on firms that were floated during the dot com bubble years of 1999 and 2000 documents that underpricing reached astronomical levels of more than 70% in the US markets (Ljungqvist and Wilhelm 2003). Further, the IPOs of internet firms yielded first day returns exceeding 96% during this period (Ofek and Richardson 2003). Relatively high underpricing was also observed on a number of European markets (Ritter (2003)). In particular, Goergen et al. (2003) find that during the period of 1996 to 2000, IPOs on the newly formed stock markets of Europe were underpriced by more than 30% on their first day of trading.

This paper focuses on the reasons for the high underpricing of firms listed on the new stock markets of Europe (EuroNMs). Studying underpricing of IPOs on the EuroNMs is interesting for two reasons. First, being new stock markets, largely developed along the lines of NASDAQ, the EuroNMs are likely to provide interesting insights into the effectiveness of their regulation, their listing activity and performance. Second, IPOs on the EuroNMs are different from those on the other, established primary markets of their country: the majority of these firms are high technology firms, with lock-up agreements[1] and are floated via the book-building procedure. They frequently are venture-capital financed and often have over-allotment options.

The IPOs on the German and French EuroNMs[2], which are the focus of this study, attracted more than 90% of all the EuroNM IPOs. Our results show underpricing in the German *Neuer Markt* of about 53% during the period of 1997 to 2000. This is about five times the past levels of underpricing reported by Ljungqvist (1997) for Germany. In comparison, during the period of 1996 to 2000, the underpricing in the French *Nouveau Marché* amounts to 21%, about twice the past levels (Derrien and Womack, 2003). Interestingly, we find that the selling behaviour of insiders in the IPO and the involvement of venture capitalists do not have any impact on underpricing. In addition,

[1] Lock-up agreements are agreements which prevent the incumbent shareholders from selling further shares during a certain period after the IPO. See Goergen et al. (2006) for an overview of the regulation on lock-ups across Europe and the US.

[2] The first EuroNM was created in 1996 in France (the *Nouveau Marché*) and later encompassed Germany (*Neuer Markt*), the Netherlands (NMAX), Belgium (EuroNM Belgium) and Italy (*Nuovo Mercato*), which were all placed under the umbrella of EuroNM.

price revisions during the offer process occur more frequently in Germany and are larger than those in France. This suggests that the German investors were more forthcoming with information about the potential demand for shares enabling investment banks to set more accurate prices and/or they were overoptimistic about their national IPO market. For France, lock-up agreements are a substitute for underpricing. The more stringent the lock-up, the smaller is the level of underpricing. In some firms, the underwriters are also shareholders in the firms they are taking public. For Germany, this leads to higher underpricing whereas for France it has the opposite effect.

Finally, we study some of the reasons behind the large differences in underpricing between the two markets. We find that German IPOs are more underpriced because they are relatively riskier, provide a larger compensation for the truthful revelation of information by potential investors, have less stringent VC lock-up contracts and mostly come to the market during the hot issue period of 1999-2000 when the average underpricing in all IPO markets is substantially higher.

The rest of the paper is organised as follows. Section II briefly discusses the creation (and demise) of the EuroNM markets and compares the characteristics of the two markets. Section III reviews the current literature on underpricing on the European new markets. Section IV then discusses the determinants of underpricing and formulates the hypotheses, while section V specifies the data sources and describes the sample. Section VI documents the underpricing in the two EuroNMs and relates it to the IPO characteristics. Section VII discusses the results and section VIII concludes.

II The rise and fall of the EuroNMs

The European New Markets (EuroNMs) were launched in 1996/97 in order to facilitate the financing of innovative companies with a potential for high growth. Given that these firms were young and had no or little trading record, they were usually not able to meet the listing requirements of the primary markets. The French New Market (*Nouveau Marché*) was created first and commenced operating on 14 February 1996. At the end of 2001, the total market capitalization of the 164 companies listed on the *Nouveau Marché* amounts to € 15 billion. The fact that some of its entry requirements were less strict was compensated by other stricter requirements (see Goergen et al. 2003). For example there was no requirement in terms of past profitability, but there was a

minimum lock-up period of six months (covering 100% of shares held by the insiders immediately after the IPO) or one year (covering 80% of the insiders' shares).

As a consequence of the increasing demand for equity investments in Germany, the Deutsche Börse established the *Neuer Markt* on 10 March 1997. The number of firms seeking a *Neuer Markt* listing took off with 11 flotations in 1997 and rose to a spectacular 143 in 2000. By the end of 2000, 325 companies were listed with a market capitalization in excess of € 50 billion.

On 25 March 1997, the Amsterdam Exchanges created a new market segment: the New Market of the Amsterdam Exchanges (NMAX). This initiative was soon followed by the Brussels Stock Exchange, which created EuroNM Brussels on 11 April 1997. However, in comparison to their French and German counterparts, the EuroNMs of Amsterdam and Brussels have only known a modest success. The total number of IPOs on the Dutch and Belgian markets was 16 and 14, respectively. The youngest EuroNM is the Milanese *Nuovo Mercato* (recently renamed MTAX) which started with the IPO of Opengate SpA, an Italian IT services group on 17 June 1999 and is operated by Borsa Italiana. Whilst today the *Nuovo Mercato* has only 39 listed companies, it includes Tiscali, one of Europe's largest internet service providers.

Initially, the five EuroNMs experienced a spectacular success with more than 430 companies listed by the end of year 2000. The total amount of capital raised on the EuroNMs exceeded € 23.5 billion, and the total market capitalization was in excess of € 234 billion (Goergen et al. 2003). The market performance has also been impressive with the official EuroNM All-share Index rising by 561% between the start of 1998 and March 2000, just prior to the bursting of the 'internet bubble'. However, because of difficulties of harmonizing different sets of listing rules, the existence of different national regulators and inefficient cross-border trading, the EuroNMs dissolved their partnership in December 2000. Consequently, the five EuroNMs went separate ways: the German *Neuer Markt* and the Italian *Nuovo Mercato* went their own ways whereas EuroNext was formed by the Belgian, Dutch and French EuroNMs. Since the dissolution of the EuroNMs, the new markets have suffered particularly badly from the decline in technology stocks with losses on some markets exceeding 80%. Since 2001, there have been fewer than 20 IPOs on the new markets down from more than 200 in 2000. After a series of insider trading and price manipulation scandals, Deutsche Börse AG absorbed the *Neuer Markt* on 5th June 2003.

The listing and disclosure requirements on the *Neuer Markt* and the *Nouveau Marché* were very similar. For example, for both markets the issuer was required to have at least € 1.5m of equity capital. Both markets demanded that the minimum number of shares issued be at least 100,000 and the minimum market capitalization be at least € 5m. Further, for both markets, the issuers were asked to have a minimum free float of 20% and at least half of the shares offered in the IPO had to be primary shares. Both markets required issuers to adopt the GAAP accounting standard and report quarterly accounts. However, in contrast to the *Neuer Markt* which had a six-month lock-up period covering all the insiders' shares, the *Nouveau Marché* locked up 80% of the insiders' shares for a period of 12 months or 100% of their shares for 6 months.

III. Literature review

The second half of the 1990s experienced the busiest IPO market in European history. This was also the period of the birth of the EuroNMs. Goergen et al. (2003) study the underpricing of firms listed on all the EuroNMs. They find that underpricing in the different EuroNM markets was quite high and quite varied. For Germany, average underpricing was around 54% whereas for France it was around 25%. The Belgian and Italian IPOs had substantially lower underpricing with 10% and 19%, respectively. Conversely, IPOs on the Dutch EuroNM were on average underpriced by about 86%. The authors argue that the listing rules for the EuroNMs were more lenient than those for the main markets and this led to a more cautious setting of the offer price resulting in higher underpricing. Commenting on the differences in underpricing across the different EuroNM markets, the authors state that the underpricing on Dutch EuroNM was higher because this market used fixed price offers as compared to book-built offers in other EuroNM markets.

Giudici and Roosenboom (2004) also find that underpricing on the EuroNMs was considerably higher by about 22% than that on the main market segments. They argue that the higher underpricing on the EuroNMs is partially due to reduced incentives to control wealth losses since the insiders sell fewer shares in the IPO. Other factors responsible for the higher underpricing are higher price revisions, the hot issue market and distinct firm characteristics. Arosio, Giudici and Paleari (2000) focus on the underpricing of internet stock IPOs on the EuroNMs. They show that underpricing is strongly related to the information gathered during the book-building process. They

document that when the final offer price is set equal to the maximum of the initial price range, the level of underpricing is around 94% while there is no statistically significant underpricing if the final offer price is set equal to the minimum of the initial price range. Further, they report that underpricing is higher if the average first day return of previous IPOs has been higher. However, unlike Giudici and Roosenboom (2004) they do not find any relationship between underpricing and the dilution of insiders' ownership in the IPO.

