The choice of outside equity: An exploratory analysis of privately held firms*†

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Abstract

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Key words: Capital structure; capital constraints; private equity; going public decision.

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We analyze the choice between public and private equity financing of a unique, hand-collected sample of privately held firms that have indicated their willingness to raise outside equity. We document that these firms are remarkably similar at the time of the announcement, yet 71% complete an IPO, 18% sell equity privately, and the remaining firms do not raise capital at all. To understand what determines the ultimate outcome, we follow these firms over time and record what they might learn up to their final decision. We identify the marginal conditions that favor raising outside equity, and those that determine the choice between public and private equity. Our results show that firms react systematically to changes in market conditions, such as equity returns and the cost of capital, that occur after the announcement, controlling for capital constraints, ownership structure, and the motivation for raising outside capital.

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A private company wishing to raise outside equity can choose between private equity and – assuming it is sufficiently large and profitable – public equity. Raising public equity involves going public on a stock exchange, an event which has received much academic attention in the IPO literature. Raising private equity involves placing stock with specialized financial intermediaries such as venture capitalists, directly with financial investors such as pension funds, or with strategic corporate investors. Each of these has also received much academic attention, in the literatures on venture capital, private placements, and joint ventures and alliances.

What has received less attention is the question what determines a company's choice between public and private equity. Economic intuition suggests it should depend on the relative attractiveness of public and private sources of outside equity, in terms of their relative costs and benefits. Quantifying these may be hard in practice. While the costs and benefits of public equity may be relatively easy to observe and evaluate, the same may not be true for private equity: there is little data on the volume and valuations of private deals, the demands of private buyers at a given point in time, or other companies' competing supplies of equity. Therefore, the costs and benefits of private equity may be more opaque than those of public equity. Where this is the case, we would expect companies to engage in a search to learn about and evaluate the relative attractiveness of public and private equity in their particular case. In this paper, we provide empirical evidence of such learning.

We model the choice between public and private equity financing of a unique, hand-collected sample of privately held firms. These firms are identified by virtue of the fact that they announce their *intention* to go public, and in so doing put themselves on the market. The difference between announcing an intention and announcing a well-formulated plan – such as a formal SEC registration – is important for our purposes: we sample firms at a point in time when their plans are still vague,

no underwriter has been selected, and the announcement itself implies no financial or other commitment to executing the announced intention. Indeed, nearly 30% of our sample firms ultimately do not go public.

Following the announcement, some companies will press ahead with their IPO preparations without any need for learning about the attractiveness of private equity. Examples include venture-backed firms whose VC shareholders may be presumed to help firms choose between public and private sources of equity [for evidence that VC-backed bio-tech companies time their IPOs to coincide with peaks in the public equity market, see Lerner (1994)]. Other firms will wait, in order to compare the conditions on which prospective underwriters might take them public to the conditions on which private buyers might contribute equity.[1] Having observed these conditions, some companies may decide not to raise outside equity at all. Waiting, in turn, is costly to the extent that firms are capital-constrained or investment opportunities require early funding commitments.

Learning about the relative attractiveness of public and private equity will be especially advantageous, the less developed and the less competitive the markets for outside equity. In the U.S., for instance, a private (non-start-up) company can probably observe the relative attractiveness of private and public equity more easily than its German or French counterpart, by virtue of a sophisticated VC industry whose deals are often well-publicized and followed by database vendors such as Venture One and Venture Economics. This would tend to lower the search costs of raising outside equity. The U.S. company may also benefit from greater competition between different players in the private equity market, and thus may have less to gain by also eliciting bids from IPO underwriters. This suggests that the need for and value of learning is lower in the U.S. than elsewhere. In this paper, we focus on a country – Germany – that not only has a much less

sophisticated private-equity market than the U.S., but also a relatively less developed IPO market.[2] In this respect, we view Germany as representative of Continental Europe. Our sample firms announced their intention to go public some time between 1984 and 1994. 70.6% ultimately chose to go public, 17.6% raised equity from private sources, and 11.8% chose to do nothing.

A corollary of our story is that companies do make choices, so we test the counter-hypothesis that the nearly 30% of sample companies which did not go public were prevented from doing so by adverse firm-level events. We do find that firms will cite poor performance as the main reason why they do not proceed to an IPO. In a multivariate analysis, however, we find that lower announcement-year profitability does not decrease the probability of going public.

Given our focus on learning, a data snapshot on its own won't do: knowledge of firm characteristics either pre-announcement or post-decision will shed little light on the learning process.[3] We assume that companies do learn, that is, that information received following the announcement influences the choices they finally make in ways that are not predictable using only information available before the announcement. For instance, if 'old' firms always went public while 'young' firms always stayed private, it would be difficult to argue that firms had put themselves on the market in order to learn anything. We verify empirically that pre-announcement information has little power predicting the final choices of our sample companies. Similarly, using post-decision data would shed little light on the learning process due to the hindsight bias introduced when looking only at final choices. Absent irrational behavior and random errors, a firm which did not go public *must* have decided that public equity was relatively less attractive, but we cannot tell if this decision is based on its informational priors or on learning.

What we need instead of a snapshot are data corresponding to the time line of events that extends from the announcement to the final choice. Ideally, we would observe the relative costs and benefits of public and private equity as they are revealed to the company and as they evolve and change over time. In reality, we settle for observations of post-announcement changes in economic variables that we argue correlate with the relative attractiveness of public and private equity, and investigate how these influence the final decision. Analyzing their influence in a dynamic context potentially adds considerable power. Suppose that an *ex post* snapshot indicates that companies which float are associated with higher levels of variable X than companies which raise private equity. Is this causal? It may not be if variable X increased sharply shortly after the announcement *without triggering any reaction from the company,* which instead reacted to some later change in variable Y. A dynamic model has more power to distinguish between the effects of X and Y. We therefore employ a duration model for the main part of our analysis.

We find that companies do appear to learn valuable information by putting themselves on the market. Firms react to changes in capital market conditions, such as equity returns, stock market volatility, and the cost of debt. They also appear to learn from information spilling over from contemporaneous IPOs, in the sense that they react to changes in IPO deal flow and underpricing (which in turn may correlate with changes in market perceptions concerning the valuation of IPO companies). Specifically, companies tend to go public after increases in market returns, avoid periods of unusually high underpricing, and raise external equity as debt becomes more expensive. They are likely to decide against raising outside equity as market returns drop and – if they have a financial institution amongst their shareholders – as the cost of debt increases. Generally, companies raising private equity respond to the same factors as companies going public, except that stock

market returns have no effect on their decisions. Companies that appear capital constrained (those which seek primary equity or do not have a bank amongst their shareholders) make their decisions more rapidly, consistent with the notion that their cost of waiting is greater.

Prior literature looking at the going public decision has tended to focus on the benefits and costs of becoming a public company, without reference to the benefits and costs of raising private equity instead [see Zingales (1995), Mello and Parsons (1998), and Stoughton and Zechner (1998) for models emphasizing the original owner's desire to sell out; and Pagano and Röell (1998) and Bolton and von Thadden (1998) for models based on the trade-off between liquidity, agency costs, and monitoring].[4] A notable exception is Chemmanur and Fulghieri (1999). In their model, the choice between public and private equity financing is driven by the costs investors incur in evaluating the company's prospects. When little is known about a firm, the duplication of evaluation costs by many small outside shareholders would result in a lower offer price than the company could achieve in placing equity directly with a small number of venture capitalists. This implies that only firms about which enough information is available will go public.

1. Empirical predictions

To motivate the variables we include in our empirical model, we offer the following predictions.

We expect more firms to go public as the IPO market 'heats up'. Lowry and Schwert (2000) suggest that higher-than-expected underpricing may indicate that investors value IPO companies more highly than the companies and their advisors had expected, which should make public equity relatively more attractive. (This does not imply that firms choosing an IPO in response are underpriced by as much as those who went before them: knowing that the IPO market is

unexpectedly responsive, they can price their offerings more aggressively.) Using U.S. data, Lowry and Schwert show that following periods of high underpricing, more private firms file IPO registrations with the SEC, firms already in registration speed up their process through the regulatory hoops, and fewer IPOs are cancelled.

