Investor demand for stocks in Initial Public Offerings and their price behaviour after debut. Evidence from Poland

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Abstract

This article investigates the relationship between investor demand during an IPO and the long-term behaviour of share prices following a company's stock market debut. Specifically, the study examines the impact of the demand observed during the public offering and the size of the offering on abnormal return rates for a sample of 116 IPOs on the Warsaw Stock Exchange between 2012 and mid-2022. The primary research hypothesis tests whether the medians of abnormal return rates, influenced by these factors, are statistically significant over several time intervals ranging from 3 to 12 months after the debut. The findings confirm that certain information from the completed public offering, particularly the relatively low number of new shares offered, plays a significant role in predicting abnormal changes in share prices during these periods. This research offers valuable insights for investors, emphasising the key factors within the IPO process that can influence the trajectory of share prices following a company's market debut.

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Introduction

A new company stock exchange debut combined with a public offering of its shares is a major event and an opportunity to explore the wealth of company information. Thanks to the knowledge a prospectus carries, as well as numerous media statements of the executives and analysts, both during the debut and offering process, institutional and individual investors are provided with the basis to value the company and its development prospects. At the same time, the company's executives and owners provide their own company valuation and information on how many funds they expect the company to raise in issuing shares, as well as how many funds (if any) will go to the existing shareholders selling their shares in the public offering process. Valuations from both sides (the company and investors) come together in the book building and subscription process.

It is typically only after these stages are completed that the company executives may come up with the final price per share and the final number of offered shares: new shares as well as those offered by the existing shareholders. In this manner, the actual demand for shares in a public offering can be determined. In preparing for the analysis, a handful of public offerings for shares were examined, and a Demand Index was calculated for each of them. The Index was defined as an Index of funds actually raised in the offering versus the expected proceeds from the sale of new shares and those offered by company owners.

$$\text{Demand Index} = \frac{P_f \cdot S_f}{P_m \cdot S_m} \tag{1}$$

where: P_f is the final price for shares offered and S_f is the actual number of shares offered (new and existing shares sold by their existing shareholders), determined following the book building process; P_m is the maximum price for shares offered and S_m is the maximum number of shares offered (new and existing shares sold by their existing shareholders), determined before the book building process and provided in the prospectus.

From an observer's perspective, very high values of the Demand Index may indicate high interest in the shares in the public offering, which may show the investors' belief in the company's further development. On the other hand, low values of the Demand Index (issue price being markedly lower than the maximum and/or sale of fewer shares than the offerors expected) may show the investors' interest in the offering was low. Therefore, information on the Demand Index value may motivate observers to decide to buy shares after the offering is completed, when the stock exchange trading of company shares begins.

Another interesting index, the value of which may also be an argument for buying shares from the market after the offering is completed and trading in shares

begins, is the Offering Size Index. It is the ratio of newly issued shares under public offering versus the total number of shares in the company.

$$\text{Offering Size Index} = \frac{\text{NS}_m}{\text{TS}}$$

(2)

where: NS_m is the maximum number of newly issued shares as per the prospectus; TS is the number of all the shares of the company before the issue of new shares.

A low value of the Offering Size Index may demonstrate that the company does not intend to largely dilute the existing shareholding but rather intends to raise capital (in most cases, to accelerate its growth and, consequently, to boost its future value). The lower the Index value, the lower the company's capital needs. In turn, high values of the Index show the company is willing to raise relatively ample funds to foster development while ignoring a significant dilution of the existing shareholding.

This paper aims to examine the relations between information from the completed public offering and the long-term share price behaviour after the offering is completed and the shares become publicly traded, that is to say, following the debut.

This study holds significant practical implications for investors considering purchasing shares after the debut, when they already possess information about how the IPO has unfolded. Investors can make decisions to buy shares during the company's first trading session based on publicly available information regarding the IPO itself and assess the likelihood of achieving returns in the medium to long term, up to one year following the debut.

