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Costs of IPO in Poland

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Abstract

Theoretical background: Entering the stock market is an important moment in the development of a company. However, whether the timing of the decision is determined by capital needs or driven by attractive market conditions is debated in literature studies. On the other hand, neither in financial theory nor in practice there is a single universal formula, the use of which would enable the determination of the most favourable capital structure for a given company, reconciling both the optimum profitability of its own capitals and a reasonable scale of risk. The decisions regarding the selection of sources of financing depend on several factors. There is no question the cost of capital is an important criterion used by companies when deciding on a financing decision. In the case of initial public offers (IPO), the total costs consist of directand indirect costs. This study fills a specific gap in the literature due to the lack of such analyses based on data coming from the Polish market especially in the context of the type of IPO and market conditions.
Purpose of the article: The purpose of this article is to present the results of a study on the costs of IPO conducted on the Warsaw Stock Exchange (WSE) between 2005 and 2020.
Research methods: The hypotheses were verified using the statistical analysis and an econometric linear regression. Analysis covers 249 companies debuting on the WSE between 2005 and 2020. Information on the costs of the analysed offers was obtained from the companies' current reports published after the completion of the share subscription.

Main findings: The analysis confirmed that indirect cost of the offer are higher than direct costs. Although the average total costs of the offer are highest in the case of the issuance of new shares but they are not statistically significant. Furthermore, the higher the value of the offer, the lower its total cost. The interest rates affect the total cost of IPO but the total offer costs may not be directly explained by the activity on the IPOs market. The results of the analysis indicate that the explainability of the estimated model is the biggest for the direct costs. There is also a significant difference between the years with the highest and the lowest total costs of the offer.

Introduction

Going public and the possibility of conducting an offer in a public manner is one of the most important moments in the life cycle of a company. In the long run, its operation on the capital market involves meeting the high standards required of public companies, so companies are ready to do so at a certain stage of their life cycle. There are many explanations in the literature of the motives for a company to go public (Bancel & Mitoo, 2009; Brau & Fawcett, 2006; Maximovic & Pichler, 2001; Kim & Weisbach, 2008; Pagano et al., 1998; Zingales, 1995; Chemmanur & Fulghieri, 1999). However, there are two main reasons for conducting initial public offerings (IPOs): to raise capital and to take advantage of favourable market conditions (Kim & Weisbach, 2008; Ritter & Welch, 2002). The process of an IPO can take various forms. Firstly, it is an issue of new shares by public subscription to raise funds for growth and expansion. In this case, in addition to acquiring the status of a listed company, there is an increase in its share capital. Secondly, it is a public offering of seeling shares by existing shareholders. The company acquires the status of a listed company, the market valuation of its shares and increases the liquidity of the shares traded. This is a typical way to market companies privatised by the State Treasury, as well as a way to divest portfolio companies of private equity and venture capital funds. Thirdly, there is a combined offer, in which there is a simultaneous offer of selling the existing shares and an issue of new shares by public subscription.[1]

Matching the decision to issue shares to market conditions and not just to financial needs is the basis of the market timing theory presented by Baker and Wurgler (2002). This theory, along with trade-off theory, pecking order theory and signalling theory, is based on the models of Modigliani and Miller's models of 1958 and 1963, and represents a significant body of work on capital structure formation. According to this theory, firms adapt to the market by issuing equity when share values are high and issuing debt when share prices are low. The theory, thus, refers to the occurrence of different periods in the market. In the case of a hot market, i.e. a period in which there are high share valuations and, therefore, high investor interest in acquiring

[1] It is important to mention that not all companies are offering shares to be sold during the debut. Some of them only introduce the shares to trading. We are talking about companies which go public in a two-stage process, so to speak, and, thus, those which change their trading floor from an alternative market to a regulated market. The concept of going public is, therefore, broader than that of an initial public offering.

shares, managers are willing to issue shares even if sources of debt capital are still available. In contrast, in the case of a cold market, where there is a significant undervaluation of share prices and consequently low investor demand for the shares, managers opt for internal sources of equity capital or seek outside capital. As Duliniec (2015) notes, decisions to select sources of financing according to "market sense" do not result from companies' desire to optimise their capital structure.

Market timing theory is in line with research by Loughran and Ritter (1995), which shows that the average annual rate of return over the five years following an issue is only 5% for IPO companies. Investing the same amount at the same time in a non-issuing company with roughly the same market capitalisation and holding it for an identical period would yield an average compound annual rate of return of 12%. This means that companies, therefore, take advantage of temporary opportunities by issuing shares when, on average, they are significantly overvalued, and use internal funds or debt when share prices are undervalued.

Aydogan's (2006) research, which shows that the timing of an IPO has a significant impact on the level of the ratio of the size of the capital raised to the company's total assets prior to the IPO, also fits with market timing theory. Aydogan finds that the IPO proceeds of the average cold market IPO company are 54% of its pre-IPO asset value. The same figure for the average hot market IPO company is 76%, an increase of 40% over cold market IPOs.

Chemmanur and Fulghieri (1999) elaborate on the thesis that going public involves costs on the one hand. In addition, there is the need to disclose a lot of confidential information to all investors, then it becomes optimal to go public for companies that are large enough and not those operating at the beginning of their life cycle. This trend is also echoed by Doidge et al. (2017), who find that larger companies choose to go public and smaller companies do not, as there are fixed costs of going public, but no fixed benefits associated with going public. The benefits of being a listed company firstly increase with the size of the company as measured by assets and secondly increase faster than the costs, at least above a certain asset threshold.

Korajczyk et al. (1992) state that a firm issues equity only when the benefits of obtaining this type of financing outweigh the direct costs of issuance plus any adverse selection costs. It may, therefore, choose to issue equity when it expects relatively little information asymmetry. When information asymmetry is particularly high, the adverse selection costs associated with issuing shares are greater, fewer firms choose to go public and they are then more likely to find it optimal to raise alternative types of financing. Delaying an issue in this way can, however, be costly, as the project being financed may lose value if it is postponed due to increased competition or the need to adopt a more costly source of financing. In the context of IPOs, it can, therefore, be inferred that companies will postpone an IPO until the cost of issuing shares has fallen and the increase in capital requirements makes equity issuance the optimal choice to maximise the value of the company.