A high volume of IPOs has an ambiguous effect on the relative attractiveness of public and private equity. On the one hand, high volume may indicate a sustained hot market worth taking advantage of. On the other hand, high volume may increase the cost of going public: when the IPO calendar is full, underwriters may offer less attractive terms. This would be true if underwriters are in fixed supply in the short run, which is plausible in Germany where (during our period of study) few banks had underwriting desks of any significant size. At the same time, more information may 'spill over' as more companies go public, so depending on the nature of such information, higher IPO deal flow should accelerate sample firms' decisions.

Previous empirical studies suggest a link between the state of the stock market and the likelihood and volume of public equity being raised. Choe, Masulis, and Nanda (1993) show that already-listed firms raise more equity in bull markets. Loughran, Ritter, and Rydqvist (1994) show that the number of firms going public increases with the stock market index. Lerner (1994) shows that VC-backed biotech companies raise equity publicly following unusually high returns on a biotech index. We therefore investigate how changes in the state of the stock market affect firms' choices.

Changes in the cost of debt financing may make both public and private equity more or less attractive compared to not raising outside equity at all, so we include the corporate bond yield in our empirical model as a proxy. Increases in the cost of debt should reduce the value of waiting and thus prompt firms to raise outside equity, though we cannot predict from which source.

We also control for the state of the economy as a whole. Economic growth undoubtedly affects the decision to raise outside equity (as more investment opportunities require funding), but it is less clear how it affects the choice between public and private sources.

In addition to these external factors, we include three sets of firm-specific variables.

Firms have more to learn if they are riskier, that is, if there is more uncertainty regarding the valuations they might achieve in a public versus a private sale of equity. We attempt to capture this notion using company age, earnings, and sales. Ideally, we would also use the volatility of earnings or sales, but we lack a sufficiently long pre-announcement time series. However, we do capture the stochastic evolution of earnings and sales post-announcement. Of course, these may not only correlate with the value of learning, but also with the feasibility of going public: adverse earnings shocks are unlikely to endear a firm to public-market investors.

Zingales (1995) argues that the value of control rights is harder to establish than the value of cash flow rights. Arguably, companies that intend to sell existing shares are more likely to sell some degree of control in the process, especially if they transfer a block to a single outside investor. Companies that intend to raise new capital, on the other hand, typically do not sell control in the process and so their offerings should be easier to value and the benefit of eliciting competing bids should be lower.[5] We therefore classify each firm's self-declared motivation for seeking outside equity. Unlike all previous variables, this one is observed only at the time of the announcement and thus does not vary over time.

The remaining variables are equally time-invariant. Firms that have access to other sources of finance can more easily afford to wait and learn than those that are capital-constrained. We do not observe firms' unused lines of credit or their owners' private wealth. However, we conjecture that

some *types* of companies may have back-up sources of finance. Specifically, corporate-owned companies may have access to internal capital markets, and companies in which a financial institution owns a stake may have easier access to loans. We would expect such companies to take a longer time before deciding between public and private equity, all else equal, than family-owned companies. We therefore assemble a careful picture of each firm's ownership structure at the time of the announcement. This also allows us to control for the effect ownership concentration may have on the value of learning: in firms without a dominant or majority shareholder, the decision-maker may not internalize the cost-benefit trade-off between alternative sources of outside financing, so she stands to gain less personally from making a more informed decision. As to the choice between public and private equity, managers in firms without a dominant shareholder who consume private benefits may prefer to go public rather than face the scrutiny of a large private blockholder.

2. The sample

2.1 Sample selection

Before 1983, IPOs were extremely rare in Germany, averaging fewer than one a year. In 1983, nine companies went public starting what commentators at the time called Germany's "IPO wave." The resulting media interest shone a spotlight on companies that were preparing to go public, and from June 1984, *Börsen-Zeitung*, a semi-official financial newspaper controlled by stock exchange member banks, began to publish a list of IPO announcements. We refer to firms making such announcements as IPO candidates. Between June 1984 and December 1994, 266 firms appeared on the *Börsen-Zeitung* list. Over that period, the microstructure of Germany's IPO market remained largely unchanged.[6]

Although *Börsen-Zeitung* does not disclose its criteria for including companies in the list, there are some clues. In late 1986, for example, an editorial commented that certain firms, rumored to be considering a flotation, were not yet included due to the vagueness of the rumors. In August 1987, *Börsen-Zeitung* stated as the reason for dropping a number of companies private correspondence from the companies denying they intended to raise equity. Both of these clues suggest a minimum 'seriousness threshold' for inclusion in the list. The list could be subject to two biases. First, it could be under-representative in the sense of omitting *bona fide* IPO candidates. Second, it could be over-inclusive in the sense of including firms merely because of newspaper speculation, as opposed to company announcements. We investigate each potential bias using news sources provided on-line in Nexis-Lexis and Reuters Business Briefing as well as hardcopy sources in newspaper archives. There is some evidence that the list is under-representative: it omitted 32 IPOs (14 of which announced and completed their IPO between two list publication dates, which may be why *Börsen-Zeitung* did not capture them) and 17 firms rumored to seek a listing (though upon inspection, these appear to be no more than newspaper speculation, not company announcements). We add the 32 IPO firms but not the 17 rumored candidates to our sample. There is also some evidence that the list is over-inclusive, since we are unable to verify the company's listing intention in 21 cases. We drop these from the sample. We also exclude nine *Unternehmensbeteiligungsgesellschaften* (closed-end investment companies required by law to float 70% of their equity within ten years of incorporation) and two firms that had previously been listed. This gives a sample of 266 IPO candidates.

2.2 Final choices

For each of the 266 firms, we use Nexis and Reuters to determine their final choices as of December 1999. To this end, we read every published article about each company. For 21 companies we were

unable to find sufficient or consistent information. Some of these received no further news coverage after their initial announcement, whilst for others, news reports provided contradictory accounts of subsequent events. The final sample therefore consists of 245 firms, all of which are *bona fide* self-announced IPO candidates for which the final choice is known.

Of the 245 IPO candidates in our sample, by December 1999 173 (70.6%) had gone public, 43 (17.6%) had raised equity privately, and 29 (11.8%) had not raised outside equity. We will refer to the firms which opted for an IPO as 'public sellers', those which opted for private equity as 'private sellers', and the remainder as the residual group. Of the 43 private sellers, 17 (40%) sold the entire company, 8 (19%) sold a majority stake, 9 (21%) sold a non-controlling stake (of between 25% and 50%), and 9 sold less than 25% (including firms that raised capital through joint ventures or privately sold participation rights). Of the 29 firms in the residual group, 5 (17%) experienced financial distress while the remaining ones either publicly abandoned their plans to raise outside equity or had not yet raised outside equity by the end of our sample period.

Not a single public seller in our sample sold sufficient amounts of equity to surrender control at the IPO. The private sellers, on the other hand, typically relinquished control (often involving a family owner selling to another company). To the extent that control rights are harder to value than cash flow rights [Zingales (1995)], we would expect private sellers to benefit more from learning.

Only one of the 72 firms that did not go public pulled its flotation just days before the official start of trading, after losing the backing of its underwriter. All other firms withdrew at a much earlier stage, generally even before concrete details of the offering became available.[7] This is in contrast to the U.S., where IPOs are abandoned at much shorter notice, always after a registration filing that details the offering and often just days or even hours before the intended first listing day

[Benveniste, Busaba, and Guo (2000)]. This supports our contention that an IPO announcement in Germany does not indicate that the firm has already made up its mind about the relative desirability of public over private equity.

3. Predicting final choices using *ex ante* information

3.1 Sample distribution and firm characteristics

Table 1, Panel A shows the number of IPO announcements by year. Notable peaks occurred in 1986 and 1989, with a subsequent downward trend in 1990-1994. Panel B presents the distribution of the duration between announcement and exit decision. Public sellers exit the sample after an average (median) of 378 (148) days; this is substantially faster than private sellers who take 1,401 (1,317) days to conclude their capital raising. Time-to-decision thus appears to be related to the decision finally taken. In Section IV, we will explicitly condition on time-to-decision.

Panel C reports descriptive statistics on company size, profitability, and age. We face the practical problem that financial data on privately-held companies in Germany is difficult to obtain, partly because of their general reluctance to disclose 'sensitive' information, and partly because standard sources – we use Hoppenstedt (*Handbuch der Aktiengesellschaften, Handbuch der Großunternehmen,* and *Handbuch der mittelständischen Unternehmen*), Global Vantage, and Primark Worldscope – tend to focus on much larger companies than those in our sample. On the other hand, our sample companies appear unusually willing to disclose at least sales figures and often earnings to the business press, especially once a decision to raise outside equity has been made.[8] Information on company age was obtained from a variety of sources, including the files of *Creditreform*, a credit reference agency.

