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Shareholder lockup agreements in French *Nouveau Marché* and German *Neuer Markt* IPOs

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Abstract:

We analyse the characteristics of lockup agreements of IPOs on the *Neuer Markt* and the *Nouveau Marché* from 1996 to 2000. Even though both markets were part of the same EuroNM network, the characteristics of their lockup agreements are substantially different. Firm characteristics have a major influence on lockup contracts. In addition, shareholder characteristics explain the diversity of contracts within the same firm. Although the French regulator offers two types of minimum lockup contracts, the market perceives a difference between the two contracts as the choice is influenced by the type of the firm and the type of shareholders.

Key words: Initial public offerings, IPO, lockup agreements, lockup agreements, underpricing, Neuer Markt, Nouveau Marché, EuroNM, asymmetric information

JEL codes: G24, G34

1. Introduction

Lockup contracts[1] are agreements that prevent the initial shareholders of IPO firms from selling a specific percentage of their shares over a certain period following the admission of their firm to the stock exchange. One of the interesting features of lockup contracts is that they tend to be mostly voluntary arrangements. For example, although the UK and US[2] stock markets do not impose any generally applicable minimum lockups, most firms that go public have such arrangements in place. Even for the case of the markets that require minimum lockups, such as the Euro New Markets (EuroNM) of Continental Europe, the original shareholders often tend to agree to lockup periods and locked in shareholdings which far exceed the legal minimum.

Another interesting feature is the diversity of lockup contracts across and within countries in terms of their contractual characteristics. The US is at one extreme of the spectrum with very short lockup periods. Over the last decade, there has been an increasing trend in the US towards standardisation in terms of the lockup duration (see Bradley et al., 2001). Whereas the (voluntary) US lockup contracts are mostly standardised, the lockup contracts on the continental European markets are frequently mandatory and the lockup periods are more varied and longer. At the other end of the spectrum are the lockup contracts of UK firms with an average duration of about 600 days and with even greater diversity in terms of expiry dates. There is not only diversity in terms of the lockup expiry, but also in terms of the specification of the expiry date itself. Whereas the lockup contracts of continental European and US IPOs tend to specify clear-cut dates, i.e. absolute dates such as 31 July 2002, about a quarter of lockup arrangements of UK IPOs specify a date which is relative to a corporate event, e.g. the publication of the annual report for the forthcoming year (Espenlaub, Goergen and Khurshed, 2001).

The third interesting feature of lockup agreements is that the US studies have found evidence of a negative share price reaction on the day of their expiry (e.g. Bradley et al., 2003; Brav and Gompers, 2003). This evidence contradicts the efficient market hypothesis (EMH), as the IPO prospectus contains all the details of the lockup agreement (including the expiry date). Consequently, there should be no significant price change at expiry. To the opposite of studies on US data, Espenlaub et al. (2001) do not find significant abnormal returns around the expiry for a sample of UK IPOs.

This paper contributes to the literature in the following ways. First, there is only a small body of research on lockup agreements and all the published studies are on the US stock markets, apart from Espenlaub et al. (2001, 2003b) on the UK. In this paper, we extend the literature to the two major markets which were part of the EuroNM alliance of continental European stock markets, i.e. the German *Neuer Markt* and the French *Nouveau Marché*. In the second half of the 1990s, these stock exchanges attracted many high technology firms. Lockup agreements may be one way to reduce agency problems and asymmetric information on firm quality which may be particularly prominent in these firms. Second, the paper benefits from a high-quality database which comprises data on all the lockup agreements applying to the

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[1] A lockup agreement is called *engagement de conservation* in French and *Veräußerungsverbot* or *Marktschutzvereinbarung* in German.

[2] Certain shareholders of US issuing firms may still be subject to restrictions concerning the sale of their shares (see table 1). However, Field and Hanka (2001) find that 91% of the shares owned by the initial shareholders are locked in after the IPO via lockup contracts and another 4% are prohibited from selling by SEC Rule 144.

individual shareholders of each firm.[3] Our data are more detailed than those analysed by previous studies. Not only do we have data on directors' holdings, but also on the holdings of all other shareholders. For each firm we are also able to distinguish the founding shareholders from other pre-IPO shareholders. Our results show that, in addition to firm characteristics, the identity of the shareholder (venture-capitalist or other shareholder), her position on the board (executive or non-executive director), and the importance of her stake compared to the stakes owned by other shareholders are major determinants of the lockup length and period. Third, we contribute to the agency literature by investigating whether lockup agreements are substitute instruments to initial underpricing, venture capital-backing of the firm, and control concentration.

Our main findings can be summarized as follows. For both countries, shareholders of firms with more uncertainty (smaller and younger firms with more intangibles) are locked in for longer periods. Venture capitalists have shorter lockup agreements which suggests that they prefer to exit the firm at the earliest (legal) opportunity. In contrast, executive and non-executive directors who retain equity stakes after the flotation are locked in for longer periods. We also examine whether the presence of a venture capitalist has a negative impact on lockup duration given the possible certification role of VCs, but find no evidence of such a role. In French IPOs, strong ownership concentration is related to longer lockup agreements, but not when control is held by a single shareholder. This suggests that the presence of multiple large shareholders leads to longer lockups but that one powerful shareholder can reduce the duration of her lockup contract. For the German IPOs (though not for the French ones), the lockup length is a substitute to initial underpricing in terms of a signal of firm quality.

In contrast to the German regulation, the French regulation provides firms with a choice between locking in 100% of the shares for 6 months and locking in only 80% of the shares but for 1 year. Interestingly, we find that for France, the market is not indifferent between the two legal 'minimum' lockup agreements. Overall, the former is perceived to be less stringent than the latter, as it is chosen by firms with less uncertainty about their value. Furthermore, we find that when there is little ownership dispersion and ownership is highly concentrated (as measured by the Herfindahl index) the former contract is chosen. When ownership dispersion is low but less concentrated, the lockup duration tends to be longer. In this case (when the multiple shareholders have individually less control power), either the alternative legal minimum of a one-year lockup for 80% of the shares is chosen or a contract which covers 100% of the shares and lasts longer than the legal minimum of 6 months. When a firm is VC-backed, all the shareholders tend to be locked in and exemptions are rare. However, the probability that lockup contracts which are stricter than the legal minima will be imposed on the venture capitalists themselves or on the founders is small. Finally, we do not find any evidence that firms, that signal their superior quality by locking in their shareholders for longer or with a higher proportion of their shares, are able to revise their offer price upwards during the offer period.

The rest of the paper is structured as follows. The next section reviews the regulation concerning lockup contracts on the two markets and compares it with that on other markets. Section 3 discusses the theoretical reasons for the existence of voluntary and compulsory lockup agreements and develops the

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[3] The only other studies on French and German lockup contracts are of, Ducros (2001) and Nowak and Gropp (2000), both unpublished, which use data aggregated at the firm level. Neither study clearly states how firms with more than one lockup agreement are treated. As we will see later, the vast majority of firms have more than one contract in place specifying a different expiry date and/or percentage of shares locked in.

hypotheses to be tested. Section 4 gives information on data and reviews the contractual characteristics of the lockup contracts on the French and German new markets. In section 5, we discuss the results from the regressions and multinomial logit models explaining the period of the lockup and the percentage of shares locked in. Section 6 concludes.

2. Regulatory provisions and their enforceability

As table 1 shows, the French and German EuroNM markets as well as the other partners of the EuroNM alliance, the Brussels EuroNM, the Dutch *Nieuwe Markt* and the Italian *Nuovo Mercato*, all impose minimum lockup periods. For France, up to 1 December 1998, all directors and founders were locked in with 80% of their shares for 3 years. From this date onwards, directors and founders had to be locked in with all of their shares for 6 months or with 80% of their shares for a year. For Germany, all the initial shareholders are locked in for 6 months with 100% of their shares. Hence, French firms have a choice both in terms of the lockup period and the percentage of shares locked in whereas German firms can only choose the length of the lockup period.

Although, US regulation imposes compulsory lockup periods only in certain limited cases (see table 1), most firms have voluntary lockup contracts in place. The UK is similar in the sense that, prior to January 2000, lockup contracts were only mandatory for firms with a trading history of less than 3 years. Since January 2000, there have been no compulsory lockups. However, certain types of firms are required to display in their IPO prospectus a prominent statement whether they have a lockup agreement, and if not the reasons for its absence.[4]

[Insert table 1 about here]

There is one additional important difference between the French and German markets. In Germany, the lockup rule of 6 months also applies to the company itself. As a result the firm is not allowed to issue any new shares during the six-month regulatory lockup period. The lockup agreement in the IPO prospectus of Euromed AG Health Systems (p.12) illustrates this difference:

> ***Future disposals by the existing shareholders***
> *Once the placement of the shares is complete (including the exercising of the Greenshoe option), the existing shareholders will hold 50% of the Company's share capital. They have pledged not to offer for sale or dispose of any shares directly or indirectly within a period of six months from the start of trading in the Neuer Markt. Taking account of the relevant provisions of national stock corporation law, the Company has pledged, for a period of six months from the admission of the shares to the Regulated Market and to trading in the Neuer Markt of the Frankfurt Stock Exchange, not to offer for sale directly or indirectly, or dispose of any shares, nor to announce this or undertake any measures which would be equivalent in economic terms to an issue or a disposal (see also section "Risk factors – Concentration of share ownership").*

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[4] See table 19.2 of Goergen et al. (2004) for a synopsis of the listing requirements of the UK stock exchanges.

3. Reasons for the existence of lockup agreements

At the time of the flotation, outsiders usually have little information about a firm. In contrast, the incumbent shareholders, who are frequently involved in the management of the firm, tend to have a better picture about the firm's prospects. Consequently, one of the reasons for lockup agreements is to protect outside investors from being exploited by insiders acting on private information (Brav and Gompers, 2003). Committing the incumbents to keep their holdings over a certain time after the IPO makes it more likely that any private information becomes public. Therefore, we hypothesize that:

Hypothesis 1:
Firms characterised by more uncertainty about their value will have longer lockups and/or lockups involving a higher percentage of the shares for all the shareholders.