Franzke (2004) studies the underpricing of German EuroNM IPOs by distinguishing between venture-capital backed IPOs and those without venture capital. She finds that there is no difference in underpricing between the two types of IPOs. Using the age of the VC as a proxy for its reputation, Franzke reports that the presence of prestigious VCs is associated with higher underpricing. Using a sample of IPOs similar to that used by Franzke (2004), Bessler and Kurth (2004) find that for those IPOs, whose underwriting bank was also providing venture capital to the firm, the level of underpricing is much higher.

Even though some of the above papers analyse the underpricing of EuroNM IPOs, none of them investigates the likely causes for the high underpricing and the reasons for the large difference in underpricing between the different EuroNM markets. However, some recent studies of underpricing on the US markets during the dot com bubble provide some reasons why underpricing was so severe during the dot com bubble. For instance, Ljungqvist and Wilhelm (2003) document that, for a sample of internet IPOs during the years 1999-2000, the level of underpricing was 89%, about 5 times the level of the mid-1990s. They find that the high underpricing is partially due to marked changes in the pre-IPO ownership structure and the insider selling behaviour in the IPO. During the bubble, pre-IPO ownership was fragmented, the stakes of pre-IPO CEOs were half their former level, and the frequency and magnitude of secondary sales by all insiders was smaller. There were also larger price revisions.

In addition, Loughran and Ritter (2004) argue that part of the increase in underpricing of IPOs during the dot com bubble is attributable to the relatively higher risk of these firms, which gives support to the changing risk composition hypothesis. During the internet bubble period in the US, a high proportion of very young firms went public. However, unlike Ljungqvist and Wilhelm (2003), Loughran and Ritter do not find a relation between the sale of secondary shares and underpricing. In fact, Loughran and

Ritter find that CEO ownership, as measured by the dollar value of holdings at the offer price, was twice as high during the dot com bubble period as compared to earlier periods. They argue that this should have led to decreased underpricing during the bubble period. Instead, they attribute much of the higher underpricing during the bubble period to a changing issuer objective function and argue that during this period there was less focus on maximising IPO proceeds due to an increased emphasis on analyst coverage. Issuing firms were seeking to hire high-reputation underwriters with highly ranked analysts even if these came at the cost of higher underpricing (the analyst lust hypothesis). In addition, beginning in the 1990s, the underwriters were making side payments to the executives of the issuing firms in the form of share allocations in hot IPOs. This practice created an incentive for the issuing firm's management to seek rather than avoid underwriters with a reputation of severe underpricing (the spinning hypothesis).

There are alternative explanations for the severe underpricing of US IPOs during the bubble period. For example, Aggarwal, Krigman and Womack (2002) argue that issuers at the time of the bubble were willing to underprice more in order to generate an information momentum (by attracting attention to the stock) resulting in higher market prices at the end of the lock-up period when insiders typically sell some of their shares. DuCharme, Rajgopal and Sefcik (2002) state that high underpricing of internet IPOs was partly because of the media hype prior to the going-public.

IV. The determinants of underpricing

The theoretical literature on IPOs suggests a number of reasons for underpricing. For example, IPOs are underpriced because of underwriters' risk aversion, information asymmetry and the winner's curse, insurance against litigation, and compensation to (institutional) investors for revealing truthful information about the demand for shares.[3] Below, we focus on the likely determinants of underpricing in the context of the dot com bubble.

[3] For a discussion of these and other reasons for underpricing, see Jenkinson and Ljungqvist (2001).

Ownership dilution

Habib and Ljungqvist (2001) develop a model which relates underpricing to the insiders' participation in the offering and the magnitude of the dilution they suffer on retained shares. They argue that if the insiders sell a large number of their shares in the IPO, then they should be more concerned about the level of underpricing. Habib and Ljungqvist show that the larger the sale of secondary shares by the insiders, the lower is the underpricing. Similarly, the greater the dilution factor or the increase in the shares outstanding (as a result of the issuance of primary shares), the smaller is the level of underpricing. Therefore we hypothesise:

Hypothesis 1: Larger insider participation in the offering and larger ownership dilution leads to lower underpricing.

Similar to Habib and Ljungqvist, we measure the level of insider selling by the issue participation ratio which is defined as the number of secondary shares sold in the IPO divided by the total number of shares outstanding in the pre-IPO period. The dilution factor is defined as the number of primary shares issued in the IPO divided by the total number of shares outstanding before the IPO.

Venture capital

Venture capitalists are important providers of finance to firms with a high growth potential. They not only provide the necessary capital but their presence also signals the firm's quality as they usually monitor the firm's management and are also otherwise involved in the decision-making process (e.g., Barry 1994, Jain and Kini 2000). Barry et al. (1990) report that, in a sample of VC-backed US companies, VCs hold substantial stakes and provide intensive monitoring. They also report that, contrary to conventional wisdom, VCs frequently keep their shareholdings a long time after the IPO. Hence, VCs may mitigate agency problems as well as more general problems arising from asymmetric information. Hence, we expect that underpricing of VC-backed firms is less severe:

Hypothesis 2: Firms that are backed by VCs have less underpricing than firms without VC financing.

Price revisions

Once the underwriter discloses the indicative price range (the book-building range) for the issue, information on the potential demand of the issue is collected from investors (for example through road shows). Benveniste and Spindt (1989) argue that potential investors need compensation for revealing truthful information about the demand for the issue. The underwriter will revise the price upwards if it receives favourable information from the investors. However, it will increase the issue price to a level below the 'fair price' suggested by the newly revealed information (the partial adjustment phenomenon). This causes underpricing which compensates the investors who revealed truthful information. In order to guarantee the disclosure of favourable information, the price adjustment that follows the revelation of bad news will be less substantial, resulting in less underpricing, than that following good news. Ljungqvist and Wilhelm (2003) make similar arguments.

Hypothesis 3: A higher positive price revision of the IPO leads to higher underpricing.

The price revision is measured as the percentage difference between the final offer price of the share and the mid-point of the book-building range.

Lock-up periods vs. underpricing

Espenlaub et al. (2001) and Brau et al. (2004) argue that issuers with more substantial information asymmetries should have longer lock-up periods. The literature also predicts that firms with high ex ante uncertainty have higher underpricing. Further, the lock-up length and the underpricing may act as complementary devices. In contrast, Goergen et al. (2006) argue that underpricing is a substitute to the lock-up length and, therefore, firms that use higher underpricing should have shorter lock-up lengths. They find support for their assertion for a sample of French IPOs that show a negative relationship between underpricing and lock-up length. This discussion leads us to the following two competing hypotheses:

Hypothesis 4a: Underpricing is a complement to the signal sent by the choice of the lock-up length.

Hypothesis 4b: Alternatively, underpricing is a substitute to the signal emitted by the lock-up contract. A more stringent lock-up contract is then related to less underpricing.

For every shareholder of every firm in our sample, we do not only measure the length of the lock-up period but also the percentage of his/her shares locked up. We classify shareholders as insiders (executives and founder-owners), VCs, and outsiders (all other types of shareholders). A major difference between German and French minimum lock-ups is that the former apply to *all* the pre-IPO shareholders who still hold shares immediately after the IPO whereas the latter only apply to the insiders. For the German EuroNM IPOs, the minimum lock-up period is 6 months after the IPO. For all the afore-mentioned categories of shareholders, we calculate the percentage of post-IPO shares locked up at the minimum requirement and locked up beyond the minimum requirement. IPOs on the *Nouveau Marché* can choose between two alternative minimum lock-up contracts: a lock-up covering 100% of the shares for 6 months or one covering 80% of the shares for 12 months. Goergen et al. (2006) show that, for France, these two minimum requirements are not equivalent and that the longer contract – despite covering only 80% of the shares – is perceived as more stringent. Therefore, we calculate the percentage of post-IPO shares locked up at the first minimum requirement (6 months with 100%), locked up at the second minimum requirement (1 year with 80%), and locked up beyond the two minimum requirements. In addition, for France, we also calculate the percentage of VC shares not locked up.

