Long-Run IPO Overpricing: Evidence from the Warsaw Stock Exchange

Anna Blajer-Gołębiewska* and Leszek Czerwonka   **

Initial Public Offering (IPO) is sometimes considered the critical moment for a company's development as it allows raising capital and improving company's performance. However, there are some anomalies connected with stock pricing. The aim of the research is to find out if one of them - the long-run overpricing - occurs in case of IPOs in the Warsaw Stock Exchange. We put forward a hypothesis, that the overpricing effect took place for the analysed IPOs. Moreover, assuming that IPOs were prepared and proceeded properly, we put forward the second hypothesis: the fact that the initial public offerings were conducted in the bear market condition does not impact significantly the performances of the analysed companies. We have examined the eight-quarter horizon in order to include enough time which allows us to achieve long-run results. The analysed IPOs were conducted in the bear market period from the beginning of the stock market slump in July 2007 to the minimal value of Warsaw Stock Exchange Index in February 2009. On the basis of the analysis conducted for 81 listed companies the first hypothesis could not be rejected. Moreover, the fact that the initial public offerings were conducted in the bear market condition does not impact significantly the performances of the analysed companies.

Field of Research: Financial Economics, Corporate Finance and Governance, Value of Firms

JEL Codes: G14, G30 and G32

1. Introduction

Initial Public Offering (IPO) is sometimes considered the most important step in a company's development - not only due to its financial aspects, but also to generally economical or even technological one. Capital raised through an IPO does not have to be repaid. A company goes public to raise funds and share the risk.

Numerous researches into IPO problem have revealed some anomalies connected with stock pricing: for example: underpricing in the short run and overpricing in the long run. As there is evidence for underpricing in Poland, there is no information on the overpricing anomaly.

The aim of the research is to find out if there was long-run overpricing in case of IPOs in the Warsaw Stock Exchange. We have examined the eight-quarter horizon in order to include enough time which allows us to achieve long-run results.

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*Dr. Anna Blajer-Gołębiewska, Department of Microeconomics, University of Gdańsk, Poland.
Email: a.blajer@ug.edu.pl

**Dr. Leszek Czerwonka, Department of Microeconomics, University of Gdańsk, Poland.
Email: leszek.czerwonka@ug.edu.pl

As a result we can use buy-and-hold abnormal returns (BHAR) approach to estimate long-run performance. BHAR is based on the changes in the analysed share prices relatively to the behaviour of all shares in the market.

Moreover, to make the conditions stricter, we took into consideration the most inconvenient period for beginners on the stock exchange market. The analysed IPOs were conducted in the bear market period from the beginning of the stock market slump in July 2007 to the minimal value of Warsaw Stock Exchange Index in February 2009.

We put a hypothesis that the overpricing effect took place for analysed IPOs. Moreover, assuming that IPOs were prepared and proceeded properly, we put forward another hypothesis: the fact that the initial public offerings were conducted in the tough condition if the bear market condition does not impact significantly the performances of the analysed companies. This is the continuation of the previous research which aimed to identify changes in the performances of companies which went on the Warsaw Stock Exchange and the NewConnect market in 2008 (in the crisis condition). The previous research covered rates of growth in the net profits on continuous activities for shareholders, net profit per share, equity and book value per share (BVPS) in first year after the IPOs. The findings were different from other authors' conclusions. That fact became the incentive to conduct further research in IPOs, strictly in IPO overpricing.

In the section 2 literature review is provided. The section 3 contains the description of the methodology of the event study, namely buy-and-hold-abnormal returns (BHAR) approach. The section 4 contains analysis of IPOs during the bear market and the behavior of share prices in subsequent periods. In the last section we provide recapitulation of the most important issues.

2. Literature Review

On the one hand, the fact that a listed company that went through a screening process, was involved in applying for listing, is accepted onto an organized exchange, works as a signal of the financial condition of the company. Moreover, this can be a signal of management's confidence in the company's future performance. On the other hand, managers predict their company to receive extra attention from financial analysts, public and private investors after listing (McConnell and Sanger 1984) which can additionally improve its performance. This web of relations should improve company's performance just like a kind of *perpetuum mobile*. However, it not always does.