We report median levels of sales and profitability for each of the three years before the announcement and for year 0 (the fiscal year in which the announcement falls). We also report annual sales growth before and during the announcement year. In year 0, the median company had sales of DEM 218.5 million (in constant 1991 Deutsche Mark) and earnings of DEM 6.5 million, with return on sales of 3% and return on equity of 28%. Median (mean) age was 40 (52) years. These are thus clearly not small, start-up companies. Sales growth for the median firm ranged from 8% to 10% in the three years pre-announcement.

Looking across the three subsamples in Panel C, we find very few differences. Firms in the residual group are somewhat larger in year 0 (with median sales of DEM 344 million) than public sellers (DEM 199.5 million) or private sellers (DEM 177.5 million). Public sellers are the most profitable in year 0, with median earnings of DEM 6.9 million against DEM 4.2 million for the private sellers and DEM 4.1 million for the residual group. This difference in earnings between public and private sellers is significant, though to some extent it reflects differences in equity capitalizations: returns on equity are remarkably similar, ranging between 27% in the residual group and 28% for the median public or private seller. There is, however, a significant difference in returns on sales: the median public seller has net margins of 3% versus 2% amongst private sellers and the residual group. Interestingly, the median private seller saw earnings fall in the year before its announcement. This may suggest that capital constraints could motivate the desire to raise outside equity. Finally, the median age of private sellers (27 years) is significantly lower than that of public sellers (48) and the residual group (38).

We do not report an industry breakdown of the sample to conserve space. The sample is drawn from a wide range of industries, and none of the three groups appears to cluster in particular industries. The sample precedes the Internet IPO wave in the later 1990s.

Table 2 reports the sample firms' ownership structure at the time of the announcement. We obtained ownership data from newspaper sources and both supplemented and cross-checked it with standard sources such as Commerzbank's *Wer gehört zu wem?* and Hoppenstedt's publications. We not only identified the dominant shareholders and size of their stakes, but also carefully investigated the presence of minority stakes. Minority shareholders could play an important role in choosing between public and private equity; bank backing, for example, might mitigate capital constraints.

At announcement, 62% of sample firms are majority-controlled by a family, 15.5% are controlled by another company, 10.2% are controlled by some other owner (the government or a financial institution), and the remainder have no majority owner. Public sellers are significantly more likely not to have a majority shareholder than are private sellers or companies in the residual group.

While most firms are closely held, 22.9% also have significant minority blockholdings (see Panel B). These are significantly more frequent amongst private sellers, where 44% have one or more minority blockholders. Such blockholders are usually financial institutions (banks or venture capitalists) which hold minority stakes in 26% and 21% of the private sellers, respectively. This is a significantly higher rate than amongst public sellers, where banks and VCs hold stakes in only 6% and 4% of companies, respectively.

3.2 Self-declared IPO reasons

Table 3 outlines the reasons for seeking outside equity as stated by the firms themselves at the time of their announcements. By construction, our sample avoids hindsight bias, unlike, for instance, questionnaires that could capture managers' *ex post* rationalizations rather than the true motivations at the time of the original announcement. We group the self-declared reasons into *primary* (capital-raising) and *secondary* (selling out). Cases where the company intended to raise both new capital and sell some existing equity are included in the *primary* category. *Secondary* includes divesting the whole business, or a significant part thereof, for the benefit of the controlling shareholder(s). It also includes exits by financial institutions such as venture capitalists or banks. In the sample as a whole, about two-thirds intended to raise primary equity and a third intended to sell secondary equity. The predominance of primary-motivated announcements is consistent with the high pre-announcement growth rates we saw in Table 1.[9] A greater fraction of the public sellers (76%) than of the private sellers (49%) or the residual group (52%) intended to raise new capital. None of the seven cases where a financial institution had signaled its intention to sell out ultimately went public.

3.3 External conditions at announcement

Table 4 reports the conditions prevailing in the markets for stocks, IPOs, and bonds, as well as the economy in general, in the quarter preceding each firm's announcement. The average announcement followed a quarter in which the value-weighted DAFOX share index[10] returned 2.5% and which saw fewer than five companies go public, with average underpricing of 15.2%. The yield on corporate bonds as reported by the *Bundesbank* averaged 760 basis points. GDP growth averaged 3.1% p.a.

Looking across outcome groups, we find no significant link between conditions at announcements and final choices.

3.4 Multinomial logit

Our univariate results in Tables 1-4 suggest that public and private sellers generally look very similar. The only univariate differences we found are that private sellers have lower earnings and ROS in year 0, are younger, have more minority blockholders, especially financial institutions, and tend to motivate their IPO plans more often as sell-offs than as capital-raising exercises.

Is this information, which adds up to an *ex ante* snapshot of the sample, sufficient to predict the final choices the companies made? Or do companies learn about and react to the relative attractiveness of public and private equity *after* the announcement, in ways that *ex ante* information cannot predict? To provide an answer, we estimate a multinomial logit. The dependent variable takes on three values denoting public and private sales and the residual group. Letting X be the matrix of explanatory variables, the multinomial logit uses maximum likelihood to estimate the set of coefficients β in the following model:

$$\Pr(Y_i = k) = \frac{e^{X\beta^{(k)}}}{\sum_{m=1}^{3} e^{X\beta^{(m)}}}, \text{ for each outcome } k = 1, 2, 3$$

To identify the model, and without loss of generality, we set $\beta^{(k=\text{residual})} = 0$. The remaining coefficients now measure the change in probability relative to not raising outside equity. Comparing the $\beta^{(k=\text{public})}$ and $\beta^{(k=\text{private})}$ coefficients, we can identify the determinants of the choice between raising outside equity publicly or privately. Based on the earlier univariate analysis, we use as

explanatory variables company characteristics (pre-announcement earnings, the log of pre-announcement sales, and log company age); a dummy equal to one if the stated IPO reasons included the desire to raise primary capital; ownership (three dummies capturing firms without a majority owner, firms controlled by other companies, and firms with financial institutions among their shareholders); and the external variables from Table 4 measuring the conditions prevailing in the markets for stocks, IPOs, and bonds, as well as the economy in general (all measured in the quarter before the announcement).

The estimation results are reported in Table 5. Regression 1 suggests that firms are less likely to raise outside equity, from either source, the more profitable they are (p<5%). This hints at capital constraints playing a part in the decision to raise outside equity and is surprising in view of the univariate result in Table 1 that public sellers are the most profitable at announcement. The effect is significantly stronger for private than for public sellers (p=8.4%), suggesting that private sellers are more capital constrained. Firm size, as measured by the log of average sales in the three years before the announcement, has a positive effect on the probability of raising outside equity (p<5%), without having a differential impact on the choice between public and private equity. Firm age is not significant relative to not raising outside equity, but the coefficients are significantly different between public and private sellers (p<5%). Specifically, the older the firm, the more likely it is to raise public rather than private equity, consistent with the univariate result in Table 1. Companies which planned to raise fresh capital are significantly more likely to raise outside equity than companies whose owners planned to sell existing shares, irrespective of the source of funds (p<5%). This suggests that secondary sales are more likely to be postponed, though it cannot explain why.

Ownership structure at the time of the announcement also has a significant effect on final choices, consistent with the patterns we saw in Table 2. Firms without a majority owner are significantly more likely to go public than to raise equity privately or not at all, while firms that have a financial institution amongst their shareholders are more likely to raise equity privately than publicly or not at all (p=5.3%).

Amongst the external variables – which in Table 4 have no significant association with final choice – only GDP growth is significant. Higher GDP growth, at the time of the announcement, makes it less likely that a firm sells equity privately compared to not at all (p=7.4%), but has no effect on the choice between going public and not raising outside equity.

The overall fit of the model is reasonably good. The pseudo-R^2 is 27.8% and the coefficients are jointly significantly different from zero and from each other across the three choices. However, Regression 1 uses only 175 observations, as we lose companies that do not report sales and earnings figures for the three pre-announcement years. Regression 2, therefore, uses sales and earnings figures for year 0 only. This increases the sample size to 207 observations but also changes some of the coefficient estimates, which suggests that the propensity to disclose accounting information is not random. Qualitatively our results remain unchanged, however.[11]

How well do the models perform? At the 95% level, regression 1 correctly classifies 111 of the 142 IPOs included while regression 2 correctly classifies 135 of the 162 IPOs included. But the models have a hard time classifying private sellers correctly: regression 1 predicts that only one firm will sell equity privately, while regression 2 predicts two private sellers. This strongly suggests that as far as the multinomial logit is concerned, sample companies do look indistinguishable ex ante and appear to be serious IPO candidates.