Underwriter's stake vs. underpricing

An interesting feature of the German and French EuroNM markets is that, in about 15% of the German IPOs and 10% of the French ones, the underwriter hired by the issuer is also a pre-IPO shareholder. This creates an interesting dilemma for the underwriter: if the underwriter underprices the issue heavily, on the one hand it will incur a personal wealth loss on the share stake it is selling in the IPO, but on the other hand, the underpricing may generate repeat business from clients who have been allocated some of the underpriced shares. In contrast, if the underwriter's setting of the price creates only modest underpricing, its personal wealth loss will be relatively small and so will be the chances of repeat business. We arrive at the following two competing hypotheses:

Hypothesis 5a: IPOs, whose underwriter is also a pre-IPO shareholder, show higher underpricing.

Hypothesis 5b: Alternatively, IPOs, whose underwriter is also a pre-IPO shareholder, show smaller underpricing.

We measure the underwriter's ownership by the shareholding of the underwriter expressed as a percentage of the shares outstanding before the IPO.

In addition to the variables described above, we also use a number of control variables such as the volatility of the share price in the first month of trading (to capture the ex ante uncertainty of the firm), firm age, reputation of the underwriter[4], a dummy variable capturing whether there was an over-allotment option, and industry and time dummies. We also include lagged returns of the EuroNM All Share index (NEMAX) measured over the quarter preceding the IPO in order to examine whether the degree of underpricing is correlated to past stock market movements (as do Loughran and Ritter 2002). Table 1 summarises the hypotheses, the variables used and the predicted signs of their coefficients.

[Insert table 1 about here]

V. Data sources and sample description

We study the whole population of IPOs on the German *Neuer Markt* and the French *Nouveau Marché* during 1996 to 2000[5]. During this period, there were 265 IPOs on the German market and 136 on the French market. Information on IPOs such as the date of the IPO, the offer price and other listing particulars were obtained directly from the exchanges. Firm specific information such as the firm's age, underwriters of the issue, shares sold in the IPO, lock-up agreements and the presence of VCs, were hand-collected from the listing prospectuses. For the German market we completed the data using the annual volumes of the *Hoppenstedt Aktienführer* and data from *Deutsche Bank AG*. The first-day share prices as well as information on industrial sectors were obtained from Datastream.

Table 2 shows some of the characteristics of the IPOs on the German and French EuroNMs. The firms are significantly younger than IPOs on the first and second-tier exchanges. For example, the average age of an IPO firm on the *Neuer Markt* is about 13

[4] This is only available for Germany.
[5] The German data starts in 1997. Our sample period ends in 2000 due to the collapse of the IPO market subsequent to the equity market crash in March 2000.

years whereas the average age of German IPOs on the Official and Regulated Markets is more than 49 years (Goergen and Renneboog 2003). For the *Nouveau Marché*, the average age of IPOs is about 11 years compared to 30 years for IPOs on other French markets (Chahine 2004). The market capitalization of the average French IPO is about 4 times smaller than the average German IPO (the difference is significant at the 5% level). In both markets venture capitalists have a strong presence with nearly 47% of the German firms and 57% of the French firms having at least one VC among their shareholders (the difference is significant at the 5% level). Interestingly, the average length of lock-up agreements for both the markets is similar (around 10 months) despite the different rules on the minimum lock-up length.

[Insert table 2 about here]

Book-building is the pricing method used for all the IPOs in both markets[6]. We find that for the majority of the German IPOs (about 75%); the final offer price is the same as the upper bound of the book-building range. For only about 8% of the IPOs, the final offer price is set to the lower bound. Few IPOs (only about 3%) are priced below the book-building range. The majority of the IPOs with their final offer price at or below the lower bound came to the market in late 1999-2000, which was the period when the internet bubble burst. In contrast, only about half of the French IPOs (about 51%) are priced at the upper bound of their book-building range and for nearly 15%, the offer price is set at the lower bound. Similar to the German IPOs, few French IPOs (about 4%) are priced below the book-building range. However, in contrast to the situation in Germany, there are a few French IPOs which are priced above the book-building range (only about 2%). The fact that for most of the German EuroNM IPOs the offer price was set at the top end of the book-building range indicates the high demand for the German new economy IPOs at that time. The demand for French IPOs was lower.

One new and interesting feature of the German and French EuroNM IPOs is the provision of over-allotments (Greenshoe) options which provide underwriters with the option to sell additional shares (usually about 15% of the shares being sold in the IPO) in the market if demand is high. Over-allotment options are much more prevalent in Germany where about 90% of IPOs use them as compared to less than half in France

[6] Only one firm in Germany did not use a book-building procedure.

(the difference is significant at the 5% level for the Z-test on the difference between two proportions assuming a binomial distribution).

The German and French EuroNM IPOs also differ in terms of their timing. The majority of IPOs in the German EuroNM went public at the height of the dot com bubble years (1999 and 2000) whereas only about half of the French IPOs were floated in those years (the difference is significant at the 5% level). Finally, the owners of the German IPOs sell a higher fraction of their holdings (as the issue participation ratio is 9.26%) in comparison to their French counterparts which have an average issue participation ratio of 6.54% (the difference is significant at the 5% level). In addition, the dilution factor in Germany (34%) is also higher than that in France (32%), the difference being significant at the 5% level. Hence, for both markets the existing owners saw on average one third of their ownership being diluted as a result of primary shares sold in the IPO.

VI. Underpricing in the *Neuer Markt* and the *Nouveau Marché*

Table 3 shows the level of underpricing for the German and French EuroNMs during the period of 1996 to 2000. The average underpricing for the German EuroNM is around 53%, while that for the French EuroNM IPOs is substantially lower at 21%. This level of underpricing is unprecedented for both markets as the historical level of underpricing of IPOs in Germany and France has been around 10% (see Ljungqvist 1997 for Germany and Derrien and Womack 2003 for France). However, it is still substantially lower than the underpricing of 89% in the US market during the same period (see Ljungqvist and Wilhelm 2003).

[Insert table 3 about here]

A closer look at the quarterly and yearly underpricing yields some interesting facts. Underpricing in both markets is cyclical in nature (see figure 1). For Germany, the initial returns for the first quarter of any year (except for 1997) are always substantially higher than those for any of the other quarters of the same year. For France, this pattern is somewhat less pronounced. For Germany, the level of underpricing surges abruptly from about 34% in 1997 to about 74% in 1998 and averages 51% in subsequent years. Overall, the yearly (average and median) underpricing for Germany is always significantly higher than that for France.

[Insert figure 1 about here]

Underpricing by industry

Panel A of table 4 shows a cross-sectional analysis of IPO underpricing by industry. The majority of IPOs (64.9% in Germany and 59.3% in France) are in the Business Services industry (SIC 70-89) which has the highest underpricing amongst all industries in Germany. For France, the largest underpricing occurs in the Transport & Public Utilities industry (SIC 40-49), although it should be noted that the number of IPOs in this industry is small (6 firms). For both markets, the second most important industry in terms of the number of IPOs is Manufacturing (SIC 20-39). Underpricing in this industry is high both for Germany (46.52%) and France (26.07%). When we delve into the various sectors forming the Business Services industry, we find that the majority of the IPOs from this industry occur in computer-related services such as computer programming, pre-packaged software and integrated systems design. Panel B of table 4 shows the level of underpricing in these sectors. The underpricing is larger in virtually all sectors of the Business Services industry in Germany.

[Insert table 4 about here]

Ownership dilution vs. underpricing

Panel A of Table 5 shows the frequency of the different types of pre-IPO shareholders in Germany and France. In both the markets, the majority of the IPO firms (70.85% in Germany and 79.66% in France) have a family or an individual (such as the founder) as their shareholder. Ownership by this type of shareholder is significantly higher at the 10% level in France than in Germany. About 12% of the German and 11% of the French firms have VCs as one of their pre-IPO owners. Other companies such as banks and financial institutions are present as one of the owners in 16.19% of the German and 9.32% of the French firms (the difference is significant at the 10% level).

Habib and Ljungqvist (2001, 2003) argue that insiders are more tolerant of underpricing if they sell fewer shares in the IPO. Their data corroborates their hypothesis for the case of US IPOs in 1999-2000. We verify whether this is also the case for the IPOs on the EuroNMs. Panel B of Table 5 shows the underpricing for firms with below and above-

median participation and dilution ratios. Whereas underpricing significantly differs between firms with above-median and below median issue participation/dilution ratios and also across the two countries, we do not find a relationship between underpricing and the level of insider participation or the dilution of their ownership at the flotation.

