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The Existence and Effectiveness of Price Support Activities in Germany – A Note^{*}

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Abstract

The overallotment or greenshoe option has become very popular in the German IPO market since its introduction in 1995 and is nowadays an important tool to stabilize IPOs or to issue additional shares in the case of excess demand. Besides providing evidence for the prevalence of price support activities by the underwriter we show that the greenshoe option which seems to be used to support overpriced offerings in the secondary market is not very effective in propping up aftermarket prices. Additionally, the market seems to decide quite early which firms are ‘losers’ and which are ‘winners’ in terms of stock market performance.

JEL Classification: G10, G12, G24, G32

Key Words: Initial Public Offerings (IPO), Price Support, Overallotment Option

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1 Introduction

The analysis on initial public offerings (IPO, hereafter) has been a major stream of research in corporate finance for over 30 years. Most research focuses on the explanation of underpricing, hot-issue-markets and long-run underperformance (Loughran and Ritter, 1995). Recently, researchers have discovered another, due to lack of data and lack of transparency, less explored puzzle of underwriter activities in the secondary markets to support or stabilize IPOs and therefore influence the IPO price performance (Aggarwal, 2000).

Aggarwal (2000) points out that a popular way of supporting IPOs during the first trading days is the combination of initially selling excess shares (e.g. 115%) and covering this short position using an overallotment option. This overallotment or greenshoe option, which has been named after the Greenshoe Manufacturing Company as this firm was the first to go public while using this type of a call option, allows the underwriter to buy additional shares (e.g. the 15% additionally sold) from the issuer at the issue price in order to meet excess demand. If on the other side demand is low and the stock price drops below the offer price the underwriter can, instead of using the greenshoe option, buy the stock in the secondary market and therefore support the performance of the IPO due to increased demand.

Franzke and Schlag (2002) stress that greenshoe options have become very popular in Germany and are nowadays announced in nearly all initial offerings. As this tool for supporting IPOs dominates not only the Germany New Issue Market it is interesting to analyze its effectiveness in stabilizing newly issued stocks and, additionally, to analyze the impact on return patterns during the first weeks of trading.

Before analyzing the usage of the greenshoe option for the first time we provide, following Ruud (1993), new evidence on underwriter price support by examining the distribution of first day returns. This analysis is supported by the study of the returns patterns during the first 30 trading days. In order to conduct this examination we group IPOs with an

initial return below 5% into different groups, as they are most likely supported by underwriter in the aftermarket (Aggarwal, 2000).

After providing some evidence for the presence of price support activities at the Frankfurt Stock Exchange we analyze the behavior of buy-and-hold returns of IPOs with initial returns during the first trading day between -5% and +5% and compare the results with IPOs with initial returns below -5%. In order to draw inference of the price impact of the overallotment we break down all IPOs into groups where the greenshoe option has been used, has not been used or has not been announced before the IPO. Summing up, we provide evidence, consistent with Aggarwal (2000), that the use of greenshoe options seems to be the tool to be used for stabilizing activities. Additionally, we provide evidence that overpriced IPOs decrease even more during the first 30 trading days and therefore support the idea of a negative cascade as discussed by Welch (1992).

The reminder of this paper is organized as follows. Section 2 provides a short overview of prior research and the reason why underwriter are supporting IPOs in the secondary market. Section 3 describes the data set and provides the empirical analysis for the existence of price support activities in Germany and the effectiveness of the overallotment with regard to price support by the underwriter. Section 4 concludes the paper.

2 What do we know about aftermarket price support?

Underwriters use price support to prop up aftermarket prices when the market price would decline without intervention (Schultz and Zaman, 1994). This argument is in line with the cascade theory discussed by Welch (1992), as potential buyers could change their mind in the absence of potential price support and therefore starting a negative cascade resulting in further price declines.