The decision to raise capital by issuing shares to the public is one of the most important decisions taken in the context of shaping the optimal capital structure, understood as the desired optimal combination of debt and equity that companies seek to achieve and maintain. It is also referred to as the target capital structure, which, by minimising the total cost of capital, will ensure that the value of the enterprise is maximised (Atril, 2006). Neither in financial theory nor in practice is there a single universal formula, the use of which would enable the determination of the most favourable capital structure for a given company, reconciling both the optimum profitability of its own capitals and a reasonable scale of risk (Bień, 2008). Decisions regarding the selection of sources of financing depend on several micro and macroeconomic factors, which are constantly changing (Ickiewicz, 2004; Ostaszewski, 2006; Błach, 2009). The cost of capital is an important criterion used by companies when deciding on a financing source. It can be defined as the relationship of the income expected by capital contributors to the value of their committed capital in the assets of the company (Szczepankowski, 2007). Thus, it corresponds to the rate of return on investment expected by equity owner at an acceptable level of risk (Dudycz, 2005; Jajuga & Jajuga, 2000).

In the Polish literature, surprisingly little attention has been paid to the analysis of the total costs of IPOs. Exceptions include the research of Sieradzki (2016), who studied the total costs of Polish IPOs between 2003 and 2014. There is also a lack of studies in which the subject of research, the total costs of IPOs by type of offering. Other studies available focus on evaluating the costs of offerings involving the issuance of new shares (Puławski, 2013) or/and concern the analysis of direct costs (Wawrzyszak-Misztal, 2015). In contrast, studies available in the daily press tend to focus on a narrowly selected group of companies or period (Rudke, 2021; Kucharczyk, 2021).

The purpose of this article is to present the results of a study on the costs of initial public offerings conducted on the Warsaw Stock Exchange (WSE) between 2005 and 2020.

Literature review and hypothesis development

The arrangement of an IPO involves significant costs for the company, so IPO issuers only retain the net proceeds to use in their business. The costs of an IPO can be distinguished between direct costs and indirect costs.

The estimated direct costs of conducting the offer reflect the fees for activities performed to raise capital and/or for the sale of shares and are disclosed in the prospectus. Upon completion of the subscription or sale of shares related to the admission of securities to trading on the official stock exchange listing market, companies are required under Polish law to publish a report containing, *inter alia*, information on the total amount of the costs which have been included in the costs

of the issue, together with the methods of their settlement in the accounting books and the manner of their recognition in the financial statements (Rozporządzenie…, 2005; 2009; 2018). It is necessary to indicate the amount of the costs by their titles, with a breakdown at least into the costs of preparing and carrying out the offer, the costs of remuneration of the underwriters (for each separately), the costs of drawing up the prospectus, including consultancy costs, and the costs of promoting the offer. Information shall also be given as to the average cost of carrying out the subscription or sale per unit of security being subscribed or sold.

It should be added that some costs, such as the administrative fees for the supervisory authority or the market operator, are fixed in absolute value; consequently, when the value of the issue increases, the costs in terms of average percentage cost per share will decrease. Other costs, such as the cost of remuneration to the process coordinator for the placement of shares, calculated as a percentage of the value of the newly issued or sold shares, are correlated with the size of the offering. However, the commission rate may vary not only depending on the size of the offering, but also on other parameters such as the structure of the offering or the difficulty of the offering. The remuneration arrangements may also be supplemented by various incentives, such as a premium linked to the valuation of the issuer achieved on debut.

Some of the offering costs are mandatory in nature, such as costs related to the employment of the share offeror and the auditor examining the financial statements, costs of court, stamp and notary fees incurred in connection with the process of registering the company's share capital increase, fees for the preparation and submission of documentation to the supervisory authority, fees for registration and record-keeping activities related to the shares being subscribed for to the public and marketed. In contrast, however, some of the direct costs of the offering are optional, as they depend on the decision of the company itself. These include fees paid by the issuer to hired underwriters for sales concessions, for management, for underwriting and for advisers used by the issuer (e.g. legal, financial, strategic, communications). In Poland, only a handful of companies sign underwriting agreements, and these are most often companies that are privatised as part of their IPO (e.g. PZU, PGE, ENEA). For example, in the group of 102 companies in the research of Wawryszak-Misztal (2015), there were only 8 such cases. But it should be emphasised that if such an agreement is concluded and the stabilisation option is exercised, the underwriters' remuneration on this account significantly increases the total costs of the offering.

Chen and Ritter (2000) found that in the US market, underwriting fees of around 7% are higher than in other countries. They report that in Australia, Japan, Hong Kong and Europe, for example, they are approximately half that in the US. Torstilla (2003) indicated that most Asian equity markets have highly standardised gross spreads, mainly at 2% and 2.5%. In Europe, there is less standardisation of fees (clustering phenomenon), but there are some exceptions, for example, in Germany, where 62% of all IPOs have a gross spread of 4%, in France there is some clustering at 3% and in Belgium at 2.5%. Although European IPO markets show less variation in spreads

than the US markets, clusters do appear, and country-by-country data shows that these are most pronounced in the countries with the lowest gross spreads. This "7% phenomenon" was investigated by Hansen (2001) in the context of the existence of price collusion, but his results testify against its existence. Referring to the theory of efficient contract theory, he concludes that investment banks compete in setting 7% fees in IPOs based on reputation, placement services and underpricing. In support of this, he points out that the 7% contract persisted even though the Department of Justice was investigating allegations of collusion.