4. The link between learning and final choices

The multinomial logit model estimates the likelihood of each company's choice between private, public, and no outside equity, but it does a poor job of predicting which choice is ultimately made. As it is based on information known at the time of the announcement, it neglects information arriving subsequently. Such new information could have an important effect on the timing and choice of funds. One of the main advantages of our data set is the existence of a clear time line of events. Beginning with the IPO announcement, we have data on the 'why' and 'how' of the planned IPO and on the timing and type of subsequent actions taken by the company. Corresponding to this time line, we have data on company characteristics and external conditions. The existence of a clear time line of events allows us to establish whether preceding events are correlated with subsequent events, and thus what *causes* each firm's choices.

In this section, we explore subsequent events. We begin by investigating the effect of changes in company performance (Section IV.A) and external conditions (Section IV.B). We then estimate a duration model to isolate the marginal effects of such changes on a firm's choice (Section IV.C).

4.1 Why do firms not go public?

We first consider whether private sellers simply 'failed' to go public. Using company announcements and press reports, we investigate why the 72 firms that raised equity privately or not at all withdrew their IPO plans. Table 6 shows that about half of them blamed their withdrawal on 'poor company performance' post-announcement. Nearly 14% in fact experienced outright financial distress (bankruptcy, liquidation, etc.). However, this does not necessarily violate our assumption that private sellers make choices, for two reasons. First, adverse firm-level events disproportionately

affect firms in the residual group, explaining in part why these raised no outside equity. Second, 'poor company performance' is known to affect also companies that do go public. Ljungqvist (1997) reports below-market share price performance following IPOs in Germany over roughly the same sample period as ours. Jain and Kini (1994) report significant declines in operating performance over the first few years of trading in a large sample of U.S. IPOs, both in absolute terms and relative to a matched control sample.

To see whether IPO firms enjoyed better operating performance post-announcement than firms that did not go public, Table 7 outlines the evolution of sales and profitability over the next three years. Following the announcement, all firms increase their sales but at a significantly lower rate than before. As in the U.S. [Mikkelson, Partch, and Shaw (1997)], companies seem to announce an IPO at the top of their sales growth cycle: sales growth for the median sample firm slows from 9% in the pre-announcement year to 2% three years later. There is little evidence that this affects private sellers more than public sellers: only in the first year after the IPO announcement do IPO firms grow their sales significantly faster. This similarity in sales growth suggests that poor performance per se is unlikely to be the prime motivation for withdrawing an IPO plan, in contrast to the private sellers' own indications (see Table 6). As mentioned earlier (see Table 1), public sellers are significantly more profitable in year 0. This difference persists for the next three years, in terms of both earnings levels and returns on sales.

In summary, IPO firms clearly experienced operating performance declines that are similar to those seen amongst private sellers. This does not support the hypothesis that private sellers simply failed to complete their IPOs due to adverse firm-level shocks.

4.2 External conditions after announcement

The information in Table 6 indicates that changes in the external environment, such as stock market conditions or the general business climate, are rarely cited as reasons for withdrawing an IPO. Do they nevertheless influence final choices? Table 8 shows the conditions prevailing in the markets for stocks, IPOs, and bonds, as well as the economy in general, in the quarter preceding each firm's final choice between public and private equity and no outside fundraising at all. Compared to Table 4, which showed that the prevailing conditions at the time of the announcement were indistinguishable across the three groups, there are two distinct patterns in Table 8. First, there is evidence that the final decision is influenced by developments in the stock market. Firms go public after quarters with high market returns (averaging 3%), raise funds privately following modest market returns (0.7%), and decide not to raise equity at all when the market is in decline (–4.4%). They also go public in markets that are more volatile. Second, underpricing is significantly higher when companies go public (averaging 13.7%) than when they sell equity privately (9.8%). This could indicate that a 'hot' IPO market is more conducive to raising equity publicly.

4.3 Duration analysis

The univariate results in the previous two subsections indicate that external conditions post-announcement (and changes therein) do appear to influence firms' final decisions. Using a hazard-rate model, we can estimate the probability of choosing a particular exit route by exploiting our time line of events [see Lancaster (1996)]. A firm is assumed to have a certain probability of exiting in each period, measured by the following hazard rate:

$$h(t) = \frac{\text{probability of exiting between } t \text{ and } t + \Delta t}{\text{probability of exiting after } t}$$

We estimate a competing-risk proportional-hazard model $h(t) = h_0(t)e^{X\beta}$ in which the covariates X have a multiplicative effect on the hazard. The baseline hazard $h_0(t)$ can either be left unspecified, giving the Cox (1972) semiparametric model, or take a specific parametric form. We report results using the Weibull parameterization, which corresponds to a hazard that changes monotonically with time.[12] The Weibull hazard is given by $h(t) = p \cdot e^{X\beta} t^{p-1}$ where p is the shape parameter. For p=1, the hazard rate is constant over time, for p<1 it is monotonically decreasing, and for p>1 it is monotonically increasing. We expect the hazard to be decreasing: the more time has elapsed since announcement, the lower the probability of the firm raising outside equity. The coefficients β are estimated via partial maximum likelihood.

As in the multinomial logit, we want to capture the fact that firms have multiple choices at a given point in time: they can raise outside equity, either from public or private sources, or not raise outside equity at all. We therefore estimate a competing-risk model. This assumes that each firm is 'at risk' from each choice in the next time interval Δt. We set it up so that exits are 'fully absorbing': once a firm has made a choice, it is treated as no longer being 'at risk.' For instance, a firm that has gone public is no longer at risk from going public again, raising equity privately, or not raising it at all. Within the residual group, firms which announce they no longer intend to raise outside equity are treated as no longer being at risk, while firms which make no such announcement are at risk until the end of our sample period (December 1999). This implies that the latter are 'right-censored': at the end of our sample period, they still face a non-zero probability of going

public or selling privately at some point in the future. Duration models can easily be corrected for right-censoring.

A competing-risk model is obtained by allowing the baseline hazards (h_0) to vary across exits. In addition, we can either constrain the covariates X to be the same across exit choices or allow some of them to vary. A variable-effect specification is likely more reasonable economically, since the choices we model are mutually exclusive. For instance, an event which makes going public more attractive should have a negative impact on the probability of raising private equity.

The matrix of covariates X consists of the same explanatory variables used in the multinomial logit model, plus three further variables: a measure of stock market volatility (the 90-day trailing standard deviation of daily DAFOX returns), the announcement year, and a dummy for the introduction of the *Neuer Markt* in March 1997. We allow company characteristics and external conditions to vary over time, because post-announcement changes in these may affect a firm's choice. The dummy for the *Neuer Markt* is also time varying, in that it equals one only if calendar time is greater than February 1997. Ownership information is not allowed to vary over time since subsequent changes are, of course, endogenous to a firm's exit decision.

Table 9 reports the results of three different specifications. The first specification includes all X variables but constrains their effect to be the same across exit choices. This specification allows us to focus on learning. It asks, what factors influence when a firm makes up its mind, irrespective of which choice it finally makes? If a firm's final decision is pre-determined at the time of its announcement, all coefficient estimates for the time-varying covariates will be zero, while if there is learning, post-announcement events will influence the final decision and so some of the coefficients will be non-zero. We report hazard ratios instead of coefficients because they are easier to interpret.

Each ratio measures how much the hazard (i.e. the instantaneous risk of exiting) increases for a unit change in the covariate. Hazard ratios greater (less) than 1 imply that the covariate increases (decreases) the probability of exit.

The results estimated in specification 1 are broadly consistent with learning. The hazard ratio for earnings is significantly greater than 1 (p<1%), indicating that increases in earnings post-announcement have a positive effect on the probability of making a decision in the next time interval Δt. The magnitude of the coefficient, 1.02, indicates that a unit increase in earnings (which is measured in DEM million) increases the hazard by 2%, which is a relatively small effect economically given that earnings average DEM 8.5 million in our data.