The incumbent shareholders in turn may opt for an agreement with a longer duration than that prescribed by the regulator to signal their superior quality to outsiders. This argument is in line with the Leland and Pyle (1977) model in which the founder signals his firm's higher value by retaining a large stake after the IPO. The lockup agreement is then a legal device enabling the incumbent shareholders to precommit to retaining a high stake over a certain period after the flotation. In other words, the lockup agreement acts as a complement to the percentage of shares retained by the initial shareholders immediately after the IPO. Alternatively, strict lockup contracts may compensate for the fact that the equity stakes held by the initial (pre-IPO) shareholders are diluted as a consequence of the flotation. As such, strict lockup contracts may be substitute mechanisms to signal the commitment of the initial shareholders.

Hypothesis 2:
a) *Firms in which the initial shareholders retain a large number of shares immediately after the IPO to signal their superior quality use longer lockups and/or lockups involving a larger percentage of locked in shares to add credibility to the signal.*

b) *Alternatively, firms whose initial shareholders retain a large number of shares after the IPO have shorter lock- in periods and have a lower percentage of their shares locked in.*

Brav and Gompers (2003) argue that insiders can essentially signal the quality of the firm using three variables: underpricing, the percentage of shares locked-in, and the length of the lockup period. In a separating equilibrium, a high-quality issuer will underprice more, lock in for a longer period of time, or lock in a larger percentage of the shares outstanding.[5] Although US studies tend to reject the signaling role of IPO underpricing (e.g. Garfinkel, 1993; and Michaely and Shaw 1994), some of the European studies have found evidence of such as role (e.g. Keloharju (1993) for Finland; and Levis (1995) for the UK). This leads to the following hypothesis:

Hypothesis 3:
Underpricing is a substitute signal to the signal sent by the lockup length and the percentage of shares locked in. Hence, firms that use more underpricing lock in their shareholders for briefer periods and/or a smaller percentage of their shares.

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[5] Alternatively, Loughran and Ritter (2002) argue that underpricing is related to agency problems rather than to signaling. They also show that the degree of underpricing is correlated to stock market movements.

Brau et al. (2001) develop a model where insiders of IPO firms use the length of the lockup agreement as a signal under asymmetric information. Their model predicts that lockups will be longer in low transparency firms, when the cost of investing in positive NPV projects is low and the benefits from investing in positive NPV projects are high. Brau et al. also discuss the possibility of an alternative signal which is the proportion of locked-in insider shares. They argue that only the proportion of *informed* insider shares that are locked in will act as a signal. However, they discard this as a signal because information on this proportion is not easily available or easily derived from the disclosed information. Brav and Gompers (2003) argue that firms signal their superior quality with the lockup length and the percentage of shares locked-in. High-quality firms will be able to revise their final offer price upwards just before the IPO after the investors have observed the signal in the IPO prospectus.

Hypothesis 4:
Higher quality firms that lock in more shares and/or lock in the shares for longer will be able to revise their offer price upwards.

Underwriters may also find that lockup agreements provide price support for the shares offered through the IPO.[6] As underwriters have a reputation to protect, they may wish to avoid a drop in the share price of a firm they have recently floated. Therefore, underwriters may prevent the initial shareholders from selling their existing holdings in order to avoid a sudden increase in the supply of shares. If one assumes that the demand curve for shares is downward sloping, then an increase in the supply of shares will cause a permanent fall in the share price. Jenkinson and Ljunqvist (2001) report that price support by the underwriter is legal in many countries, including France, Germany, the UK and the US.[7] The way US lockup agreements are phrased speaks in favor of the price-support argument. Brau et al. (2000) report that for US firms the lockup contract disclosed in the IPO prospectus normally starts with a statement that a large sale of shares after the IPO could negatively affect the firm's share price and jeopardise future capital increases. Similarly, in Germany, firms have to refer to lockup agreements in their IPO prospectus under the Risk Factors section (*Risikofaktoren*).[8]

Venture capitalists (VCs) are important providers of external finance to new firms. VCs not only provide the necessary capital but their presence also signals quality as they usually monitor the firm and are involved in the decision-making process (e.g. Barry, 1994; Jain and Kini, 2000). Barry et al. (1990) analyse a sample of VC-backed US companies. They report that VCs hold substantial stakes in these firms and provide intensive monitoring. They also find that, contrary to conventional wisdom, VCs frequently tend to hold their shareholdings a long time after the IPO. Hence, VCs may reduce agency problems as well as problems arising from asymmetric information. The presence of a VC would then reduce the period of the lockup and/or the proportion of shares locked in irrespective of the shareholder. Alternatively, given that the market may expect VCs to sell out shortly after the IPO, the other initial shareholders may be locked in for longer and/or with a higher percentage of their shares in order to signal

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[6] This is the commonly cited motive by practitioners for lockup agreements (see e.g. Rödl and Zinser (1999) who state this as the only motive (p.59), and Förschle and Helmschrott (2001) who mention this motive as one out of three (p.21)).

[7] The motivation of price support may explain why in markets where only voluntary contracts exist, these tend to be between the incumbent shareholders and the underwriter [rather than with the new shareholders or the firm itself]

[8] See 4.1.16 of *Regelwerk des Neuen Marktes*. In principle, this rule implies that firms should explicitly state any potentially detrimental effects on their share price However, according to Novak and Gropp (1999) only 49% of their sample does so.

the firm's quality to the market. A related argument is that, as VCs are repeat-investors in IPO firms, they are likely to influence the choice of the underwriter. Hence, underwriters may 'bribe' VCs to propose them as underwriters by promising these VCs less stringent lockups (e.g. the legal minimum). These arguments yield the following competing hypotheses:

Hypothesis 5:
a) *Venture capitalists, given their certification role of firm quality, decrease the need for larger proportions of shares to be locked in and for longer lockup periods for all the shareholders.*

b) *Furthermore, venture capitalists themselves are locked in for shorter periods and/or fewer of their shares relative to the other shareholders of the firm.*

There is now a vast body of the finance literature on the role of underwriters in IPOs. Carter and Manaster (1990) find evidence that there is a rational segmentation in the underwriter market with high-quality underwriters backing less risky issues. Brav and Gompers (2003) suggest that sponsors (underwriters) write lockup agreements that buttress their reputation. The shorter the lockup period the more reputation is at stake as investors are likely to blame the sponsor in the event of adverse share-price movements or unfavorable information released shortly after the issue. These arguments lead to two conflicting hypotheses:

Hypothesis 6:
a) *More reputable underwriters are associated with higher quality issues so that there is less need for longer lockup agreements and/or lockup agreements involving a higher percentage of the shares.*

b) *Alternatively, more reputable underwriters have more reputation capital at stake and are therefore more likely to impose lockup agreements with longer periods and/or a higher proportion of shares locked in.*

Finally, Brav and Gompers (2003) argue that high-quality underwriters use lockups to extract further fees from the issuing company. They report that US lockups often only allow insider equity sales (or even SEOs) before the lockup expiry if they are carried out via the lead underwriter. This will then generate additional income for the underwriter through market-making (if the underwriter conducts a block trade on behalf of the firm) or though the fees from underwriting the SEO.

Hypothesis 7:
High-quality underwriters use the lockups to extract further compensation from firms via sales of insider equity or SEOs.

From the discussion of section 2, one can refute hypothesis 7 for France as the regulation of the *Nouveau Marché* does not prohibit the issue of new shares during the compulsory lockup period. However, the hypothesis may still be valid for Germany because the firms may be able to conduct an SEO if it is done beyond the 6 month compulsory lockup period.

4.   Data sources and description

a.   Data sources

The data on the characteristics of lockup contracts, ownership and control, and age are taken from the IPO prospectuses of the firms. We have set up a unique database which includes paper and/or electronic copies of the prospectuses of all the firms that went public on the French and German EuroNMs since their inception (1996/97). The prospectuses were obtained from the firms themselves, from Thomson Analytics, and from the French and German stock exchanges. The database contains detailed data on the ownership and control of each shareholder immediately before and after the IPO as well as information on the lockup contract the shareholder is subject to, if any. Accounting data, share prices and SIC codes were obtained from Thomson Analytics.

Shareholders are classified into five different categories: executives, non-executives, founders, venture capitalists, and others. For the German firms, executives are defined as the members of the management board (*Vorstand)* whereas non-executives are defined as the members of the supervisory board (*Aufsichtsrat*). French firms have a choice between either an Anglo-American one-tier board, the *conseil d'administration*, or a two-tier board consisting of a supervisory board, the *conseil de surveillance*, and the management board, the *directoire*. For French firms adopting the latter we proceed in a similar way as we do with the German IPOs. For firms which choose the one-tier board, executives are defined as the senior managers (*conseil de direction*) who sit on the single board, all other members of the *conseil d'administration* are considered to be non-executives. The identity of the founders is mentioned in the IPO prospectus. Venture capitalists are defined as shareholders who are members of a national or cross-national venture-capital association. We obtained lists of members of 31 national and cross-national VC associations – among them the Belgian, Dutch, French, German, Italian, Swiss, UK, US and European VC associations – and checked whether each shareholder was part of one or more of these associations.

b.   Data description

Descriptive statistics

Table 2 provides descriptive statistics on the characteristics of the firms that have gone public on the *Neuer Markt* and the *Nouveau Marché* since they have started operating on 10 March 1997 and 14 February 1996, respectively. We only retain domestic firms that had an initial public offering and exclude all IPOs by foreign firms as well as transfers from other markets.[9] We also ignore IPOs by banks and insurance firms.[10] Until the end of 2000, there were 268 German IPOs and 138 French IPOs. The market capitalisation is defined as the number of shares outstanding times the offer price. The price revision is the offer price minus the midpoint of the bookbuilding range over the midpoint of the bookbuilding range. The ratio of intangible assets over all fixed assets is measured at the end of the year of the IPO or the following year if the ratio is not available for the year of the IPO. First-day (first-week) underpricing is

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[9] We do not exclude firms that conduct their IPO simultaneously on their domestic market and a foreign market (e.g. a German firm going public on the *Neuer Markt* as well as NASDAQ).