The decision-making process for investors immediately after the company's public debut is facilitated by information about demand during the public offering, which is a key factor in the subsequent valuation of shares on the stock market. Three studies were conducted to examine the relationship between the value of the Demand Index and the Abnormal Return Rate of share prices. This analysis looked at price changes from the end of the first trading session to intervals of three months, six months, nine months, and one year post-debut. The abnormal rate is understood as being higher or lower than the expected return rate, whereby the expected return rates are equated with changes in stock market indices at the same time. Additionally, the study explored the relationship between share price change and the value of the Offering Size Index. Ultimately, various combinations of both the indexes were analyzed to assess their combined effect on share price fluctuations.

An overall hypothesis, examined in three variants, assessed whether the information provided by the company following its public offering significantly impacts share price behaviour over time. This analysis covered the period from the

end of the first stock exchange session to selected intervals ranging from three months to one year.

Interest was taken in abnormal, higher or lower than expected, return rates on shares and their correlation with the type of information derived from the public offering. The studies were conducted using the event study method, including statistical analysis.

The subsequent sections of the paper present a literature review, a description of the data used and the timeframes covered, along with an explanation of the research methodology. Following that, the three studies, their results and the conclusions drawn are presented.

1. Literature review

IPOs have been the focus of extensive research, with most studies examining first-day return rates and the occurrence of underpricing. Numerous authors (Khurshed et al., 2009; Kim et al., 1995; Sullivan & Unite, 1999; Vong, 2006) have confirmed the existence of this phenomenon. Several theories have been proposed to explain IPO underpricing, such as the signaling hypothesis by Leland and Pyle (1977), Rock's information asymmetry model (Rock, 1986), as well as theories related to institutional reasons and deliberate underpricing (Taranto, 2003). In the context of the Polish market, Śliwiński et al. (2022) conducted notable research demonstrating that the issuer's industry influences the level of underpricing. Additionally, Żyła (2022) provides a comprehensive literature review on IPOs, further enriching the understanding of this topic.

Share price behaviour following the very stock exchange debut is yet another issue. Two areas of study can be identified here. The first one concerns shares listed at a significant premium to the issue price. In this way, investors are capable of reaching an abnormally high rate of return versus the benchmark (Kuklinski & Schiereck, 2007; Purnanandam & Swaminathan, 2004; Ritter, 1984). The second study shows that underpricing of IPO companies persists in the long term. In their studies, Hoechle and Schmid (2008) showed that return rates on the shares of companies making their IPO are much worse in the first year following the debut (although this phenomenon does not occur after that year). Jaskiewicz et al. (2005) found that worse performance normally holds for three to five years post-debut.

It is precisely long-term lower return rates on shares following IPO that were given vast coverage in the literature (Bessler & Thies, 2007; Firth, 1997; Megginson et al., 2000; Omran, 2005; Sohail & Nasr, 2007). Certain researchers, e.g. Hensler et al. (1997) also examined the determinants for weak IPO performance. It was found

that characteristics of companies at the moment of issue have a predictive impact on the later price curve. In turn, Jaskiewicz et al. (2005), analysed 153 German and 43 Spanish IPOs in the years 1990–2000 and they found that three years following IPO, the return was on average –32.8% in Germany and –36.7% in Spain. They also proved that the size and age of the company going public, as well as the family influence, largely affect worse performance over the long term. Bhabra and Pettway (2003) found that prospectus information, e.g. pre-IPO profitability, R&D, relative size of the offering, company size and the number of risk factors named in the offering document, helps to anticipate post-IPO long-term performance. They also evidence that weaker post-debut returns are more severe for smaller and younger businesses than for big and mature companies. The size of the offering, level of underpricing, insider retention, industry affiliation and IPO period are statistically significant (and positive) in accounting for long-term share price behaviour (Hensler et al., 1997). Houge et al. (2001) found that, in the long term, IPOs exhibit low performance and higher uncertainty.