Increases in log sales have the opposite effect (p<5%). A unit increase in log sales lowers the hazard by about 14% (0.858 – 1). In Table 7 we saw that firms were still increasing their sales post-announcement (though at a lower rate than before), while their margins were declining. Taken together with the negative effect of log sales, this suggests that pursuing sales at the expense of profitability has a negative impact on capital raising. Log age has a similar negative effect but is not significant. Firms that state their intention to raise primary equity have significantly higher hazards (p=10%). Specifically, they are 54% more likely than other firms to make a decision at a given point in time. This is consistent with cash flow rights being easier to value than control rights [Zingales (1995)] and so requiring less learning. Amongst the ownership variables, only the bank dummy is significant (p<1%). Its hazard ratio implies that companies with a financial institution amongst their shareholders are 58% less likely than others to make a decision at a given point in time. To the extent that bank-backed companies have access to back-up sources of finance and so are less capital-constrained, they can afford to wait longer – and learn more – before deciding what to do.

We find no support for our prediction that corporate-owned companies use their access to internal capital markets to finance their learning, nor for the prediction that managers are influenced in their choice of financing by the absence or presence of a dominant shareholder.

While changes in stock market returns have no effect, changes in volatility have a large positive effect on the hazard (p=6.2%). A unit increase in volatility (which is measured in percentage points) increases the hazard by 55%. If the rate of information arrival is greater in more volatile markets, this is again consistent with learning. Increases in the number of companies going public (p<1%) and underpricing (p<1%) also increase the hazard. This might be additional evidence of learning: when other firms go public, relevant information may spill over [Benveniste, Busaba, and Wilhelm (2001)], for instance in the form of greater-than-expected underpricing [Lowry and Schwert (2000)]. The extent of information spillovers should correlate positively with the number of firms going public, explaining the greater-than-one hazard ratio. Changes in the corporate bond yield (p<1%) have a positive effect on the hazard, so as credit becomes dearer, firms decide to either raise equity or abandon their capital raising plans. Changes in GDP growth have no significant effect.

Finally, the hazard ratio estimated for the announcement year is greater than one (p<5%), suggesting that firms make a decision more quickly over time, which is consistent with development of the financial markets. Interestingly, the launch of the *Neuer Markt* appears to have a marked *negative* impact: for firms still undecided at the time, the hazard drops by 94% after the *Neuer Markt* opened. This indicates that a sample firm's chances of raising outside equity dropped sharply once attention in Germany shifted to the sorts of high-growth/high-tech companies which created a tremendous buzz on the German IPO scene in the late 1990s.

Overall, the model χ^2 indicates the specification has good fit. The Pseudo-R^2 is 15.8%. The Weibull shape parameter is 0.599, consistent with our prediction of a decreasing hazard over time. Finally, we reject that the baseline hazards are equal across exit choices, consistent with the assumption behind the competing-risk model.

The second and third specifications estimate variable-effect models. This allows us to focus on what influences which choice a firm finally makes. In specification 2, we let all time-varying covariates vary across exit choices and only constrain the time-invariant covariates to have equal coefficients.[13] This leads to a large and significant likelihood gain over specification 1, with the Pseudo-R^2 rising to 21%. The estimates show that the three final choices are sensitive to different post-announcement effects. Changes in earnings only affect the probability of going public significantly. A DEM 1 million rise in earnings increases the IPO hazard by 1.8% (p<1%) but does not affect the choice between raising equity privately or not at all. This puts paid to the argument that adverse post-announcement earnings changes cause firms to abandon their IPO plans. It also contrasts with the multinomial logit result in Table 5 where *pre*-announcement earnings affected the likelihood of a firm raising private equity negatively. Including pre-announcement earnings as a time-invariant regressor in the hazard model (not reported) yields an insignificant coefficient, indicating that neither pre- nor post-announcement earnings impact on choosing private equity.

Once we allow for differential effects, stock market returns become significant. A 1% increase in market returns increases the probability of going public by 1.9% (p<5%) – consistent with prior evidence in Loughran, Ritter, and Rydqvist (1994) and Lerner (1994) – while a 1% drop in market returns increases the probability of not raising outside equity at all by 26% (p<1%). This confirms the univariate findings in Table 8: post-announcement changes in market returns are important,

certainly much more important than returns at the time of the announcement (see Tables 4 and 5). As to market volatility, its positive effect is confined to firms going public (p<1%) or raising equity privately (p=5.1%). We cannot reject the hypothesis that volatility has the same effect on these firms' hazards (p=36%). The impact of IPO activity is heavily skewed towards firms deciding not to raise outside equity. A unit increase in the log number of IPOs increases these firms' hazard 24-fold.[14] Increases in underpricing affect all hazards positively. The effect on firms raising outside equity publicly (p<1%) or privately (p<5%) is not significantly different, indicating that higher underpricing prompts these firms to proceed with their equity-raising plans in equal measure. Curiously, the effect is significantly larger for the hazard of not raising outside equity. Specification 3 will shed further light on this. Finally, increases in the corporate bond yield have no effect on the probability of raising outside equity, but they do increase the probability of not raising equity. One explanation may be that the firms that do not raise equity are more sensitive to the cost of debt, to the point of being unable to raise equity as the cost of debt rises.

The third specification removes some of the insignificant factors from specification 2 and adds two interaction terms. First, the results in specification 2 suggest that companies become more likely to go public when underpricing has increased. This is consistent with the notion that high underpricing may be informative about the valuation investors are willing to pay. On the other hand, if high underpricing has a tendency to persist, companies may in fact be disinclined to go public to avoid the high dilution implied by high underpricing [Habib and Ljungqvist (2001)]. Persistence in underpricing has been documented for the U.S. by Lowry and Schwert (2000). We therefore include a new variable that equals underpricing if underpricing is at least 32.9% (the 3rd quartile), and zero otherwise. This will capture the marginal effect on the hazard of particularly high underpricing.[15]

Second, the results in specification 2 suggest that firms that ultimately do not raise outside equity are particularly sensitive to changes in the corporate bond yield. This is surprising, for we expected that increases in the cost of debt should prompt firms to raise equity – be it publicly or privately – rather than shelve their equity raising plans. The explanation may have to do with the role of banks. When banks are shareholders, they may influence the firm's decision partly with a view to protecting their lending business [see Franks and Mayer (1998) for evidence of such behavior in the context of takeovers in Germany]. When the cost of debt is particularly high, banks have more to lose from letting a company go public. We therefore interact the corporate bond yield with the dummy for banks being present amongst the shareholders.

Specification 3 shows a small but significant likelihood gain over specification 2, with the pseudo-R^2 rising to 22.1%. The results confirm our predictions. First, once we control for particularly high underpricing, the effect of underpricing on the hazard is no longer highest in the residual group. A one percent increase in underpricing increases the hazard of going public by 12.3% (p<1%), that of not raising outside equity by 7.7% (p<1%), and that of selling equity privately by 2.3% (p<1%). However, when underpricing is particularly high, the marginal effect of a further 1% increase in underpricing is to decrease the probability of going public by 8%. This asymmetry suggests that high underpricing may be informative and thus induce firms to go public, but particularly high underpricing involves unacceptable levels of dilution and so deters IPO exits. Second, once we control for bank backing amongst the residual group, the effect of changes in the corporate bond yield becomes significant and positive (p<1%) for firms raising outside equity. The estimate for the hazard ratio implies that a 1% increase in the corporate bond yield increases the likelihood of raising outside equity by 30.4%. Amongst the residual group, only the interaction term

is significant (p<5%). Consistent with our prediction, it is greater than one, suggesting that increases in the corporate bond yield cause only bank-backed firms to drop their equity-raising plans.

5. Conclusion

We analyze a sample of privately held German firms that announce their intention to go public and attempt to shed light on how these firms choose among alternative ways of raising external equity. We establish that announcements are indeed indicative of an intention to go public and follow these firms over time, until either the IPO is completed or the firms exit the sample through a private sale or abandon the process for other reasons. We document in detail what characterizes the IPO candidate firms at the time of their announcement, when they exit the sample, and the changes they experience in the meantime. One upshot of our analysis is that learning is an important feature of corporate decision-making. For a relatively homogeneous, carefully selected set of firms that intend to raise outside equity, we show that characteristics observable before and at the time of the announcement are only a modest predictor of the actual outcome. We then document that by the time they make the actual decision, the firms and their economic environment have changed significantly: private seller face worse stock-market conditions, colder IPO markets, and have lower profits compared to public sellers.