[Insert table 5 about here]

VCs and Underpricing

Table 6 reports the presence of VCs in the German and French EuroNM markets before the IPO as well as their exit behaviour at the time of the IPO. Panel A of Table 6 shows that about 47% of the German and 57% of the French IPOs are backed by VCs. Out of the 99 different VCs operating in the German IPO market, 25 are domestic (i.e. they are members of the German VC association), while the remaining 74 are members of one or more VC associations outside Germany. Nine VCs are members of more than 4 international VC associations and invest in more than a third of all German firms with VC backing. Out of the 69 VCs on the French IPO market, 44 are domestic while the remaining 25 are members of one or more VC associations outside France. Only 3 VCs (ABN AMRO, 3i and Apax Partners) account for more than a quarter of all the VC-backing in the French IPOs. About 41% of the German firms are backed by more than one VC. For example, there is a consortium of 12 different VCs in GPC Biotech AG. However, the average number of VCs per firm is 2, with a median value of 1. In comparison, almost 70% of the French VC backed IPOs have more than one VC as an investor. For example, ESI Group SA has 13 VCs, while the average number of VCs per French firm is 2.5 with a median of 2. We also find that there are only 8 venture capitalists that operate in both the German and French EuroNMs. Out of these, 3i backs 21 German IPOs and 6 French IPOs, and ABN AMRO backs 8 French firms and one German IPO.

[Insert table 6 about here]

Panel B of Table 6 gives information on the exit behaviour of VCs in the IPO. In about 27% of the VC-backed German firms, VCs hold on to all of their shares in the IPO. In about 31%, VCs sell up to 25% of their pre-IPO holdings, and in a quarter of German

firms, VCs sell between 25 and 50%. In only 4 firms, VCs liquidate all of their shareholdings. In one exceptional case, a VC bought shares in a firm at the time of flotation. In about 42% of French VC-backed firms, the VCs retain all their shares at the IPO. In about 37% of the firms, the VCs sell anything up to 25% of their pre-IPO share stakes and in 15% of the IPOs they sell between 25 and 50% of their pre-IPO holdings. In only 6% of the IPOs, the VCs liquidate more than 50% of their holdings, but none liquidates more than 70% of its shareholdings. This shows that, apart from a few exceptions, in both German and French IPOs, VCs retain most of their shares after the IPO.

The evidence on the relation between VC involvement and underpricing is mixed. Megginson and Weiss (1991) find that VC-backed US IPOs show lower underpricing than other IPOs. However, Francis and Hasan (2001) and Lee and Wahal (2004) report higher underpricing for VC-backed IPOs. For the German EuroNM IPOs, we extend the study of Franzke (2004) by using other measures of VC reputation such as the domestic or international character of the VC, and whether the VC is UK/US-based or not. We also look at various other characteristics of VCs such as their sales in the IPO, the level of their post-IPO ownership and whether the VC is on the supervisory board of the issuing firm. Table 7 shows the level of underpricing in relation to the different VC characteristics. For Germany, the average level of underpricing for VC-backed firms is 50.77% compared to 54.75% for firms without a VC. For France, VC-backed IPOs experience an average underpricing of 21% compared to 19.10% for IPOs without VC-backing. However, for both markets, the difference in (both mean and median) underpricing between VC-backed firms and other firms is not statistically significant.

[Insert table 7 about here]

We categorise VCs as domestic if they are a member of the VC association of the country in which the IPO is taking place and as international if they are a member of one or more VC associations of other countries.[7] We find that for both markets the level

[7] For example, Gold-Zack AG is a member of the German VC association only and has been classified as a domestic VC. Advent International is not a member of the German VC association but is a member of VC associations of 6 other countries and hence is classified as an international VC. Similarly for the French market, Banque De Vizille is a member of the French VC association only and is thus considered as domestic, whereas Innovacom is an international VC as it is a member of both the French and EU VC associations.

of underpricing for those IPOs which are backed by domestic VCs is similar to that for those which are backed by international VCs. Further, there are more German IPOs with UK/US-based VCs than French ones. However, their presence does not affect the level of underpricing. Therefore, it seems that the presence of VCs and their reputation does not influence the pricing of IPOs in the EuroNMs.

If VCs have the power to influence the pricing of IPOs, the level of underpricing will be lower if they intend to sell the majority of their shares in the IPO. We check if the selling behaviour and the post-IPO stake of the VC are related to underpricing. We find that the level of underpricing, when VCs retain most of their share stakes after the IPO, is similar to the level of underpricing when VCs sell most of their holdings in the IPO. This is true for both markets. The post-IPO ownership held by the VCs in the German market does not seem to affect the level of underpricing. However, for those French IPOs where the VC holds a below-median post-IPO stake in the firm, the level of underpricing is much smaller than when the VC has an above-median ownership stake. Still, the difference (both in the mean and median) is not statistically significant.

Finally, we examine whether VCs are represented on the supervisory board and/or the management board of the firms they invest in and whether this has an impact on underpricing. Out of the 124 VC-backed German firms, there are only 30 cases (24.2%) where at least one VC is a member of the supervisory board and only one firm (WEB.DE AG) where the VC is a member of the management board. For France, out of the 57 VC-backed IPOs, 34 (59.6%) have at least one VC who is a member of the supervisory board and only 3 firms have at least one VC represented on the management board (but not on the supervisory board). In only one firm (InfoVista SA), the VC is a member of both the supervisory and the management board. Even though a quarter of the German VC-backed firms and around 60% of the French VC-backed firms have VCs on the supervisory board, underpricing (both mean and median) in these IPOs is not statistically different from those IPOs without VC representation. However, for Germany, we still find a large economic difference in underpricing between the two types of IPOs (Table 7).

To summarise, VCs do not seem to have an impact on the underpricing of IPOs in both EuroNM markets and therefore the validity of Hypothesis 2 that VC backing signals quality is not corroborated for the EuroNM markets.

The timing of *Neuer Market* IPOs and underpricing

One interesting aspect of IPOs that usually goes unnoticed is their timing. Not all the firms go public on the initially announced date. For the German EuroNMs, we are able to collect information on the announcement dates for 133 IPOs. Out of these, 11 IPOs go public earlier than planned, 95 are floated as scheduled and 27 IPOs (around 20%) are postponed at least once[8]. All the postponed (but eventually successful) IPOs are either from the Manufacturing or the Business Services industry. Table 8 shows that underwriters with a good reputation either float IPOs as scheduled ('on-time') or bring them earlier to the market. Postponed IPOs are usually underwritten by underwriters with lower reputation.[9]

[Insert table 8 about here]

The spread of the book-building range for all types of IPOs is close to € 4. As expected, virtually all (90%) of the earlier IPOs and the vast majority (78%) of the IPOs that are floated on-time are priced at the upper bound of the range. In contrast, only 64.5% of the postponed IPOs are priced at the upper bound. We find that the majority of the earlier IPOs are VC-backed (about 78%). As for the underpricing, earlier and postponed IPOs show relatively smaller underpricing than those which are on-time. However, the difference in underpricing (both mean and median) is not statistically significant.

The average number of IPOs in the month preceding the announcement of the flotation is similar for all the three types of IPOs. Hence, the IPO activity in the market prior to the announcement of the flotation date does not seem to influence the flotation decision. However, the level of underpricing in the month preceding earlier IPOs is very high compared to that preceding IPOs that are on-time or are postponed. It may be that the observed large underpricing is interpreted by potential IPO candidates as a signal of

[8] We do not have similar information on the IPOs on the French EuroNM and are therefore able not analyse the timing on the French market.
[9] For any of the above three categories of IPOs, the average time period between the first announcement and the actual date of IPO is around 17 to 20 days.

high demand for IPO shares in the market, which then triggers the decision to float their IPO earlier than planned. In the same vein, issuers seem to postpone their IPOs if the feedback from the market is not positive, i.e. if the level of underpricing in the market is lower. Table 8 confirms that the level of underpricing in the month preceding postponed IPOs is considerably lower than that of earlier IPOs[10].

VII. Regression analysis

Models 1 and 2 of Table 9 explain the underpricing in the German and French EuroNM IPOs, respectively. For Model 2, we only consider French IPOs after 1 December 1998 as, prior to this date, all insiders were required to be locked up for three years with 80% of their holdings. Given that the *Neuer Markt* and the *Nouveau Marché* both started around the same time, were members of the same EuroNM network with similar listing rules and had a number of similar firm characteristics such as age, VC backing, lock-up agreements and the use of the book building procedure, the large difference in underpricing between the two markets is intriguing. Model 3 explains the difference in underpricing between the two countries.