Furthermore, Aggarwal and Rivoli (1990), along with Aggarwal et al. (2008), presented an intriguing study demonstrating that IPOs with high pre-debut investor demand tend to experience lower long-term returns on their shares. This suggests that strong initial demand can negatively impact a company's stock performance over time.

This paper complements the literature with studies on return rates over various periods following the IPO, taking into account information from the subscription summaries made by investors on the Polish market.

2. Data and methods

The period from early 2012 to mid-2022 was analysed, during which a total of 119 cases of public offerings were examined that resulted in a debut on the main market of the Warsaw Stock Exchange (WSE). Both new companies entering the WSE main market with equity offerings and companies migrating from the WSE's alternative market, known as NewConnect (NC), to its main floor with simultaneous equity offerings were taken into account. The selection of IPOs was made based on the following criteria:

1. The IPO company has completed the offering.
2. The IPO had to be successful and the company's shares had to be admitted to trading on the WSE main (regulated) market.
3. The equity offering could include new shares but also existing shares belonging to existing shareholders, or only existing shares.

4. In the second and third studies, scenarios where only existing shares were offered were excluded, as it is not possible to calculate the value of the Offering Size Index in such cases.
5. The company's quotation may not have been considerably distorted throughout the analysed period due to factors such as tender offers, trading suspensions or other events that withhold trading activities or force certain behaviours of stock trading investors.

A total of 116 research cases that met the aforementioned criteria were identified. The sample examined includes nearly all companies that initiated an IPO on the Warsaw Stock Exchange between 2012 and mid-2022. The period was selected due to the availability and reliability of data. Prior to 2012, gathering consistent and trustworthy data for IPOs on the Warsaw Stock Exchange proved to be problematic. It is also important to note that companies transitioning from NewConnect to the main market with a new share offering were considered just as relevant as those launching an IPO for the first time. This is because the characteristics of the NewConnect market previously made it difficult for the majority of large institutional investors, particularly investment funds, to purchase shares in these companies. The study also lacks data on the actual demand from investment funds and the extent of any reductions, as this information is unavailable.

Information derived from completed public offerings may affect the post-debut share price over the following months to a year or more. Thus, a hypothesis was analysed to corroborate the statistical significance of this information on abnormal post-debut share price changes.

In this way, a null hypothesis H_0 and an alternative hypothesis H_1 were formulated.

H_0: The medians of abnormal return rates on investment in the shares of companies, irrespective of the demand observed during the public offering or the size of the offering, are not statistically significantly different from zero in the studied intervals of several to a dozen or so months after the debut.

H_1: The med+-ians of abnormal return rates on investment in the shares of companies, influenced by the demand observed during the public offering and the size of the offering, are statistically significantly different from zero in the studied intervals of several to a dozen or so months after the debut.

With the hypothesis formulated in this manner, return rates were examined in relation to three types of information derived from completed public offerings: the Demand Index, the Offering Size Index, and a combination of the two. Additionally, the study explored their relationship with abnormal return rates, defined as the

actual positive or negative differences in share price changes compared to the expected price changes indicated by index fluctuations at that time.

Return rates were calculated from the moment of buying shares at the end of the company's first trading session to the point of selling them at 3, 6, 9, and 12 months after the debut. The expected rates of return, referred to as the benchmark, were defined as the rates of return on investment in particular stock indexes during the same period. For each case, one of four indexes was selected for comparison:

– WIG20 for big companies,
– mWIG40 for medium-sized companies,
– sWIG80 for smaller companies,
– and WIG for the remaining companies.

The size of each company was determined and assigned to the appropriate index by comparing its capitalisation at the time of debut with the average capitalisation of companies in the respective indexes.

On the other hand, information was taken into account from the two Indexes studied separately and jointly. Therefore, whether the hypothesis was confirmed or rejected was tested in three configurations: studies A, B and C.

Study A

Auxiliary hypothesis: high values of the Demand Index have a statistically significant effect on the return on investment in the shares of post-debut companies over selected periods ranging from several to a dozen or so months.

