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Insider Retention and Long-Run Performance
in German and UK IPOs

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ABSTRACT: This paper is about ownership retention in German and UK IPOs, the determinants of ownership retention and its impact on IPO long-term performance. First, we study ownership retention by pre-IPO shareholders over a period of six years following the flotation. Our findings suggest that ownership retention six years after the flotation is a function of four factors, i.e. total risk, growth rate of assets, involvement of the founder, and the existence of non-voting shares. Second, we investigate whether the bad long-run performance of IPOs is due to the reduction in the holdings of the pre-IPO shareholders. Using recently developed econometric estimation techniques, which do not suffer from omitted-variable bias, we find that long-run performance and ownership is unrelated.

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1. Introduction

Loughran, Ritter and Rydqvist (1994) report that long-term underperformance, one of the three market anomalies associated with initial public offerings (IPOs), can be observed in a large number of different capital markets. We find supporting evidence of the bad long-run performance of IPOs for a sample of German and UK IPOs. Over the five years after the flotation the German and UK IPOs in our sample underperform the stock market by 14 per cent and 33 per cent respectively.

The aim of this paper is to explain this bad long-run performance in our sample by the agency problems caused when ownership by the original shareholders is diluted in the IPO. This study benefits from a unique set of ownership and performance data on British and German IPOs from 1981-88. In a first stage, we explain differences in ownership retention by pre-IPO shareholders. Theoretical models explaining ownership retention after the IPO normally assume that the initial owners when taking their firm public face a trade-off between the benefits of keeping a concentrated holding and the benefits of selling out. Bolton and von Thadden (1998) argue that the original shareholder of a firm is subject to a trade-off between the benefits from a better portfolio diversification and the benefits from monitoring his firm. Kahn and Winton's (1996) model predicts that ownership retention by the initial shareholders will be lower in high-growth firms as these firms will need more outside financing than low-growth firms.

In a second stage, we determine whether the often substantial changes in ownership by the pre-IPO shareholders after going public explain why IPOs underperform similar, non-issuing, companies in the long-run. Two US studies have looked at the effect of different levels of ownership retention on IPO performance. Unfortunately,

the studies find contradicting results. Jain and Kini (1994) argue that the bad long-term performance of IPOs can be partly explained by the decreasing ownership of managers immediately after the flotation. The decrease in managerial shareholdings following the IPO potentially leads to a worsening of managerial incentives. Jain and Kini find a positive link between operating performance and the proportion of shares retained by managers after the IPO. Mikkelson, Partch and Shah (1997) record managerial ownership over the ten years following the IPO. Contrary to Jain and Kini (1994), Mikkelson *et al.* do not find any consistent relationship between performance and changes or levels of ownership at different points in time.

This contradicting evidence on the impact of agency costs on the performance of IPOs calls for further research on the issue. Jain and Kini (1994) use a univariate methodology whereas Mikkelson *et al.* (1997) use ordinary least squares (OLS). Both methodologies may be subject to biases. In addition, the OLS estimates may also be inconsistent, if there are omitted variables. We will use the advanced econometric techniques, developed by Blundell and Bond (1998), which do not suffer from such problems.

This paper analyses a unique set of ownership and performance data on British and German IPOs. It is interesting to study British and German IPOs for three reasons. First, the two countries are examples of the two main systems of corporate governance and corporate control, the relationship-based system and the market-based system. Second, studying German and UK IPOs, which are characterised by different levels of ownership retention by pre-IPO owners, provides an acid test for theoretical models explaining ownership retention. Third, if different degrees of ownership retention cause different levels of long-term profitability, the sample used in this

study should provide significant results given a cross-sectional variation of ownership retention larger than the one in previous studies. Studying German and UK new issues should shed further light on the link between ownership and performance in IPOs.

The paper is organised as follows. Section 2 reviews the theory relevant to the two parts of the paper, the theory relating to ownership retention after the IPO and the one relating to ownership and corporate performance. Based on these theories, we develop several hypotheses, which will be tested later in the paper. Section 3 describes the data sample and the methodology used. Section 4 investigates whether institutional differences between Germany and the UK may cause the observed differences in the ownership retained by the initial shareholders in the two countries. Section 5 discusses the results for the econometric model explaining differences in the level of ownership retention and the one explaining the bad long-run performance of IPOs by sub-optimal levels of ownership retention by pre-IPO shareholders. Section 6 concludes.

2. Theory and Hypotheses

The first part of this section reviews theories explaining the evolution of ownership in companies going to the stock market and formulates hypotheses, which will be tested in section 5. The second part of this section studies the link between long-term performance of IPOs and ownership structure.

2.1 OWNERSHIP RETENTION

According to the pecking order theory of capital structure (Myers, 1984), firms prefer internal finance to external finance and debt finance to equity finance. Hence, if a firm grows at a steady and slow rate, it will be able to finance most of its investment

decisions by retained earnings or debt. However, if the firm grows too fast, the founders may be forced to give their firm access to outside equity and consequently face a dispersion of control.

In Kahn and Winton's (1996) model the major shareholder has the choice between increasing his firm's value by monitoring the management, and trading on private information. Again, a higher demand for liquidity makes selling out more attractive than monitoring. Kahn and Winton (1996) as well as Bolton and von Thadden (1998) predict that the initial shareholders of firms with a high risk should sell off more rapidly than the ones of firms with a low risk. In the case of high-tech firms, once the wealth and liquidity constraints prevent shareholders from continuing to provide finance, these firms should go public and should end up with a large number of shareholders as their technologies are difficult to monitor for non-specialists.

- C1.** *The faster the growth rate of the firm the lower the proportion of shares owned by the old shareholders six years after the IPO.*

- C2.** *The incumbent shareholders will divest rapidly out of high-risk firms as the portfolio diversification benefits from doing so are more important than the benefits from monitoring.*

Furthermore, if the founder or her heirs still has a stake at the IPO, this may indicate that private benefits are still significant (e.g. the social status and power derived from controlling a listed company) and that control will only be slowly sold off. Founders may also have an important leadership role, especially in younger firms (Morck, Shleifer and Vishny, 1988). Alternatively, Chung and Pruitt (1996) argue that the

founder may still own a large proportion of the equity ‘due strictly to historical circumstance’.