Researchers discovered IPO-related anomalies connected with stock pricing (Ritter 1991), e.g.:
- in the short run after initial public offerings appear to be underpriced;
- in the long run overpricing was observed;
- issuers can experience the hot issue market phenomenon.

According to worldwide research, most IPOs are under-priced. Low price of stock attracts investors who expect enormous increases. Consequently, the issue price is lower than the price at the end of the first day. Furthermore, initial underpricing is related to the increase in annalist coverage (Cliff and Denis 2004), which can improve company's marketability in the future and lower asymmetric information in corporate governance.

However, as the stock has been offered at a low price very close to its value, the capital raised by the investor is lost for the company. If the price of stock was higher, capital could have been raised for the company.

According to research conducted on sample of European property company IPOs from 1997 to 2007, the main signal of interest, underpricing, is in fact positively related to average property yields for a 12-month post-IPO period (Brämisch, Rottke & Schiereck 2011). The analysis was based on a heterogeneous set of industry performance measures (eg. yields).

Table 1: Equally weighted average initial returns for selected countries[1]

Country	Source	Sample Size	Time Period	Average Initial Return
Australia	Lee, Taylor & Walter; Woo; Pham; Ritter	1,103	1976-2006	19.8%
China	Chen, Choi, & Jiang; Jia & Zhang	2,102	1990-2010	137.4%
Germany	Ljungqvist; Rocholl: Ritter; Vismara	704	1978-2009	25.2%
India	Marisetty and Subrahmanyam	2,811	1990-2007	92.7%
Italy	Arosio, Giudici & Paleari; Cassia, Paleari & Redondi; Vismara	273	1985-2009	16.4%
Japan	Fukuda; Dawson & Hiraki; Hebner & Hiraki; Pettway & Kaneko; Hamao, Packer, & Ritter; Kaneko & Pettway	3,078	1970-2009	40.5%
Poland	Jelic & Briston; Ritter	224	1991-2006	22.9%
United Kingdom	Dimson; Levis	4,205	1959-2009	16.3%
United States	Ibbotson, Sindelar & Ritter; Ritter	12,165	1960-2010	16.8%

Source: Own compilation on the basis of Loughran, T, Ritter, JR & Rydqvist, K 1994, 'Initial Public Offerings: International Insights, Pacific-Basin Finance Journal', vol. 2, pp. 165-199; updated version from February 22 2011, viewed 5 May 2011, <http://bear.warrington.ufl.edu/ritter/Int2011feb.pdf>.

The anomaly of issues' overpricing in the long run was observed and analysed by Ritter[2]. He found that in the 3 years after IPOs these companies experienced significantly lower performance than comparable firms matched by size and industry (Ritter 1991). That confirmed the previous research (made by other authors on smaller samples) in the long run post IPO-performance. The research was based on Cumulative Abnormal Returns approach (CAR):

$$CAR_{s,q} = \sum_{t=q}^{s} AR_t \ .$$

in which the cumulative benchmark-adjusted aftermarket performance was the summation of the average benchmark-adjusted returns.

Table 2: International Evidence on Long-Run IPO Overpricing[3]

Country	Author(s)	Number of IPOs	Issuing years	Total abnormal return
Australia	Lee, Taylor & Walter	266	1976-89	-46.5%
Austria	Aussenegg	57	1965-93	-27.3%
Brazil	Aggarwal, Leal & Hernandez	62	1980-90	-47.0%
Canada	Jog and Srivistava	216	1972-93	-17.9%
Chile	Aggarwal, Leal & Hernandez	28	1982-90	-23.7%
Finland	Keloharju	79	1984-89	-21.1%
Germany	Ljungqvist	145	1970-90	-12.1%
Japan	Cai & Wei	172	1971-90	-27.0%
Singapore	Hin & Mahmood	45	1976-84	-9.2%
Sweden	Loughran, Ritter & Rydqvist	162	1980-90	+1.2%
United Kingdom	Levis	712	1980-88	-8.1%
United States	Loughran & Ritter	4,753	1970-90	-20.0%

Source: Ritter, JR 1998, 'Initial Public Offerings' in Logue, D, Seward, J (eds.), *Warren Gorham & Lamont Handbook of Modern Finance*, reprinted (with modifications) in *Contemporary Finance Digest*, vol. 2, no. 1, p. 15, viewed 5 May 2011, <http://bear.warrington.ufl.edu/ritter/rittipo1.pdf>.