In this study, all the research cases were included (a total of 116). In turn, the Demand Index values were divided into 4 groups:

1. up to 50% (the final value of the public offering was lower than half of the value the company and its owners expected). Sample size: 30 research cases.
2. 50–75%. Sample size: 24 research cases.
3. 75–90%. Sample size: 32 research cases.
4. 90–100% (the final value of the public offering was the same or almost the same as the value the company and its owners expected). Sample size: 30 research cases.

For each of the ranges, the statistical significance of abnormal return rates was examined for the periods running from the end of the first trading session to the end of sessions after the 3rd, 6th, 9th and 12th month following the debut. Thus, a total of 16 variants were analysed for this study.

Study B

Auxiliary hypothesis: low values of the Demand Index have a statistically significant effect on the return on investment in the shares of post-debut companies over selected periods ranging from several to a dozen or so months.

In this study, only research involving offerings with newly issued shares was included, as the Offering Size Index is calculated as the ratio of newly issued shares under public offering versus the total number of the company's shares. Out of the 116 companies in the sample, 91 had offerings with newly issued shares, while the remaining companies offered only existing shares.

In turn, the Offering Size Index values were divided into 4 groups:

1. up to 16% (the number of shares of the new issue was lower than 16% of the number of total shares of the company before the issue). Sample size: 22 research cases.
2. 16–25%. Sample size: 24 research cases.
3. 25–35%. Sample size: 22 research cases.
4. from 35% (the number of shares of the new issue was greater than 35% of the company's total shares before the issue). Sample size: 23 research cases.

For each of the ranges, the statistical significance of abnormal return rates was examined for the periods running from the end of the first trading session to the end of sessions after the 3rd, 6th, 9th and 12th month following the debut. Thus, a total of 16 variants were analysed for this study.

Study C

Auxiliary hypothesis: high values of the Demand Index combined with low values of the Offering Size Index have a statistically significant effect on the return on investment in the shares of post-debut companies over selected periods ranging from several to a dozen or so months.

In this study, only research cases being equity offerings with newly issued shares were included. Out of the 116 companies in the sample, a total of 91 such cases were identified, as the remaining companies offered only existing shares, making it impossible to calculate the Offering Size Index, similarly to the limitation applied in Study B. In turn, the values of the two indexes were classified into 9 joint ranges which is presented in Table 1 for clarity.

Case three was not examined (up to 20% of the Offering Size Index value combined with up to 60% of the Demand Index value) as the sample size of research

Table 1. Classification into ranges of values of the Demand and Offering Size Indexes

Range of Offering Size Index value (%)	Range of Demand Index value (%)	Sample size of research cases
up to 20	from 90	10
up to 20	60–90	15
up to 20	up to 60	5
20–33	from 90	10
20–33	60–90	13
20–33	up to 60	9
from 33	from 90	7
from 33	60–90	9
from 33	up to 60	13

Source: own analysis.

cases was very low (5 cases). For each of the ranges, the statistical significance of abnormal return rates was examined for the periods running from the end of the first trading session to the end of sessions after the 3rd, 6th, 9th and 12th month following the debut. Thus, 32 variants were analysed for this study.

All of the studies and their variants were conducted in a similar fashion. In order to arrive at a result that enables rejecting the null hypothesis H_0, the Wilcoxon matched-pair test was employed. Additionally, an analysis was conducted to explore the relationships between the Demand Index, Offering Size Index and abnormal return rates over the selected time intervals. This analysis aimed to determine how changes in these indices relate to post-IPO share price behaviour, allowing for a deeper understanding of the factors affecting abnormal returns beyond just their statistical significance. Corroboration was opted at $\alpha = 5\%$ and $\alpha = 10\%$ significance levels.