C3. *If the founder or his heirs are still holding shares in the firm immediately before the IPO, the proportion of equity owned by the old shareholders six years after the flotation will be larger than the one in firms where the founder’s family is no longer involved.*

Finally, the possibility to issue non-voting shares may help pre-IPO shareholders to keep control long after the IPO by deviating from the one share-one vote rule.

C4. *Non-voting preference shares help the initial shareholders to retain control a long time after the IPO.*

Mello and Parsons (1998) argue that the IPO is only part of a lengthy process of going public and that firms go public in several stages until they achieve their optimal ownership. Our ownership data support this view. The most significant reductions in the ownership by pre-IPO shareholders occur during the first five years after the flotation. Hence, we will attempt to explain ownership by the original shareholders six years after the IPO rather than explain ownership immediately after the IPO.

The regression of ownership retention, which we will be running, and the expected signs on the individual coefficients are as follows:

$$OLD6_i = \alpha - \beta_1 \cdot GROWTH_i - \beta_2 \cdot RISK_i + \beta_3 \cdot FOUNDER_i + \beta_4 \cdot PREF_i + \varepsilon_i \quad (1)$$

where:

- $OLD6_i$ is the proportion of voting shares which are owned by the pre-IPO shareholders six years after the IPO or in the last year of listing, if the firm left the stock exchange before the six-year period.

- $GROWTH_i$ is the average annual growth rate of total assets¹ calculated from the year of the IPO to year five. For some firms there may be missing data on total assets for some years. The growth rate was computed for all firms with a minimum of three years of consecutive data.
- $RISK_i$ is a measure of the total risk of firm i .

This is the standard-deviation of the monthly share return over the five years following the IPO (or less if the firm left the stock exchange before the end of this period).² Davis and Pointon (1984) and Leech and Leahey (1991) argue that given that large shareholders of firms do not hold diversified portfolios, they should be interested in total risk rather than only in undiversifiable risk (i.e. the CAPM-beta).

An alternative measure for risk, the standard-deviation of the ratio of cash flow³ to total assets over the period beginning with the year preceding the IPO and ending with the fifth year after the IPO (or less if the firm was delisted before the end of this period), was also used. However, this second measure was not significantly

¹ Accounting figures are taken from the consolidated company accounts, if available.

² Share price returns are adjusted for dividends, scrip issues and rights issues, and are log-returns.

³ Cash flow was defined as the published profits gross of tax and interest (before any dividend payments on both ordinary and preference shares) + depreciation of tangibles + amortisation of intangibles + change in pension provisions (for German firms only) + deferred & future tax (for UK firms only) + change in other provisions (for German firms only) + change in temporarily tax-exempt reserves (for German firms only). Data sources for the accounting data were the company reports for Germany and Datastream, the company reports, Extel and the LSE microfiches for the UK.

different from zero in the estimated regressions. As this measure is only based on a maximum of seven data points per firm, it is highly sensitive to outliers.⁴

- $FOUNDER_i$ is a dummy which is one, if the founder or his heirs own shares in firm i immediately before the IPO.
- $PREF_i$ is a dummy which is one, if firm i offers non-voting shares in the IPO.⁵
- ε_i is a white noise.

2.2 LONG-TERM PERFORMANCE AND OWNERSHIP RETENTION

In this sub-section, we develop hypotheses, which try to explain why IPOs perform worse than established, quoted companies during the five-year period following their flotation.

Jain and Kini (1994) as well as Mikkelsen *et al.* (1997) argue that the reduction in ownership concentration after the flotation may increase agency problems within the firm and that this may have a negative effect on long-term performance.

C5. *The lower the ownership retention by the pre-IPO shareholders the lower will be the long-term performance of the firm.*

Mikkelsen *et al.* (1997) argue that the higher the proportion of secondary shares (as opposed to primary shares) sold in the IPO the worse will be the long-term

⁴ The measure of risk retained is an ex-post measure of risk (relative to the IPO) rather than an ex-ante measure. However, Pagano, Panetta and Zingales (1998) argue that if the relevant decision makers have rational expectations, ex-ante data as well as ex-post data should give consistent answers.

⁵ Instead of this dummy variable, an alternative model was estimated using the proportion of non-voting shares in the equity. The results are not substantially different from those obtained using PREF. Among our sample firms only German firms offer non-voting preference shares in their IPO.

performance of the firm after the flotation. They advance two reasons for this. The first reason is that the initial owners of the firm may time the IPO to follow a period of good performance, which should be followed by a decrease in performance. The second reason is that the secondary sale may reduce ownership concentration.

C6. *The higher the fraction of secondary shares in the IPO the worse will be the long-run performance of the firm.*

The regression, which will be estimated, as well as the expected signs on the coefficients of the explanatory variables are as follows:

$$RETURN3_i = \alpha + \beta_1 \cdot OLD0_i + \beta_2 \cdot MAIN_i - \beta_3 \cdot SPROP_i + \varepsilon_i \quad (2)$$

$$RETURN5_i = a + b_1 \cdot OLD0_i + b_2 \cdot MAIN_i - b_3 \cdot SPROP_i + e_i \quad (3)$$

$$CF_{,it} = \omega + \lambda_1 \cdot CF_{i,t-1} + \lambda_2 \cdot OLD_{i,t-1} + \gamma_i \quad (4)$$

- $RETURN3_i$ and $RETURN5_i$ are the three-year buy-and-hold returns and the five-year buy-and-hold returns respectively, calculated from the end of month share prices and starting with the return on the second month. These returns were computed by using the market model with $\beta=1$ and $\alpha=0$. For Germany we used the broad-market DAFOX Index, as developed by Göppl and Schütz (1996) and as used by Ljungqvist (1997). The DAFOX Index is a value weighted index. For the UK we used the HG 1000 Index, as used by Levis (1993).⁶ Levis (1993) shows that the Hoare Govett index is a more appropriate performance benchmark for UK IPOs than the FTA Index for example. The buy-and-hold return is the

⁶ Note that OLD6, RISK, RETURN3 and RETURN5 are expressed as percentages.

standard measures of performance used in the studies on the long-term performance of IPOs (see e.g. Ritter, 1991).