According to the hot issue market phenomenon (Ritter 1980), periods of underpricing new issues are highly cyclical. As in the period of hot issue market IPOs experience underpricing, market investors positively react to this fact (due to the positive feedback hypothesis). Consequently, issuers experience higher average initial returns from IPOs and they tend to issue new equity to the public. As a result, the cycle appears not only in the IPOs underpricing, but also in IPO volume (Ibbotson, Sindelar & Ritter 1994).

Dharan and Ikenberry (1995) conducted the research of IPOs for smaller and larger companies. Due to their findings, the post-listing performance is on average negative which is most characteristic in case of smaller firms (that are not widely held by institutional investors) and was not observed in larger firms. The reason for this situation is that in smaller companies' managers "time" their initial listing application by applying for listing prior to a decline in performance, due to the fact that the initial listing requirements may pose them more meaningful barriers. The results of the research are similar to the conclusions reported in the other sources.

3. Event Study and Buy-and-Hold-Abnormal Returns (BHAR) Approach

Event study is a tool that can help to assess the impact of certain events relating to a company on the company's share price (Gurgul 2006, p. 26). This method involves calculating the expected ("normal") rates of return on the share that should occur if

no extraordinary event has occurred, then comparing actual returns on shares and expected – the abnormal returns are obtained in this way. To calculate the "normal" rates of return it is required to use some model, which enables evaluating the returns. The models used in event studies are: mean-adjusted return model, market-adjusted return model, market model, CAPM model, Fama and French three factor model, reference portfolio model or matching with control firms model.

Two measures of abnormal returns used in the event studies are:
- CAR – Cumulative Abnormal Returns,
- *BHAR – Buy-and-Hold-Abnormal Returns.*

Cumulative abnormal return CAR is calculated as the sum of abnormal returns in a certain period, while the rate of return "buy and hold" BHAR indicates what is the rate of return on shares which are purchased at the beginning of the analysis period and kept until the end of the abnormal return's measurement period – adjusted for the expected rate of return during this period. Despite the discussion on the use of CAR and BHAR indicators, it is widely claimed that a standard measure of long-term abnormal returns is the rate of BHAR (Mitchell and Stafford 2000, p. 296).

In this study Rosen's BHAR abnormal return is used, in which the actual rate of return on shares is adjusted by dividing it by the rate of return on the stock index:

$$BHAR_{iT} = \prod_{t=1}^{T}(1 + R_{it}) / \prod_{t=1}^{T}(1 + R_{index,t})$$

Where:

R_{it} – the return on the share on the day t
$R_{index,t}$ – the return on the stock index on the day t (Rosen 2006, p. 1006).

In case of such abnormal return's definition the shareholders benefit if the value of the BHAR is above 1, and lose when the value of BHAR is between 0 and 1. In our model, if the value of 1 is subtracted of all abnormal returns, the positive BHAR values mean that the share prices are relatively higher than market average value while negative BHAR values mean relative loss.

For our analysis purpose we put forward a hypothesis, that the overpricing effect took place for the analysed IPOs. Moreover, assuming that IPOs were prepared and proceeded properly, we put forward the second hypothesis: the fact that the initial public offerings were conducted in the bear market condition does not impact significantly the performances of the analysed companies.

As a result the analysis is based on a sample of companies listed on the main market of the Warsaw Stock Exchange, which went public during the period from 6 July 2007 to 17 February 2009. It was the period between the maximum and minimum value of the WSE index, the period of the stock market slump. The list of the initial public offerings was made on the basis of the table: 'IPO's in 2007 (-2009)', published by the Warsaw Stock Exchange (2008-10). There were 84 companies that went public in the analysed period, but companies that were delisted during the analysis period were removed from the sample. Finally, there were 81 listed companies in the analysis.