[10] Other firms that operate within the finance, insurance and real estate industries (SIC codes 60-67) are still included. For example, one of the German IPOs, OnVista AG, has an SIC code of 6282 (*investment advice*) and provides and develops financial databases and analysis tools via the internet.

defined as the difference between the closing price on the first day (first week) of trading and the offer price over the offer price.

Panel A of table 2 shows that the *Neuer Markt* IPOs are on average 13 years old compared to 11 years for the *Nouveau Marché* IPOs. The German IPOs are also significantly larger, have more intangibles and are significantly more underpriced than the French firms.[11] Panel B of table 2 displays the distribution across industries based on the SIC classification. Although, the Z-test for the difference between two proportions (Kanji, 1995) is not significant for any of the SIC industry categories, the percentage of French IPOs in the French manufacturing industry is higher than that of German IPOs in the German manufacturing industry. In both countries, the vast majority of IPOs is in the services industry.

[Insert table 2 about here]

Ownership and control

The proportion of firms with ownership by executives and founders is virtually identical for both countries: executives and founders are among the pre-IPO shareholders in about 95% and 83% of the firms. However, there is a major difference for ownership by VCs between the two countries. Panel A of table 3 shows the incidence of VC-backing for the two countries. As much as 61% of French firms have at least one VC among their shareholders compared to only 47% of the German firms (the difference is significant at the 5% level). If VCs provide a certification role, then the higher incidence of VCs in the French IPOs may explain why French IPOs are significantly less underpriced than German IPOs. Indeed, several studies have found a negative relation between underpricing and VC backing (e.g. Megginson and Weiss, 1991; and Lin and Smith, 1998).

Panel B of table 3 reports the ownership by the different categories of shareholders (non-executives,[12] executives, venture capitalists and founders) immediately before and after the IPO. Ownership (before and after the IPO) by any of the 4 categories is higher in France than in Germany. As panel C shows, it is significantly higher at the 1% level for non-executives and VCs. However, after the IPO, only French VC ownership is still significantly higher than in Germany. Panel D shows that, whereas all other categories significantly reduce their ownership in the IPO, only German non-executives significantly increase their ownership and control in the IPO.

[Insert table 3 about here]

Similar to ownership, control (before and after the IPO) by any of the 4 categories (not reported in the table) is higher in France than in Germany. However, after the IPO, only VC and executive control (but not ownership) in the French IPOs is significantly higher than in the German ones. For France, executives as well as founders hold significantly more control rights than cash flow rights after the IPO. The reason for this is that most French firms have a provision in their articles of association attributing double voting

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[11] Goergen et al. (2004) also point out that there are substantial differences in the long-term performance between the French and German IPOs.

[12] The non-executives may either own the shares themselves or act as a representative of a large shareholder (e.g. another company, or a venture capital firm).

rights to shareholders who have registered the ownership of their shares with the company and have held their shares for a certain number of years (normally 2 years) since the date specified in the provision.[13]

In about three quarters of both German and French firms, at least one of the founders is an executive director, while in about a fifth of the firms one or more founders take up a position as a non-executive director.[14] While table 3 showed that the percentage of firms with ownership by VCs is higher in France, VCs owning equity in French firms assume significantly more often the functions of non-executive and executive director than VCs in German firms. This suggests that the VCs in France are not only more important in terms of providers of finance, but that they are also more actively involved in the management and/or monitoring of the management.

Frequency of lockup contracts

Table 4 reports the frequencies of different types of lockup contracts for all the shareholders. As most firms have more than one contract in place, the number of contracts is higher than that of the firms in the sample. Often, the different types of shareholders of a firm are subject to different contracts.[15] Panel A contains the types of agreements which lock in 100% of the shares owned by a shareholder (e.g. 100% of the shares for 6 months). Panel B is on all the contracts that lock in only part of the shares owned by a given shareholder (e.g. 80% of the shares for 12 months). Panel C reports the frequency of so-called staggered agreements: a first period during which sales are completely prohibited[16] is followed by at least one additional period during which only part of the shares are locked in. For instance, all the directors' shares are locked in during the first year after the IPO, followed by 50% of the shares during the second year after the IPO. Panel D covers all other types of contracts. Although, the German regulation requires all the pre-IPO shareholders to be locked in, smaller shareholders may be exempted at the discretion of the stock market. Typically, their holdings tend to be significantly smaller than one percentage of the equity outstanding. Also, German investors who obtain their shares in the preferential allocation of the IPO (the so called *Friends & Family* programme) are normally exempted from the compulsory lockup[17,18]. There are, however, a few firms which voluntarily lock in any shares from the preferential allocation. Similarly, for France, although the stock market rules prescribe that all directors should be locked in, directors with small holdings (typically amounting to a fraction of a percentage) are frequently exempt.

The frequency of certain types of contracts is obviously influenced by the regulation in force in each country. Panel B of table 4 reflects that, until 1 December 1998, 80% of the shares of directors of French

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[13] Such provisions often come into effect retroactively. For example, the provision for double voting rights may be put in place just before the IPO, e.g. 1 July 2003, and give double votes to shares registered with the company and held by the same shareholder for at least 2 years since 1 July 2001. Consequently, although some of these shareholders reduce their ownership in the IPO, their control may increase (relatively) after the IPO.

[14] A table with the percentage of founders and VCs being directors is available upon request.

[15] This is similar to Espenlaub et al. (2001, 2003) who find that UK IPOs tend to have more than one contract in place, whereas one single contract applying to all the shareholders is common in US firms.

[16] We did not come across any staggered agreements with the first lockup period covering only part rather than the entirety of the shares.

[17] Novak and Gropp (2000) argue that in certain cases Deutsche Börse AG can give an exemption form the compulsory lockup rule. They discuss the case of Senator Film AG which was successful in obtaining an exemption for its minority shareholders who held 12% of the equity. Finally, the shares that are subject to the Greenshoe option – these shares can be new shares issued by the firm or shares sold by the old shareholders – are not subject to the lockup agreement.

[18] This is similar to what Field and Hanka (2001) observe for the US.

IPO firms had to be locked in for 3 years. Interestingly, panel B shows that some of the French firms that went public after 1 December 1998 chose lockup lengths exceeding those of the two legal options of 6 months for 100% of the shares or one year for 80% of the shares. However, none of these firms chose a lockup length exceeding 36 months Contrary to the UK, the lockup arrangements of French and German IPOs all specify absolute dates. An absolute expiry date is a specific calendar date such as 01 July 2000 whereas a relative expiry date is e.g. the date of the publication of the annual report for 2000.

[Insert table 4 about here]

Table 4 reports that the majority of contracts in both France and Germany have longer durations and/or larger proportions of shares locked in than those required by the stock exchanges. In Germany, only about 43% of the contracts follow the legal requirement of a 100-percent lockup for 6 months. Almost half of all the contracts specify a longer lockup period of 12 months or more[19]. For France, about 16% of lockup contracts follow the legal minimum of 6 months with 100% of the shares locked in and about 19% of the contracts follow the other legal minimum of 1 year with 80% of the shares locked in. About 13% of the French IPOs opt for a more stringent lockup arrangement covering 100% of the shares for 1 year. If one ignores all the firms that went public before 1 December 1998 and were subject to a three-year lockup covering 80% of their shares, then the previous percentages become 22, 26, and 17%, respectively.

In the light of the increasing trend towards standardised lockups in the US, the diversity in terms of the characteristics of lockup agreements in both France and Germany is surprising. For example, Brau et al. (2000) find that 70% of the lockup contracts of their US sample firms have durations of exactly 180 days, which is confirmed by Bradley et al. (2001), Field and Hanka (2001) and Mohan and Chen (2001). In addition, Field and Hanka (2001) report that for a sample of 1,948 US IPOs with lockup arrangements, managers, the selling shareholders in the IPO as well as shareholders owning in excess of 5% of the equity are almost always locked in. Given the high homogeneity of lockup agreements in the US, one could argue that US firms do not use the length of the lockup and the proportion of shares locked in as a signal of their value. Further, Brau et al. (2000) doubt that lockup contracts are effective in mitigating asymmetries of information between insiders and outsiders given their short length. They argue that the average lockup duration of 180 days will at most cover two quarterly earnings announcements.[20] The French and German lockup contracts, given their diversity and longer length, may therefore have a higher potential for signaling.

The lockup period for venture capitalists is relatively short.[21] In Germany, about two thirds of the VC lockup agreements adhere to the minimum legal period of 6 months, which confirms the pattern shown by Novak and Gropp (2000). In France, the situation is similar. The majority of VCs opt for short lockup contracts or at not locked in at all. More than a third of the VCs are not locked in at all and about 40% follow the legal minima of six months with 100% or 12 months for 80%. In both countries, most of the executive and non-executive directors are frequently locked in for longer periods than the legal

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[19] We found that for Germany there were 98 cases where there was no lockup; this figure was 101 for France. Almost all of the French and German lockup exemptions apply to shareholders who have acquired their shares in a preferential allocation programme (a so-called Friends & Family programme).
[20] Field and Hanka (2001, p.474) report that 11% of US IPOs have staggered lockup agreements.
[21] Detailed tables on the lockup agreements of VCs are available upon request.

minimum.[22] The percentage of contracts in Germany with a length of more than 6 months amounts to 54%. In France, where the stock exchange provides a choice between 6 months covering 100% of the shares and 12 months covering 80% of the shares, more firms subject their directors to the latter option. This suggests that the longer duration of 12 months is perceived to be a stronger signal than the higher proportion of shares with the 6-month period. In both countries, executives tend to be subject to longer lockups than non-executives. As about three quarters of French and German executives are also the founders of the firm, this explains why the contract structures for founders are very similar to those for executives.