Aggarwal (2000) analyzes 114 IPOs between May to July 1997 and possesses information on each short market transaction and whether penalty bids are part of the contracts and if they have been assessed. Due to this unique dataset this is the first comprehensive analysis of underwriter activities in the secondary market. Aggarwal (2000) discusses and analyses 'pure' stabilization, aftermarket short covering and penalty bids and finds that the first type is never performed by the intermediary, as these transactions have to be identified due to SEC regulations, and that aftermarket short covering is the cardinal way to support newly issued stocks if they perform worse than expected.

Contrary to Aggarwal (2000) most researchers have had to estimate which IPOs are supported in the aftermarket or use indirect measures to identify stabilizing activities due to a lack of data.

Ruud (1993) bases her findings on the skewed distribution of the initial returns following the public offer. She discovers that instead of forming a symmetric curve centered over a positive mean, the distribution of one-day returns is found to peak rather steeply around a value close to zero and are heavily skewed to the right. We are therefore only able to observe the distribution of returns conditional on market stabilizations by underwriters, but not the unconditional return distribution, which means that relatively few IPOs sink much below their offering price immediately (Mihurko, 2000). Due to this, one could argue that the effect of such stabilizing activities is to reduce the number of negative initial returns from what would otherwise be observed.

Ruud (1993) uses a sample of 463 IPOs occurring in 1982 and 1983 in her analysis. She found that one-fourth of the sample has a first-day return of zero and that the one-day return is heavily skewed to the right but this skewness gradually decreases in the first four weeks of trading. This effect is interpreted as the steady removal of underwriter's price support.

Further evidence for the aftermarket support of IPOs is provided by Schulz and Zaman (1994). They split their sample which covers 72 issues in 1992, at each point in time into 'hot'

and ‘cold’ IPOs. The first group referred to offerings that trade above their offering price and the latter to IPOs that trade below their offering price. Schulz and Zaman (1994) find, by examining the dealer quotes, that underwriters spend 86.1 % of the time at the inside bid¹ for ‘cold’ issues but only 63.1 % of the time for ‘hot’ issues² by examining the aftermarket transactions from the first three trading days of 72 public offerings in 1992. Additionally, underwriters repurchase a surprising 20 % of their underwritten shares during the first three days of trading. The authors conclude that due to the volume of aftermarket repurchases, along with the exercise of overallotment options for ‘hot’ IPOs that stocks are supported in the aftermarket by permanently reducing the supply of shares.

Asquith et. al. (1998), using the data of 560 firm-commitment IPOs between 1982 and 1983, find that the cross-sectional distribution of one-day returns is modeled better as a combination of two distributions, with the parameter estimates on one distribution being consistent with underpricing and the other with price stabilization.

Hanley et. al. (1993) examine 1,523 firm-commitment IPOs between 1982 and 1987 and provide indirect evidence of the existence of market stabilization through the behavior of bid-ask spreads. In their model the investment banker’s stabilizing bid provides a put option to other dealers, therefore truncating losses at the floor price. An implication is that the put option reduces costs to market makers and therefore, *ceteris paribus*, IPOs undergoing stabilization should have narrower spreads. Supporting their model Hanley et al. (1993) find after adjusting for volume that the number of market makers, volatility, price and spreads are narrowest for IPOs that begin trading at prices 3 % below their offering price. Additionally, they found that for the aforementioned group of stocks, spreads widen and stock prices decrease over time. A similar result is found by Hedge and Miller (1989), who examined 540 IPOs for the 1983 to 1984 period. They find that spreads are narrower for recent IPOs than for other stocks.

¹ The inside bid is referred to the highest bid any trader will pay for the stock.

² A test for a difference in proportions between ‘hot’ and ‘cold’ IPOs yields a t-statistic of 3.64.