In each of the three studies (A, B and C), Abnormal Return Rates for all the research cases (companies making their debut) were first calculated with respect to each study variant (that is, for each combination of the range of index, or indexes, and each of the four periods determined in months from the debut date). Abnormal return rates follow the equation:

$$AR_{i,t} = SR_{i,t} - IR_{i,t} \tag{3}$$

where: $AR_{i,t}$ is the abnormal return rate on the shares of the company i over the analysed period t; $SR_{i,t}$ is the return rate on the shares of the company i from between the end price of the first trading session P_{i,t_1} and the company's i share price following the analysed period t $P_{i,t}$.

Thus, the return rate $SR_{i,t}$ was determined as follows:

$$SR_{i,t} = \frac{P_{i,t} - P_{i,t_1}}{P_{i,t_1}} \tag{4}$$

In turn, $IR_{i,t}$ from Equation (3) is the rate of return based on the index relevant to company i over the same period. It is determined similarly to $SR_{i,t}$, except that instead of the price, the value of the index at the end of the day of the first trading session t_1 of company $I_{i,t}$ and following the period t under analysis ($I_{i,t}$) are taken into account. The rate of return based on the index is expressed by the following equation:

$$IR_{i,t} = \frac{I_{i,t} - I_{i,t_1}}{I_{i,t_1}} \tag{5}$$

Next, the research case groups were analysed using the Wilcoxon matched-pair test. In almost all of the variants studied, the sample size of research cases did not exceed 30, so after assigning ranks and calculating the test statistic, tables were used for this test to show the critical value. For the only case comprising 32 companies, a Z test statistic was used. The statistic does not include corrections for tied ranks, as none were identified for the case.

The aim of this operation was to demonstrate statistical significance at the levels of $\alpha = 5\%$ and $\alpha = 10\%$ of abnormal return rates.

3. Results

The research work was classified into three studies. The research regards the abnormal return rates being dependent on indexes describing the completed public offering. Thus, the results will also follow such a classification.

Study A

The first analysis examined whether demand for shares during the IPO, as indicated by the Demand Index, influences the emergence of abnormal return rates after 3, 6, 9, and 12 months. The demand for shares was measured under 4 ranges of the Demand Index value. The data are included in Table 2.

Table 2. Identification of abnormal return rates depending on the value range of the Demand Index

Range of Demand Index value (%)	Time from the debut (in months)	Sample size for the N variant under analysis	Greater rank sum	Test statistic	Limit for the critical region $\alpha = 5\%$	Limit for the critical region $\alpha = 10\%$	Reject the null hypothesis	Median of abnormal return rates (%)
90–100	3	30	negative	$T = 206$	137	152	no	−1.7
90–100	6	30	negative	$T = 209$	137	152	no	−2.2
90–100	9	30	negative	$T = 184$	137	152	no	−5.1
90–100	12	30	negative	$T = 184$	137	152	no	−6.5
75–90	3	32	positive	$Z = -2.1317$			no	4.4
75–90	6	32	positive	$Z = -0.4114$			no	3.6
75–90	9	32	positive	$Z = -0.4114$			no	1.0
75–90	12	32	positive	$Z = -0.2431$			no	3.6
50–75	3	24	negative	$T = 108$	81	92	no	−4.5
50–75	6	23	negative	$T = 102$	73	83	no	−6.2
50–75	9	22	negative	$T = 75$	66	75	yes for $\alpha = 10\%$	−12.8
50–75	12	22	negative	$T = 63$	66	75	yes for $\alpha = 5\%$	−24.7
up to 50	3	30	negative	$T = 152$	137	152	yes for $\alpha = 10\%$	−6.0
up to 50	6	29	negative	$T = 177$	127	141	no	−7.2
up to 50	9	29	negative	$T = 175$	127	141	no	−5.2
up to 50	12	28	negative	$T = 140$	112	130	no	−11.7

Source: own analysis.

The null hypothesis H_0 could only be rejected in three of the tested variants in favour of the alternative hypothesis H_1. In two of these three cases, the value of the test statistic was equal to the critical value for the weaker significance level of 10%. Moreover, for the variants with the rejected hypothesis, in the remaining periods (months) the null hypothesis could not be rejected.