Percentage of shares locked in

Table 5 reports the maximum percentage of shares locked-in for each category of shareholders. In the case of a staggered lockup agreement we report the percentage of shares locked in during the first lockup period which is always the highest.[23] Panel A shows the numbers of shares locked in as a percentage of shares outstanding. Given that by regulation, 100% of the shares of the German pre-IPO shareholders have to be locked in, the shares locked in as a percentage of the shares outstanding are significantly higher in Germany than in France (see the *t-test* in Panel B). Panel C shows the number of shares locked in for each category of shareholders divided by the number of shares they own immediately after the IPO. For Germany, the percentage is always 100%. However, the French firms have some choice as to the percentage of shares locked in. Bearing in mind the observations from tables 5-7, we find that non-executives and venture capitalists are locked in for a higher proportion of their shares but for a shorter period whereas the exact opposite is true for executives and founders.[24]

[Insert table 5 about here]

Lockup period

Table 6 shows the minimum lockup periods (in months) for the different categories of shareholders. For staggered agreements, the first period during which all sales are prohibited is reported. Although, both the French and German regulators offer a minimum lockup period of 6 months, which is close to the standard voluntary lockup period of US IPOs, the average French or German firm opts for a longer lockup of about 10 months. However, this average is still much lower than the average lockup period of about 19 months for the UK firms, reported by Espenlaub et al. (2001). We find that for all pre-IPO shareholders the average lockup period in France as compared to Germany is (insignificantly) longer by about one month. In both countries, VCs are on average locked in for significantly shorter periods than all the pre-IPO shareholders whereas executives and founders are locked in for longer periods. However, there are significant differences in terms of the lockup duration between the different categories of shareholders.

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[22] Detailed tables on the lockup agreements of executive and non-executive directors are available upon request.

[23] Given the relatively small number of staggered contracts in both countries (32 out of 477 contracts for Germany and 13 out of 297 contracts for France), the percentages locked-in do not change substantially if the simple average percentage of shares locked in for each contract or the weighted average percentage are considered.

[24] When the French IPOs that occurred before 1 December 1998 are excluded, the percentages in panels A and C of table 6 only change slightly. Although, ownership by pre-IPO shareholders in Germany is still significantly higher at the 1% level, the difference in ownership by non-executives is no longer significant and the difference in ownership by the founders is now significant at the 5% level.

Non-executives and venture capitalists of German firms are locked in significantly longer than their French counterparts (Panels A and B). The opposite is true for executives and founders.[25]

[Insert table 6 about here]

To summarise: first, there is a higher occurrence of VC financing on the *Nouveau Marché* than on the *Neuer Markt*, whereas ownership by executives and founders is similar in the two countries. Second, ownership and control of the French firms is more concentrated both before and after the IPO. The executives and founders of French firms keep a high level of control by using provisions in the company articles of association which confer double voting rights to long-term shareholders. Third, French VCs are more likely to have board representation (via executive and non-executive directors) than their German counterparts. Hence, if there is VC certification, it is likely to play a more important role in France than in Germany, given the higher involvement of VCs in French firms. Fourth, French executives and founders tend to tie themselves in for longer periods, but with lower fractions of their shares. The converse is true for French non-executives and venture capitalists. Fifth, in both countries most VCs are locked in for the regulatory minimum lockup length. A third of the French VCs are not locked in. Sixth, the pre-IPO shareholders of German firms are locked in for significantly longer periods than their French counterparts. Finally, as a consequence of differences in regulation, German shareholders can only signal via the duration of their lockup agreements, whereas French shareholders can also use the percentage of shares locked in as a signal.

5.   The reasons behind the differences in the characteristics of lockup agreements

a.   Methodology

The aim of this section is to explain the differences in the length and the percentage of shares locked in across firms and between France and Germany. Given that there is no cross-sectional variation in the French sample before 1 December 1998 in terms of lockup agreements, firms that went public before that date are excluded from all the regressions. To the opposite of previous studies, our data are at the level of individual shareholders. Hence, given that most firms have more than one lockup agreement in place, each applying to different types of shareholders, our paper benefits from much richer data.

We run two types of regressions. The first (table 8) explains the minimum lockup period while the second (left hand side of table 9) explains the maximum percentage of shares locked in. The percentage of shares locked in is the ratio of the number of shares locked in for a given shareholder over the number of shares owned by that shareholder immediately after the IPO. If a shareholder is subject to a staggered lockup agreement we consider the percentage which applies during the first period of the agreement and which always happens to be 100%. As there is no variation in this ratio for Germany (by law the ratio is equal to 100%), this model is only estimated for the French sample. We do not only run OLS regressions, but also multinomial logits (results reported in table 9) for the following reasons. First, there is a high discreteness of the percentage of shares locked and the length of the lockup period. For example, very few contracts specify percentages other than 0, 80 or 100%. Second, and more importantly, the French regulator has

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[25] If French IPOs before the regulatory change of 1 December 1998 are excluded (not reported) then German non-executives and VCs are still locked in for substantially longer periods, but there is no longer a difference between the

created interdependence between the percentage of shares locked in and the length of the lockup. Therefore, it is important to consider the two variables jointly by running a logit which distinguishes between different combinations of the lockup length and the percentage of shares locked in. The dependent variable of the multinomial logit is equal to zero if the shareholder is not locked in; equal to 1 if 80% of his shares are locked in for one year, 2 if all of his shares are locked in for 6 months, and 3 if all of his shares are locked in for more than 6 months. The 45 shareholders subject to other lockup arrangements are excluded from the multinomial logit regressions. All models contain time dummies and industry dummies (based on the SIC codes obtained from Thomson Analytics, see table 2).[26]

To test the effect of uncertainty on lock in contracts (hypothesis 1) we use three different proxies for uncertainty: the ratio of intangible assets over total assets, the age of the firm and the natural logarithm of the market capitalisation calculated at the offer price (in € million). We expect a negative coefficient on the last two variables and a positive one on the first one.[27]

In order to check the validity of hypothesis 2 (the impact of ownership concentration), we use three variables: the free-float, the Herfindahl index of post-IPO ownership by the pre-IPO shareholders, and ownership by the individual shareholder. The free-float measures how many primary and secondary shares have been sold in the IPO and gives us an idea of the dispersion of overall ownership of the firm after the IPO. The Herfindahl index measures the concentration of post-IPO ownership by the initial shareholders.[28] The third variable captures the share stake of the specific shareholder. This variable allows us to perform a slightly different test on the validity of hypothesis 2 by checking whether different shareholders of a firm are treated differently while controlling for the size of their post-IPO holdings. A negative coefficient on the free-float would support hypothesis 2a (stricter lockups give credibility to the signal) whereas a positive coefficient would lend support to the competing hypothesis 2b (ownership concentration and strict lockups are substitutes). For the Herfindahl index and the ownership of the individual shareholder we expect a positive sign if hypothesis 2a is valid and a negative sign if the competing hypothesis 2b is valid.

[Insert table 7 about here]

Underpricing is measured in two ways, i.e. on the first day of trading and also after the first week of trading. If hypothesis 3 is correct and underpricing is a substitute signal, then the coefficient on underpricing will be negative. The price revision is defined, in line with Brav and Gompers (2003), as the ratio of the difference between the offer price and the midpoint of the bookbuilding range over the midpoint of the bookbuilding range. If hypothesis 4 is valid, the coefficient on the price revision will be positive.

Hypothesis 5 consists of a set of competing hypotheses. Hypothesis 5a assumes that VCs are a substitute device to lockups whereas hypothesis 5b assumes that VCs act as complements. In order to check the validity of hypothesis 5, we use two different variables. First, we use a dummy variable which is set to one

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executives and founders of the two countries. Also, overall, German pre-IPO shareholders are now locked in for significantly longer periods than their French counterparts.

[26] The industry dummies and time dummies are jointly significant in each regression.

[27] The predicted signs of the independent variables are summarized in table 11.

[28] The Herfindahl index is the sum of the squared ownership stakes of the pre-IPO shareholders and ranges from 0 to 1.

if the firm is VC-backed, and zero otherwise. Second, we use a dummy variable which equals one if a particular shareholder is a VC, and zero otherwise. Thus, the first variable is a firm-specific variable whereas the second variable is shareholder specific. Hypothesis 5a predicts a negative coefficient on the first variable and has no prediction as to the sign of the second variable. Hypothesis 5b predicts a positive sign for the coefficient on the first variable and a negative one for the second variable.

We include three additional shareholder-specific dummy variables: the first one equals one if the shareholder is a founder, the second equals one if the shareholder is an executive and the third equals one if the shareholder is a non-executive. We expect positive coefficients on the first two dummies and a negative one on the last one.

According to hypothesis 6a, good underwriters only take high-quality firms public and therefore there is less need for a longer lockup and/or a higher percentage of shares to be locked in. The competing hypothesis 6b states that reputable underwriters will lock in firms for longer and/or for a higher proportion of their shares as they have more reputation capital to protect. For Germany, we use Franzke's (2003) measure of underwriters' reputation. For the IPOs in 1997, the measure of reputation for each underwriter is the percentage of IPOs on all the segments of the Frankfurt stock exchange from 1990 to 1996 for which it acted as lead underwriters. For the years 1998 to 2000, the measure of reputation also includes the percentage of IPOs for which the underwriter acted as the lead underwriter on the *Neuer Markt* from 1997 until the end of the year preceding the IPO. Equal weighting is applied to the two percentages. In order to compute the reputational measure, all the segments of the stock exchange need to be considered, as some highly reputable underwriters, i.e. those with a substantial share of IPOs on the main segments, may have refrained from taking public the lesser-quality IPOs on the *Neuer Markt.* Hence, by just considering an underwriter's market share on the *Neuer Markt*, one would underestimate their reputation. An equivalent measure of underwriters' reputation for France is not available.

Hypothesis 7, which states that underwriters may use lockups to extract further fees from the firms via SEOs conducted during the lockup period, is refuted for France; as French lockup agreements do not contain restrictions about the issue of new shares. For the German IPOs, we investigated how many firms had SEOs before the expiry of their lockup agreement.[29] We find that firms wait until the expiry of their lockup to issue further shares. Similarly, for the US, Brav and Gompers (2003) report that the likelihood of having the SEO with the IPO underwriter is not affected by the fact whether the SEO is within the lockup period or not.