The method used in this analysis is the BHAR method according to the formula used by Rosen (Rosen 2006), for the period from IPO day, to eight quarters ahead, beginning with the first full quarter after going public.

The expected rates of return were obtained using the market-adjusted model, where the index used to adjust the actual rates of return on shares of the companies to achieve abnormal rates of return, was the Warsaw Stock Exchange Index. The share prices and the value of the WSE Index come from the archive of Stooq.com service. Share prices published on this site are adjusted for the impact on the valuation of such operations as splits, pre-emptive rights issuing or, dividend payments. Prices adjusted in such way can be compared with other companies' share prices as well as with the values of the WSE Index, under market-adjusted model assessment, because WSE Index as an income index is also adjusted for splits, pre-emptive rights and dividends.

4. IPO During the Bear Market and the Behavior of Share Prices in Subsequent Periods

Investors opting for investing money in some company believe that they reach an appropriate return on investment. However, during the bear market investors are extremely cautious. This is the reason why companies which go public have difficulties with persuading them to invest money in beginners' shares. The analysis below has been conducted to indicate the change of the share prices of companies whose public offering coincided with the stock market slump, in the period of two years since their IPO. In case of the Polish stock market, the bear market period lasted from 6 July 2007, when the WSE Index reached a maximum closing value (not only a few years before the bull market, but - ever), till 17 February 2009, when the stock market index reached a minimum value of the closing WSE index - the day after it began to grow again. The maximum and minimum values of the WSE index during the trading day were reached on: 9 July 2007 and 18 February 2009 (figure 1).

Figure 1: WSE Index in years 2007-2009
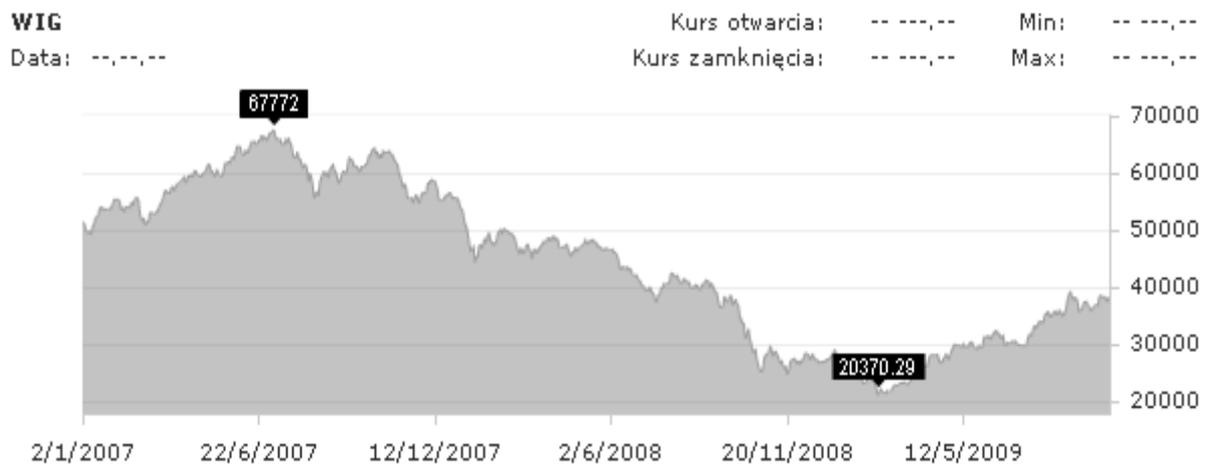
Source: Warsaw Stock Exchange 2011, viewed 20 March 2011, <www.gpw.pl>.