Unlike the evidence from US IPOs, we do not find a statistically significant relation between the changes in insider ownership concentration and underpricing. The coefficients on the issue participation ratio and dilution factor are statistically significant for neither the German nor the French markets. Thus, Habib and Ljungqvist's (2001) assertion that the insiders set the offer price to minimise wealth losses in the IPO is not supported for these markets and we do not find support for Hypothesis 1.

[Insert table 9 about here]

We find that underpricing is positively related to the price revision. The higher the price revision, the higher is the level of underpricing. Therefore, we find support for Benveniste and Spindt's (1989) argument that potential investors need to be compensated for revealing truthful information about the demand for the issue. Both the German and the French underwriters only partially adjust the final offer price towards

[10] The difference in means is not statistically significant. This could be because of the small sample size for earlier and postponed IPOs. However, the difference in medians (71.79% for earlier IPOs and 41.05% for postponed IPOs) is statistically significant at the 10% level.

the firm value revealed by the potential investors. Therefore, we fail to reject Hypothesis 3.

For the German IPOs, there is no significant relation between the stringency of lock-up agreements and underpricing. Neither the length of the lock-up agreements nor the fraction of the locked up shares acts as a substitute or as a complement to underpricing. For France, the results are different: if VCs are locked up beyond the minimum requirements, the level of underpricing is smaller. This implies that the lock-up contracts for VCs act as a substitute device for underpricing. Further, as the stringency of the insider lock-up agreements increases (from the first legal minimum contract to the second legal minimum requirement, and then beyond the two legal minima), the level of required underpricing decreases, which further supports the substitution hypothesis for France.[11] Therefore, for the French market, there is general support for Hypothesis 4b.

We find that the fact that an underwriter is also a shareholder affects the level of underpricing. For German IPOs with a shareholder-underwriter, the larger the number of pre-IPO shares owned by the underwriter, the larger is the underpricing. In contrast, this relation is negative for the French IPOs. These results suggest that the German and French underwriters have conflicting views on the wealth loss caused by the underpricing and the benefits from obtaining future business. Even though the German underwriters sell a relatively higher proportion of their holdings in the IPO[12], for them underpricing is an acceptable price to pay in order to secure a higher volume of future business and a high probability of a successful issue. The French underwriters provide evidence of the opposite behaviour. Therefore, we obtain support for Hypothesis 5a for Germany and for Hypothesis 5b for France.[13]

[11] It is somewhat puzzling that if the outsiders (apart from the VCs) are locked-up beyond the two minimums, the level of underpricing is larger. However, there are only 9 out of 61 firms with outsiders locked up beyond the two minimum requirements.

[12] The selling behaviour of the German and French underwriters was quite different. For 30% of the German IPOs whose underwriter was also a shareholder, the underwriter did not sell any shares, whereas in nearly half of the IPOs, the underwriter sold more than 30% and in 16% of the IPOs the underwriter sold all its shares. In contrast, for the French IPOs whose underwriter was also a shareholder, in nearly half of these IPOs the underwriters did not sell any of their shares and in only 16% of the IPOs the underwriter sold more than 30%. There were no IPOs in which the underwriter sold all of its shares.

[13] The difference in the impact of shareholder-underwriters on underpricing is not caused by differences in the market momentum as the coefficient on the interaction term between the two variables is not significantly different from zero.

When we control for the ex-ante uncertainty in the IPOs, we find that the higher the volatility of the share price, the larger is the level of underpricing. The results are highly significant and similar for both markets. Therefore, riskier firms are more underpriced. For Germany, we do not find any relationship between underwriter reputation and underpricing.[14] Further, the size of the issuer, the presence of an over-allotment option and the age of the IPO firms do not have any impact on underpricing.

For Germany, past market movements also have an impact on the level of underpricing. The higher the market return in the quarter prior to the IPO, the higher is the underpricing. No such relationship is evident for the French IPOs. We also investigate the impact of the dot com bubble period (1999-2000), but do not find any significant impact on the underpricing of German and French IPOs. This contradicts the findings by Loughran and Ritter (2002) who report a positive relation between underpricing and past stock market movements in the US. The results in Table 9 further show that for Germany, underpricing is not industry specific: high-tech issues in the Business Services industry (SIC 70-89) are underpriced to a similar degree as flotations in more mature industries, such as Transport and Utilities (SIC 40-49).

Finally, model 3 estimates the determinants of the differences in the level of underpricing between the two countries. To study the reasons for the difference in underpricing between the two markets, we match the German and French firms first by industry (using two digit SIC codes) and then by size (to the nearest €1,000,000 for small firms and €5,000,000 for large firms) using the market capitalisation at the offer price. We are able to match all the 61 French firms using these two criteria. The last column of Table 9 reports the results from an OLS regression with the difference in underpricing between each pair of matched German and French IPOs as the dependent variable and the difference between the explanatory variables. The results show that the difference between the two markets in terms of ownership dilution (dilution factor and issue participation ratio) does not explain their large difference in underpricing. Conversely, the difference in the level of price revisions between the markets explains the difference in underpricing. From Table 2, we know that the average price revision in

[14] Franzke (2004) ranked the top twelve German underwriters based on their underwriting activity between 1997 and 2001. Her Table A2 (p. 229) gives more information on the calculations of reputation. We are not able to test this relationship for France because of the absence of any reliable measure of underwriter's reputation.

Germany is almost twice that in France. Table 9 confirms that the larger the difference in the price revision, the larger is the difference in underpricing.

The difference in the stringency of VC lock-up agreements in terms of length and the percentage of shares locked up explains the differences in underpricing between Germany and France. The German IPOs show higher underpricing because a relatively smaller percentage of VC shares are locked up beyond the minimum requirement. Indeed, Goergen et al. (2006) show that only 33% of the VC shares are locked up beyond the minimum requirement in Germany compared to 60% in France. The difference in the lock-up contracts of insiders and that for outsiders other than VCs do not explain the difference in underpricing between the two markets.

The difference in the level of pre-IPO ownership by underwriters in the two countries does not explain the large difference in underpricing between the two markets. However, the difference in ex-ante uncertainty – the average volatility of German IPOs is around 15.14% as compared to only 5.00% for French IPOs – is one of the main reasons for the difference in underpricing.

Finally, the frequent use of over-allotment options in the German firms (89% of IPOs have Greenshoe options in Germany as compared to only 46% of IPOs in France) does not explain the large difference in underpricing between the two countries. Likewise, the age difference between the matched pairs of German and French firms also fails to explain the difference in underpricing.

VIII. Conclusion

IPOs on the EuroNMs are characterised by the presence of lock-up agreements, the use of the book-building procedure for their valuation, venture-capital backing, the existence of over-allotment options and high levels of underpricing. In this paper, we first document some of these idiosyncrasies and then focus on how – if at all – they influence the level of underpricing in the two largest members of EuroNM network, namely the *Neuer Markt* of Germany and *Nouveau Marché* of France.

We find that all IPOs (except for one German IPO) use the book-building procedure for their pricing. IPOs from both markets have lock-up periods in place which exceed the compulsory minimum. We also find that IPOs from these two markets are venture-capital backed and that a large number of VCs do not sell any of their holdings in the

IPO. Data on the German market show that a number of IPOs are either brought earlier to the market or have their flotation postponed. The majority of the IPOs that go public earlier than planned are VC backed. Therefore, it seems that VCs are able to time their issues well.

Analysing the determinants of underpricing, we find that the high level of underpricing in these two markets is neither driven by insider selling behaviour nor by the dilution of insider ownership in the IPO. We show that IPOs are highly underpriced if they are risky and if the offer price is revised upwards. Lock-up agreements seem to act as substitute devices to underpricing for French IPOs. For French firms, if the VCs are locked up beyond the minimum requirement, then the underpricing is lower. Further, the more stringent the French lock-up, the smaller is the level of underpricing. The presence of underwriters as shareholders has a positive impact on underpricing in Germany but a negative one in France. This suggests that German underwriters may have been willing to suffer wealth losses resulting from underpricing in order to capture future business. In contrast, French underwriters may be more concerned about minimising their personal wealth losses due to underpricing. Finally, we explore the reasons for the large difference in underpricing between the German and French EuroNM markets and find that German firms are relatively more underpriced than French firms because they are more risky, use larger price revisions have less stringent VC lock-up contracts and mostly go public during the hot issue period of 1999-2000 when the general level of underpricing in all IPO markets is substantially higher.