For these reasons, the conclusion is that it would be too hasty to draw any conclusions about the correlation of abnormal returns with the values of the Demand Index. Therefore, the assumption is that, regardless of the range of the Demand Index values, the null hypothesis cannot be rejected within the analysed periods, ranging from a few to a dozen or so months from the debut.

Study B

In the second study, an examination was conducted to determine whether the ratio of the number of new issued shares offered to the number of all company shares, expressed by the Offer Size Index, affects the occurrence of abnormal rates of return after 3, 6, 9 and 12 months. The said ratio of the number of shares was presented in 4 ranges of the Offer Size Index.

For the value of the Offer Size Index not exceeding 16%, in all analysed periods, i.e. 3, 6, 9 and 12 months from the debut, abnormal rates of return were statistically significantly different from zero. Therefore, the null hypothesis is rejected for these tested values and periods.

In addition to the Wilcoxon test, further analysis was conducted to explore the relationship between the Offering Size Index and abnormal return rates. The analysis confirmed a negative relationship between the size of the new share offering (up to 16%) and abnormal returns in the periods studied. Comparing the sums of negative and positive ranks, it can be concluded that in these cases, the median abnormal returns were negative.

Significantly statistically abnormal rates of return also occurred for an isolated case of the Bid Size Index values ranging from 25% to 35%, but only for a period of 12 months. Due to the fact that similar relationships have not been confirmed for shorter periods, this result is not taken into account in the general conclusions presented below.

The following conclusion can be stated: the low ratio of the number of newly issued shares (up to 16%) to all company shares before the debut is important information for investors, as it has a significant impact on achieving negative rates of return calculated from the purchase of company shares at the end of the session on the debut day to their sales after 3, 6, 9 or 12 months. The data are included in Table 3.

Table 3. Abnormal rates of return depending on the Bid Size Index range

Range of Offer Size Index (%)	Time from the debut (in months)	Sample size for the N variant under analysis	Greater rank sum	Test statistic	Limit for the critical region $\alpha = 5\%$	Limit for the critical region $\alpha = 10\%$	Reject the null hypothesis	Median of abnormal return rates (%)
up to 16	3	22	negative	41	66	75	yes for $\alpha = 5\%$	−11.6
up to 16	6	20	negative	39	52	60	yes for $\alpha = 5\%$	−22.8
up to 16	9	21	negative	47	59	68	yes for $\alpha = 5\%$	−26.2
up to 16	12	21	negative	53	59	68	yes for $\alpha = 5\%$	−32.7
16–25	3	24	negative	138	81	92	no	1.8
16–25	6	24	negative	125	81	92	no	−3.5
16–25	9	23	negative	112	73	83	no	−6.0
16–25	12	22	negative	108	66	75	no	−4.0
25–35	3	22	negative	104	66	75	no	−1.8
25–35	6	22	negative	93	66	75	no	−2.6
25–35	9	21	negative	70	59	68	no	−10.9
25–35	12	21	negative	44	59	68	yes for $\alpha = 5\%$	−15.5
over 35	3	23	negative	129	73	83	no	1.8
over 35	6	23	positive	128	73	83	no	−2.5
over 35	9	23	positive	114	73	83	no	7.9
over 35	12	23	negative	122	73	83	no	−5.0

Source: own analysis.

Study C

In a recent study, an examination was conducted to test whether the combination of the Bid and Demand Quantity metrics contributed to the occurrence of abnormal returns at 3, 6, 9 and 12 months. The data are included in Table 4.

For the value of the Offer Volume Index not exceeding 20% and, at the same time, the value of the Demand Index above 90%, in all analysed periods, i.e. 3, 6, 9 and 12 months from the debut, abnormal rates of return were statistically significantly different from zero at a significance level of at least 10%. Therefore, the null hypothesis is rejected for these tested values and time periods. Comparing the sums of negative and positive ranks, it can be concluded that in these cases, the median abnormal returns were negative.