- CF_i is a measure of performance based on accounting figures rather than share prices. It is the annual cash flow defined as the published profit gross of depreciation, interest, taxes and changes in provisions divided by the sum of the book values of equity and debt of the firm.⁷ Both Jain and Kini (1994) and Mikkelson et al. (1997) use accounting measures of performance. We use cash flow rather than published earnings, as published earnings of German firms have been shown to be very conservative. Correia da Silva (1997) measures the published-profit per share and the cash-flow per share for a sample of 221 German firms over the period of 1984-1993. He finds that published profits make out only 25 per cent of the cash flow of the firm.
- $OLD0_i$ is the proportion of voting shares which are owned by the pre-IPO shareholders immediately after the IPO. By definition, ownership by the old shareholders immediately before the IPO will be 100 per cent. Hence, $OLD0_i$ can also be interpreted as 100 per cent minus the change in ownership by old shareholders.
- $MAIN_i$ is a dummy which is one, if firm i was floated on the official market.
- $SECONDARY\%_i$ is the proportion of secondary shares sold in the IPO.

⁷ We also used an alternative version of this cash flow ratio, using the same cash flow figures, but using the market value of equity and the book value of debt on the denominator. This measure is similar to the one used by Healy et al. (1992). The results from estimating the model were not substantially different.

- ε_i , e_i and γ_i are error terms. The error term $\gamma_i = \eta_i + v_{i,t}$ where η_i is the fixed-effect term and $v_{i,t}$ is the inter-temporal error term.

In addition, the following two dummy variables are used as alternatives to $SECONDARY\%_i$.

- $PRIMARY\%_i$ is a dummy which is one, if firm i offers only primary shares in the IPO.
- $ONLY_SEC_i$ is a dummy which is one, if firm i offers only secondary shares in the IPO.

3. Data Analysis

3.1 CHARACTERISTICS OF GERMAN AND UK IPOs

Between 1981 and 1988 on average the German firms that went public were almost four times older (51 years) than the UK firms (14 years). However, the German IPOs were only twice as large as the UK IPOs (£113 million compared to £56 million of closing market capitalisation of the first day of listing, adjusted for UK inflation⁸).

The industrial distribution of IPOs in Germany and the UK is also different.⁹ Although the industry group with the highest proportion of IPOs is the same in both countries (the electricals, electronics and office equipment group), German IPOs seem to be concentrated in mature industries (e.g. mechanical engineering with 15.5 per cent of the total number of IPOs and motor components with 5.2 per cent) whereas about 29 per cent of the UK IPOs are in more cyclical industries (service agencies

⁸ These amounts are in constant 1985 pounds sterling.

⁹ Section 4.2 provides further detail on the industrial classification.

with 9.0 per cent, property with 6.0 per cent, leisure with 5.7 per cent, chain stores with 3.6 per cent and construction with 4.9 per cent).

Hence, in the UK there is a higher frequency of IPOs in the more cyclical service industries than in Germany. UK IPOs are also smaller than German IPOs in the same industry. Finally, UK IPOs seem to grow faster than German IPOs.

3.2 DATA SOURCES AND METHODOLOGY

Information on the identity of existing shareholders, their pre-IPO holdings and their post-IPO holdings is obtained from the IPO prospectuses. The holdings of the old shareholders are tracked in subsequent annual reports as well as the London Stock Exchange Yearbooks for the UK and in the *Salting Aktienführer* for Germany. The period of study is 1981-88. It ends in 1988 to allow for at least six years of ownership data (not counting the year of the IPO).

Share prices were obtained from the *Karlsruher Kapitalmarktdatenbank (KKMDB)* and the London Share Price Database (LSPD). The characteristics of IPOs (age and industry) and the closing market capitalisation for the first day of listing were obtained from Deutsche Börse AG and London Stock Exchange. Accounting information was taken from the IPO prospectuses, company reports, the Extel Financial Company Research and Global Vantage CD-ROMs for both countries, and also from Datastream and the Extel Microfiches for the UK.

For both the UK and Germany only domestic¹⁰ IPOs listed on the official and secondary markets are retained for this study, as data for lower market tiers is not normally available. More importantly, we also focus on German and UK IPOs whose largest shareholder of the voting equity at the IPO is an individual or a group of persons (e.g. a family or unrelated associates) to allow for a similar initial ownership.

A total of 764 British firms went public during 1981 and 1988, thereof 284 on the Official Market and 480 on the USM. From the 96 German IPOs 51 were floated on the Official Market and 45 on the Regulated Market. Out of the 96 German IPOs, 80 were owned by individuals just before the IPO. Ownership could be tracked reliably for 61 of these 80 firms.¹¹

We match the German IPOs by size to obtain a first UK sample. Firm size is measured by market capitalisation in pounds, adjusted for UK inflation by the annual GDP deflators (base year 1985) provided by the IMF.¹² Each German company is

¹⁰ For the UK, given the different legislation, we do not retain companies registered in the Channel Islands.

¹¹ For most of the other IPOs, the identity of the shareholders was available, but not the exact size of their holdings.

¹² As several German firms in our sample have dual class shares of which one class is not listed, the market capitalisation for these firms was obtained by multiplying the total number of shares by the market price of the listed class.

matched with a UK company of the closest size.¹³ The sample size for the size-matched sample is 54 as there was no close match for seven firms.¹⁴

We also perform an alternative matching by industry. For each German firm the industry description at the time of the IPO in the *Saling Aktienführer* is recorded. German firms are reclassified into the two-digit UK SE Groups. This is the industry classification used by the London Stock Exchange in its quarterly publications on new listings. Each group has a clear-cut definition of the companies that it contains.¹⁵ The sample size for the industry-matched sample is 58 as three German IPOs could not be matched with UK IPOs.