But who benefits from price support in the secondary market? Aggarwal (2000) points out that price support can reduce sales pressure created by flipping activities (i.e. investors who sell the stocks after a very short holding period) and is therefore beneficial for initial investors. As pointed out by Benveniste et. al. (1998), it is hard to see why underwriters should be willing to support issues in the aftermarket unless they clearly benefit from these activities directly in achieving profit or indirectly gaining a good reputation. They found, by examining the quantities sold in the first few trading days, that institutional trading is concentrated in the first day of trading and therefore conclude that the evidence is consistent with institutional investors being the primary beneficiaries of price stabilization effort. Partly in line with this argument would be Carter and Manaster (1990) who stated that overallotment options enables the underwriter to allocate additional shares of particularly attractive and oversubscribed shares to special clients. This would increase the underwriters prestige and reputation and also build a good client relationship. Smith (1986) discusses price support also in the context of underwriter's reputation, stating that if an investment bank follows a policy of repurchasing ex-post overpriced shares, his reputation for aftermarket support assures that the IPOs that are underwritten in the future are apparent ex-ante as less likely to be overpriced. Hanley et. al. (1993) argue that underwriters may be willing to purchase shares even if they expect a significant price decline to allow favored customers to return overpriced stocks. The reason underlying this argument is due to the fact that – at least in the United States – investors have the right to cancel an indication of interest or to renege even on firm orders within five trading days therefore giving underwriters a clear incentive to support issues in the after-market. This argument would also be in line with Welch's (1992) cascade theory, as the renege would most likely cause a negative cascade. Additionally, Hanley et. al. (1993) point out that the underwriters may believe that stabilizing an issue might convey the sale of shares, which have not been distributed during the subscription period, in the after-market. Finally, Tinic (1988) argues that aftermarket support minimizes legal liability with the possibility of

legal liabilities giving an incentive to underprice IPOs as well as a reason for supporting a stock in the aftermarket.

Given the above outlined reasons for the underwriters to support an IPO in the aftermarket and the fact that the greenshoe option has become so popular around the world it seems to be very important to analyze the effectiveness of this widely used tool. We focus, while analyzing the potential price impact of the overallotment for the first time, on the German stock market. But the results found below, should be transferable to any other developed stock market as well.

3 Empirical Analysis

3.1 Sample Description

We analyze the period 1997-2001 and all initial listings on the Frankfurt Stock Exchange across different stock market segments. Other studies on IPO-research in Germany mainly focus on the Neuer Markt, which has become extremely popular in the late nineties and has attracted even many foreign companies for their initial offering. Additionally, prior research covers a much smaller sample in terms of analyzed IPOs.

The overallotment option has been used in the IPO process for the first time in Germany in 1995, but before 1997 most information on the usage of the greenshoe was missing or little reliable. We exclude companies that have been traded at a different stock market before going public on the Frankfurt Stock Exchange have been excluded. 424 firms fulfilled our requirements but we could only obtain all necessary data, like the usage of the greenshoe option, for 410 firms.

As there are different but not always reliable compilations of Initial Public Offerings we use the web page and the Factbooks of the Frankfurt Stock Exchange and double check our list using the company's homepage or investor relations department, newspaper articles, the

IPO database of the newspaper ‘Börsenzeitung’, and the IPO database of the news provider OnVista. The information about the announcement of the greenshoe option are taken from the IPO Prospectus, the web pages of the ‘Börsenzeitung’, the company’s web pages and investor relations departments. The information about the usage of the overallotment option are taken from the web pages of the ‘Börsenzeitung’, ad-hoc information services, the company’s web pages and the investor relations departments. Therefore, this is the first time a comprehensive database of the usage of the greenshoe option has been collected and analyzed. “The secondary market prices are obtained from the KKMDB database at the University of Karlsruhe.”³

3.2 Analysis of the Price Support

In order to offer concrete evidence for or against the existence of underwriter price support it would be necessary to acquire information about which offers have been stabilized. Unfortunately, this information is, as for many other stock markets, not available for Germany. Therefore, following Ruud (1993) inference is drawn from the distribution of IPO returns⁴. If IPOs were underpriced deliberately this should lead to a bell-shaped curve with the peak of the distribution centered on a positive mean. Figure III shows that initial returns peak rather steeply around zero, and that the negative tail of the distribution is significantly curtailed. Relatively few IPOs fall much below their offer price.