Similarly, abnormal rates of return that were statistically significantly greater than zero occurred in the 9- and 12-month periods studied for the combination of the Bid Size Index ranges from 20% to 33% and the Demand Index values above 90%. For these test variants, the null hypothesis can also be rejected, with the proviso that for the remaining periods (3 and 6 months) such a rejection cannot be made.

Conclusion: significant demand for shares in the public offering, combined with a low ratio of the number of new issue shares to all company shares before the debut, is important information for investors as it has a significant impact on achieving negative rates of return calculated on the purchase of company shares at the end of the session on the debut day for sale after 3, 6, 9 or 12 months. In addition, in the case of the two longest periods (9 and 12 months), it can be concluded that the significant demand for shares in the public offering combined with the average ratio of the number of new issue shares to all shares (up to 33%) also has a significant impact on achieving negative rates of return.

It is also worth noting that in the case of lower values of the Demand Index, below 90%, the relationship could not be confirmed and the null hypothesis cannot be rejected in such cases. This proves the importance of achieving high values of the Demand Index in the offering process, but only together with a combination of a relatively low value of the offering of new shares.

Conclusions

The research conducted in this paper confirms the importance for investors watching the public offering of some information from the completed public of-

Table 4. The occurrence of abnormal rates of return depending on the combination of the Bid Size Index and Demand Index ranges

Range of Offer Size Index (%)	Range of Demand Index value (%)	Time from the debut (in months)	Sample size for the N variant under analysis	Greater rank sum	Test statistic	Limit for the critical region $\alpha = 5\%$	Limit for the critical region $\alpha = 10\%$	Reject the null hypothesis	Median of abnormal return rates (%)
up to 20	90–100	3	10	negative	7	8	11	yes for $\alpha = 5\%$	−12.9
up to 20	90–100	6	10	negative	9	8	11	yes for $\alpha = 10\%$	−12.8
up to 20	90–100	9	10	negative	11	8	11	yes for $\alpha = 10\%$	−12.5
up to 20	90–100	12	10	negative	10	8	11	yes for $\alpha = 10\%$	−28.6
up to 20	60–90	3	15	negative	42	25	30	no	4.3
up to 20	60–90	6	14	negative	31	21	26	no	−9.4
up to 20	60–90	9	15	negative	33	25	30	no	−13.5
up to 20	60–90	12	15	negative	39	25	30	no	−13.1
20–33	90–100	3	10	negative	13	8	11	no	−2.6
20–33	90–100	6	10	negative	12	8	11	no	−5.0
20–33	90–100	9	10	negative	10	8	11	yes for $\alpha = 10\%$	−13.4
20–33	90–100	12	10	negative	8	8	11	yes for $\alpha = 5\%$	−14.6
20–33	60–90	3	13	negative	39	17	21	no	−0.1
20–33	60–90	6	13	negative	43	17	21	no	3.5

Range of Offer Size Index (%)	Range of Demand Index value (%)	Time from the debut (in months)	Sample size for the N variant under analysis	Greater rank sum	Test statistic	Limit for the critical region $\alpha = 5\%$	Limit for the critical region $\alpha = 10\%$	Reject the null hypothesis	Median of abnormal return rates (%)
20–33	60–90	9	11	negative	30	11	14	no	0.4
20–33	60–90	12	11	negative	22	11	14	no	−15.5
20–33	up to 60	3	9	negative	21	6	8	no	−2.4
20–33	up to 60	6	9	negative	18	6	8	no	−12.8
20–33	up to 60	9	9	positive	22	6	8	no	−10.9
20–33	up to 60	12	8	negative	17	4	6	no	−20.5
over 33	90–100	3	7	positive	12	2	4	no	1.8
over 33	90–100	6	7	negative	14	2	4	no	−4.3
over 33	90–100	9	7	negative	12	2	4	no	−22.1
over 33	90–100	12	7	negative	8	2	4	no	−26.7
over 33	60–90	3	9	positive	16	6	8	no	2.1
over 33	60–90	6	9	positive	18	6	8	no	13.4
over 33	60–90	9	9	positive	18	6	8	no	8.3
over 33	60–90	12	9	negative	20	6	8	no	−6.1
over 33	up to 60	3	13	negative	26	17	21	no	−7.3
over 33	up to 60	6	13	negative	34	17	21	no	−4.6
over 33	up to 60	9	13	positive	45	17	21	no	−0.4
over 33	up to 60	12	13	negative	34	17	21	no	−5.0