References

Aggarwal, R., Krigman. L. and K. Womack (2002) Strategic IPO Underpricing, Information Momentum and Lock-up Expiration Selling, Journal of Financial Economics, 66, 105-137.

Arosio, R., Giudici, G. and S. Paleari (2000) Why Do (or Did?) Internet-Stock IPOs Leave So Much "Money on The Table"?, Working paper, University of Bergamo, Italy.

Aussenegg, W., Pichler, P. and A. Stomper (2005) IPO Pricing with Bookbuilding and a When-Issued Market, mimeo, University of Vienna, Austria.

Barry, C., (1994) New Directions in Research of Venture Capital Finance, Financial Management, 23, 3-15.

Barry, C.B., Muscarella, C.J., Peavy, C.W. and M.R. Vetsuypens (1990) The Role of Venture Capitalists in the Creation of Public Companies: Evidence from the Going Public Process, Journal of Financial Economics, 27, 447-471.

Benveniste, L.M. and P. A. Spindt (1989) How investment bankers determine the offer price and allocation of new issues, Journal of Financial Economics, 24, 343-61

Bessler, W. and A. Kurth (2004) The Performance of Venture-Backed IPOs in Germany: Exit Strategies, Lock-up Periods, and Bank Ownership, Working paper, University of Giessen.

Brau, J., Lambson V. and G. McQueen, Lock-ups Revisited, forthcoming Journal of Financial and Quantitative Analysis.

Chahine, S. (2004) On the trade-off between Gross Spreads and Underpricing: Some French Evidence, Working paper, American University of Beirut.

Derrien, F. and Womack K.L. (2003) Auctions vs. Bookbuilding and the Control of Underpricing in Hot IPO Markets, Review of Financial Studies, 16, 31-61.

DuCharme, L.L., Rajgopal, S. and S.E. Sefcik (2002) Why Was Internet IPO Pricing so severe? Working paper, University of Washington.

Espenlaub, S., Goergen, M. and A. Khurshed (2001) IPO Lock-up Agreements in the UK, Journal of Business Finance and Accounting 28, 1235-1278.

Francis, B. B. and I. Hasan (2001) The underpricing of venture and nonventure capital IPOs: An empirical investigation, Journal of Financial Services Research, 19, 93-113.

Franzke, S. (2004) Underpricing of venture-backed and non-venture backed IPOs: Germany's *Neuer Markt*, in G. Giudici and P. Roosenboom (eds) The Rise and Fall of Europe's New Stock Markets, Advances in Financial Economics, 10, Elsevier, UK

Giudici, G and P. Roosenboom (2004) Pricing Initial Public Offerings on Europe's New Stock Markets, in G. Giudici and P. Roosenboom (eds) The Rise and Fall of Europe's New Stock Markets, Advances in Financial Economics, 10, Elsevier, UK

Goergen, M., Khurshed, A., McCahery, J. and L. Renneboog (2003) 'The Rise and Fall of the European New Markets: On the Short- and Long-Run Performance of High-Tech Initial Public

Offerings', in J. McCahery and L. Renneboog (eds), Venture Capital Contracting and the Valuation of High Technology Firms, Oxford University Press.

Goergen, M., Renneboog, L. and A Khurshed (2006) Explaining the diversity in shareholder lock-up agreements, forthcoming, Journal of Financial Intermediation 15, 254-280.

Goergen, M. and L. Renneboog (2003) Why are the Levels of Control (So) Different in German and UK companies? Evidence from Initial Public Offerings, Journal of Law, Economics and Organization, 19(1), 141-79.

Habib, M. and A. Ljungqvist (2001) Underpricing and entrepreneurial wealth losses in IPOs: Theory and Evidence, Review of Financial Studies, 14, 433-458.

Jain, B.A. and O. Kini (2000) Does the Presence of Venture Capitalists Improve the Survival Profile of IPO Firms?, Journal of Business Finance and Accounting, 27, 1139-1176.

Jenkinson, T. and A. Ljungqvist (2001) Going Public: The Theory and Evidence on How Companies Raise Equity Finance – 2nd Edition, Oxford University Press (2001).

Kanji, G. (1995) 100 Statistical Tests. Sage Publications, London.

Lee, P. and S. Wahal (2004) Grandstanding, Certification and the Underpricing of Venture Capital Backed IPOs, forthcoming, Journal of Financial Economics

Ljungqvist, A. (1997) Pricing Initial Public Offerings: Further evidence from Germany, European Economic Review, 41, 1309-1320.

Ljungqvist, A. and W. J Wilhelm (2003) IPO Pricing in the Dot-Com Bubble, Journal of Finance, 58, 723-752.

Loughran, T., and J. Ritter (2004) Why has IPO underpricing changed over time? Financial Management, 33(Autumn), 5-37.

Loughran, T., and J. Ritter (2002), Why Don't Issuers Get Upset about Leaving Money on the Table in IPOs? Review of Financial Studies 15, 413-443

Megginson, W. L. and A. W. Weiss (1991) Venture capitalist certification in initial public offerings, Journal of Finance, 46, 879-903.

Ofek, E. and M. Richardson (2003) DotCom Mania: The rise and fall of internet stock prices, Journal of Finance, 58, 1113-1137

Ritter, J. (2003) Differences between European and American IPO Markets, European Financial Management, 9, 421-434.

Table 1: Variables used and hypotheses tested

Hypothesis	Variable	Expected sign of the coefficient
Ownership dilution vs. underpricing (Hypothesis 1)	Issue participation ratio	–
	Dilution factor	–
VC certification (Hypothesis 2)	VC presence	+
	VC nationality	?
	VC sell-off	–
	VC post-IPO ownership	+
	VC board representation	+
Price revisions vs. underpricing (Hypothesis 3)	Price revision	+
Lock-up periods vs. underpricing (Hypothesis 4)	% of VC shares not locked up	?
	% of VC shares locked up beyond the minimum requirement	+ Hyp 4a / – Hyp 4b
	% of outsider shares (except VC) locked up for the 1st min. req.	+ Hyp 4a / – Hyp 4b
	% of outsider shares (except VC) locked up for the 2nd min. req.	+ Hyp 4a / – Hyp 4b
	% of outsider shares (except VC) locked up beyond the min. req.	+ Hyp 4a / – Hyp 4b
	% of insider shares locked up for the 1st minimum requirement	+ Hyp 4a / – Hyp 4b
	% of insider shares locked up for the 2nd minimum requirement	+ Hyp 4a / – Hyp 4b
	% of insider shares locked up beyond the minimum requirement	+ Hyp 4a / – Hyp 4b
Underwriter's stake vs. underpricing (Hypothesis 5)	% of pre-IPO shares owned by the underwriter	+ Hyp 5a / – Hyp 5b
Control variables		
Ex-ante uncertainty	Volatility of the share price in the first month of trading	+
Signalling	Underwriter reputation	?
Size of the issuer	Market capitalisation at offer price	–
Over-allotment	Dummy variable = 1 if over-allotment option present, zero otherwise	+
Ex-ante uncertainty	Age	–
Market conditions	Return on NEMAX index during the quarter before the IPO	–
Hot issue period	Dummy variable = 1 if the IPO was in 1999-2000, zero otherwise	–
Business cycles	Various industry dummies	?

Table 2: Descriptive statistics of German and French firms floated on the European New Markets.

Age is calculated as the number of full years between the year of foundation and the year of the flotation. Market capitalization is measured at the end of the first day of trading. Price revision is the ratio of the difference between the offer price and the mid point of the bookbuilding range divided by the mid point of the book-building range. Over-allotment options allow underwriters to purchase up to 15% additional shares beyond the number of registered shares in an IPO. The issue participation ratio is the number of secondary shares sold at the time of the IPO normalised by the number of pre-IPO shares outstanding. The dilution factor is the number of primary shares issued normalised by the number of pre-IPO shares outstanding. *, **, and *** stand for the statistical significance of the t-test on difference in means between Germany and France at the 10%, 5% and 1% level, respectively, of the two-tailed test. $^{+}$, $^{++}$, and $^{+++}$stand for the statistical significance at the 10%, 5% and 1% level, respectively of the two-tailed Z-test for the equality between two proportions from two samples, assuming a binomial distribution. Under the null hypothesis that the two proportions are identical, Z is approximately distributed as a standard normal deviate (Kanji, 1995).