As reported by Abrahamson et al. (2011), for many years, different types of price setting in offerings were cited as the reason why gross spreads were lower in Europe than in the US. US offerings have for decades been managed using the "book building" method, whereby investment banks collect legally non-binding but serious signals of interest from institutional investors before pricing and allocating shares. European IPOs, on the other hand, used a less time-consuming and, in terms of direct costs, less expensive method of fixed price or organising a tender/auction process. However, their research in a sample of IPOs that took place over a period of 10 years later (1998–2007) confirmed the same figures, despite changes in the types of offering. At the same time, they noted that while gross spreads were lower for larger offerings in both the US and Europe, fees for larger US IPOs tended to increase, while fees for larger European IPOs became increasingly cheaper. Interestingly, they also confirm the phenomenon previously studied by Torstila (2001) using data from 1986 to 1999, that investment banks charge significantly lower fees for IPOs in Europe than for similar IPOs in the US. Even after considering the different parameters of size, issue characteristics, syndicate structure and timing and country effects, there is a "3% wedge" between European and US IPOs showing that European IPOs are always cheaper than US IPOs. Other studies indicate that the direct costs of listing on the WSE are several times lower than on the London Stock Exchange, Nasdaq market or Euronext (Kucharczyk, 2021).

The indirect cost of an offer, meaning its underpricing (or undervaluation), is the ratio of the market price of a share achieved at the debut to its offer price. McDonald and Fisher (1972) called this observed difference between the offer price and the market price the "rent", which is distributed by the offeror to the initial buyers of the shares. Ljungqvist (2007) calculates underpricing in currency units as the amount of "money left on the table". In this view, it represents the difference between the secondary market share price and the offering price, multiplied by the number of shares sold and/or offered in the IPO. The relevant assumption here is that shares sold at the offer price could be sold at the market price on the secondary market. The effect of setting the issue price below the actual market value and, therefore, at a lower level than the IPO price of the shares is a kind of economic cost, i.e. an opportunity cost. Existing shareholders thus suffer an opportunity loss due to the transfer of value to new buyers of shares (Czekaj & Dresler, 2008; Puławski, 2013).

Gale and Stiglitz, on the other hand, referred to the phenomenon of undervaluation as "burning money" (1989).

Indirect costs can also include costs that are extremely difficult to calculate a quantifiable value for. These include, among others, the costs of management time spent working on the offering, or the so-called "green shoe" option, which gives underwriters the right to allot additional shares at the offering price and sell them in the market to cover high investor demand during the subscription (Ross et al., 2008). There are also hard-to-count costs associated with the potential erosion of competitive advantage resulting from the disclosure of material information about the company to a wide range of stakeholders and, in the longer term, also the costs of the risk of losing control of the company resulting from unwanted takeover attempts (Bushee & Miller, 2012; Doidge et al., 2017).

To calculate the indirect costs of an offering, an assessment of the price reaction to the IPO event is used, which is the raw immediate rate of return expressed by the mathematical equation:

$$IC = IR_{i0} = \frac{P_{it} - P_{i0}}{P_{i0}} \tag{1}$$

where:
P_{it} – closing price of the i^{th} offer on the first day of trading
P_{i0} – issue price of the i^{th} offer

The results of many empirical studies conducted worldwide indicate that underpricing is an important indirect cost of an offering. Ritter (1987), in a study of companies debuting on the US market in the period 1977–1982, found that underpricing as an indirect cost of going public averaged 14.80% for firm commitment offers and 47.78% for best effort offers. Money on the table, which can also be described as a transfer of value to investors, is particularly painful for the existing owners of the IPO company. However, as Puławski (2013) rightly points out, there are not infrequent cases of overvaluation of the issue price, which, in turn, drain investors' pockets on the stock market. Numerous studies of underpricing concern the US market (Ritter, 1984; Ljungqvist, 2007; Ibbotson et al., 1988; 1994; Loughran & Ritter, 2004; Loughran et al., 1994; Welch & Ritter, 2002, Barry & Jennings, 1993). However, relatively often this phenomenon is studied in other markets, e.g. Sweden (Rydqvist & Hogholm, 1995), Germany (Ljungqvist, 1997), France (Derrien, 2005), China (Chan et al., 2004). In the Polish market, such research has been conducted, among others, by Siwek (2005), Mamcarz, (2010), Mizerka and Lizińska (2017), Sieradzki (2016), Wołoszyn and Zarzecki (2013), Zarzecki and Wołoszyn (2016), Gemzik-Salwach and Perz (2013), Lizińska and Czapiewski (2014), Pomykalski and Domagalski (2015), or Podedworna-Tarnowska (2013, 2020).

The decision-making dilemmas of issuers conducting an initial public offering in the selection and remuneration of expert legal counsel, auditors and investment

bankers in the context of underpricing was the subject of a study by Beatty and Welch (1996). They showed that underwriters' remuneration depends on the size of the offering, but also that underwriters with a higher reputation are better paid. At the same time, they confirmed a positive correlation of underwriters' remuneration with underpricingbut did not confirm such a correlation concerning the remuneration of lawyers or auditors. Ljungqvist et al. (2003) studying international markets and focusing on the relationship between underpricingand gross spreads found that although foreign issuers pay more for US bank intermediation, they simultaneously obtain lower underpricing. The higher direct costs are, therefore, more than offset by the issuer's savings from the lower amount of money being leftover.

From the point of view of capturing total costs, one of the first empirical studies conducted by Ritter (1987) based on a sample of IPOs that took place between 1977 and 1982 in the US is noteworthy. His results show that best effort offers were more costly for issuers (31.87%) than firm commitment offers (21.22%). At the same time, they show that, in average terms, the total cost of conducting IPO is lower in the sample of best effort offers (31.87%) than the cost of underpricing (47.78%), meaning that at the level of a single offering there were cases with negative returns, indicating at the same time a negative value of money left on the table. Ritter described the method of calculating total costs as "100% minus the net proceeds as a percentage of the market value of securities in the aftermarket". Consequently, total costs are not the simple sum of cash expenses and the average initial rate of return, which can be expressed by the formula:

$$TC_{IPO} = 1 - \frac{1-DC}{1+IC} \tag{2}$$

where:
TC_{IPO} – total costs of the offer
IC – indirect costs (underpricing costs) expressed as simple immediate rate of return
DC – direct costs expressed as a percentage of the offer

After transforming the formula, the formula for calculating the total costs for a single offer has the following form:

$$TC_{IPO} = \frac{DC+IC}{1+IC} \tag{3}$$

Lee et al. (1996), using this formula in their research, report that in the US market for offerings conducted between 1990 and 1994, the average total costs were 18.69%. With the average underpricing costs from this period being 12.05%, the direct costs calculated as a percentage of the total gross proceeds of the share issue was approximately 11%. Since, as mentioned, part of the direct costs are fixed in nature, a significant variation is noticeable depending on the value of the offering: for issues under USD 10 million, they averaged 16.96%, while for proceeds above

USD 500 million, the average cost represented 5.72%. The research, therefore, clearly confirmed the existence of economies of scale in both total direct costs and underpricing costs.