Source: own analysis.

fering and has an impact on the abnormal declines in share prices in the period of several months from the debut.

Information from Study A regarding the demand for shares during the IPO suggests that the correlation between demand and abnormal return rates is weaker than anticipated. Despite isolated cases where the null hypothesis was rejected, the significance was marginal, and no consistent pattern emerged across the analysed timeframes. This indicates that, contrary to expectations, the demand for shares during the IPO does not appear to have a statistically significant impact on achieving abnormal return rates over a period of 3 months to a year from the debut. Therefore, it can be concluded that investor interest measured by the Demand Index does not reliably predict post-debut share price behaviour within the studied timeframe.

Information from Study B on the relatively low number of new issue shares offered correlates with the achievement of rates of return lower than the benchmark (i.e. the appropriate index) within 3 months to a year from the debut. Similarly, combined with the above information, information regarding high demand for shares also correlates with achieving rates of return below the benchmark. Such conclusions contradict our predictions. The assumption was that the relatively low number of new issue shares offered would have a positive impact on the share price within a year of the debut. Similarly, high demand for shares could suggest investors' interest in the debuting company, and thus a further increase in the share price after the debut.

Demonstrating a statistically significant impact on negative rates of return may be due to the specificity of this type of public offerings, in which a relatively small number of shares are offered for sale. The small size of the offer also translates into small amounts to be obtained in relation to the total value of the company. Entities entering the stock exchange, deciding on a limited issue of shares, in most cases need relatively small funds from the issue for further development. This proves the stability of their business, but also shows plans that assume a relatively slower development in time, due to small recapitalisation, compared to companies that raise significant funds from the share offering. Obtaining significant funds is usually needed in the case of acquisition plans or quick entry into new areas of activity, i.e. for rapid business development. Thus, companies that raise more funds develop relatively faster than those that decided to issue small shares. The latter may therefore seem less attractive to investors, precisely because of the relatively slower development. This may explain the statistically significant drop in their share price in the year following their IPO. However, the reverse correlation could not be confirmed in these studies – the increase in the share price for companies offering a large number of shares in relation to the total number of shares was not shown.

If we combine the information about the relatively low number of newly issued shares offered with the demand for shares (defined as the ratio of the funds ac-

tually received from the share offering to the funds assumed to be obtained from the sale of new shares and those offered by the owners of the company before the offering), we obtain a relationship that is also important information for investors (Study C). Offerings with fewer new shares and strong demand from institutional and individual investors were found to correlate with lower rates of return compared to the benchmark, up to a year after the debut.

Intuitively, one might expect that the high demand in the public offering would be correlated with an increase in the future share price, not a decrease. However, the significance of the demand for shares in the offer was demonstrated only in the case of a low number of new shares in relation to all shares. Considering the arguments regarding the relatively slower development of low-issue companies, it can be concluded that the high demand for shares before the debut only makes the situation worse. The lack of a rapid increase in the value of the company causes the desire to get rid of shares purchased at a price close to the maximum price, which is another argument explaining the decline in the share price.

The conducted study may serve as a basis for further research by focusing on additional explanatory factors, such as the role of investor sentiment or macroeconomic indicators, which could influence abnormal returns. It is also worth exploring how varying levels of market liquidity or company-specific characteristics impact the correlation between IPO-related information and post-debut share price performance. Additionally, future research could address the limitations of this study, including the specific market conditions and the time frame analysed, to offer a more comprehensive understanding of these relationships.

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