We then ask the question, how do firms incorporate these changes into their decision process? We use a hazard-rate model to estimate the marginal determinants of the ultimate choices. First, we document that firms intending to sell primary capital (as opposed to secondary sales by existing shareholders) are substantially more likely to ultimately complete the transaction. Moreover, the chances of raising outside equity are drastically reduced if a bank is among the firm's shareholders. We attribute this latter finding to easier access to alternative sources of capital. Most importantly,

we find that the outcome depends systematically on developments between the announcement to raise new capital and the final decision how to do it or whether to abandon their plans. For example, increasing stock-market returns and increasing market volatility make it significantly more likely that a firm does indeed raise outside equity. We also document that increases in recent IPO underpricing make IPOs more likely, though unusually high underpricing induces firms to wait longer. Finally, we document that firm performance following the announcement only has an effect for public equity sales; it has no effect on the probability of a private sale or of not raising any equity.

Because these changes, which materialize subsequent to the original announcement to raise outside equity, are significant determinants of the actual decision, we can infer that firms indeed learn. That is, they explicitly incorporate changes in market conditions into their decision process. Alternatively, the initial announcement creates a real option for the prospective issuer (Benveniste, Busaba, and Guo (2000) make similar inferences). This paper provides a unique example of how such an option becomes valuable, and how the decision process for selling outside equity evolves over time.

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Endnotes

[1] By putting themselves on the market *publicly*, as opposed to seeking to negotiate bilaterally with possible buyers, companies may enjoy greater bargaining power. Bulow and Klemperer (1996) show that under reasonable conditions an auction with no reserve price is a more profitable mechanism for selling an object than an optimally structured negotiation with one fewer bidder. Hence, an auction between as few as two buyers raises more revenue (in expectation) than direct negotiation with a single buyer.

[2] In 1994, there were a mere 666 exchange-listed firms in Germany, compared to 7,684 in the U.S. Over the 35 years to 1994, there were about 200 initial public offerings (IPOs) of equity in Germany, as compared to more than 10,000 in the U.S.

[3] Pagano, Panetta, and Zingales (1998) analyze the empirical determinants of the going public decision in Italy using an *ex post* snapshot of firms which completed an IPO and the universe of private Italian companies. They show that the probability of a flotation is related to the market-to-book ratio of firms in the same industry, which indicates that companies 'time' their IPOs to coincide with periods of high valuations. Benveniste, Busaba, and Guo (2000) analyze the empirical determinants of the decision to withdraw an IPO using an *ex ante* snapshot of firms which had registered a public offering with the SEC. They argue that the option to withdraw is valuable to the issuing firm in the context of bookbuilding techniques of information-acquisition.

[4] Roëll (1996) provides an overview of field-based studies and highlights three key reasons why companies go public: trading liquidity which increases the effectiveness of employee incentive schemes; the role of share prices in conveying information about a company's prospects to customers, suppliers, employees and potential providers of finance; and the potential for access to outside capital on more competitive terms.

[5] A similar prediction can be derived from the pecking order theory developed in Myers (1984) and Myers and Majluf (1984). In secondary offers, where sellers presumably have discretion over the time of the offer, an equity issue might signal issuers' belief that current prices are too high. In

contrast, if there is less discretion in primary offers, maybe because of limited debt capacity and capital constraints, investors may perceive a lower risk of over-paying.

[6] Two subsequent regime changes have contributed to a more active IPO market in 1998-2000. In 1995, bookbuilding techniques were imported from the U.S. These proved very popular and have now virtually replaced fixed-price offerings [see Ljungqvist, Jenkinson, and Wilhelm (2000)]. In March 1997, the Frankfurt Stock Exchange launched a new market segment for smaller, mostly high-tech companies, the *Neuer Markt*. Our IPO announcements preceded both these developments.

[7] Just under a third of the sample firms got no further than to announce their intention to seek a flotation. A further sixth abandoned their IPOs when they either already had bank support, or were in the process of negotiating with a bank. The remaining 58% had either put in place the necessary legal requirements (such as a change in corporate form and structure) or announced specific details of their IPOs when pulling out.

[8] One concern when combining data from different sources is comparability, as the underlying accounting conventions are rarely set out. For instance, sales figures could be more or less consolidated, while reported earnings could be before or after tax, depreciation and so on. We ensure that the data is comparable over time – because the duration model in Section 4 relies on the time dimension – but note that it may not be perfectly comparable across companies.

[9] Examples of primary motivations include "to fund new product development / acquisitions / capital-intensive investments / expansion / the next ten years' growth", "a rapid growth rate", or "a growing need for capital." Typically, the announcement of a primary IPO was coupled with the creation of reserve capital or non-voting shares and the suspension of the existing shareholders' pre-emption rights, both of which are key steps in raising *primary* equity. Some firms explicitly mentioned capital constraints or the wish to broaden their sources of finance ("to ease capital constraints", "gain access to alternative sources of finance when finding it hard to get credit to fund investment", "improve access to capital", or "widen the financial base").

[10] The DAFOX index covers all officially listed German companies, accounting for more than 90% of market capitalization. It is thus considerably broader than the better-known DAX index of

the 30 leading shares. Unlike the DAX, the DAFOX is computed according to consistent rules that ensure comparability over time.

[11] We have also estimated other specifications (for instance, using growth rates rather than levels of sales and earnings), but find similar results to the ones reported in Table 5.

[12] We obtain very similar results in terms of the estimated hazard ratios and significance levels using other distributions (Gompertz, exponential) or Cox's semiparametric model.

[13] We cannot let *all* covariates vary, for this would imply three separate duration models and so a firm would no longer be at risk from all three choices.

[14] Because of the log specification, a unit increase in our measure of IPO activity corresponds to a 2.718-fold ($=e^1$) increase in the number of IPOs. This is in excess of two standard deviations, which puts the apparently large effect into perspective.

[15] Results are qualitatively similar at other cut-off points.

Table 1. Sample distribution and firm characteristics at announcement.

The sample consists of 245 firms that announced their intention to go public in Germany between 1984 and 1994. Public sellers are firms which by December 1999 had gone on to raise public equity by floating on a stock exchange. Private sellers are firms which raised equity from private sources instead. The residual group contains firms which had either decided not to raise outside equity or had de facto neither raised public nor private equity. The table provides a breakdown of the number of announcements by year (Panel A) and the number of days between announcement and final decision (Panel B). It also reports certain firm characteristics during the three years prior to the IPO announcement and the announcement year (Panel C). All monetary variables are deflated to 1991 purchasing power using the GDP deflator. In the final column of Panel A we test whether the sample distribution over time is different for public and private sellers. We use a chi-square test for the null that the proportion of public and private sellers equals their respective proportion in the population. In Panels B and C we test for differences between public and private sellers and use a Wilcoxon signed-rank test for equality of medians and a *t*-test for equality of means. N/A indicates that no test statistic was computed, and ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

	Total sample (245 firms)	Public sellers (173 firms)	Private sellers (43 firms)	Residual group (29 firms)	Test: public= private
Panel A. No. of announcements by year					
1984	21	17	2	2	-
1985	16	13	2	1	-
1986	37	29	7	1	-
1987	28	21	5	2	-
1988	17	10	5	2	-
1989	36	27	5	4	-
1990	32	20	6	6	-
1991	26	15	4	7	-
1992	22	13	5	4	-
1993	6	4	2	0	-
1994	4	4	0	0	N/A
Panel B. No. of days between announcement and decision					
Mean	722	378	1,401	1,768	***
Minimum	0	0	13	64	N/A
1st quartile	81	64	872	889	N/A
Median	310	148	1,317	1,467	***
3rd quartile	1,039	370	1,944	2,685	N/A
Maximum	5,464	2,884	4,247	5,464	N/A

Table 1 (cont'd).