Puławski (2013), examining companies issuing shares during initial public offerings between 2008 and 2012, showed that the total costs of public share subscriptions of companies debuting on the WSE relative to the value of the issue are relatively high for smaller issues and decrease as the value of the issue increases, confirming the occurrence of economies of scale, where the average direct costs of an issue decrease as the size of the issue increases. At the same time, he showed an increase in direct emissions costs during the 2008 financial crisis, which amounted to 25% of emissions revenues. Similar conclusions were also reached by Sieradzki (2016), who reports an average cost of conducting an IPO between 2003 and 2014 of 5.7%, separating out the boom years, i.e. 2004 and 2011, in which costs in the period under study were the lowest (4.3% and 4.1%, respectively) and the downturn years, i.e. 2008 and 2009, in which costs were the highest (7.3% and 8.2%, respectively).

In the context of crisis phenomena, research was also conducted by Wawryszuk-Misztal (2015), who investigated the dynamics and structure of direct costs of the first public share issues on the main market of the Warsaw Stock Exchange in the period 2006–2014. Based on 102 IPOs, she observed the phenomenon of rising costs only in the case of issues with a value of up to PLN 50 million, while the costs of issues incurred by larger issuers were relatively stable, regardless of the occurrence of crisis phenomena. It also showed that in the group of smaller issues, the costs of preparing a prospectus and advisory services increased significantly.

Investments in larger offerings are accompanied by lower risk, as a rule, larger offerings involve larger companies and, therefore, lower risk of their bankruptcy (Baron, 1982; Rock, 1986). Besides, investors are more familiar with firms that make large offerings (Boulton et al., 2018). Consequently, information asymmetry is reduced. As part of building favourable signals and positive attitudes toward the company among investors, makes the first small issue with a low valuation guaranteeing undervaluation, in order to already set a higher price in the next large one (Welch, 1989). Moreover, it is assumed that economies of scale effect will occur with larger offerings (Lee et al., 1996; Puławski, 2013). Accordingly, the value of the offer negatively affects total costs.

Ritter proved that higher underpricing is observed in hot periods in the market (Ritter, 1984). According to Loughran and Ritter (2002), underpricing is significantly related to pre-IPO market returns. Their findings are interpreted as evidence that investment bankers do not make a full adjustment to the offering price despite publicly available information on the market's pre-IPO performance. Lyn and Zychowicz (2003) also reported that underpricing is significantly related to market returns prior to an IPO. Thus, underpricing of offers made during periods of strong market dynamics will be higher and consequently the total costs will be higher as well. The metric mostly used in above mentioned research to determine the impact

of stock market conditions on underpricing is the index of a given market prior to the IPO at various time intervals.

During hot periods in the market, there is increased activity in the IPO market (Ritter, 1984; Boulton et al., 2018). Aggarwal and Rivoli (1990) report empirical findings that are supportive of IPOs being subject to overvaluation or fads in early trading. An inclusion of a market momentum measure is intended to proxy for such periodic market conditions (Lyn & Zychowicz, 2003). Therefore, it can be assumed that IPO market activity is correlated with total costs. On the one hand, higher direct costs can be expected during such periods but on the other hand, lower direct costs can be anticipated resulting from greater competition among advisors assisting in the offering.

It is also interesting whether the macroeconomic variables affecting the cost of money in the debt market, such as the prime rate or WIBOR, affect the cost of the IPO. One would assume that during periods of high interest rates, offering costs would also fall.

Considering theoretical background and research presented, the following hypotheses are proposed:

H1: Indirect costs are higher than direct costs of the IPO.

H2: The total IPO costs depends on the type of the offer.

H3: The total costs of IPO depend on the market condition.

H4: The total IPO costs depend on the prosperity on the IPO market.

H5: The total IPO costs depend on the value of the offer.

Research method

To verify the hypothesis, the analysis covered companies debuting on the Warsaw Stock Exchange between 2005 and 2020. The initial group included 427 debuts. The following entities were excluded:

– companies that changed listing floor from MTS Ceto and NewConnect to the main floor,

– companies debuting after demerger by spin-off,

– foreign companies,

– companies for which data was not available,

– two companies for which the total costs varied widely (including them caused standard deviation amounted to 63%).

The final sample included 249 companies. These included IPOs involving offers to issue shares (135 companies), offers to sell shares (30 companies) and offers combining issuance and sale (84 companies).

Information on the costs of the analysed offerings was obtained from the companies' current reports published after the completion of the share subscription. For this purpose, the data from the website https://infostrefa.com/ was used. Data on the value of the offer, the issue value, the offer price of the shares and the closing price on the first day of trading were obtained from the website https://www.gpw.pl/.

Based on the information obtained on the level of direct offering costs and the gross offer value, offering costs were estimated as a percentage, i.e. in relation to the gross offering value. For companies that only carried out a new issue, the gross offer value was equal to the gross proceeds of the offer.

Direct costs were first analysed for individual companies. In the case of share sale offers, only the costs incurred by the company charged to its financial result were considered (costs incurred by the selling shareholder were ignored). In the case of joint offers, the issuers' reported costs of issuing the shares and the part of the costs of selling the shares borne by the company were taken into account together (the costs borne by the selling shareholder were also omitted). Measure (1) was used to calculate the indirect costs of the offering. In the next step, the method described in Ritter (1987) and Lee et al. (1996) given in formula (2) and (3) was used to count the total costs for each company. Total costs are counted for each company as direct and indirect costs as a percentage of market value. The results are then averaged both for the entire study population and by group in terms of the type of the offer, and then also by year. Therefore, the average cost/market value ratio is different from the ratio of these averages. It is also different from the sum of the component values. The study did not focus on either indicating the structure of total costs or the structure of direct costs.

