

Stock returns and liquidity after listing switch on the Warsaw Stock Exchange¹

Dorota Podedworna-Tarnowska², Daniel Kaszyński³

Abstract: The aim of the article is to evaluate the market reaction to the change of listing venue of companies moving from the alternative market to the regulated market of the Warsaw Stock Exchange. To do so, we investigated 71 switches, and their effect on market returns and liquidity. While the transfer itself creates a negative market reaction, the announcement of the transfer of a company and the institutional confirmation by the supervision of the company's readiness for this transfer resulting from the approval of the prospectus creates positive market reactions. As a result of the transfer of companies there is an improvement in the liquidity of the shares. The empirical findings of the study could assist managers and investors in understanding the impact of stock exchange migration on returns and the liquidity of shares in the shorter and longer term.

Keywords: alternative market, main market, listing change, stock liquidity.

JEL codes: G10, G14, G18, G30, G32.

Introduction

There is a wide range of research findings in the finance literature related to the process of going public including theoretical and empirical studies indicating abnormally high returns obtained by investors during the Initial Public Offer (i.e., the phenomenon of undervaluation in the short term) and on average negative returns obtained by investors in the long term (i.e., overvaluation in the long term). These phenomena were analysed from the perspective of a company's direct debut on the stock exchange. In the authors' opinion relatively little attention has been paid to companies that are already listed on

¹ Article received 25 October 2022, accepted 16 December 2022.

² Institute of Value Management, Axiology and Value Measurement Unit, SGH Warsaw School of Economics, al. Niepodległości 162, 02-554 Warszawa, Poland, corresponding author: dpoded@sgh.waw.pl, <https://orcid.org/0000-0001-5945-403X>.

³ Institute of Econometrics, Decision Analysis and Support Unit, SGH Warsaw School of Economics, al. Niepodległości 162, 02-554 Warszawa, Poland, dkaszy@sgh.waw.pl, <https://orcid.org/0000-0002-0865-0732>.

an alternative market or a segment of the regular stock market designed for smaller companies and which then decided to change the place of quotation.

Accordingly, an intriguing research issue in the presented perspective is the assessment of demand for the shares of such a company in the pre- and post-transfer period and its market valuation. It is essential to verify whether there is an investor-positive effect of the transfer to a regulated market meaning that investors achieve above-average returns, as it has been repeatedly demonstrated in many studies of companies debuting directly on regulated markets (e.g., Ritter, 1984; Ljungqvist, 2007; Loughran & Ritter, 2005; Welch & Ritter, 2002; Mizerka & Lizińska, 2017; Sieradzki, 2016; Zarzecki & Wołoszyn, 2013, 2016; Lizińska & Czapiewski, 2014, 2015; Pomykalski & Domagalski, 2015; Podedworna-Tarnowska, 2018), or alternative ones (Vismara, Paleari, & Ritter, 2012; Hadro & Pauka, 2019; Podedworna-Tarnowska, 2020).

Research on the market reaction when announcing a change of listing venue has been confirmed by studies mainly based on the US market (Sanger & McConnell, 1986; Kadlec & McConnell, 1994; Jain & Kim, 2006; Dang, Michayluk, & Pham, 2018) and on the UK market (Campbell & Tabner, 2011; Vismara et al., 2012; Mortazian 2021). Such studies are also conducted on the basis of data coming from other stock exchanges including, the following markets: French (Bacmann, Dubois, & Ertur, 2002), German (Bessler, Beyenbach, Rapp & Vendrasco, 2021, 2022), Korean (Park, Binh, & Eom, 2016), Indian (Ahmed, Aney, & Banerji, 2019), Brazilian (De Carvalho & Pennacchi, 2012), Chinese (Kwok, 2020). On the Polish market this topic is addressed extremely rarely. Kordela (2011) conducted a case study of five companies that changed their trading floor between 2007 and 2010, assessing their capitalisation, turnover rate and return on investment at six-month intervals but the results are inconclusive. A broader study was conducted by Asyngier (2015) based on 29 companies that changed listing floor from 2008 to August 2014. His results show that there were abnormal positive stock returns before the change of listing market and clearly negative ones after the transfer of listing to the regulated market with the downward trend being strongest in the first dozen days after the debut on the main market.