The two German samples have 52 firms in common. However, the German sample matched by size includes two additional firms, which could be matched by size, but not by industry as there were no UK IPOs in these industries during the period. The German sample matched by industry contains six additional firms that could be matched by industry, but were so large that they could not be matched with UK IPOs of a similar size (and ownership).¹⁶

¹³ The average difference in size is 2.7 per cent. The median is 0.5 per cent and the standard-deviation is 4.7 per cent.

¹⁴ A close match is defined as a match within a ± 25 per cent difference in size.

¹⁵ Groups 27 (Misc. Mechanical Engineering) and 28 (Machine and Other Tools) were merged. Groups 19 (Electricals), 35 (Electronics) and 69 (Office Equipment) were also merged as groups 35 and 69 did not exist at the beginning of the 80s and computer and software manufacturers were first assigned to group 19, then to group 69 and later only to group 35.

¹⁶ It may be argued that another matching based on the age of firms should have been performed. However, a reasonable match (plus or minus two years of difference) could only be found for about 19

3.3 DATA DESCRIPTION

Table 1 records the number of shares held by the initial shareholders for the size sample for each of the seven years starting with the year of the IPO. Firms which are taken over before the end of the period of study are still reported in the table. They are reported as having a zero per cent ownership by the old shareholders from the year of the takeover. Similarly, firms, which were taken private after the IPO, are also reported over the whole period with a 100 per cent ownership by the original shareholders from the year of going private.

For a few firms which did however not leave the sample, data on ownership were not always available for each of the individual years. In these cases, information available on the matched firm was still reported in the table. This and the bankruptcies / liquidations explain the slightly different sample sizes for some years.

Permanent reductions in sample size are due to bankruptcy and liquidation only. It is crucial to keep UK takeover targets within the sample as in the UK investors who acquire more than 30 per cent of the equity of a firm must make an offer for the entirety of the equity,¹⁷ and one cannot obtain majority control over a UK company without preventing it from leaving the listing. As there is no compulsory tender offer in Germany, an investor can for example acquire a majority stake in a company and the company remains on the stock market.

German firms. Similarly, we tried to match firms simultaneously by size and industry. However, again for more than three-quarters of the firms no match could be found.

¹⁷ This obligation does not apply to the incumbent shareholders whose holding after the IPO still exceeds 30 per cent. See Weinberg and Rabinowitz (1989), paragraphs 3-939, 3-946, 3-952.

For the UK size sample, 24 firms left the listing of which 20 were taken over, two were taken private again by their initial shareholders, one was liquidated and one entered into receivership. For the UK industry sample, there was a total of 23 cancellations. Nineteen were taken over, two were liquidated and two went into receivership. Franks *et al.* (1998) report that on average every year four per cent of the listed UK companies are taken over. Hence, the takeover rate among recently floated companies is higher (between 6.4 and 7.4 per cent) than the one for the UK stock market. Conversely, only one German firm left the listing, the reason being a full takeover. This firm is both part of the sample matched by size and the sample matched by industry.

Table 1¹⁸ shows that, first, the old shareholders of UK firms lose majority control on average after already two years whereas the old shareholders of German firms lose majority control after only five to six years. Second, although the fraction of the voting equity held by old shareholders both in German and UK firms decreases over time, ownership by the old shareholders is consistently higher in the Germany than in the UK. The difference in means is consistently different from zero at the five per cent level.

Our UK results on ownership retention are very similar to those obtained by Brennan and Franks (1997) who find that for a sample of 69 IPOs in 1986-89 (excluding investment and closed-end mutual funds) old shareholders own 59.23% immediately after the IPO.

¹⁸ A table similar to Table 1, but based on the industry-sample, is available from the author on request.

Despite matching firms by size on one side, and matching firms by industry on the other side, there are still differences in ownership retention by the original shareholders. However, these differences may be less substantial than one may initially expect.

Three conclusions can be drawn from Table 1. First, even after adjusting for size and industry, the ownership of German and UK companies still evolves in a different way. Second, the pre-IPO shareholders of UK IPOs tend to retain a much smaller percentage of the equity than those of German IPOs. Third, old shareholders of British companies seem to transfer control to new shareholders much quicker than old shareholders of German firms.

Table 2 describes the characteristics of the size-sample. UK firms seem to grow faster than German firms. The difference is economically significant but not statistically different from zero. UK firms also seem to have on average a significantly higher risk (significant at the one per cent level).

Although the proportion of German firms with the founder's family still being a shareholder at the time of the IPO is higher than that of UK firms, the difference in the proportions is not statistically different at any of the usual levels of confidence using a two-tailed Z-test for comparing two counts following a binomial distribution.

According to the three-year buy-and-hold returns, German firms perform better than UK firms. However, the five-year buy-and-hold returns suggest that there is no such difference in performance. The results found for the UK are similar to those found by Levis (1993): the long-term underperformance continues beyond the 36-month period after the flotation. More than a third of German IPOs comprise only primary shares.

The proportion for the UK IPOs is only 11 per cent. The difference in the proportions is significant at the ten per cent level. However, there is no significant difference between proportions of IPOs offerings only secondary shares, or the proportions of secondary shares offered in the IPO.

For the industry-matched sample¹⁹ German firms are larger and less risky than their British counterparts. Again, UK firms seem to grow faster. The difference in the average growth between the two countries is however not statistically different from zero. At the time of the IPO, the founder or members of his family still hold shares in 93 per cent of the German companies, but hold shares in only 76 per cent of the British firms (the difference is significant at the 5 per cent level for the Z-test). A more striking observation is probably that British firms have on average a higher level of risk than German firms. There is no difference in the performance of British and German firms operating in the same industry.