Then an econometric linear regression model was prepared, with the endogenous variable being the variable indicating the level of total costs, for individual IPO cases.

A stepwise backward variable selection procedure was carried out for the variable determined in this way. Elevenexplanatory variables were selected as the base of variables from which selections were made:

– monthly average values and changes in WIG index for 6 and 12 months prior to IPO, respectively,

– monthly average values and changes in the value of interest rates for 6 and 12 months prior to IPO, respectively,

– the value of the offer after logarithmic transformation,

– year index (0 = 2005, 1 = 2006, 2 = 2007, etc.),

– number of IPOs in the previous month.

Out of presented variable base, the following set of variables was selected using the stepwise backward variable selection method indicated earlier:

– constant – constant in linear model,

– offer_value – value of the offer after logarithmic transformation,

– IPO_prev_month – the number of IPOs in the previous month,

– ir_12m – monthly average percentage changes in interest rates for 12 months prior to IPO,

– year – year index, e.g. 0 = 2005, 1 = 2006, 2 = 2007, etc.,

– if_combined – dummy variable related to combined offering,

– if_new – dummy variable related to new offering.

Consequently, linear model was estimated for the variables thus selected and with total costs as dependent variable (equation 2):

Total_costs = (1) Constant + (2) offer_value + (3) IPO_prev_month + (4) ir_12m + (5) year+ (6) if_combined + (7) if_new

As total costs are not the simple sum of direct costs and indirect costs, the model was also used to test the dependent variables which were *indirect_cost* (equation 1) and *direct_cost*:

Indirect_costs = (1) Constant + (2) offer_value + (3) IPO_prev_month + (4) ir_12m + (5) year+ (6) if_combined + (7) if_new

Direct_costs = (1) Constant + (2) offer_value + (3) IPO_prev_month + (4) ir_12m + (5) year+ (6) if_combined + (7) if_new

With regard to the statistical significance and stability of the variables used in the model, a single-factor analysis was carried out against the dependent variables analyzed (*total_costs*, *indirect_costs*, *direct_costs*). For this purpose, a linear regression model was estimated in which the *total_costs* variable was the target variable against a particular explanatory variable (and constant). The same was carried out for *indirect_costs* and *direct_costs*, respectively. The results of the estimated models are attached to the article's appendix. It is indicated in the estimated models which variables are statistically significant (i.e. at the 1%, 5%, and 10% levels). Standard notation for marking the statistical significance of variables was used here.

A Durbin–Watson test was also conducted to verify the presence of the autocorrelation of model residuals (resulting from, among others, the instability of variables or model misspecification). According to Durbin–Watson statistics, the range of 1–2 indicates the absence or insignificant level of autocorrelation. For all of the estimated models (i.e. the model for the variable *total_cost*, *indirect_cost*, and *direct_cost*), the values of the Durbin–Watson statistics were within the range of 1–2. At the same time, it is worth pointing out that for the variable *direct_cost* for which the estimated model had the highest level of model quality, the Durbin–Watson statistic was close to 2 (i.e. the absence of the problem of autocorrelation of model residuals).

Results

The results of the research show that, in average terms, for the period 2005–2020, the total cost of an IPO on the WSE is 12.66% for the total sample, with the indirect cost due to underpricing amounting to 11.12% on average and direct costs representing 5.78% of the value of the offer on average. As in the cited studies by Ritter (1987), Lee

et al. (1996) and Sieradzki (2016), in the averages, the total cost of conducting an offer, for some of the groups or years studied, lower than the indirect cost resulting from underpricing, as a result of the occurrence of offers with negative returns, indicating at the same time the negative value of money left on the table. This phenomenon is also mentioned by Sieradzki (2016), who, using this methodology and reporting an 18.1% average total cost of conducting IPOs in Poland between 2003 and 2014, shows while for 70 of them these costs were negative, averaging -19%. In the present study covering the period 2005–2020, total costs were negative in 30 cases and averaged at the level of -6.48%.

The results of the research confirmed that the total costs of the offer are highest in the case of the issuance of new shares, at 14.12% (Table 1). Interestingly, the combined offer is the more expensive option (12.53%) than the offer of only selling the existing shares (6.40%). The combined offer is, therefore, a cheaper option than the offer to issue new shares only. It should also be noted that the transfer of value to new investors is lowest with offers of selling the existing shares. This is understandable, as exiting shareholders are keen for the valuation of the shares and the offer price to be as high as possible. This is confirmed, among other things, by empirical studies on the level of underpricing of IPOs carried out as part of venture capital fund divestments, which indicate its lower level compared to other IPOs (Megginson & Weiss, 1991; Barry et al., 1990; Sieradzki & Zasępa, 2016; Rzewuska & Wrzesiński, 2016; Zasępa, 2019). Furthermore, the study confirmed that indirect costs are higher than direct costs in the whole sample. Interestingly, the discrepancy between direct and indirect costs is bigger in the group of debuts with the issue of new shares and combined offer. The reason of lower direct costs in this group is sharing them between the company and the existing shareholders.

Table 1. Cost metrics between 2005 and 2020 depending on the type of offer

Metric	Indirect costs	Direct costs	Total costs
Issue of new shares			
mean	10.96%	8.10%	14.12%
median	4.30%	5.92%	11.73%
Sale of existing shares			
mean	6.40%	1.31%	6.40%
median	2.07%	0.79%	4.67%
Combined offer			
mean	13.05%	3.65%	12.53%
median	6.28%	2.91%	9.04%
Total all offers			
mean	11.12%	5.78%	12.66%
median	5.00%	4.32%	9.70%

Source: Author's own study.

The result confirmed that indirect costs are higher than direct costs in the majority of years. To verify this hypothesis, the Student's *t*-test (paired) for mean and the Wil-

coxon test for median have been carried out. The results confirming the hypothesis H1 are presented in Table 2.