It is apparent that the log-returns are not symmetrically distributed and that a relative high number of IPOs have first-day returns close to zero, which may be due to this censoring effect. The skewness and kurtosis are 1.3071 and 4.0198, respectively. These findings have been confirmed for other stock markets as well. For example, Keloharju (1993) reports that

³ We thank Hermann Göppl for providing the data.

⁴ An analysis of underwriter price support using Ruud’s (1993) analysis has been conducted for the German market by Kaserer and Kempf (1995) who found no support for stabilizing bids by the underwriter. Mihurko (2000) analyzing the German ‘Neuer Markt’ over the period 1997 to 2000 found evidence for stabilizing activities by the underwriters.

over the period 1984 to 1989 that initial returns in Finland are skewed to the right and have excess kurtosis. Kaserer and Kempf (1995) also report high skewness and excess kurtosis for Germany for the period 1983 to 1992.

Please insert Figure I around here

Ruud (1993) finds in her analysis by covering a sample of 463 IPOs over the years 1992 and 1993, that 25% of the sample has a first-day return of zero and that the one-day return is heavily skewed to the right. However, this skewness gradually decreases in the first four weeks of trading. This effect has been interpreted as steady removal of underwriter's price support. The distribution of IR1, which is calculated as the division of the first day closing price by the IPO offering price, is shown in Figure I.

As noted above, in order to be consistent with the price support hypothesis proposed by Ruud (1993), one should expect a steady decline of skewness in the aftermarket. Table VII gives a summarized overview about the distribution of the IPO log-returns over the first 30 trading days.

Please insert Table I around here

Skewness, which is based on the third moment of the distribution, declines with the number of trading days. The sharp decline during the first 10 trading days suggests that underwriter price support decreases over time. The mean is relatively constant over the first 30 trading days, whereas the minimum drops already in the first week and again sharply in week two, three and five suggesting the removal of underwriter price support in the secondary market. Therefore, it seems to be reasonable to argue that underwriters do not support the issue constantly but time their actions.

Chung, Kryzanowski and Rakita (2000) find, based on summary measures, that skewness is positive and always significantly different from zero at the 1% level during the first four weeks. The third moment about the mean peaks during the first day of secondary market trading and decreases steadily afterwards.

Fama (1976) finds that monthly stock returns measured in logs are, in contrast to daily log-returns, positively skewed and close to normal in terms of kurtosis. The above stated results are nearly consistent with Fama's findings, whereas the daily log returns are neither consistent with neither Fama's (1976) nor Peiró's (1999) results.

In order to shed more light on the price support puzzle we are going to have a closer look at those IPOs which are commonly supposed to be price supported in the secondary market by the underwriter. The literature generally proxies for price supporting activities for initial offerings which trade below or at the offering price. Aggarwal (2000) on the other side points out that IPOs which trade slightly above the offer price are as well supported by the underwriter to reduce the risk of dropping below this important bound. Additionally, Ruud (1993) finds that in her sample 95% of the initial returns lie between -5% and $+5\%$. Summing up, we first analyze the dynamic return behavior during the first 30 trading days by grouping IPOs into quantiles with initial returns below 5% , below -5% , between -5% and $+5\%$, and between -5% and 0% . In order to accommodate this selection process we divide the first day opening and closing price by the offer price. Focusing, as is normally done, solely on the first day closing price would lead to a biased analysis as firms who start poorly are most likely supported during the first trading day to avoid a negative cascade. One drawback of this methodology is that 11% of the analyzed firms are counted twice as they start for example with an initial return below -5% and close at $+1\%$ at the end of the first trading day. This leads to a slight convergence of the analyzed return patterns, but on the other side grouping these 21 firms manually would lead to subjective results.