The firms in the industry sample were also divided into four categories: capital goods (groups 11-35, 69), durable consumer goods (groups 36-43²⁰), non-durable consumer goods (groups 45-65) and other groups (groups 66-76, excluding group 69 and group 86 (property)).²¹ As previously noted German companies are larger, except for firms producing durable consumer goods and they are significantly smaller for firms in *other groups*. Although the average size of a German IPO in the former class is higher

¹⁹ A table similar to Table 2 is available from the author for the industry sample.

²⁰ The group 44 does not exist in the classification.

²¹ *Other groups* comprises plastic and rubber fabricators (66), pharmaceutical products (67) and agencies (75) as well as groups 68-74, which were however not represented by firms of our sample.

by more than 100 million pounds, the standard-deviation of the size is about 5 times larger than for the UK. German companies in the capital goods groups, non-durable consumer goods and in *other groups* are on average less risky than their UK counterparts. However, there is no significant difference in means for the durable consumer goods class. Again, there is no significant difference in the share performance of British and German firms matched by industry.

The lower concentration of ownership by the initial shareholders after the IPO in UK firms, reported in Table 1, may be due to more stringent UK listing rules. It may be the case that a UK firm asking to be admitted to the stock market may have to float a larger proportion of its equity than a German firm. The following section investigates whether this is really the case.

4. UK and German Listing Conditions and Issuing Procedures

Table 3 summarises the listing requirements applying to the different market tiers in Great-Britain and Germany. The conditions relating to age, size and dispersion of equity are almost identical. The listing rules for both countries are very similar and cannot therefore be the reason for different sizes, industries and ages of IPOs in both countries.

Both in Germany and the UK ordinary shares and non-voting preference shares can in principle be admitted to the listing. In both countries, ordinary shares carry one vote per share and preference shares do not normally confer the right to vote at the annual shareholders' meeting. In practice, however, UK firms rarely have outstanding non-voting shares and to the opposite of German firms, if such shares exist, they are normally owned by the founders rather than by outside investors. Brennan and Franks

(1997) state that ‘investing institutions and the London Stock Exchange have discouraged the issuance of non-voting shares and other devices for discriminating against different shareholders’. Among all the UK firms in the two samples, only two firms had preference shares. In both cases, the preference shares were issued prior to the IPO and were not sold in the IPO. There was a total of 27 German IPOs with non-voting preference shares.²²

5. Results

Section 5.1 contains the results for the regression explaining ownership by the pre-IPO shareholders six years after the IPO. Section 5.2 reports the results for the regression explaining the long-run performance.

5.1 THE OWNERSHIP RETENTION MODEL

Table 4 displays the results from the OLS estimation of equation (1). The first two columns and the last two columns report the results for size and industry samples respectively. Each regression is run on the pooled German and UK firms. The pooled

²² Hay and Morris (1984) argue that in the UK inheritance taxes often force families owning large unlisted firms to sell off a substantial part of the equity on the stock market at the death of the founder to meet the tax liability. Inheritance taxes may be significantly higher in the UK than in Germany. If this is true, then the founder of a UK company dies, his heirs may be forced to sell a much more important part of the equity to meet the tax bill than is the case for a German company. Goergen (1998) analyses inheritance tax rates applying to an average-sized German IPO and an average-sized UK IPO over the period 1980-95. His findings suggest that the German IPO would have faced a tax charge of 35 per cent of its value whereas the UK IPO would have faced a tax charge ranging from 20 to 37.5 per cent of its value. Thus, inheritance taxes incurred by families owning large companies in the UK have been on average lower than those incurred by families in Germany.

samples include all the firms, even those that were taken over or left the stock market for another reason before the end of the six-year period.

The regressions in the first and third columns were estimated using the LIMDEP software and the OLS stepwise regression technique. The four variables from equation (1) were forced into the regression as well as the differential intercept, COUNTRY.²³ Additional variables were all the variables picking up any differential effect for the German IPOs (e.g. the differential slope coefficient on GROWTH, measuring any additional effect of the variable for the German firms). The use of the stepwise procedure ensures that the OLS regressions do not include any variables whose explanatory power is low or non-existent. First, it is interesting to note that the differential intercept COUNTRY is not significantly different from zero at any of the usual levels of confidence. Second, none of the differential slope coefficients were retained by the stepwise algorithm. This suggests that differences in the levels of the explanatory variables pick up all the differences in ownership retention between Germany and the UK.

Columns two and four are standard OLS regressions run on the four variables underlying the four above conjectures.

Except for the variables FOUNDER in the regression run on the pooled size-sample and GROWTH in the regression run on the pooled industry-sample, the coefficients on the four explanatory variables are significantly different from zero at the five per cent level of confidence or better.

²³ Dropping the differential intercept COUNTRY from the list of forced variables does not influence the results in columns (1) and (3) in Table 4.

The results for the size sample suggest that the higher a company's growth rate the less will be the ownership retained by the pre-IPO shareholders six years after the IPO. The results for the industry sample are less strong (at the 20 per cent level at best).²⁴ This is probably not surprising as firms in the same industry should have a similar growth rate and the growth rate should not be a strong explanatory variable for the different levels of ownership retention. Firms of a similar size, but operating in different industries, may have very different growth rates and growth should be better at explaining differences in insider retention.²⁵

In general, we cannot reject conjecture one. Alternative specifications of the growth variable were also used, such as a dummy variable set to one if the growth rate exceeds a given threshold (e.g. 20 per cent) and a dummy variable set to one if the company's growth is higher than the average growth. However, none of these alternative specifications gave any significant results.²⁶

Initial owners of high-risk firms will retain less ownership of their firms than those of low-risk firms. The coefficient on RISK is in a consistent way significantly different from zero at the five per cent level of confidence. We do not reject conjecture two.

²⁴ Due to the nature of accounting figures (past and present price data), time dummies were also included in the model. This did not change the significance of the coefficient on GROWTH.