Table 2. Direct and indirect costs

Statistics	Direct costs	Indirect costs
Issue of new shares		
Mean	0.0810	0.1096
Standard deviation	0.0814	0.2471
t-stat (paired)	1.3171	
*p*_value	0.1901	
Median	0.0592	0.0430
z-stat	4365.0	
*p*_value	0.6212	
N	135	
Sale of existing shares		
Mean	0.0131	0.0640
Standard deviation	0.0123	0.1082
t-stat (paired)	2.4901**	
*p*_value	0.0187	
Median	0.0079	0.0207
z-stat	152.0	
*p*_value	0.0978	
N	30	
Combined offer		
Mean	0.0365	0.1305
Standard deviation	0.0244	0.2153
t-stat (paired)	3.9891***	
*p*_value	0.0001	
Median	0.0291	0.0628
z-stat	953.0***	
*p*_value	0.0002	
N	84	
Total costs		
Mean	0.0578	0.1112
Standard deviation	0.0671	0.224
t-stat (paired)	3.67***	
*p*_value	0.0003	
Median	0.0432	0.0500
z-stat	13122.0**	
*p*_value	0.0319	
N	249	

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Considering the distribution of costs over the years, it should be noted that, on average, the highest costs were in 2020, where total costs amounted to more than 24% (Table 3). This year was also characterised by the highest average indirect costs (24.5%). Total costs were also relatively high in the year before (20.68%), and in 2009 (21.86%). The study, therefore, confirmed the conclusions of the other presented re-

search (Sieradzki, 2016; Puławski, 2013; Wawryszuk-Misztal, 2015), presenting the increase in costs during the periods of crisis. The noticeable increase in costs in 2020, may be related to the emergency situation caused by the COVID-19 pandemic. The financial crisis in 2008 left its mark on the financial market translating into average low returns for investors and, thus, a negative cost of underpricing for a few issuers and then the increase in total costs is observed in 2009. Interestingly, in 2008, the direct costs exceeded cost of underpricing by almost 10 pp. In contrast, the lowest average total cost applies to 2014–2015.

Table 3. Average costs 2005–2020

Year	Indirect costs	Direct costs	Total costs
2005	9.51%	4.47%	10.99%
2006	24.49%	5.02%	19.60%
2007	17.99%	4.90%	15.60%
2008	0.97%	10.74%	9.82%
2009	14.09%	12.39%	21.86%
2010	5.98%	6.46%	11.35%
2011	4.07%	4.20%	6.98%
2012	11.67%	8.73%	14.17%
2013	7.31%	4.17%	9.43%
2014	1.99%	2.38%	4.19%
2015	0.83%	3.72%	4.19%
2016	4.86%	4.40%	8.42%
2017	2.41%	9.18%	11.51%
2018	12.46%	4.34%	13.68%
2019	14.74%	8.99%	20.68%
2020	24.50%	8.32%	24.25%
Average 2005–2020	11.12%	5.78%	12.66%

Source: Author's own study.

In order to check whether these extreme values in the indicated years are statistically significant, the Student's *t*-test was carried out. The results confirming the statistical significance of these differences are presented in Tables 4–7.

Table 4. Comparison of costs in 2009 and 2014

Type of cost	Measure	2009	2014	*t*-stat	*p*-value
Total costs	mean	0.22	0.04	7.8329***	0.0000
	N	9	11		
	std	0.16	0.04		
Indirect costs	mean	0.14	0.02	6.4244***	0.0000
	N	9	11		
	std	0.14	0.03		
Direct costs	mean	0.12	0.02	5.3600***	0.0000
	N	9	11		
	std	0.14	0.02		

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Table 5. Comparison of costs in 2009 and 2015

Type of cost	Measure	2009	2015	*t*-stat	*p*-value
Total costs	mean	0.22	0.04	7.8884***	0.0000
	N	9	12		
	std	0.16	0.06		
Indirect costs	mean	0.14	0.01	6.9295***	0.0000
	N	9	12		
	std	0.14	0.06		
Direct costs	mean	0.12	0.04	4.9624***	0.0001
	N	9	12		
	std	0.14	0.02		

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Table 6. Comparison of costs in 2014 and 2020

Type of cost	Measure	2014	2020	*t*-stat	*p*-value
Total costs	mean	0.04	0.24	-5.7276***	0.0001
	N	11	2		
	std	0.04	0.15		
Indirect costs	mean	0.02	0.24	-3.5023***	0.0050
	N	11	2		
	std	0.03	0.35		
Direct costs	mean	0.02	0.08	-3.2280***	0.0080
	N	11	2		
	std	0.02	0.07		

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Table 7. Comparison of costs in 2015 and 2020

Type of cost	Measure	2015	2020	*t*-stat	*p*-value
Total costs	mean	0.04	0.24	-4.6235***	0.0006
	N	12	2		
	std	0.06	0.15		
Indirect costs	mean	0.01	0.24	-3.5395***	0.0041
	N	12	2		
	std	0.06	0.35		
Direct costs	mean	0.04	0.08	-2.6964**	0.0194
	N	12	2		
	std	0.02	0.07		

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

During periods of weakness in the IPO market as measured by the number of IPOs conducted, competition between advisory firms plays a large role. It is expected that advisers' fees will be lower during bull market periods, which will translate

into lower direct costs. In Figure 1 general yearly statistics are shown, including the number and value of IPOs that took place over the period 2005–2020.