Table 7 summarises the hypotheses, the variables, and the predicted signs of their coefficients. The correlation matrix of all the independent variables reveals that, for both countries, there is a high correlation between the free-float after the IPO and the dummy variable indicating whether the firm is VC-backed. There could be two reasons. First, VCs use the IPO as a partial exit route; sell off a significant proportion of their holding in the IPO while keeping a stake in the firm. Second, VC-backed firms are relatively more risky and, therefore, the diversification benefits for all the shareholders are higher. Hence, all the shareholders of VC-backed firms will sell relatively more shares in the IPO than those of firms without VC-backing. We find that both reasons hold. Analysing the German data, we find that VCs sell on average 26% of their shares in the IPO compared to 9% of shares for the other shareholders of the VC-

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[29] If a firm has more than one lockup contract in place, we use the first date of expiry.

backed firms. The difference in means is significantly different from zero at the 0.1% level. On average, any of the shareholders (i.e. VCs and non-VCs) of VC-backed firms sell about 11% of their shares through the IPO compared to only 8% for the shareholders of firms without VC-backing. The difference in means is statistically significant at the 5% level for the two-tailed test. For France, VCs sell 13% of their shares in the IPO compared to 8% for the other shareholders of VC-financed firms. However, the difference is not significantly different from zero. The shareholders of VC-backed firms sell 9% of their shares compared to 5% for the shareholders of firms that are not financed by VCs. The difference is significant at the 1% level.

b. Regression results

The models in table 8 on the length of the lockup period for both France and Germany have high explanatory power (15-20%). There is strong support for hypothesis 1 for both France and Germany: less uncertainty about the firm's future value – as measured by the firm's age and its market capitalisation at the offer price – decreases the length of the lockup agreement. Furthermore, the coefficient on the ratio of intangibles over fixed assets is positive and significant at better than the 0.1% level for Germany.

There is no evidence for the validity of either of the competing hypotheses 2a and 2b for the German IPOs as the coefficients on the free-float and on the percentage of shares locked in for the individual shareholder are not significantly different from zero. However, for France both coefficients are highly significant (at the 0.1% level or better) and positive. The multinomial logit regression in table 9 takes the interdependence between the lockup period and the percentage of shares locked in into account and tests the validity of these hypotheses further.

As the coefficient on first-day underpricing is highly significant in all the regressions, hypothesis 3 is upheld for Germany.[30] This suggests that, on the *Neuer Markt,* underpricing acts as a substitute signal to the lockup length. The reason why the hypothesis is not supported by the French data may be due to the fact that underpricing in France is significantly less substantial with an average of 21.2% for first-day underpricing compared to 58.5% for Germany (see table 2).

No support is found for hypothesis 4 which states that firms that use longer lockup periods as a signal of their superior quality are able to revise their offer price when the signal has been perceived by the market. Similarly, Brav and Gompers (2003) do not find any support for this signaling hypothesis. They report that firms that revise the final issue price upwards have shorter lockups, but the difference is not statistically different from zero.[31]

Hypothesis 5 is on the role of VCs, i.e. whether they provide a certification role that acts as a substitute to lockups (hypothesis 5a) or whether they are a complement to lockups (hypothesis 5b). For Germany, we find that the coefficient on the dummy variable which indicates whether the shareholder is a VC is highly significant and negative. However, the coefficient on the dummy variable which indicates whether the shareholder's firm is VC-backed is insignificant. This suggests that, in Germany, VCs are locked in for

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[30] We also used the natural logarithm of (1 + first-day underpricing) and of (1+ first-week underpricing). The coefficient was slightly less significant, but still had the correct sign.
[31] The fact that we do not find a significant impact of the price revision on the lockup characteristics could be due to the nature of the market which is a bull market. As table 2 shows, almost all of the firms had a positive price revision. The price revision would then reflect rapidly increasing market prices rather than the firm's quality.

shorter periods, but VC-backing has neither a significantly positive nor negative impact on the length of the lockup applying to the other shareholders of the firm. Hence, in Germany, VCs are neither complements nor supplements to the lockup length. For France, the coefficient indicating whether the shareholder is a VC is negative and highly significant. However, in contrast to Germany, the coefficient indicating whether the firm is VC-backed is significantly positive. This suggests that hypothesis 5b is valid for France: VCs are locked in for shorter periods, but at the same time, the other shareholders of the firm are locked in for longer. Hence, VCs seem to act as complementary signaling devices to lockups by increasing the length of the lockup period for all the other shareholders. However, this result should be interpreted with caution. First, we still need to bear in mind the interdependence between the lockup period and the percentage of shares locked in. Second, model (1) for France shows that the overall effect for VC shareholders is positive (2.621–2.268=0.353). This indicates that although a VC is locked in for a shorter period (the negative coefficient) than the other shareholders of the firm, he will still be locked in somewhat longer (for about a third of a month) than shareholders of non VC-backed firms. Further, in model (3), the two coefficients cancel out. This suggests that when one adjusts for the ownership distribution across pre-IPO shareholders – which depends on the level of uncertainty about the firm[32] – VCs are subject to the minimum lockup period (zero effect) whereas the other shareholders of the firm are locked in for longer (positive effect). Espenlaub et al. (2003b) also report that VCs in the UK seem to be complements to lockups rather than supplements. They also find that lockup periods are particularly long for VC-backed high-tech firms whereas for the other firms the presence of a venture capitalist reduces the lockup length.

Finally, table 8 documents strong support for hypothesis 6b as the coefficient on underwriter's reputation in regression (3) for Germany is positive and highly significant. This suggests that high-quality underwriters impose longer lockups on the shareholders of the firms they take public in order to protect their reputational capital. Conversely, Espenlaub et al. (2001) do not find that underwriter reputation has an impact on the lockup characteristics of UK IPOs.

[Insert table 8 about here]

To summarise, we find that firm as well as shareholder characteristics explain a significant part of the cross-sectional variation in the length of lockup arrangements for IPOs on both the *Neuer Markt* and the *Nouveau Marché*.[33]

Table 9 reports the results for the models explaining the percentage of shares locked-in for the French IPOs. The explanatory power is substantially better (ranging from 0.28 to 0.32) than that of the regressions explaining the length of the lockup. On the whole, the percentage of shares locked is influenced by the same factors as the lockup period: uncertainty, agency conflicts, VC certification and shareholder type. However, there are some differences. We find a strongly statistically significant relation between the percentage locked in and the degree of price revision of the offer price. This implies that a high percentage of locked-in equity increases the market's confidence in the quality of the firm such that the firm is able to

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[32] Theoretical models such as Bolton and von Thadden (1998) predict that for high-risk firms the benefits of ownership diversification outweigh those of monitoring generated by concentrated ownership.
[33] As a robustness check, we re-estimated the models excluding the ratio of intangibles over fixed assets (the results are not reported in the table) as we do not have this ratio for about half of the German firms and about 40% of the French for the year of the IPO (or the following year). The results are similar to the ones reported above.

revise the offer price upwards. The coefficients on firm size (the natural logarithm of the market capitalisation at the offer price) and the ratio of intangibles over fixed assets have opposite signs to the predicted ones as a consequence of contract choice (see the multinomial logit model below, table 10).

[Insert table 9 about here]

Given the interdependence between the length of the lockup and the percentage of shares locked in for the case of France, we run an additional multinomial logit regression. The logit distinguishes between four types of lockup contracts: no lockup (Y=0), an 80-percent share lockup for 1 year (Y=1), a 100-percent share lockup for 6 months (Y=2), and a 100-percent share lockup for more than 6 months (Y=3). Shareholders subject to all other types of contracts are excluded from the regression. The results (based on shareholder rather than firm data) are reported in table 9. The firm's size, as measured by the natural logarithm of its market capitalisation at the offer price, has a significant influence on the odds of each of the three latter cases (relative to the base case of no lockup). Larger firms are more likely to lock in all of the shares of their shareholders for 6 months whereas the smaller firms are more likely to opt for longer lockup periods (either 1 year with 80% of the shares locked in or lockup durations of more than 6 months with all the shares locked-in). Adjusting for the interdependence between the choice of the percentage of shares locked in and the period of the lockup created by the French regulator, we find strong support for hypothesis 1. The same conclusion applies to the other proxies for uncertainty, i.e. the age of the firm and the ratio of intangibles over fixed assets. This provides support to an earlier conclusion drawn from the descriptive tables that firms do not perceive the two contracts to be equivalent. Firms regard the legal option of 80% for one year to be a stronger commitment than the legal option of 100% for six months.[34]

[Insert table 9 about here]

The coefficient on the shareholder's ownership is always positive and significantly different from zero. First, this suggests that large shareholders are unlikely to be exempt from being locked in, which is a trivial result, given the nature of the regulation. Second, firms with a high level of ownership concentration in the hands of few shareholders, as measured by the Herfindahl index, are more likely to have all the shares locked in for 6 months. Furthermore, large shareholders of highly concentrated firms will be subject to a six-month lockup covering all of their shares as the coefficient on the Herfindahl index and the coefficient of the shareholder's ownership are both positive. In more risky firms, as measured by a high ratio of intangibles to fixed assets, the minimum contract of 6 months lockup with 100% of the shares is less likely to occur. This confirms hypothesis 2b: substantial ownership retention and riskiness convincingly signal the quality of the firm to the market and significantly reduces potential agency costs such that stricter lockup agreements are not necessary.

Hypothesis 3 is not confirmed as underpricing does not seem to act as a substitute signal to the lockup length and the percentage of shares locked in. For each of the three types of lockup arrangements, the coefficient on price revision is always positive and significantly different from zero. This implies support

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[34] This conclusion applies to all the variables, except for the shareholder's ownership after the IPO as the odds of being locked in for one year with 80% of the shares and those of being locked in for 6 months and 100% of the shares are virtually identical. The results reflect the fact that often small shareholders, typically holding a fraction of a percentage point of the firm's equity, are exempt from the lockup.

for hypothesis 4 as shareholders of firms with a positive price revision are more likely to be locked in than to be exempt from a lockup.[35]

When a firm is VC-backed, the likelihood that its shareholders are subject to a lockup contract is high. However, VC-backing implies that the most likely lockup agreement is the minimum contract of 6 months locking in 100% of the shares and, at the same time, contracts with longer lockup periods are less likely. This finding supports the certification role of VCs (hypothesis 5a). We also find that the probability that the venture capitalist is locked in with all of her shares and for longer than the official minimum of 6 months is small (which supports hypothesis 5b).