Please insert Figure II around here

Ruud (1993) found that only 8% of IPOs with zero first-day returns exhibit one-week subsequent returns greater than 5% and additionally that 69% of IPOs with zero first-day return exhibit zero or negative one-week returns. Figure IV shows that firms with an return between -5% and $+5\%$ during the first day trade slightly below zero during the analyzed period and start to increase at the end of the examined time range. The increase of this overpricing supports Aggarwal's (2000) findings that firms with slightly positive returns are being supported during the first trading days, too. IPOs which could be considered as very 'cold' offerings (initial return below -5%) decrease rather steeply during time which highlights the possible existence of a negative cascade effect as in Welch (1992). Surprisingly, there is a clear increase in the return pattern of these stocks at day 28 and 29 which leads to the conclusion that underwriters start a last desperate bid to push up the stock returns. This would be contrary to Ellis, Michaely and O'Hara (2000) who report that IPOs are supported by the underwriter on average during the first 21 trading days.

Aggarwal (2000) points out that underwriter mostly use short sellings to support IPOs during secondary market trading. In order to facilitate this they sell more shares than initially offered by the issuer, e.g. 115 %. This overallotment can lead to two possible scenarios: First, the market price drops below the offer price in this case the underwriter buys the securities back in the secondary markets to cover the short position. Second, the market price is above the offer price, now the short position can be covered by using the greenshoe option (i.e. buying additional stocks from the issuer). As the gross margin depends on the shares distributed the only situation in which an underwriter would not exercise the greenshoe option is if he has to support the IPO through purchasing stocks in the open market. Therefore, in order to shed more light on how underwriter possible support IPOs and on how the usage of

the overallotment option affects the returns patterns, we focus on offerings where this derivative has been announced initially but not exercised afterwards.

Please insert Figure III around here

Inspecting the return pattern of newly public firms with an initial return during the first trading days between -5% and $+5\%$ it becomes apparent that IPOs where the greenshoe has been used perform much better than firms where it has not been exercised. This is quite surprising as the usage of the total overallotment option leads to the conclusion that these firms have not been supported by the underwriter, at least not using this derivative. For offerings where the underwriters have covered the short position through purchasing stocks in the secondary market show a clear decreasing trend of the stock returns. Therefore, one has to conclude that the market decides quite early which stocks are so called ‘winner’ and therefore worth buying and stocks and which are ‘losers’ and therefore less attractive. Analyzing offerings with an initial return being below -5% shows again that price support of the underwriter by using the overallotment option does not seem to be very effective. Rather surprising is the fact that the greenshoe has been used in three cases representing 7% of this quantile and therefore additional shares have been bought at the issue price by the underwriter.

Having a closer look at the usage of the greenshoe option shows that for 83% of all IPOs with an overpricing of more than 5% and for 49% of all IPOs with an initial return between -5% and $+5\%$ the greenshoe has not been used by the underwriter to cover his short position. Therefore we can conclude that the overallotment option is indeed quite often used to support newly listed firms in the secondary market, but seems not to be very effective in terms of pushing up the share price and therefore avoiding a negative price trend. Concluding the analysis of potentially stabilized IPOs it should be noted that offerings with no greenshoe

announced exhibit a more random pattern and therefore one could conclude that this option has at least some stabilizing impact on the return patterns during the first trading days.

4 Conclusion

As the overallotment option has become very popular in Germany and is nowadays included in nearly every new issue, we analyze the effectiveness of this tool and its impact on the return pattern during the first trading days for the first time. Additionally we provide evidence for the prevalence of price support activities in Germany by the underwriter while examining the distribution of first-day returns, and especially negative or zero first-day returns.