In the study conducted on the sample of 81 companies, which went public in the period between the maximum and minimum value of the WSE Index, the analysis of 2-year share prices behaviour was performed. These companies were in more difficult situation than others, because they had to fight for investors' confidence despite the fact that they were not known by investors, who wanted to buy some shares. Table 3 shows the percentages of positive and negative abnormal returns BHAR in subsequent quarters after their IPOs. It may be noted that during the first 3 quarters, the percentage of positive results, although

less than half, oscillated near value 0.5. However, since the fourth quarter after the IPO, over two thirds of the companies received a negative value, which means that it could earn less on them (or lost more) than the average return for the market. Thus, the preliminary analysis indicates that the probability of losing was higher than the probability of gaining on shares of companies going public during the bear market.

Table 3: Percentages of Positive and Negative Abnormal Returns BHAR in Subsequent Quarters Which had Their Ipos During the Bear Market Period

Quarter after IPO	1	2	3	4	5	6	7	8
Percentage of positive BHAR values (%)	44	48	46	30	31	26	32	27
Percentage of negative BHAR values (%)	56	52	54	70	69	74	68	73

Source: Own compilation.

Although there was high probability of buying shares of the company, which would result in loss in subsequent quarters, it would be possible to create a portfolio that could be possibly profitable, which would include shares of companies going public. It is necessary to analyse the average value of the BHAR abnormal returns, for companies that went public during the bear market period.

Table 4 presents the average BHAR values for subsequent quarters, in relation to the IPO price. BHAR rate, which shows how much higher the actual rate of return is on shares of a company, compared to the expected rate of return (in this case, the average for the entire market, which illustrates the WSE Index), indicates that if the shares of companies making their debuts during the bear market period were sold after the first full quarter from their purchase on the day of its debut, the relative loss on this operation would be -0.7%. However, If the shares of companies which had their IPOs during the stock market slump, were sold after the 2nd quarter after their purchase on the IPO day , then the 10% profit would be possible (or loss less by 10% than on other shares). But only the sale in quarters 2 and 3 from the date of the purchase would give the relative gain. The sale of these shares in all other periods of around two years after the debut of the company, meant the relative loss – that is, during the slump period – loss greater than from the other shares. However, there is a wide dispersion of the results. Some of the companies resulted in the loss, but some gave the relative gain. As it can be seen in table 2, none of the results cannot be considered statistically significantly different from zero at the assumed significance level of 0.05 (table 4, column 3).

Table 4: The average value of abnormal returns BHAR for companies that went public during the bear market period, and p-values indicating significance level at which the results could be considered to be different from zero

Quarter	Average value (%)	p-value
1	-0.68	0.861
2	9.71	0.129
3	5.51	0.406
4	-4.84	0.520
5	-7.41	0.319
6	-9.25	0.213
7	-3.84	0.671
8	-3.84	0.396

Source: Own compilation.

Thus, on average, it cannot be claimed that the price behaviour of companies that had IPOs during the bear market period differs from the behaviour of other companies' prices (taking into account the proviso that the distributions of abnormal returns cannot be considered normal - which means that the deducing on the significance should be cautious).

Worse performances of companies that went public during the bear market than average market performances (taking into account that these differences may be insignificant) may be explained by overpricing of shares on the IPO date, and then depreciating the valuation to adjust the value of shares to the value recognized by investors after some time for the real value. Table 5 shows the average ratio of excess of the closing price on the IPO date over the IPO issue price and the p-value indicating the significance of the obtained result. For the sample of companies which went public during the bear market period, despite the unfavourable time, the closing price on the date of the IPO was more than 10% higher than the issue price of the shares - the result can be considered statistically significant at usual significance level of 0.05.

Table 5: Excess of the closing price on the IPO date over the IPO issue price ratio for companies that went public during the bear market period

	Average value	p-value
Excess price (%)	10.8	0.0203

Source: Own compilation.

The overpricing of the shares during the IPO process could be indicated, to some extent, by a negative correlation between the excess of the closing price on the IPO date over the IPO issue price ratios and valuations of companies in subsequent quarters. This relation is presented in table 6. The correlation coefficient between these variables is negative in all periods of analysis. Although only in quarters 1, 4 and 5 the weak correlation (but above 0.2) can be observed, while the remaining values of the correlation coefficient are lower, but this correlation in quarters 1, 4 and 5 is statistically significant, and in all 8 periods it is negative.