²⁵ The significance of the coefficient on GROWTH does not change in both models, if a size variable and industry dummies are included.

²⁶ A variable measuring company size (market capitalisation at the end of the first day of trading) was also added to the models run on the industry. However, this did not improve the significance of the coefficient on GROWTH.

Our results corroborate the findings by Demsetz and Lehn (1985) and Leech and Leahy (1991) on the link between ownership and risk.

Ownership of voting shares is also higher, if the founder or his family were still holding shares at the time of the IPO. This conclusion is always true for the German firms, but only true for the UK firms matched by industry. We do not reject conjecture three. This result is consistent with the result found by Chung and Pruitt (1996).

There is also a higher ownership retention, if the firm issued non-voting preference shares. The coefficient on PREF is significantly different from zero at the one per cent or five per cent level of confidence. We retain conjecture four.

Our findings suggest that post-IPO ownership by the original shareholders depends on a series of corporate characteristics and other factors. These findings are consistent with those of Denis and Denis (1994). Denis and Denis compare majority-owned firms to widely held ones. They find that firms with a majority ownership have a higher family involvement, tend to have dual-class shares, and that firms with a dispersed ownership tend to have a higher variance of the residual from the market model. Denis and Denis do not include a growth rate in their model.

5.2 LONG-TERM PERFORMANCE AND OWNERSHIP RETENTION

In addition to the variables in equations (2) and (3), we include the variable MAIN into the regressions, a dummy variable, which is set to one if the firm was floated on the official market and set to zero if it was floated on the second market tier. The estimation technique is similar to the one used for the ownership retention model. Again, a stepwise regression technique is used, forcing the ownership retention variable as well as the variables COUNTRY, MAIN and SECONDARY% into the

regression and suggesting the differential slope coefficients as well as PREF and FOUNDER as possible additional regressors.

Table 5 contains the results for the buy-and-hold return and *OLDO*, i.e. ownership retention by the original shareholders immediately after the IPO. At the ten per cent level of confidence, none of the coefficients on *OLDO* is significantly different from zero. However, there is some evidence for both models that a higher proportion of secondary shares offered in the IPO is connected with a worse long-run performance. The link exists for the UK firms, but not for the German firms: the differential slope coefficient for the German firms is of the opposite sign and of a similar magnitude in absolute terms as the general coefficient on SECONDARY%. In general, the models explaining long-term performance of IPOs by ownership retention have no or only a negligible explanatory power, as the R^2 , R^2_{adjusted} and the F-test suggest. It is also interesting to note that the stepwise procedure did not retain PREF as an explanatory variable. This suggests that non-voting shares are not in general a means to expropriate the new shareholders in the firm. This is in line with the results found by Bergström and Rydqvist (1990). They find that for a sample of Swedish firms the existence of non-voting shares cannot normally be associated with expropriation of small shareholders.

Table 5 displays only one of the many specifications that were tested. Alternative specifications included variables such as the categories (e.g. firms which offer less than 25 per cent of the total equity (voting plus non-voting equity) in the IPO) and the natural logarithm of one plus the fraction of share capital offered in the IPO as used by Ljungqvist (1997), as well as quadratic specifications of the ownership variables defined at the beginning of this section. Other models regressed the buy-and-hold

return for years 4-5 on ownership in year 1, 2 and 3 respectively without any significant results. None of these alternative models suggests a link between long-run performance and ownership retention.

Table 6 reports the results for model (4), the model based on the accounting measure of performance. The model is a dynamic panel data model, estimated using the Generalised Method of Moments (GMM) in first differences and in levels as developed by Blundell and Bond (1998). Contrary to OLS, this estimation method provides consistent estimates if there are unobserved effects. The method uses a system of equations. The system consists of the equations in levels as well as the equations in first differences. The estimation method uses the lagged differences of the dependent variable and the independent variables as instruments for the equations in levels. In addition, it uses the lagged levels of the dependent variable and the independent variables as instruments for the equations in first differences. For model (4) we use a similar methodology to one of models (2) and (3), i.e. we use a differential intercept, COUNTRY, and differential slope coefficients.

Table 6 shows that for the size sample there is no evidence that past ownership by the initial shareholders influences current performance. The results for the industry sample are similar. This is consistent with the results found by Mikkelson *et al.* (1997) on US IPO data.

Ljungqvist (1997) finds a negative link between ownership retention and long-run performance for a sample of German IPOs. However, his sample includes several privatisations and spin-offs and firms are not of a homogenous initial ownership. Similarly to Jain and Kini (1994) we split the sample into firms whose ownership retention exceeds the sample median and those whose ownership retention is below

the median. Again, there is no evidence of a link between performance and ownership retention.²⁷

The likely absence of a link between long-run performance in IPOs and ownership characteristics is a very interesting result, especially in the context of the results obtained from the estimation of the ownership retention model. All in all, the results suggest that ownership retention depends on corporate characteristics such as risk and growth rate and that firms choose an ownership structure, which maximises their firm value. These results are consistent with an increasing amount of studies using different samples and estimation techniques and that also do not find a link between financial performance and ownership characteristics (see e.g. Agrawal and Knoeber (1996), Kole (1996) and Loderer and Martin (1997)).

6. Conclusion

This study has found that German IPOs are in more mature industries than UK IPOs. They are also older and larger than their UK counterparts. Analysing ownership retention after the IPO as well as its evolution during subsequent years shows that the initial shareholders of UK IPOs lose control much quicker than those of German IPOs and that the fraction of shares owned by new shareholders is significantly higher in UK IPOs at all times.

Differences in ownership retention can be explained by corporate characteristics such as the firm's growth rate, its total risk, the involvement of the founder as well as the

²⁷ Industry dummies were also added to the model run on the pooled size-sample and a size variable was added to the industry-sample. This did however not affect the results in any substantial way.

issue of non-voting shares. This suggests that results obtained from studies on corporate performance and ownership that have assumed ownership to be exogenous may suffer from serious econometric biases.