In line with Aggarwal (2000), we find that the greenshoe option seems to be the tool for price stabilizing activities. In addition, we have to conclude from our analysis of the greenshoe usage that short covering does not seem to be very effective in supporting IPOs in the secondary market. In line with Arosio et. al. (2000), we therefore have to conclude that a small group of IPOs are immediately pointed out by investors as a not profitable investment and consequently do not benefit from price support. It seems, by analyzing the return patterns, that the market decides quite early which stocks are worth buying and which not.

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Figure I
Histogram of first day returns

The sample covers the 1997 – 2001 period and 410 firm. The initial public offerings were taken from the Frankfurt Stock Exchange web pages and Factbooks and always double checked with the company's prospectus, homepage or investor relations department, the IPO database of the 'Börsenzeitung' and the IPO database of OnVista. The *initial return* (IR1) returns are calculated as $\ln(P_t/P_{\text{offer}})$, where P_{offer} is the offering price at the end of the bookbuilding range and P_t is the first day closing price.

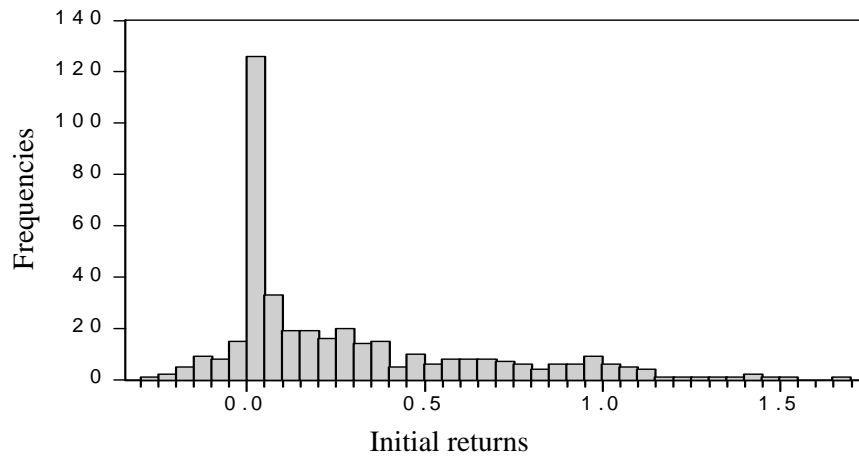


Table I**Characteristics of the holding period returns for the first 30 trading days**

The sample covers the 1997 – 2001 period and 410 firm. The initial public offerings were taken from the Frankfurt Stock Exchange web pages and Factbooks and always double checked with the company's prospectus, homepage or investor relations department, the IPO database of the 'Börsenzeitung' and the IPO database of OnVista. Initial returns (IR_t) are calculated as $\ln(P_t/P_{\text{offer}})$, where P_t is the market price at time t , which ranges from 0 (offer price at day 1) to 30 (closing price at day 30), and P_{offer} is the offer price at the end of the bookbuilding period.

	IR₀	IR₁	IR₅	IR₁₀	IR₁₅	IR₂₀	IR₂₅	IR₃₀
Mean	0.2739	0.2752	0.2812	0.2756	0.2728	0.2730	0.2728	0.2761
Median	0.1196	0.1233	0.1806	0.1611	0.1651	0.1521	0.1729	0.1533
Maximum	1.6740	1.6740	1.9640	1.8871	2.1715	2.0020	1.9923	2.1747
Minimum	-0.2877	-0.2877	-0.4249	-0.5798	-0.6229	-0.7687	-1.0554	-1.1632
Std. dev.	0.3680	0.3679	0.4049	0.4366	0.4701	0.4703	0.4938	0.5212
Skewness	1.3158	1.3071	1.1476	0.9378	1.0803	0.8603	0.7889	0.7479
Kurtosis	4.0360	4.0198	4.2797	3.5889	4.3259	3.6334	3.6682	3.7468