Table 6: The correlation between the excess of the closing price on the IPO date over the IPO issue price ratios and valuations of companies in subsequent quarters for companies which went public during the bear market period

Quarter after IPO	1	2	3	4	5	6	7	8
Correlation coefficient	-0.34	-0.12	-0.11	-0.24	-0.23	-0.18	-0.16	-0.19
p-value	0.002	0.289	0.343	0.033	0.037	0.117	0.166	0.097

Source: own compilation.

Relatively low values of the correlation coefficient may be due to the fact that the issue prices, determined by the management of the companies did not refer equally to the real, intrinsic values of the companies. Some companies sold shares at the highest prices to obtain the maximum amount of money from the issue, while other companies sold shares at moderate prices - bearing in mind the success of the emission. Therefore, taking the valuations of the boards as a reference value, assuming the hypothesis of excessive optimism of investors on the companies' IPOs, the negative correlation between the

excess of the closing price on the IPO date over the IPO issue price ratios and valuations of companies in subsequent quarters should be observed. However, due to different approaches of managements to the final valuation of the shares, this correlation might not be too high. Due to the abovementioned research the hypothesis that the overpricing effect took place for the analysed IPOs could not be rejected. Furthermore, the performances of the analysed companies were not affected by choice the analysed period.

5. Summary and Conclusions

According to the research conducted, the hypothesis that companies that went public in the stock market slump period did not lose because of that fact in the long run should not be rejected. Moreover, the fact that the initial public offerings were conducted in the bear market condition does not impact significantly the performances of the analysed companies.

Average *Buy-and-Hold-Abnormal Returns* BHAR, calculated for the assumption that shares had been bought on the day of IPO and held for the next 1, 2, 3, 8 quarters, were insignificantly different from zero. As a result, rates of return for the analysed shares were not statistically different from the stock market average rate of return. Although these results were not statistically significant, it was observed, especially after a year since the IPO day, that average BHAR values are negative and there is a distinct predominance of negative values of companies' BHARs. The explanation might be the phenomenon of over-reaction of investors for the IPOs. Confirmation of this hypothesis could be a negative correlation between the increase in price on the IPO day over the issue price and stock price behaviour in the subsequent quarters. The phenomenon of over-reaction of share prices for the first listing on the stock market and the IPO has been observed also in foreign stock markets – the analyses of this phenomenon can be found in: Dharan and Ikenberry (1995), Ritter (1991), Loughran and Ritter (1995), Spiess and Affleck-Graves (1995), Lee (1997), and Brav, Geczy and Gompers (2000). From the viewpoint of the primary owners of the company and the company itself, impact on the profitability of the issue of shares during the bear market period has undoubtedly the issue price of shares, but this has not been the subject of this paper.

The new approach applied in the research is the choice of the analysed period. There is wide array of analyses of changes in stock prices in different stock exchanges in the literature, but this time we put the impact on the tough market condition and its influence on the well-known overpricing theory. The analysis was based on the assumption that prices, which were demanded by the management, reflected the company's value. Even if in this specific period the overpricing theory can be confirmed, we could put forward the hypothesis that the overpricing theory has strong basis. The issue of the impact of the market condition on the stock exchange mechanisms for determining the issue price will be the subject of further research.

Endnotes

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[1] In case of more than one set of authors listed as a source of information, the combined sample sizes have been constructed (Loughran, Ritter & Rydqvist 2011).

[2] The research covered 1526 firms that went public in the U.S. in the 1975-84 period (for the first time such research in the subject was conducted on such a numerous sample). Companies were selected due to 5 criteria. The most important criteria are: an offer price of $1.00 per share or more and gross proceeds of

$1,000,000 or more (measured in terms of 1984 purchasing power). As a result, about 38% smallest IPOs were not taken into consideration.

[3] "Total abnormal returns are measured as 100×[(1+Ripo,T)/(1+Rm,T)] - 100, where Ripo, T is the average total return […] on the IPOs from the market price shortly after trading commences until the earlier of the delisting date or 3 years; Rm,T is the average of either the market return or matching-firm returns over the same interval." (Ritter 1998).

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