This study sheds further light on the link between ownership by the initial shareholders and financial performance. Contrary to existing studies, the study uses advanced econometric techniques, which provide consistent estimates even if there are omitted variables. We find that the bad long-term performance of IPOs cannot be explained by the observed dilution of ownership by the original shareholders after the IPO and possible agency conflicts caused by this dilution. Our findings are consistent with Mikkelson et al. (1997), but are in direct contradiction with Jain and Kini (1994).

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Table 1: Average proportion of voting rights held by the old shareholders in the size-matched sample

(1) If a company is taken over and leaves the stock exchange, it will be recorded as a company owned 100 per cent by its new shareholders from the year of the takeover. If a company is taken private by its original shareholders, it will be recorded as a company owned 100 per cent by its original shareholders. (2) *** indicates that the difference in means is significantly different from zero at the 1% level.

| Time after IPO | German firms | | UK firms | | t-statistic for difference in means |
|----------------------------------|-----------------|-------------|-----------------|-------------|-------------------------------------|
| | Proportion held | Sample size | Proportion held | Sample size | |
| Immediately after the IPO | 76.4% | 54 | 62.6% | 54 | 2.9*** |
| 1 year | 73.6% | 54 | 51.3% | 54 | 4.6*** |
| 2 years | 69.1% | 54 | 47.0% | 54 | 4.2*** |
| 3 years | 63.8% | 54 | 38.7% | 52 | 4.2*** |
| 4 years | 59.0% | 54 | 30.3% | 52 | 4.8*** |
| 5 years | 51.2% | 54 | 25.5% | 52 | 4.1*** |
| 6 years | 45.3% | 54 | 24.2% | 48 | 3.3*** |

Source:

- For Germany, own calculations based on IPO prospectuses and Saling.
- For the UK, own calculations based on IPO prospectuses, company reports, London Stock Exchange and Extel.

Table 2: The sample characteristics of the size-matched sample

(1) The table is based on a sample of German and UK IPOs matched by market capitalisation. The sample is unbalanced i.e. if a firm leaves the listing before the sixth year after the flotation, then the shareholder for the last year of the listing is reported. (2) Growth is the average annual growth rate of total assets. Founder is a dummy variable which equals one if the founder or her family own shares in the firm at the time of the IPO. Risk is the standard-deviation of the monthly share return over the five years following the IPO (or less if the firm was delisted before the end of this period). Primary Shares and Secondary Shares are dummy variables which equal one if the firm offers only primary shares and secondary shares in the IPO respectively. RETURN3 and RETURN5 are the three-year buy-and-hold return and the five-year buy-and-hold return calculated using the market model with $\beta=1$ and $\alpha=0$. (3) *** Significant at the 1 per cent level for the two-tailed test. * Significant at the 10 per cent level for the two-tailed test.

| Panel A: Mean, median, proportion = 1, minimum, maximum and sample size | | | | | | | | |
|--|------------|----------|----------|-------------|----------------|------------------|--------------------------------|------------------------------------|
| Germany | | | | | | | | |
| Variable | Growth (%) | Risk (%) | Founder | Return3 (%) | Return5 (%) | Primary Shares | Secondary Shares | Proportion of secondary shares (%) |
| Mean | 17.8 | 9.1 | - | 6.3 | -14.2 | - | - | 38.3 |
| Median | 13.5 | 9.0 | - | 0.4 | -13.1 | - | - | 29.2 |
| Proportion =1 | - | - | 92.0 | - | - | 38.9 | 14.8 | - |
| Min | -2.3 | 4.8 | - | -85.5 | -186.3 | - | - | 0.0 |
| Max | 75.5 | 15.9 | - | 120.9 | 92.7 | - | - | 100.0 |
| Sample size | 49 | 53 | 51 | 53 | 53 | 54 | 54 | 54 |
| UK | | | | | | | | |
| Variable | Growth (%) | Risk (%) | Founder | Return3 (%) | Return5 (%) | Primary shares | Secondary shares | Proportion of secondary shares (%) |
| Mean | 23.7 | 12.8 | - | -32.9 | -33.1 | - | - | 49.1 |
| Median | 18.7 | 12.9 | - | -24.1 | -25.0 | - | - | 50.0 |
| Proportion =1 | - | - | 84.9 | - | - | 11.3 | 9.4 | - |
| Min | -20.5 | 4.8 | - | -261.8 | -363.5 | - | - | 0.0 |
| Max | 111.2 | 22.4 | - | 103.5 | 165.7 | - | - | 100.0 |
| Sample size | 44 | 53 | 53 | 53 | 53 | 53 | 53 | 53 |
| Panel B: t-statistics for the difference in means and Z-statistics for difference in proportions | | | | | | | | |
| Growth | Risk | Founder | Return3 | Return5 | Primary shares | Secondary shares | Proportion of secondary shares | |
| 1.111 | -5.645*** | 1.157 | 2.985*** | 1.107 | 3.283* | 0.852 | -1.630 | |

Table 3: Listing requirements for the London Stock Exchange and the German Stock Exchanges

(a) The market capitalisation refers to the total market value of all securities to be listed. Securities of lower value may be admitted if the LSE believes that there will be an 'adequate market'. (b) The 'public' does not include directors as well as connected persons and shareholders holding at least 5 per cent of the shares.

| Requirements | UK | | | Germany | | |
|--------------------------------|--|--|--------------------------|---|---|----------------------------|
| | Official Market | USM | Third Market | Amtlicher Handel | Geregelter Markt | (Ungeregelter) Freiverkehr |
| Legal form: | public limited company | idem | idem | AG or KGaA | idem | idem |
| Accounts / age: | at least three years of published accounts | - zero, if firm has a marketable product / process - three years, otherwise | | age of at least three years | nil | nil |
| Management: | no material management change during period covered by accounts | | | | | |
| Transferability of securities: | securities must be freely transferable | | | nil | nil | nil |
| Size: | at least £700,000 of market capitalisation ^a | nil | nil | at least DM2.5 million of market capitalisation | at least DM500,000 of total equity must be freely available to the market | nil |
| Dispersion of shares: | at least 25% of the class of shares where application for listing has been made ^b | at least 10% of the class of shares | nil, but 10% recommended | at least 25% of the class of shares | refer to size | nil |