We summarize the conclusions on the duration of lockup agreements as follows. First, for both countries, uncertainty about the firm's future prospects is an important determinant of the lockup period as shareholders of smaller and younger firms are locked in for longer. In Germany, uncertainty proxied by the relative size of intangible assets also increases the lockup duration. Second, the lockup period varies by type of shareholder as well as by ownership concentration. For both the French and German IPOs, venture capitalists have shorter lockup agreements. In contrast, the share stakes retained by executive and non-executive directors at the flotation are locked in for longer periods. In French IPOs, strong ownership concentration is related to longer lockup agreements, but not when this strong ownership concentration is mainly caused by one shareholder. This suggests that the presence of multiple large shareholders leads to longer lockups but that one powerful shareholder can reduce the duration of her lockup contract. Third, as it is possible that VCs play a certification role, VC backing may reduce the need for long lockups as a signal of firm quality. While we find no relation between VC backing and lockup length for German firms, there is a positive relation for French firms. This implies that the VC backing is not a substitute device to the lockup length but rather complement. Fourth, for the German IPOs (though not for the French ones), there is strong evidence that underpricing acts as a substitute signal of firm quality to the lockup length. In contrast, the underwriter's reputation is related to longer lockups. Finally, we find a weak negative relation between price revisions of the offer price and the lockup duration of German IPOs. This refutes the hypothesis that long lockups signal quality and thereby allow positive revisions of the offer price.

In contrast to Germany, French regulation allows firms to lock in shareholders for less than 100% of their equity stake (albeit for longer time periods). Interestingly, we find that for France, the market is not indifferent between the two legal 'minimum' lockup agreements (of 100% of the shares for 6 months and of 80% of the shares for 1 year). Overall, the former is perceived to be less stringent than the latter, as it is chosen by firms with less uncertainty about their value. While we find that strong ownership concentration is related to the imposition of lockup arrangements, we discover a more interesting relation with ownership dispersion. When there is little dispersion in ownership concentration, the firm opts for a lockup contract of 6 months covering 100% of the shares. When ownership concentration is high but somewhat more dispersed, longer lockup durations are chosen consisting of either the alternative legal minimum of a 1 year lockup for 80% of the shares or contracts which are stricter than the legal minima in terms of duration and percentage locked-in (100% of the shares for periods longer than 6 months). When a

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[35] However, the price revision (or the relative size thereof) increases the odds of being locked in for 6 months and with 100% of the shares as compared to the other types of contracts. This finding weakens the above support for hypothesis 4.

firm is VC-backed, the shareholders are unlikely to escape a lockup although the probability that the VCs and the founders are subject to lockup contracts that are stricter than the legal minima is small. In addition, there is a high probability that executive directors will be locked-in for 1 year and for 80% of their shares. In young, small firms with many intangibles, lockup contracts with longer durations are preferred. Finally, we do not find any evidence that firms that signal their superior quality by locking in their shareholders for longer or with a higher proportion of their shares are able to revise their offer price upwards.

6. Conclusions

Whereas virtually all the published literature has focussed on lockup contracts in Anglo-American IPOs, this paper contributes to the IPO-literature by analysing these contracts for IPOs on the French *Nouveau Marché* and the German *Neuer Markt*. The descriptive data reveal that there is substantial heterogeneity in lockup contracts within each country and between the two countries. This allows us to study the type of shareholders and firms opting for specific lockup agreements. Contrary to the UK and to most US IPOs, firms going public on the French and German new markets are subject to compulsory lockups. However, about a third of French firms and half of the German firms choose lockup contracts for their shareholders that go beyond the regulatory minimum requirements.

The paper has uncovered some marked differences in terms of the role of venture capitalists in German and French IPOs. First, there is a higher proportion of French firms that is VC-backed. Second, VCs in French firms are more likely to have board representation (via executive and non-executive directors) than their counterparts in German firms. Third, French VCs sell a smaller fraction of their holding at the flotation. The higher importance of VCs in French IPOs in terms of monitoring (as measured by board membership) may be the reason why for France we find that VCs act as a certification device and an alternative to the lockup agreements whereas for Germany we do not find such an effect.

We find that the shareholders of firms characterised by more uncertainty (small, young firms and those with many intangible assets) are locked in for longer and for a higher proportion of their shares. Venture capitalists in both French and German IPOs prefer a quick exit after the flotation: they have short lockup agreements (usually identical to the legal minimum). In contrast, executive and non-executive directors who retain shares after the flotation are locked in for longer periods. We have also examined whether the presence of a venture capitalist has a negative impact on the lockup duration as it is possible that VCs certify firm quality and thus reduce the need for long lockups. We find that this certification role is not supported by our analysis. In French IPOs, strong ownership concentration is related to longer lockup agreements, but not when this strong ownership concentration is held by a dominant shareholder. This suggests that the presence of multiple large shareholders leads to longer lockups but that one powerful shareholder can reduce the duration of her lockup contract. Similar to other studies, we do not find any evidence that high-quality firms choose more stringent lockup agreements and are thus able to revise their offer price upwards or reduce the degree of underpricing. For German firms, we find that a longer lockup length may be a substitute to the initial underpricing in terms of a signal of firm quality. In contrast, the underwriter's reputation is related to longer lockups.

Interestingly, we find is that for France, the market is not indifferent between the two legal 'minimum' lockup agreements. Overall, the lockup agreement of 6 months covering all of the shares is perceived to be less stringent as it is chosen by firms with less uncertainty about their value. We further find that when

ownership is highly concentred, the firm opts for a contract covering 6 months whereas, when ownership concentration is high but more dispersed, firms choose either the legal minimum of a 1-year lockup or a contract which is stricter than the legal minima. For VC-backed firms, all the shareholders tend to be locked in although the probability that VCs and the founders are subject to lockup contracts stricter than the legal minima is small. In young, small firms with a many intangibles, contracts with lockup contracts with longer durations are preferred. Finally, we do not find any evidence that firms that signal their superior quality by locking in their shareholders for longer or with a higher proportion of their shares are able to revise their offer price upwards.

The paper shows that although the French regulator gives firms a choice of two minimum lockup specifications, firms are clearly not indifferent between the two choices. Also, a majority of French and German firms voluntarily choose lockup contracts which are more stringent than the legal requirements. To some extent, this advocates against the use of regulation and the move towards the US or UK approach of no regulation or (auto-regulation).

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Table 1: Compulsory lockups on the EuroNM[a] and other markets

Nouveau Marché (Paris)	Neuer Markt (Frankfurt)	Nuovo Mercato (Milan)	Nieuwe Markt (Amsterdam)	Brussels EuroNM	LSE	EuroNext (since June 2000)	US market
For the directors:[b] the issuing firm has the choice between either 80% of the holdings for 1 year; or 100% of the holdings for 6 months.[c] Before 1 December 1998, directors were locked in for 3 years for 80% of their shares.	All initial shareholders and the company: 100% for 6 months and no issue of new shares is allowed during the same period	Directors, managers and founders are locked in with 80% of their holdings for one year. Shareholders (other than the above) who became shareholders (holding more than 2%) in the 12 months preceding the application for a stock exchange listing are also locked in with 80% of their shares for one year. The stock exchange may also lock in a shareholder who became a controlling shareholder before the 12 months preceding the application for a listing. [d]	All founding shareholders, all managing shareholders and shareholders sitting on the supervisory board are locked in for a minimum of 360 days and for 80% of their shares. Before 24 November 2000, all shareholders holding at least 5% of the shares outstanding were locked in depending on the firm's published results. 100% of their shares were locked in until the firm had reported positive operating income and net income. Then 50% of their shares remained locked in until the firm had reported 3 years of positive operating income and net income within a five-year period. If the firm had a record of at least three years of positive operating income and net income during the 5 years preceding the IPO, then there was no lockup.	All managing shareholders are locked in for at least one year and for 80% of their shares.	No minimum lockups since January 2000. Before that date, mineral companies and scientific research-based companies were subject to certain minimum lockup periods if they had less than 3 years of trading history.[e]	There is currently no harmonisation of listing rules. Firms applying for a EuroNext listing will need to choose the Amsterdam, Brussels or Paris market as their entry to Euronext and will then have to satisfy the listing rules of that particular market.	SEC Rule 144 limits the sale of restricted securities, i.e. securities that have been directly purchased in a private placement from the issuing firm before the IPO. Such sales are not allowed during the first year of ownership.[f] After this year, during any three-month period, the sale cannot exceed 1% of the shares outstanding and the average weekly trading volume of the previous 4 weeks.[g] NASD rules also prevent venture capitalists who have a private investment in the issuing firm from selling their shares during a 90-day period and underwriters who have received shares as compensation are not allowed to sell for one year.

Notes : [a] The lockup rules are contained in *Instruction NM3-02* of 1 December 1998 for the Nouveau Marché, section 7.2.9 of *Regelwerk Neuer Markt* for the Neuer Markt, Article 2.2.3 of the *Rules of the Nuovo Mercato Organised and Managed by Borsa Italiana S.P.A.*

[b] Earlier documents issued by the *Nouveau Marché* talk about insiders. The meaning of insiders – typically the directors and the founders – was defined and agreed at the time of the filing of the IPO prospectus.

[c] For firms that have less than 2 years of age, the directors are not allowed to sell or transfer any of their shares for the first 2 years after the admission to the listing.

[d] All shareholders in firms which have been exempted by the stock exchange from providing financial accounts for at least one entire year, are locked in for 100% of their shares for the first year and at least 80% of their shares for the second year after the first date of trading. In addition, at least 10% of the equity of firms with less than 3 financial years has to be held by venture capital investors or by other shareholders actively involved in the firm's business.

[e] See Espenlaub et al. (2001) for details about the regulation before January 2000.

[f] Before February 1997, this period was two years.

[g] After their sale, these shares become registered shares *de facto* (see Field and Hanka 2001).