	Germany	**France**
Age (in years)	13.05	11.17**
Average market capitalisation on first trading day (€ million)	314.35	75.94***
% of IPOs which are VC backed	46.8	56.8^{++}
Average lock-up length (months)	9.5	10.4
% of IPOs that used book-building	99.3	100
% of IPOs priced at the upper bound of the book-building range	75.4	51.6^{+++}
Average price revision (%)	4.23	2.70*
% of IPOs with over-allotment options	89.18	45.65^{+++}
% of IPOs during the dot com bubble period (1999-2000)	82.84	52.17^{+++}
Issue participation ratio (%)	9.26	6.54***
Dilution factor (%)	34.37	32.14*

Table 3: Quarterly underpricing on the *Neuer Markt* and the *Nouveau Marché*

*, **, and *** stand for the statistical significance of the t-test on difference in means between Germany and France at the 10%, 5% and 1% level, respectively, of the two-tailed test. $^{+}$, $^{++}$, and $^{+++}$stand for the statistical significance at the 10%, 5% and 1% level, respectively of the two-tailed Wilcoxon Mann-Whitney test which tests for a difference between the medians of 2 independent samples with similar shape distributions.

Quarter	No. of IPOs		Average first day returns (%)		Median first day returns (%)	
	Germany	France	Germany	France	Germany	France
Jan 96- Mar 96	-	1	-	-	-	-
Apr 96- June 96	-	5	-	10.25	-	10.91
July 96- Sept 96	-	2	-	-11.44	-	-11.44
Oct 96- Dec 96	-	4	-	9.28	-	0.00
For year 1996	**-**	**12**	**-**	**5.95**	**-**	**6.71**
Jan 97- Mar 97	1	5	0	44.96	-	33.33
Apr 97- June 97	1	3	106	11.5	-	0.00
July 97- Sept 97	3	3	39.75	1.80	34.44	0.00
Oct 97- Dec 97	4	5	20.06	-0.74	12.5	0.00
For year 1997	**9**	**16**	**33.95**	**15.64**	**24**	**0.01^{+}**
Jan 98- Mar 98	2	3	187.31	15.26	187.31	15.56
Apr 98- June 98	11	15	108.44	39.98	103.39	13.68
July 98- Sept 98	13	7	40.29	8.88	32.9	0.00
Oct 98- Dec 98	10	11	56.02	3.26	44.19	0.00
For year 1998	**36**	**36**	**73.65**	**20.65*****	**61.65**	**2.18^{+++}**
Jan 99- Mar 99	15	9	127.82	0.55	88.42	-2.08
Apr 99- June 99	35	9	35.53	6.20	6	0.00
July 99- Sept 99	31	2	34.23	15.23	10.89	15.23
Oct 99- Dec 99	25	8	47.55	67.20	33.33	51.31
For year 1999	**106**	**28**	**51.04**	**22.46*****	**24.5**	**8.85^{++}**
Jan 00- Mar 00	34	4	99.36	157.47	88.65	187.34
Apr 00- June 00	35	22	32.04	8.20	19.69	0.59
July 00- Sept 00	30	13	37.17	22.87	13.53	14.47
Oct 00- Dec 00	15	5	2.21	9.46	3.75	0.00
For year 2000	**114**	**44**	**49.54**	**26.25****	**20.26**	**2.28^{+++}**
For the period 1996(97) - 2000	**265**	**136**	**52.89**	**21.06*****	**28.67**	**3.28^{+++}**

Table 4: Average underpricing by industry

The first figure in parentheses is the median value, the second figure is the sample size and the third figure is the percentage of positive observations. *, **, and *** stand for statistical significance of the t-test on the difference in means between Germany and France at the 10%, 5% and 1% level, respectively, of the two-tailed test.

Panel A: Average underpricing by industry

Industry	Germany	France
SIC 20-39	46.52%	26.07%**
Manufacturing	(29.17%, 51, 86.27%)	(10.25%, 33, 78.13%)
SIC 40-49	23.5%	67.41%
Transport & Public Utilities	(15.00%, 18, 58.82%)	(2.14%, 6, 80%)
SIC 50-51	54.95%	5.58%
Wholesale Trade	(27.81%, 13, 100%)	(0.1%, 10, 60%)
SIC 52-59	42.65%	-0.35%
Retail Trade	(0.00%, 5, 40%)	(0.04%, 6, 60%)
SIC 60-67	35.53%	
Finance, Insurance, Real Estate	(17.92%, 7, 83.33%)	-
SIC 70-89	60.68%	19.92%***
Business Services	(30.37%, 174, 82.66%)	(4.4%, 80, 62.50%)

Panel B: Average underpricing within different sectors of Business Services industry (SIC 73)

SIC 73 Business Services (computer)	Germany	France
SIC 7371	63.78%	13.5%
Custom Computer Prog. Services	(33.33%, 42, 92.68%)	(14.29%, 9, 66.67%)
SIC 7372	67.2%	14.41%
Pre-packaged Software	(50.48, 21, 85.71%)	(4.38%, 18, 72.22%)
SIC 7373	44.47%	114.64%
Comp. integrated systems design	(30.00%, 23, 78.26%)	(130.79%, 4, 100%)
SIC 7379	35.4%	11.76%
Computer related services	(35.40%, 21, 79.17%)	(0.00%, 8, 42.86%)
For all IPOs in SIC 73	**56.13%** **(30.40%, 107, 83.33%)**	**25.39***** **(4.4%, 39, 59.26%)**

Table 5: Pre-IPO ownership and underpricing

Panel A provides the frequency of different types of large shareholders in the pre-IPO period. The issue participation ratio is the number of secondary shares sold at the time of the IPO normalised by the number of pre-IPO shares outstanding. The dilution factor is the number of primary shares issued normalised by the number of pre-IPO shares outstanding. $^{+}$ stands for the statistical significance at the 10%, respectively of the two-tailed Z-test for the equality between two proportions from two samples, assuming a binomial distribution. Under the null hypothesis that the two proportions are identical, Z is approximately distributed as a standard normal deviate (Kanji, 1995). *** stands for the statistical significance of the t-test on difference in means between Germany and France at the 1% level, of the two-tailed test.

Panel A: Frequency of different types of shareholders for Germany and France in the pre-IPO period

	Germany (% of firms)	**France (% of firms)**
Pre-IPO Ownership by:		
Family or individual	70.85	79.66^{+}
Venture Capitalist	12.15	11.02
Other companies	16.19	9.32^{+}
Own shares	0.40	0.00
Holding company/trust	0.40	0.00

Panel B: Underpricing and the extent of insider participation at the IPO

	Germany (Underpricing)	**France (Underpricing)**	**t-test: difference in means**
Issue participation ratio			
Below median	50.91%	24.85%	3.13***
Above median	54.70%	13.88%	5.70***
t-test: difference in means	-0.44	1.59	
Dilution Factor			
Below median	54.95%	20.67%	4.21***
Above median	50.48%	18.16%	4.07***
t-test: difference in means	0.50	0.36	

Table 6: Characteristics of German and French VCs and their exit behaviour at the IPO

Domestic VCs are those who are the members of the domestic VC association only. International VCs are those who are members of at least one VC association from outside their country of domicile. They may or may not be a member of their domestic VC association. $^{+}$, $^{++}$, and $^{+++}$stand for the statistical significance at the 10%, 5% and 1% level, respectively of the two-tailed Z-test for the equality between two proportions from two samples, assuming a binomial distribution. Under the null hypothesis that the two proportions are identical, Z is approximately distributed as a standard normal deviate (Kanji, 1995).

	Germany	France
Panel A: VC backing before the IPO		
% of IPOs with VC backing	46.8%	56.8%$^{++}$
Total number of different VCs present	99	69
Of these: Domestic	25.25%	63.8%$^{+++}$
International	74.75%	36.2%$^{+++}$
% of VC backed firms with more than 1 VC as a backer	41.1%	69.6%$^{+++}$
Average number of VCs per firm	2	2.5
Panel B: Exit behaviour of VCs in the IPO		
% of firms with VCs retaining all shares	27.2%	41.8%$^{++}$
% of firms with VCs selling up to 25% of their shareholdings	31.2%	37.3%
% of firms with VCs selling between 25% and 50%	25.6%	14.9%$^{+}$
% of firms with VCs selling more than 50%	16.0%	6.0%$^{++}$

Table 7: Average underpricing of IPOs by type of VC backing

The first figure in parentheses is the median value, the second figure is the sample size and the third figure is the percentage of positive observations. *** stands for the statistical significance of the t-test on difference in means between Germany and France at the 1% level of the two-tailed test. The difference of medians is tested by the two-tailed Wilcoxon Mann-Whitney test which tests for a difference between the medians of 2 independent samples with similar shape distributions. Domestic VCs are members of the domestic VC association only. International VCs are those who are members of at least one VC association; they may or may not be a member of their domestic VC association.