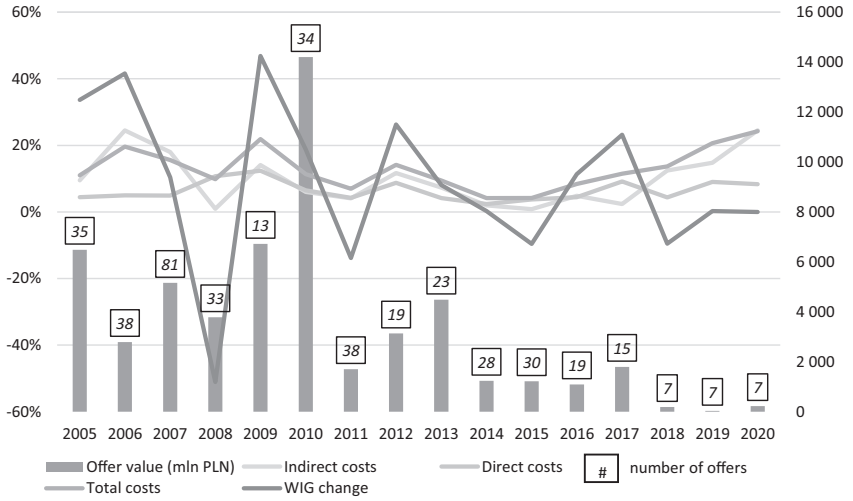

Figure 1. IPO costs versus number and value of IPOs and WIG change

Source: Author's own study.

The results of the estimation of the econometric model in which the endogenous variable is total costs are presented in Table 8.

Table 8. Total costs model – OLS regression results

Model specification and results						
Dep. Variable			total_costs			
Model			OLS			
Method			Least Squares			
No. Observations			249			
Df Residuals			242			
Df Model			6			
Covariance Type			nonrobust			
R-squared			0.092			
Adj. *R*-squared			0.069			
F-statistic			4.084			
Prob (*F*-statistic)			0.000637			
Log-Likelihood			138.91			
AIC			-263.8			
BIC			-239.2			
Variables	coef	std err	t	P>|t|	[0.025	0.975]
const	0.6887***	0.165	4.165	0.000	0.363	1.014
offer_value	-0.0230***	0.007	-3.284	0.001	-0.037	-0.009

Model specification and results						
IPO_prev_month	-0.0035	0.003	-1.020	0.309	-0.010	0.003
ir_12m	-0.0248*	0.013	-1.890	0.060	-0.051	0.001
year	-0.0130***	0.005	-2.621	0.009	-0.023	-0.003
if_combined	0.0165	0.032	0.516	0.607	-0.047	0.080
if_new	0.0149	0.033	0.457	0.648	-0.049	0.079
Tests on model's results						
Omnibus			45.135			
Prob (Omnibus)			0.000			
Skew			0.945			
Kurtosis			5.124			
Durbin–Watson			1.631			
Jarque–Bera (JB)			83.829			
Prob (JB)			6.26e-19			
Cond. No.			360.			

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

Note that the type of the offer has been transformed using dummy variables. The reference variable (i.e. the one that is included into const attribute) has been set to be *if_old_sale*, which refers to the type of the offer that is related to sales of existing shares. The rest of the variable types – *if_combined*, and *if_new* – were explicitly included into model specification as binary variables (i.e. dummy transformation was conducted on offer type). The estimated model has low explanatory power (R^2 = 9.2%). The *F*-statistics indicates that the impact of all of the variables combined is statistically significant. The attributes within 5% of statistical importance are *const*, *offer_value*, and *year*.

The results of the estimation of the model with the indirect costs as endogenous variable is the following:

Table 9. Indirect costs model – OLS regression results

Model specification and results	
Dep. Variable	indirect_costs
Model	OLS
Method	Least Squares
No. Observations	249
Df Residuals	242
Df Model	6
Covariance Type	nonrobust
R-squared	0.075
Adj. *R*-squared	0.052
F-statistic	3.271
Prob (*F*-statistic)	0.00412
Log-Likelihood	27.975
AIC	-41.95
BIC	-17.33

Model specification and results						
Variables	coef	std err	t	P>|t|	[0.025	0.975]
const	0.6212*	0.258	2.406	0.017	0.113	1.130
offer_value	-0.0064	0.011	-0.580	0.562	-0.028	0.015
IPO_prev_month	-0.0017	0.005	-0.318	0.750	-0.012	0.009
ir_12m	-0.0662***	0.020	-3.228	0.001	-0.107	-0.026
year	-0.0309***	0.008	-3.981	0.000	-0.046	-0.016
if_combined	0.0106	0.050	0.211	0.833	-0.088	0.109
if_new	-0.0031	0.051	-0.062	0.951	-0.103	0.097
Tests on model's results						
Omnibus			172.286			
Prob (Omnibus)			0.000			
Skew			2.723			
Kurtosis			14.263			
Durbin–Watson			1.821			
Jarque–Bera (JB)			1623.682			
Prob (JB)			0.00			
Cond. No.			360.			

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

The estimated model has low explanatory power ($R^2 = 7.5\%$). The *F*-statistics indicates that the impact of all of the variables combined is statistically significant. The attributes within 5% of statistical importance are *const*, *ir_12m*, and *year*.

The estimation for the model in which the endogenous variable was direct costs is the following:

Table 10. Direct costs model – OLS regression results

Model specification and results						
Dep. Variable			direct_costs			
Model			OLS			
Method			Least Squares			
No. Observations			249			
Df Residuals			242			
Df Model			6			
Covariance Type			nonrobust			
R-squared			0.391			
Adj. *R*-squared			0.376			
F-statistic			25.93			
Prob (*F*-statistic)			9.67e-24			
Log-Likelihood			381.30			
AIC			-748.6			
BIC			-724.0			
Variables	coef	std err	t	P>|t|	[0.025	0.975]
const	0.3519***	0.062	5.634	0.000	0.229	0.475
offer_value	-0.0226***	0.003	-8.521	0.000	-0.028	-0.017

Model specification and results						
IPO_prev_month	-0.0015	0.001	-1.131	0.259	-0.004	0.001
ir_12m	0.0173***	0.005	3.495	0.001	0.008	0.027
year	0.0063***	0.002	3.351	0.001	0.003	0.010
if_combined	0.0076	0.012	0.628	0.531	-0.016	0.031
if_new	0.0271**	0.012	2.198	0.029	0.003	0.051
Tests on model's results						
Omnibus			286.979			
Prob (Omnibus)			0.000			
Skew			4.744			
Kurtosis			42.564			
Durbin–Watson			1.992			
Jarque–Bera (JB)			17174.593			
Prob (JB)			0.00			
Cond. No.			360.			