		Total sample (245 firms)		Public sellers (173 firms)		Private sellers (43 firms)		Residual grp (29 firms)		Test: public=
		Median	N	Median	N	Median	N	Median	N	private
Panel C. Firm characteristics										
Sales										
Sales level (DEM m)	year –3	215.7	132	196.5	94	296.5	17	294.8	21	-
	year –2	201.1	180	199.2	124	162.8	32	298.0	24	-
	year –1	212.9	216	202.7	151	181.2	38	298.2	27	-
	year 0	218.5	230	199.5	168	177.5	34	344.0	28	-
Sales growth p.a. (%)	year –3 to –2	8%	131	7%	94	11%	16	9%	21	-
	year –2 to –1	10%	177	10%	124	10%	31	11%	22	-
	year –1 to 0	9%	208	8%	151	10%	31	8%	26	-
Profitability										-
Earnings (DEM m)	year –3	4.7	85	4.7	75	2.7	6	12.3	4	-
	year –2	4.7	126	4.9	108	2.8	12	8.3	6	-
	year –1	6.7	175	6.7	143	5.5	19	8.5	13	-
	year 0	6.5	207	6.9	164	4.2	25	4.1	18	**
Return on equity (%)	year –3	23%	56	23%	49	28%	5	-5%	2	-
	year –2	30%	78	30%	69	17%	5	26%	4	-
	year –1	36%	126	36%	104	33%	14	31%	8	-
	year 0	28%	186	28%	156	28%	17	27%	13	-
Return on sales (%)	year –3	2%	81	2%	74	0%	3	3%	4	-
	year –2	2%	123	2%	106	1%	11	3%	6	-
	year –1	3%	172	3%	141	3%	18	4%	13	-
	year 0	3%	202	3%	161	2%	24	2%	17	**
Age	year 0	40	239	48	173	27	39	38	27	**

Table 2. Ownership structure at announcement.

The table reports the frequency of ownership characteristics at the time of the IPO announcement. Each cell contains the proportion of firms with the respective ownership structure, and the number of firms in parentheses. In Panel B, double counts are possible. In the final column, we test for differences in proportions using Fischer's Exact Test (see Kendall and Stuart 1979). The test compares only public and private sellers but we obtain similar results across all three groups. Here and in subsequent tests of this type, we alternatively calculated Pearson and likelihood-ratio chi-square statistics and found all results qualitatively unchanged. N/A indicates that no test statistic was computed, and ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

	Total sample (245 firms)	Public sellers (173 firms)	Private sellers (43 firms)	Residual group (29 firms)	Test: public =private
Panel A. Majority blocks					
Majority controlled by founders/family	62.0% (152)	59.5% (103)	65.1% (28)	72.4% (21)	-
Majority-controlled by another company	15.5% (38)	15.0% (26)	16.3% (7)	17.2% (5)	-
Other majority owner	10.2% (25)	9.2% (16)	16.3% (7)	6.9% (2)	**
No majority owner (no single block >50%)	12.2% (30)	16.2% (28)	2.3% (1)	3.4% (1)	***
Panel B. Minority blocks					
Firm has large minority blockholders	22.9% (56)	16.2% (28)	44.2% (19)	31.0% (9)	***
Bank holds minority stake	9.8% (24)	5.8% (10)	25.6% (11)	10.3% (3)	***
VC holds minority stake	7.8% (19)	4.0% (7)	20.9% (9)	10.3% (3)	***

Table 3. Why do firms announce an IPO?

The table categorizes listing reasons as primary (raising capital), secondary (cashing in), and other. Reasons are extracted from company announcements and news reports. Divestiture is defined as selling the whole or a significant part of the business for the benefit of the family or corporate owner. Financial institutions include banks and venture capitalists.

Stated reason	Total sample		Public sellers		Private sellers		Residual group	
Primary and combined	167	68.2%	131	75.7%	21	48.8%	15	51.7%
Purely secondary	78	31.8%	42	24.3%	22	52.2%	14	48.3%
Divestiture	*12*	*4.9%*	*3*	*1.7%*	*9*	*20.9%*	*0*	*0.0%*
Financial institutions to sell out	*7*	*2.9%*	*0*	*0.0%*	*5*	*11.6%*	*2*	*6.9%*
Total	245	100.0%	173	100.0%	43	100.0%	29	100.0%

Table 4. External conditions at announcement.

The table reports the external conditions prevailing in the markets for stocks, IPOs, and bonds, as well as the economy in general, in the quarter before the IPO announcement. The DAFOX return is the quarterly return on a broad, value-weighted index. Volatility is the standard deviation of daily DAFOX returns over the 90 days prior to the announcement. The number of IPOs refers to quarterly IPO volume. Underpricing is the percentage change from the offer price to the first-day trading price. We report four-quarter trailing averages (to correct for the zeros otherwise induced by quarters without any IPOs). The corporate bond yield is taken from the Bundesbank monthly publications. GDP growth is for West Germany only. In the last column, we test the hypothesis that the sample means are equal for public and private sellers, respectively. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Means	Total sample (245 firms)	Public sellers (173 firms)	Private sellers (43 firms)	Residual group (29 firms)	Test: public =private
IPO and stock market climate					
DAFOX return (%)	2.5	3.0	2.0	0.6	-
DAFOX volatility (%)	0.988	0.976	1.028	1.003	-
Number of IPOs	4.6	4.5	4.4	5.3	-
IPO underpricing (%)	15.2	16.2	13.7	11.2	-
Relative cost of debt					
Corporate bond yield (%)	7.6	7.5	7.5	8.2	-
Business climate					
GDP growth p.a. (%)	3.1	3.0	3.0	4.2	-

Table 5. Multinomial logit of the choice between public and private equity and the status quo.

The dependent variable takes on three values denoting the three outcomes. The coefficients reported in the table measure the change relative to not raising outside equity. Variables are defined in Tables 1-4. The constant is not shown. heteroskedasticity-robust standard errors are reported in italics underneath the coefficient estimates. ***, **, and * indicate significance (two-tailed tests) at the 1%, 5%, and 10% level, respectively.

	Regression 1		Coeff.	Regression 2		Coeff.
	Public sellers (142 firms)	Private sellers (20 firms)	equal? (χ^2)	Public sellers (162 firms)	Private sellers (25 firms)	equal? (χ^2)
Company characteristics						
average earnings –3 to 0	–0.018**	–0.101**	*2.98**			
	0.009	*0.049*				
ln(average sales –3 to 0)	0.593***	0.823**	*0.81*			
	0.231	*0.334*				
earnings in year 0				0.001	–0.156***	*7.37****
				0.014	*0.060*	
ln(sales in year 0)				0.140	0.410	*1.26*
				0.214	*0.306*	
ln(age)	–0.038	–0.475	*4.26***	0.027	–0.304	*3.73**
	0.321	*0.356*		*0.204*	*0.239*	
Ownership						
D=1 if no majority owner	1.442*	–0.656	*3.61**	1.119	–1.400	*4.97***
	0.756	*1.291*		*0.918*	*1.403*	
D=1 if majority corporate-owned	0.570	1.067	*0.51*	–0.551	–0.424	*0.04*
	1.011	*1.133*		*0.614*	*0.791*	
D=1 if bank is shareholder	0.442	2.718*	*10.00****	–1.265	0.717	*9.63****
	1.278	*1.404*		*0.795*	*0.884*	
IPO motivation						
D=1 if plan primary sale	2.486***	1.649**	*1.94*	1.173**	–0.071	*5.55***
	0.675	*0.801*		*0.577*	*0.697*	
External conditions						
DAFOX return (%)	1.414	–0.843	*0.75*	1.524	1.505	*0.00*
	2.634	*3.312*		*2.160*	*2.981*	
ln(number of IPOs)	–0.595	0.142	*2.61*	–0.232	0.570	*5.04***
	0.565	*0.683*		*0.417*	*0.518*	
IPO underpricing (%)	0.074	0.054	*0.49*	0.041	0.015	*1.06*
	0.047	*0.053*		*0.032*	*0.038*	
GDP growth (%)	0.005	–0.385*	*5.51***	–0.073	–0.434***	*6.72****
	0.175	*0.215*		*0.134*	*0.166*	
Corporate bond yield (%)	–0.438	–0.129	*1.05*	–0.367	–0.010	*1.81*
	0.384	*0.453*		*0.291*	*0.355*	
Diagnostics						
coefficients zero by equation (χ^2)	31.7***	25.4**		30.8***	18.5	
all coefficients zero (χ^2)		52.2***			56.6***	
coefficients jointly equal (χ^2)			*20.7**			*29.6****
Pseudo-R^2		27.8 %			22.4 %	
Number of observations		**175**			**207**	

Table 6. Reported IPO withdrawal reasons.

The table uses company announcements and press reports to show why the 72 firms which raised equity privately or not at all withdrew their plans to go public. The table only reports answers for the firms that explicitly reported a reason for not raising equity publicly.