	Germany (Underpricing)	**France (Underpricing)**	**t-test for difference in means**
VC present at IPO	50.77% (28.76%, 124, 81.45%)	21.00% (2.56%, 71, 57.74%)	3.77***
No VC present at IPO	54.75% (28.57%, 141, 81.56%)	19.10% (0.01%, 57, 52.63%)	4.31***
t-test for difference in means	0.48	-0.24	
P value for difference in medians	0.89	0.60	
Domestic VC	54.48% (28.67%, 43, 79.07%)	16.01% (3.28%, 36, 61.11%)	-3.19***
International VC	53.55% (29.61%, 82, 82.93%)	19.99% (7.20%, 32, 56.25%)	-3.26***
t-test for difference in means	0.07	-0.44	
P value for difference in medians	0.98	0.94	
UK/US based VC	59.50% (36.94%, 44, 86.36%)	24.84% (5.28%, 17, 52.94%)	-2.13***
Non UK/US based VC	50.82% (20.52%, 81, 79.01%)	15.32% (3.40%, 51, 62.50%)	-4.06***
t-test for difference in means	-0.69	-0.70	
P value for difference in medians	0.27	0.83	
Below median sell-off by the VCs	52.32% (28.28%, 62, 83.87%)	15.33% (5.28%, 33, 60.61%)	-3.53***
Above median sell-off by the VCs	56.30% (30.52%, 62, 80.65%)	17.41% (3.05%, 32, 59.38%)	-3.62***
t-test for difference in means	-0.32	-0.24	
P value for difference in medians	0.83	0.98	
Below median post-IPO ownership of VCs	53.52% (26.83%, 62, 77.42%)	13.07% (4.43%, 34, 55.88%)	-3.95***
Above median post-IPO ownership of VCs	54.85% (30.13%, 62, 85.48%)	22.28% (3.53%, 34, 58.82%)	-2.90***
t-test for difference in means		-1.03	
P value for difference in medians	-0.11 0.51	0.96	
VC is a member of the supervisory board	67.35% (31.10%, 30, 90%)	20.00% (9.60%, 34, 58.82%)	2.80***
VC is not a member of the supervisory board	49.62% (28.67%, 95, 78.95%)	15.39% (2.14%, 35, 60.61%)	3.97***
t-test for difference in means	1.06	0.52	
P value for difference in medians	0.40	0.63	

Table 8: Characteristics of the German IPOs that are earlier, on-time or postponed

Earlier are those IPOs that are brought to the market prior to the intended date. On-time are those IPOs which are brought to the market on the intended date. Postponed are IPOs that were postponed at least once. Franzke's (2004) method is used to measure underwriter reputation. The higher the value, the better the underwriter reputation. The average market return is the return on the EuroNM All Share index (NEMAX) in the month before the first announcement day of the IPO. The numbers in brackets represent the minimum, maximum, median and standard deviation. Information on the announcement dates of only 133 IPOs was available.

	Earlier (11 IPOs)	**On-time (95 IPOs)**	**Postponed (27 IPOs)**
Underwriter reputation	1.40	1.39	1.26
Average number of days between first announcement and first day of trading	17 (6, 27, 19, 7)	20 (1, 72, 20, 12)	17.2 (5, 40, 16, 9)
Average book-building range (BBR) (in €)	18.68 – 22.29	22.15 – 26.03	25.45 – 29.78
Average spread of BBR (in €)	3.79	3.94	4.33
Average offer price (in €)	21.89	25.54	28.36
% of firms with offer price equal to upper bound of BBR	90%	77.55%	64.5%
% of firms with VC-backing	77.78%	45.45%	56.00%
Average underpricing	45.21%	63.48%	46.72%
Average no. of IPOs in month before announcement date	7.4	8.28	6.29
Average underpricing in month before announcement date	86.75%	63.8%	51.37%
Average market return in month before announcement date	6.42%	5.11%	6.59%

Table 9: The determinants of underpricing in German and French EuroNM IPOs

The dependent variable is the natural log of the first day return. The issue participation ratio is the number of secondary shares sold at the IPO divided by the total number of shares outstanding in the pre-IPO period. The dilution factor is the number of primary shares issued at the IPO divided by the total number of shares outstanding in the pre-IPO period. Price revision is the percentage difference between the final offer price of the share and the mid-point of the book-building range. For France there is a choice between two minimum lock up contracts, 100% of the shares locked up for 6 months (first minimum requirement) or 80% locked up for 12 months (second minimum requirement). For Germany the minimum requirement is 100% of the shares locked-up for 6 months. Insider shares refer to the shares held by the executives and founder-owners. % shares owned by the underwriter are for the pre-IPO period. Volatility of the stock price measures the standard deviation of share returns over the first month of trading. Underwriter reputation for Germany is measured as in Franzke (2004). No such measure is available for France. Size is measured as the natural log of the market capitalisation at the offer price. Greenshoe is a dummy variable taking a value of 1 if an over-allotment option is present in the IPO and zero otherwise. Models 1 and 2 study the underpricing in Germany and France, respectively. Model 3 studies the difference in underpricing between the two countries. Model 2 considers French firms that came for an IPO after 1 December 1998. Before this period all insiders were locked-up for three years for 80% of their holdings. The figures in parentheses are the t-stats. *, **, *** refer to statistical significance at the 10%, 5% and 1% levels, respectively.

Independent variables	**Germany Model (1)**	**France Model (2)**	**Difference in underpricing Model (3)**
Constant	3.58 (2.72)***	3.61 (2.29)**	0.036 (0.17)
Issue participation ratio	-0.61 (-1.15)	-0.003 (-0.43)	0.006 (0.67)
Dilution Factor	0.14 (0.51)	-0.33×10^{-3} (-0.04)	0.016 (1.57)
Price Revision	3.42 (6.33)***	0.040 (3.92)***	0.023 (2.41)**
% of VC shares not locked-up		0.11 (0.59)	
% of VC shares locked-up beyond the minimum requirement	-0.55×10^{-3} (-0.42)	-0.97 (-3.12)***	-0.005 (-1.72)*
% of outsider shares (except VC) locked-up for the first minimum requirement		-0.06 (-0.33)	
% of outsider shares (except VC) locked-up for the second minimum requirement		0.17 (0.92)	
% of outsider shares (except VC) locked-up beyond the minimum requirement	0.50×10^{-3} (0.34)	0.90 (2.41)**	0.004 (0.94)
% of insider shares locked-up for the first minimum requirement		0.78 (2.75)***	
% of insider shares locked-up for the second minimum requirement		0.65 (2.53)**	
% of insider shares locked-up beyond the minimum requirement	0.13×10^{-3} (0.10)	0.56 (2.71)***	-0.004 (-0.78)
% shares owned by the underwriter	1.22 (1.75)*	-2.18 (-2.84)***	-1.27 (-0.68)
Volatility of Stock Price	4.68 (3.26)***	11.60 (4.13)***	8.21 (3.14)***
Underwriter reputation	-0.006 (-0.11)		
Size of the issuer	-0.12 (-0.18)	-0.07 (-0.77)	
Greenshoe present	-0.14 (-0.97)	0.11 (0.82)	-0.027 (-0.15)
Age of the issuer	0.02 (0.30)	0.03 (0.43)	0.106 (0.90)
Return on NEMAX index during the quarter before the IPO	0.007 (5.05)***	0.92×10^{-3} (0.49)	
Bubble (1999-2000)	0.17 (1.55)	0.08 (0.55)	0.272 (1.78)*
SIC 20-39 (Manufacturing)		0.11 (0.47)	
SIC 40-49 (Transport and public utilities)	-0.14 (-0.54)	0.39 (1.95)*	
SIC 50-51 (Wholesale trade)	0.27 (1.18)	-0.39 (-1.15)	
SIC 60-67 (Fin., Insurance and real estate)	-0.10 (-0.41)		
SIC 70-89 (Business Services)	0.07 (0.57)		
Adj. R^2	27.60%	42.39%	23.11%
Sample	262	61	61
P value (F statistic)	0.00	0.00	0.01

Figure 1: The quarterly pattern of underpricing in Germany and France over the years 1996-2000