Table 2: Firm characteristics of the IPOs introduced on the *Neuer Markt* and the *Nouveau Marché*

*Figures shown in Panel A are the average values. The first figure in parentheses is the median value, the second figure is the sample size and the third figure (if applicable) is the percentage of positive observations. *, **, 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. For Panel B the figures are the numbers of firms for each SIC category. SIC codes were unavailable for 3 of the French IPOs. The figures in parentheses are the proportions of firms in each SIC category. The Z-test for the equality between two proportions (assuming a binomial distribution) was computed for the difference between the proportion of German firms and that of French firms in each SIC category. However, none of the differences was significantly different from zero at any of the conventional levels of confidence.*

Panel A: Sample characteristics

	Germany	France	t-test
Age at IPO in years	13.4 (10.0, 268)	11.1 (9, 138)	*
Market capitalisation at offer price in m €	229.9 (124.7, 268)	73.7 (42.1, 138)	***
Price revision	4.3% (7.1%, 267, 81.3%)	2.7% (5.0%, 138, 72.3%)	*
Intangibles/fixed assets	59.9% (69.2%, 133)	49.1% (49.5%, 86)	**
First-day underpricing	58.5% (29.0%, 268, 87.7%)	21.2% (3.3%, 135, 77.8%)	***
First-week underpricing	61.5% (33.2%, 268, 80.2%)	25.5% (9.8%, 134, 71.6%)	***

Panel B: Industry distribution (SIC codes)

	Germany	France
Agriculture, forestry, fishing (codes 01-09)	0 (0.0%)	0 (0.0%)
Mining (codes 10-14)	0 (0.0%)	0 (0.0%)
Construction (codes 15-17)	0 (0.0%)	0 (0.0%)
Manufacturing (codes 20-39)	51 (19.0%)	33 (24.4%)
Transportation & public utilities (codes 40-49)	18 (6.7%)	6 (4.4%)
Wholesale trade (codes 50-51)	13 (4.9%)	10 (7.4%)
Retail trade (codes 52-59)	5 (1.9%)	6 (4.4%)
Finance, insurance, real estate (codes 60-67)	7 (2.6%)	0 (0.0%)
Services (codes 70-89)	174 (64.9%)	80 (59.3%)
Public administration (codes 91-99)	0 (0.0%)	0 (0.0%)

Table 3: Percentage of ownership and control held by different shareholder categories

Figures shown in Panel A are the percentages of firms with VC-backing. The figures in parentheses are the numbers of firms. The Z-test in Panel A is a 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). Figures reported in Panels B, C and D refer to the percentages of ownership held by each category.

Panel A: Percentage of firms with venture capital backing

Germany	France	Z-test for difference in proportions
47.0% (126)	61.0% (75)	-2.565[**]

Panel B: Percentage of ownership before and after the IPO

	Non-executives		Executives		Venture capitalists		Founders	
	Germany	France	Germany	France	Germany	France	Germany	France
Before IPO	9.5%	30.3%	53.2%	57.8%	11.8%	26.8%	59.9%	60.4%
After IPO	18.1%	21.9%	39.0%	42.1%	7.1%	18.1%	43.7%	43.9%

Panel C: t-tests for the difference in ownership means between Germany and France

	Non-executives	Executives	Venture capitalists	Founders
Before IPO	-5.400[***]	-1.274	-4.751[***]	-0.129
After IPO	-1.334	-1.178	-5.211[***]	-0.058

Panel D: t-tests for the difference in pre- and post IPO ownership means

	Non-executives	Executives	Venture capitalists	Founders
Germany	-3.192[***]	5.859[***]	1.991[**]	6.757[***]
France	2.106[**]	4.166[***]	2.897[***]	4.344[***]

Table 4: Types of lockup contracts for all the shareholders

The table reports the frequency of different types of lockup contracts for all the shareholders excluding the free-float which is never locked in. As most firms have more than one type of contract in place the total number of contracts per country is higher than the number of firms for that country. The frequency is the number of contracts of a given type over the total number of contracts for that country. Panel C reports the frequency of so-called staggered agreements which have one period during which all the shares are locked in (e.g. 100% for the first year after the IPO), followed by at least one additional period during which only a proportion of the shares are locked in (e.g. 50% for the second year after the IPO). The period reported is the first period stated in the agreement.

Type of lockup contract	GERMANY		FRANCE	
	No of contracts	*Frequency*	*No of contracts*	*Frequency*
Panel A: All the shares are locked				
6 months after date of IPO	163	43.0%	31	15.8%
7 months after date of IPO	0	0.0%	2	1.0%
9 months after date of IPO	1	0.2%	7	3.6%
12 months after date of IPO	145	38.3%	25	12.8%
13 months after date of IPO	1	0.2%	0	0.0%
18 months after date of IPO	16	4.2%	1	0.5%
24 months after date of IPO	9	2.4%	4	2.0%
30 months after date of IPO	5	1.3%	0	0.0%
36 months after date of IPO	2	0.5%	1	0.5%
Panel B: Only part of the shares are locked in				
12 months for less than 50%	0	0.0%	2	1.0%
12 months for 80%	0	0.0%	38	19.4%
12 months for more than 80% but less than 100%	0	0.0%	5	2.6%
18 months for 50%	0	0.0%	1	0.5%
36 months for 80%	0	0.0%	52	26.5%
Panel C: Staggered agreements (in addition during a first lockup period during which sales are prohibited, these agreements include at least one additional period during which only part of the shares can be sold)				
6 months	17	4.5%	9	4.6%
9 months	0	0.0%	2	1.0%
12 months	13	3.4%	2	1.0%
18 months	0	0.0%	0	0.0%
24 months	2	0.5%	0	0.0%
Panel D: Other types of contracts				
80% of shares are locked in for 12 months; a smaller proportion of the shares are locked in for (a) further period(s)	0	0.0%	4	2.0%
No sales of shares during 6 months below a specified price (normally offer price plus premium)	0	0.0%	4	2.0%
Others	5	1.3%	6	3.1%
Sum of different contracts	379	100.0%	196	100.0%

Table 5: Maximum percentage of shares locked in

Figures reported in Panel A are the sample average of the total number of shares locked in for each category expressed as a percentage of the total number of shares outstanding for each firm. For shareholders subject to staggered agreements, the total number of shares locked in refers to the first date after which part of the shares are unlocked. Figures shown in Panel B are the two t-tailed t-tests for the differences in means based on the shares locked in as a percentage of the shares owned by a given category. Figures shown in Panel C are the sample average of the total number of shares locked in for each category expressed as a percentage of the total number of shares owned by that category for each firm. [a] Information on the executives was not available for one of the French firms.

Panel A: Shares locked in as a percentage of shares outstanding after the IPO

All pre-IPO shareholders		Non-executives		Executives		Venture capitalists		Founders	
Germany	France	Germany	France	Germany	France	Germany	France	Germany	France
68.6%	53.3%	18.0%	23.3%	39.1%	35.6%	15.3%	17.8%	43.7%	38.4%

Panel B: t-tests for the difference in means between Germany and France

All pre-IPO shareholders	Non-executives	Executives	Venture capitalists	Founders
10.134[***]	-1.700[*]	1.522	-0.859	1.337

Panel C: Shares locked in as a percentage of shares owned

All pre-IPO shareholders		Non-executives		Executives		Venture capitalists		Founders	
Germany	France	Germany	France	Germany	France [a]	Germany	France	Germany	France
100%	85.7%	100.0%	93.0%	100.0%	84.3%	100.0%	95.1%	100.0%	84.9%

Table 6: Minimum lockup period

Figures reported in Panel A are the sample average of the firm averages of the minimum lockup period applying to each shareholder or shareholder category. For shareholders subject to staggered agreements, the lockup period will be the period up to the first day on which some of the shares stop being locked in. The stars in panels A and C refer to the significance of the t-test on the difference between the average minimum lockup period for all pre-IPO shareholders and the average minimum lockup period for that particular category of shareholders. Figures shown in Panel B are the two t-tailed t-tests for the differences in means.

Panel A: Minimum lockup periods (in months)

All pre-IPO share-holders		Non-executives		Executives		Venture capitalists		Founders	
Germany	France	Germany	France	Germany	France	Germany	France	Germany	France
9.5	10.4	9.9	7.9[**]	10.9[***]	19.5[***]	8.2[***]	6.2[***]	10.5[**]	17.1[***]

Panel B: t-tests for the difference in means between Germany and France

All pre-IPO shareholders	Non-executives	Executives	Venture capitalists	Founders
-1.190	1.814[***]	-7.069[***]	2.364[**]	-4.979[***]

Table 7: Variables used and hypotheses tested

Variable	Hypo-thesis Number	Related hypothesis	Predicted sign	Findings for Germany	Findings for France
Age at IPO	1	uncertainty	–	Strongly negative	Strongly negative
Log (market cap at offer price)	1	uncertainty	–	Strongly negative	Strongly negative
Intangibles/fixed assets	1	uncertainty	+	Strongly positive	Not significant
Free–float after IPO	2a	commitment device	–	Not significant	Not significant
	2b	agency problem	+	Not significant	Strongly positive
Shareholder's ownership after IPO	2a	commitment device	+	Not significant	Strongly positive
	2b	agency problem	–	Not significant	Not significant
Herfindahl index of post-IPO ownership	2a	commitment device	+	Not applicable	Not significant
	2b	agency problem	–	Not applicable	Strongly negative
First–day underpricing	3	substitute signal	–	Strongly negative	Not significant
Price revision	4	firms signal higher quality via lockup and thus revise offer price upwards	+	Not significant	Not significant
Venture–capital backed firm	5a	VCs as a substitute device	–	Not significant	Not significant
	5b	VCs as a complement device	+	Not significant	Strongly positive
Shareholder is venture capitalist	5a	VCs as a substitute device	No prediction	Strongly negative	Strongly negative
	5b	VCs as a complement device	–	Strongly negative	Strongly negative
Underwriter's reputation	6a	underwriters as substitute device	–	Not significant	Not applicable
	6b	underwriters as complement device	+	Strongly positive	Not applicable
Control variables:					
Founder	–	–	+	Not significant	Not significant
Shareholder is non–executive	–	–	–	Weakly positive	Weakly positive
Shareholder is executive	–	–	+	Strongly positive	Strongly positive

Table 8: Cross-sectional regressions for the minimum lock–in period

The dependent variable is the minimum lock–in period (in months) for an individual shareholder and is as defined as in table 7. All specifications contain time dummies as well as industry dummies. Figures between parentheses are the p–values of the t–statistics corrected for heteroscedasticity. French IPOs before 1 December were excluded from the sample as they are all stuck to the compulsory lock–in period of 3 years.