Entire sample	All non-IPO firms (72 firms)		Private sellers (43 firms)		Residual group (29 firms)	
Reason (not mutually exclusive)						
Poor company performance	35	48.6%	22	51.2%	13	44.8%
... of which: financial distress	*10*	*13.9%*	*5*	*11.6%*	*5*	*17.2%*
Poor industry performance	9	12.5%	3	7.0%	6	20.7%
Poor stock market conditions	3	4.2%	2	4.7%	1	3.4%
Internal disputes	2	2.8%	0	0.0%	2	6.9%
Did not meet lead bank requirements	1	1.4%	1	2.3%	0	0.0%
High cost of flotation	1	1.4%	1	2.3%	0	0.0%
Number of firms represented in table	72	100.0%	43	100.%	29	100.0%

Table 7. Operating performance after the IPO announcement.

The table reports selected company characteristics and performance variables during the three years after the IPO announcement, using the same variables as in Panel C of Table 1. In the final column, we test for differences between public and private sellers using a Wilcoxon signed-rank test for equality of medians. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

		Total sample (245 firms)		Public sellers (173 firms)		Private sellers (43 firms)		Residual group (29 firms)		Test: public=
		Median	N	Median	N	Median	N	Median	N	private
Sales										
Sales level (DEM m)	year 0	218.5	230	199.5	168	177.5	34	344.0	28	-
	year +1	239.5	230	231.6	170	168.3	37	408.8	23	-
	year +2	260.6	227	238.4	171	296.7	34	378.2	22	-
	year +3	247.4	215	226.3	167	249.0	29	343.9	19	-
Sales growth p.a. (%)	year –1 to 0	9%	208	8%	151	10%	31	8%	26	-
	year 0 to +1	7%	222	7%	167	2%	32	6%	23	**
	year +1 to +2	4%	221	5%	170	5%	31	1%	20	-
	year +2 to +3	2%	215	3%	167	1%	29	1%	19	-
Profitability										
Earnings (DEM m)	year 0	6.5	207	6.9	164	4.2	25	4.1	18	**
	year +1	6.1	208	6.4	170	3.1	26	7.6	12	***
	year +2	5.3	213	5.5	173	4.3	27	0.9	13	*
	year +3	6.2	201	6.6	168	3.7	21	3.5	12	**
Return on sales (%)	year 0	3%	202	3%	161	2%	24	2%	17	**
	year +1	2%	206	3%	169	1%	25	2%	12	***
	year +2	2%	209	3%	171	1%	25	0%	13	*
	year +3	2%	194	2%	164	1%	19	2%	11	***
Return on equity (%)	year 0	28%	186	28%	156	28%	17	27%	13	-
	year +1	28%	184	28%	160	26%	18	46%	6	-
	year +2	26%	180	28%	158	19%	14	3%	8	-
	year +3	23%	159	24%	146	-8%	6	20%	7	**

Table 8. External conditions after the IPO announcement.

The table reports the external conditions prevailing in the markets for stocks, IPOs, and bonds, as well as the economy in general, in the quarter before the final decision. All variables are as defined in Table 4. In the final column, we test for differences between public and private sellers using a standard *t*-test. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Means	Total sample (245 firms)	Public sellers (173 firms)	Private sellers (43 firms)	Residual group (29 firms)	Test: public =private
IPO and stock market climate					
DAFOX return (%)	2.1	3.6	0.7	–4.4	**
DAFOX volatility (%)	0.968	1.003	0.894	0.870	*
Number of IPOs	5.9	4.5	6.4	13.7	-
IPO underpricing (%)	12.9	13.7	9.8	13.0	**
Relative cost of debt					
Corporate bond yield (%)	7.5	7.4	7.5	7.8	-
Business climate					
GDP growth p.a. (%)	2.6	2.8	2.3	1.8	-

Table 9. Hazard estimates of the choice between alternative sources of outside equity.

We estimate firms' hazard rates of choosing between public and private sources of outside equity or not raising outside equity at all. The estimates are based on a Weibull proportional-hazards model with time-varying covariates. The model is estimated as a competing-risk model, where each firm is 'at risk' from each possible choice at every point in time. Choices are 'fully absorbing' in the sense that firms are no longer at risk once they have gone public, raised private equity, or publicly abandoned their capital raising plans. However, they remain at risk if they have made no announcement by the end of our sampling period (December 1999). The estimates are corrected for the resulting right-censoring. The dependent variable is time in days from announcement to exit. The independent variables are as defined in Table 1-4, though their timing differs: variables subscripted '*t*' are allowed to vary over time. We add the calendar year of the announcement and a dummy for the creation of *Neuer Markt* as independent variables. Accounting data is measured in annual intervals; all other time-varying data is measured quarterly. Underpricing and the number of IPOs is lagged one quarter; underpricing is a trailing average of initial returns over the previous four quarters (to correct for the zeros otherwise induced by quarters without any IPOs). The table reports estimated hazard ratios rather than coefficients. A hazard ratio greater than 1 indicates that an increase in the covariate increases the hazard. Robust standard errors are given in italics; they are corrected for firm-specific clustering over time. The asterisks refer to a test of the null that the hazard ratio equals one. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The model χ^2 tests the null that all hazard ratios equal 1. The pseudo-R^2 is defined as $1-\ell(X)/\ell(0)$ where $\ell(X)$ is the log-likelihood of the specification in question and $\ell(0)$ is the log-likelihood of a model without covariates.

	Spec. 1	Specification 2				Specification 3			
Exit category:	[all]	[all]	[public]	[private]	[residuals]	[all]	[public]	[private]	[residuals]
Company characteristics									
earnings$_t$ (DEM million)	1.020***		1.018***	1.005	1.001	1.018***			
	0.003		*0.003*	*0.014*	*0.021*	*0.003*			
ln(sales$_t$) (DEM million)	0.858**		0.842*	0.871	0.892	0.851**			
	0.067		*0.075*	*0.180*	*0.243*	*0.063*			
ln(age$_t$)	0.890		0.947	0.682	1.153	0.904			
	0.079		*0.089*	*0.164*	*0.963*	*0.075*			
Ownership									
D=1 if no majority owner	2.051	2.033				1.868			
	1.082	*1.052*				*0.926*			
D=1 if majority corporate-owned	0.859	0.850				0.853			
	0.259	*0.251*				*0.253*			
D=1 if bank is shareholder	0.424***	0.421***				0.375***			
	0.120	*0.114*				*0.115*			
IPO motivation									
D=1 if plan primary sale	1.537*	1.575*				1.498*			
	0.405	*0.391*				*0.368*			

External conditions									
DAFOX return$_t$ (%)	1.007		1.019**	1.000	0.736***		1.026***	1.004	0.801***
	0.007		*0.008*	*0.018*	*0.076*		*0.010*	*0.017*	*0.026*
DAFOX volatility$_t$ (%)	1.550*		2.286***	4.859*	0.001***		2.134**	4.731***	0.001***
	0.365		*0.610*	*3.932*	*0.002*		*0.653*	*2.621*	*0.001*
ln(number of IPOs$_t$)	1.398***		1.032	1.554	23.997***	0.908			14.571***
	0.180		*0.146*	*0.574*	*19.151*	*0.125*			*6.141*
IPO underpricing$_t$ (%)	1.016***		1.038***	1.032**	1.094***		1.123***	1.023***	1.077***
	0.004		*0.011*	*0.015*	*0.025*		*0.020*	*0.009*	*0.019*
'High' IPO underpricing$_t$ (%)							0.920***		
							0.015		
GDP growth$_t$ (%)	1.009		1.068	0.877	0.400	0.989			
	0.037		*0.047*	*0.132*	*0.401*	*0.044*			
Corporate bond yield (%)	1.236***		1.028	1.258	2.290***	1.304***			1.162
	0.086		*0.086*	*0.264*	*0.544*	*0.119*			*0.184*
Bank is shareholder × corp. bond yield (%)									1.176**
									0.081
Calendar-time effects									
Announcement year	1.128**	1.168***				1.193***			
	0.059	*0.062*				*0.063*			
D=1 if *Neuer Markt* in existence$_t$	0.056***	0.002***				0.011***			
	0.024	*0.003*				*0.010*			
Diagnostics									
Model χ^2	229.7***	993.0***				869.5***			
ln likelihood	–960.5	–901.5				–889.1			
Pseudo-R^2	15.8 %	21.0 %				22.1 %			
Weibull shape parameter	0.599	0.618				0.633			
Baseline hazards equal:									
Hazard ratio for Private sales	0.000***	0.000***				0.000***			
	0.000	*0.000*				*0.000*			
Hazard ratio for Residual group	0.000***	0.000***				0.000***			
	0.000	*0.000*				*0.000*			