Source: Goergen (1998)

Table 4: Results from the ownership retention model for the pooled sample matched by size and the pooled sample matched by industry (p-values in parentheses)

(a) The dependent variable is *OLD6*, i.e. the fraction of voting shares owned by the old shareholders six years after the IPO. *Country* is a dummy which is set to one if the firm is German. *Growth* is the average annual growth rate of total assets. *Founder* is a dummy variable which equals one if the founder or her family own shares in the firm at the time of the IPO. *Pref* is a dummy which is equal to one, if the firm has non-voting shares. *Risk* is the standard-deviation of the monthly share return over the five years following the IPO (or less if the firm was delisted before the end of this period) (b) The t-statistics are robust for heteroskedasticity. (c) p-values are in parentheses..

| Model | Size | | Industry | |
|------------------------------------|-------------------|-------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) |
| Constant | 0.556 (0.000) | 0.518 (0.000) | 0.376 (0.002) | 0.321 (0.002) |
| COUNTRY | -0.041 (0.648) | - | -0.069 (0.432) | - |
| GROWTH | -0.298 (0.051) | -0.289 (0.009) | -0.105 (0.344) | -0.099 (0.144) |
| FOUNDER | 0.079 (0.458) | 0.070 (0.452) | 0.273 (0.004) | 0.250 (0.000) |
| PREF | 0.272 (0.004) | 0.253 (0.010) | 0.233 (0.009) | 0.203 (0.033) |
| RISK | -2.122 (0.036) | -1.893 (0.022) | -2.094 (0.044) | -1.689 (0.045) |
| R ² | 0.239 | 0.237 | 0.232 | 0.226 |
| R ² _{adjusted} | 0.191 | 0.199 | 0.190 | 0.193 |
| p-value of F-statistic | 0.001 | 0.000 | 0.000 | 0.000 |
| Sample size | 85 | 85 | 98 | 98 |

Table 5: Long-term performance model for the pooled sample matched by size and the pooled sample matched by industry (p-values in parentheses)

(a) The dependent variable is the buy-and-hold return over the first three years following the IPO or the buy-and-hold return over the first five years following the IPO respectively. COUNTRY is a dummy which is set to one if the firm is German. OLD0 is the percentage of the voting equity owned by the initial shareholders immediately after the IPO. MAIN is a dummy variable which equals one if the firm was floated on the main market tier. SECONDARY% is the proportion of the secondary shares sold in the IPO. SECONDARY%_D is SECONDARY% multiplied by COUNTRY. (b) The t-statistics are robust for heteroskedasticity. (3) p-values are in parentheses.

| Model | Size | | Industry | |
|------------------------------------|-------------------|-------------------|-------------------|-------------------|
| | RETURN3 | RETURN5 | RETURN3 | RETURN5 |
| Constant | 0.266 (0.064) | -0.106 (0.708) | 0.380 (0.045) | 0.386 (0.096) |
| COUNTRY | 0.009 (0.971) | 0.281 (0.132) | 0.217 (0.171) | -0.156 (0.421) |
| OLD0 | -0.376 (0.274) | -0.486 (0.278) | -0.547 (0.155) | -0.325 (0.409) |
| MAIN | 0.083 (0.541) | 0.207 (0.259) | -0.169 (0.270) | -0.156 (0.409) |
| SECONDARY% | -0.783 (0.014) | -0.099 (0.709) | -0.094 (0.665) | -0.131 (0.624) |
| SECONDARY%_D | 0.921 (0.028) | - | - | - |
| R ² | 0.165 | 0.043 | 0.033 | 0.023 |
| R ² _{adjusted} | 0.122 | 0.003 | -0.002 | -0.013 |
| p-value of F-statistic | 0.003 | 0.367 | 0.447 | 0.633 |
| Sample size | 102 | 102 | 113 | 113 |

Table 6: Performance model with cash-flow ratio (CF) and the total stake held by all pre-IPO shareholders for the size sample

(a) $CF_{i,t}$ is the dependent variable in each model. It is the cash flow adjusted for depreciation, interest, taxes and changes in provisions divided by the book values of equity and debt. COUNTRY is the differential intercept, COUNTRY being set to one if firm i is German. $Told_{i,t}$ is the total percentage of the voting equity held by the pre-IPO shareholders. Variable names marked with a D are the differential slope coefficients for German firms. (b) The model contains time dummies and industry dummies. (c) m_1 and m_2 are tests for the absence of first-order and second-order correlation in the residuals respectively. These test statistics are asymptotically distributed as $N(0,1)$ under the null of no serial correlation. (d) The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as $\chi^2(k)$ under the null of valid instruments, with k degrees of freedom reported in parentheses. (e) The model is a linear system of first-differenced and levels equations. The instruments are levels of CF1, CF1_D, Told, and Told_D dated $t-2$ to $t-99$ for the differenced equations and first differences dated $t-1$ for the levels equations. (f) p -values, based on standard-errors asymptotically robust to heteroskedasticity, are reported in parentheses.

| | |
|--------------------------------------|-------------------|
| Constant | 0.053 (0.331) |
| COUNTRY | 0.034 (0.562) |
| CF1 _{$i,t-1$} | 0.638 (0.000) |
| CF1_D _{$i,t-1$} | -0.221 (0.313) |
| Told _{$i,t-1$} | 0.024 (0.762) |
| Told_D _{$i,t-1$} | 0.024 (0.791) |
| p-value of m_1 | 0.000 |
| p-value of m_2 | 0.207 |
| p-value of Sargan test (d.f.) | 0.664 (46) |
| Observations | 265 |