Figure II
Time pattern of holding returns of IPOs

The sample covers the 1997 – 2001 period and 410 firm. The initial public offerings were taken from the Frankfurt Stock Exchange web pages and Factbooks and always double checked with the company's prospectus, homepage or investor relations department, the IPO database of the 'Börsenzeitung' and the IPO database of OnVista. The initial return ($IR(t)$) is calculated as $\ln(P_t/P_{offer})$, where P_t is the market price at time t , which ranges from 0 (offer price at day 1) to 30 (closing price at day 30), and P_{offer} is the offer price at the end of the bookbuilding period. IPOs are grouped into quantiles with an initial return ($IR1$ or $IR0$) below 5%, below -5%, between -5% and +5%, and between -5% and 0%

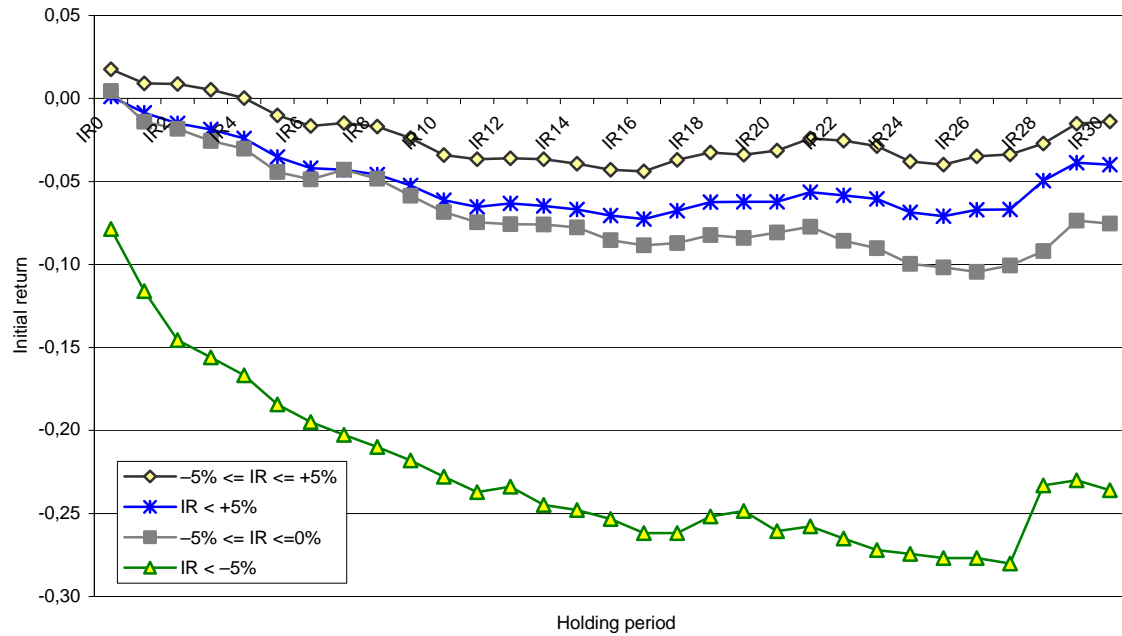


Figure III

Time pattern of holding returns of IPOs and the use of the Greenshoe option

The sample covers the 1997 – 2001 period and 410 firm The Initial Public Offerings were taken from the Frankfurt Stock Exchange web pages and Factboos and always double checked with the companies prospectus, company's homepage or investor relations department, the IPO database of the 'Börsenzeitung' and the IPO database of OnVista. The initial return ($IR(t)$) is calculated as $\ln(P_t/P_{offer})$, where P_t is the market price at time t , which ranges from 0 (offer price at day 1) to 30 (closing price at day 30), and P_{offer} is the offer price at the end of the bookbuilding period. IPOs are grouped into quantiles with an initial return (IR1 or IR0) below 5%, below -5%, between -5% and +5%, and between -5% and 0%. 'GS used' and 'GS not used' refer to the situation in which the greenshoe (GS) option has been exercised and not exercised, respectively. For some IPOs no overallotment option has been announced in the prospectus which has been labelled 'no GS announced'.