	Germany			France		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Constant	36.642***	36.281***	38.502***	38.794***	29.090***	54.937***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.005)	(0.000)
Free–float after IPO	2.887	3.045	1.403	20.169***	21.497***	–
	(0.320)	(0.258)	(0.627)	(0.000)	(0.000)	
Herfindahl index of post-IPO ownership	–	–	–	–	–	–10.905***
						(0.000)
Shareholder's ownership after IPO	0.600	0.574	0.525	15.762***	15.321***	17.344***
	(0.646)	(0.659)	(0.684)	(0.000)	(0.001)	(0.000)
Founder	–0.438	–0.438	–0.354	–0.470	–1.236	–0.666
	(0.329)	(0.331)	(0.422)	(0.613)	(0.183)	(0.464)
Shareholder is non–executive	0.862*	0.863*	0.749	1.632*	1.139	1.953**
	(0.071)	(0.070)	(0.113)	(0.082)	(0.231)	(0.040)
Shareholder is executive	2.128***	2.132***	2.038***	2.621***	2.768***	2.007**
	(0.000)	(0.000)	(0.000)	(0.007)	(0.005)	(0.033)
Shareholder is venture capitalist	–1.640***	–1.607***	–1.581***	–2.268***	–1.466**	–2.598***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.045)	(0.001)
Venture–capital backed firm	0.097	–	0.230	3.879***	–	2.769***
	(0.849)		(0.640)	(0.000)		(0.004)
Age at IPO	–0.052***	–0.053***	–0.072***	–0.212***	–0.161***	–0.144***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log(market cap at offer price)	–1.931***	–1.911***	–1.999***	–2.109***	–1.521***	–2.538***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)
Price revision	–2.563	–2.572	–5.707*	2.671	1.063	–0.263
	(0.429)	(0.427)	(0.078)	(0.684)	(0.880)	(0.967)
Intangibles/fixed assets	3.194***	3.194***	3.097***	–0.603	–0.870	–0.459
	(0.000)	(0.000)	(0.000)	(0.518)	(0.368)	(0.633)
First-day underpricing	–0.844***	–0.844***	–0.713***	0.944	–0.496	1.665
	(0.000)	(0.000)	(0.000)	(0.544)	(0.740)	(0.301)
Underwriter's reputation	–	–	1.190***	–	–	–
			(0.000)			
Adjusted R^2	0.180	0.180	0.201	0.179	0.153	0.173
F–test (p–value)	13.17	13.84	14.32	6.49	5.85	6.24
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1169	1169	1169	403	403	403

Table 9: The determinants of different types of lockup arrangements in France

The first three regression columns show the estimates of OLS regressions with as dependent variable the maximum number of shares locked expressed as a percentage of the number of shares owned by that particular shareholder immediately after the IPO. The dependent variable in the multinomial logit regressions is equal to 0 if the shareholder is not locked in, is equal to 1 if 80% of his shares are locked for one year, is equal to 2 if all of his shares are locked in for 6 months, and is equal to 3 if all of his shares are locked in for more than 6 months. Shareholders with lockups that do not fall into any of the previous categories have been excluded from the sample. All specifications contain time dummies as well as industry dummies. Figures between parentheses are the p–values of the t–statistics corrected for heteroscedasticity. French IPOs before 1 Dec. 1998 were excluded from the sample as they all have compulsory minimum lock–in period of 3 years.

	OLS regressions			Logit model		
	(1)	**(2)**	**(3)**	**Prob[Y=1]**	**Prob[Y=2]**	**Prob[Y=3]**
	% of shares locked in	**% of shares locked in**	**% of shares locked in**	**80% lockup for 1 year**	**100% lockup for 6 months**	**100% lockup for > 6 months**
Constant	−1.506** (0.016)	−1.961*** (0.001)	−0.171 (0.754)	−8.521*** (0.000)	−66.579 (1.000)	−19.547 (1.000)
Free–float after IPO	1.766*** (0.000)	1.828*** (0.000)	–	---	---	---
Herfindahl index of post-IPO ownership	–	–	−0.614*** (0.002)	−4.788* (0.066)	7.478* (0.063)	−3.402* (0.058)
Shareholder's ownership after IPO	1.079*** (0.000)	1.058*** (0.000)	1.164*** (0.000)	29.975*** (0.000)	28.487*** (0.000)	23.023*** (0.000)
Founder	−0.070 (0.129)	−0.106** (0.022)	−0.088* (0.063)	0.054 (0.926)	−0.634 (0.404)	−1.018* (0.070)
Shareholder is non–executive	0.067 (0.205)	0.044 (0.402)	0.088 (0.109)	1.014 (0.149)	0.810 (0.176)	−0.561 (0.338)
Shareholder is executive	0.204*** (0.000)	0.211*** (0.000)	0.158*** (0.002)	2.531*** (0.000)	1.376* (0.093)	0.061 (0.922)
Shareholder is venture capitalist	−0.101* (0.102)	−0.064 (0.295)	−0.122* (0.052)	−1.054 (0.158)	−0.077 (0.908)	−1.716** (0.021)
Venture–capital backed firm	0.182*** (0.002)	–	0.127* (0.060)	2.376*** (0.001)	4.911*** (0.000)	1.131* (0.068)
Age at IPO	−0.012*** (0.000)	−0.010*** (0.000)	−0.006*** (0.006)	−0.091** (0.011)	0.084* (0.054)	−0.103*** (0.001)
Log(market cap at offer price)	0.072** (0.024)	0.100*** (0.001)	0.039 (0.204)	−1.606*** (0.001)	2.100*** (0.000)	−0.589* (0.065)
Price revision	0.750** (0.024)	0.675** (0.048)	0.487 (0.146)	10.453** (0.050)	19.391*** (0.002)	9.152** (0.016)
Intangibles/fixed assets	−0.181*** (0.009)	−0.194*** (0.006)	−0.191*** (0.009)	1.428* (0.096)	−6.197*** (0.000)	0.323 (0.642)
First–day underpricing	0.141 (0.120)	0.074 (0.353)	0.243** (0.012)	0.250 (0.779)	−0.355 (0.752)	1.089 (0.175)
F–test (p–value) for OLS regressions / Chi–squared (p–value) for logit model	12.79 (0.000)	12.69 (0.000)	10.62 (0.000)		463.62 (0.000)	
Adjusted R^2 for OLS regressions / % of correct predictions for logit model	0.319	0.304	0.277		82.4%	
Observations	403	403	403		346	

Appendix

Table A.1: Correlation matrix for Germany

	Free–float after IPO	Shareholder's ownership after IPO	Founder	Shareholder is non–executive	Shareholder is executive	Shareholder is venture capitalist	Venture–capital backed firm	Age at IPO	Log(market cap at offer price)	Price revision	Intangibles/fixed assets	First-day underpricing	Underwriter's reputation
Free–float after IPO	1												
Shareholder's ownership after IPO	-0.01907	1											
Founder	0.00361	0.34372	1										
Shareholder is non–executive	-0.02837	0.0872	-0.00288	1									
Shareholder is executive	-0.0071	0.35945	0.40753	-0.15002	1								
Shareholder is venture capitalist	0.08889	-0.00752	-0.16566	-0.01457	-0.18798	1							
Venture–capital backed firm	0.22355	0.07807	0.01334	0.01824	0.03775	-0.03494	1						
Age at IPO	-0.33513	-0.04216	-0.10947	0.06145	-0.04086	0.04156	-0.01721	1					
Log(market cap at offer price)	0.01318	-0.06293	0.00241	-0.02336	-0.04627	-0.00994	-0.17223	0.05015	1				
Price revision	-0.04279	-0.02401	-0.0119	-0.03433	-0.00997	-0.06651	-0.00966	-0.00887	0.09193	1			
Intangibles/fixed assets	-0.14618	-0.02888	0.0188	-0.01043	-0.03937	-0.06881	-0.03412	-0.04548	0.20713	0.20528	1		
First-day underpricing	0.16229	-0.10991	-0.0789	0.00339	-0.08331	0.33949	-0.12566	0.28362	0.02542	-0.07822	-0.10008	1	
Underwriter's reputation	0.08074	0.02378	-0.00329	0.02581	0.05624	-0.07768	0.19679	0.05476	0.12773	0.13125	-0.04539	-0.12258	1

Table A.2: Correlation matrix for France

	Free–float after IPO	Shareholder's ownership after IPO	Founder	Shareholder is non–executive	Shareholder is executive	Shareholder is venture capitalist	Venture–capital backed firm	Age at IPO	Log(market cap at offer price)	Price revision	Intangibles/fixed assets	First-day underpricing	Herfindahl index of post-IPO ownership
Free–float after IPO	1												
Shareholder's ownership after IPO	-0.14269	1											
Founder	-0.18544	0.26108	1										
Shareholder is non–executive	0.03869	0.01866	-0.05113	1									
Shareholder is executive	-0.1965	0.40951	0.37345	-0.26542	1								
Shareholder is venture capitalist	-0.00052	-0.02547	-0.22507	0.06501	-0.13973	1							
Venture–capital backed firm	0.47299	-0.10732	-0.16949	0.0559	-0.10472	0.12722	1						
Age at IPO	-0.18176	-0.01453	-0.08072	0.08594	0.03061	0.12224	0.1209	1					
Log(market cap at offer price)	-0.17757	0.06096	-0.07441	-0.02656	0.04438	0.09106	-0.14851	-0.03185	1				
Price revision	-0.1522	0.01342	0.1802	-0.07946	0.10226	-0.01483	0.03675	0.03902	0.04309	1			
Intangibles/fixed assets	0.1973	0.02342	0.07324	-0.06562	-0.00294	-0.06556	0.01039	-0.18296	0.26252	0.15263	1		
First-day underpricing	0.23118	-0.12527	-0.33097	-0.05354	-0.12646	0.26123	0.31171	0.17791	-0.10924	-0.11478	-0.28212	1	
Herfindahl index of post-IPO ownership	-0.46722	0.1894	0.21384	0.09282	0.07853	-0.14925	-0.20533	-0.07911	0.04399	0.20389	-0.05837	-0.46306	1