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.

The estimated model has medium explanatory power ($R^2 = 39.1\%$). The *F*-statistics indicates that the impact of all of the variables combined is statistically significant. The attributes within 5% of statistical importance are *const*, *offer_value*, *ir_12m*, *year*, and *if_new*.

The results of the analysis indicate that the explainability (via external attributes) is the biggest for the direct costs. This result is intuitive, as the indirect cost and total costs (as a function of indirect and direct costs) are both depending heavily on each other. Given the defined research hypothesis, based on the estimated model, the following conclusions can be drawn. Neither total costs, nor direct costs, nor indirect costs do not depend on the offer type. The coefficients next to *if_combined*, and *if_new* are not statistically significant in any estimated model, hence the hypothesis H2 is to be rejected.

The market conditions were included into linear model as a WIG index (changes and levels for various time windows). However, this variable was not statistically significant in any of the models. Moreover, the Condition Index for this variable was high, which indicates the problem of multicollinearity. Changes in interest rates are statistically significant in the estimated models. They negatively affect the total cost of IPO and indirect costs (i.e. an increase in interest rates level is observed along with lower total costs) while positively correlated with direct costs. Hypothesis H3 is to be confirmed partially.

The number of IPOs in the previous month has weak statistical power in each estimated model, so analyzed costs of offers may not be directly explained by the number of IPOs in the preceding month. Thus, hypothesis H4 is to be rejected.

The value of the offer is statistically significant for modeling the direct costs as well as the total costs. Hypothesis H5 is to be confirmed. When modeling indirect costs, the estimated coefficient is not statistically different from zero.

Year index yielded a statistically significant result and with each following year, the total costs of offering decreases by 1.30 pp, and indirect costs by 3.09 pp, while direct costs increased by 0.63 pp.

Conclusions and discussions

The differences in the total costs and the level of underpricing in consecutive years show that the conditions under which the companies go public vary considerably over time. And, in fact, they depend not only on the fundamentals of the company, but also on the overall stock market situation. Aggarwal and Rivoli (1990) argue that, from the point of view of investors, IPOs are a profitable investment in the short term, but the abnormal returns for initial investors should not be interpreted as "money left on the table" from the issuer's point of view, as over longer periods, investments in IPOs yield poor results. This is confirmed by a number of empirical studies in which it was observed that, in the case of abnormally high returns during the debut period, returns calculated over the medium and long term, i.e. several months to several years, were negative compared to the market benchmark (e.g. Loughran & Ritter, 1995; Jenkinson & Ljungqvist, 1996; Ritter & Welch, 2002; Kwit, 2006; Rzewuska & Wrzesiński, 2016). Ibbotson et al. (1994) even argue that the poor long-term performance of IPOs confirms that, despite the short-term under-pricing phenomenon and the subsequent transfer of value to new investors, the cost of raising equity capital is not prohibitively high, especially for young, growing companies. Loughran and Ritter's (1997) research suggests that because IPOs are disproportionately fast-growing companies, they, therefore, take advantage of temporary opportunities by issuing shares when, on average, their value is significantly overvalued, taking advantage of the *de facto* mispricing at the time of going public caused by market inefficiencies. At the time of the offer, the market appears to overestimate this improvement and, therefore, market prices reflect the capitalisation of the temporary improvement in operating performance, and when this specificity of the temporariness of the improved operating performance becomes evident, share prices underperform.

As the results of a study of company IPOs on the WSE show, the total cost of listing a company varies depending on the type of offering. The direct cost alone entails a cost of several percent of the value of newly issued or sold shares, and if we add the cost of underpricing, in relation to the market value of the offer, the company's IPO constitutes a total cost of over 12% on average. At the same time, companies listing on the stock exchange because of the decision of the main shareholder to exit are characterised by a lower total cost of offer, which is due to two reasons. Firstly, such a shareholder is not willing to leave money on the table, so it has the impact on indirect costs. Second, the direct costs are shared by the company and by the shareholder. The cost is lower in a combined offer, which is also due to the

selling shareholder contribution in bearing part of the costs. However, it is important to bear in mind that the costs incurred during an IPO for individual companies vary significantly and their components depend on several factors that are worth analysing in further broader research, also in the context of their impact on individual parts of the costs. Therefore, it is important to look at this issue from a long-term perspective and relate it to the potential benefits of public company status on the capital market, such as access to broad, diversified capital, the prestige of a public company and increased credibility and brand recognition.

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Appendix 1. Single-factor analysis

Variable	Variable coeff.	Variable *p*-value	Constant coeff.	Constant *p*-value	R^2
Total_costs					
offer_value	-0.0244***	0.000	0.5589***	0.000	0.060
IPO_prev_month	0.0018	0.564	0.1194***	0.000	0.001
ir_12m	0.0085	0.217	0.0060***	0.002	0.006
Year	-0.0059**	0.017	0.1513***	0.000	0.023
if_combined	-0.0018	0.925	0.1272***	0.000	0.000
if_new	0.0320	0.084	0.1092***	0.000	0.012
Indirect_costs					
offer_value	-0.0059	0.547	0.2158	0.217	0.001
IPO_prev_month	0.0070	0.153	0.0838***	0.001	0.008
ir_12m	0.0065	0.542	0.0852*	0.058	0.002
year	-0.0105***	0.006	0.1554***	0.000	0.030
if_combined	0.0292	0.335	0.1013***	0.000	0.004
if_new	-0.0034	0.906	0.113***	0.000	0.000
Direct_costs					
offer_value	-0.0261***	0.000	0.5204***	0.000	0.322
IPO_prev_month	-0.0014	0.355	0.0631***	0.000	0.003
ir_12m	0.0071**	0.026	0.0297**	0.026	0.020
year	-0.0002	0.860	0.0586***	0.000	0.000
if_combined	-0.0322***	0.000	0.0686***	0.000	0.051
if_new	0.0506***	0.000	0.0303***	0.000	0.142

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Author's own study.