The aim of the article is to evaluate the market reaction to the change of listing venue of companies moving from the alternative market to the regulated market of the Warsaw Stock Exchange. First, the market reaction by assessing prices and liquidity of the shares of companies that have transferred from the alternative market to the main market was examined. Then, the analysis was extended by assessing the impact on the prices and liquidity of shares of intermediate events preceding the transfer and occurring before the company starts its listing on the target exchange, i.e., the announcement of the decision of the General Shareholders Meeting to list the company on the regulated market and the announcement of the approval of the prospectus by the Polish Financial Supervision Authority. There is a lack of research in the literature concern-

ing broader analysis for transfers taking place on the Warsaw Stock Exchange. Including both the impact of stock exchange shifting on market returns and liquidity of shares which is covered in the research and which fills this gap.

The rest of the article is organised as follows. Section 1 contains a review of existing literature related to the studies concerning the listing changes and hypothesis development. Section 2 presents the methodology of the study and data collection. Sections 3 includes the results of the research regarding the consequences of the listing change on the Warsaw Stock Exchange and is divided into two paragraphs: the first one concerns on the rates of return and the second concerns liquidity. The last section covers the final conclusions.

1. Literature review and hypothesis development

Each stock exchange or the market segments within it has specific formal requirements that must be fulfilled by a company seeking to have its shares authorized for listing and trading. He, Huang, and Zhang (2022) show on a theoretical model that a carefully designed market microstructure, listing standards, disclosure requirements, trading mechanism, and market governance, can play an important role to reduce investor ambiguity. On the more reputable stock exchanges or the regulated segments of a particular exchange, these requirements tend to be more stringent and the need to meet them is a challenge for companies entering these markets. The alternative markets, such as NewConnect in Poland, Alternative Investment Market (AIM) in the UK or NASDAQ in the US, have been designed to enable smaller entities to operate on the public listing markets. Their characteristics are widely described in Pastusiak (2011), Vismara and others (2012), Panfil (2013), Asyngier (2013), Tomaszewski (2013), Kordela (2013), Zygmanski (2017), Radke (2020). Although fewer regulatory restrictions characterize alternative markets they remain institutionalized stock markets.

Shifting between markets and changing the exchanges is not a common phenomenon both in the US and Europe. As reported by Dang and others (2018) 196 companies made the switch from NADAQ to NYSE over the period 2000–2015. At the same time a voluntary change of listing location from NYSE to NASDAQ was made by only 53 companies. Research by Vismara and others (2012) shows that in the UK since the start of the Alternative Investment Market, i.e., from 1996 to 2009, only 90 companies have moved to the London Stock Exchange's regulated market. Shareholder interest, greater visibility, and growth opportunities were cited as reasons for it. However, research by Campbell and Tabner (2011) shows that the majority of companies do not give a rationale for the transition. On the London Stock Exchange transfers of companies in the other direction, i.e., from the main floor of the stock exchange to the alternative market are more common—there were as many as

282 such companies in the period under review. In both Vismara and others (2012) and Campbell and Tabner (2011) the most common motive for moving to a smaller stock exchange is indicated to be growth appropriate to the size of the company, the implementation of mergers and acquisitions, more flexible AIM environment, simplified reporting, cost savings and less regulation. Also for the German market the fact is notable that companies start listing on the primary segment and then move to the lower segments of Deutsche Börse (Bessler et al., 2021, 2022). Some studies present the results of two-way migration (Vismara et al., 2012; Campbell & Tabner, 2011; Jenkinson & Ramadorai, 2013; Dang et al., 2018).

Research using different approaches and time periods mostly indicate that the market reaction to the announcement of a company's migration to a more highly regulated exchange is significantly positive, while the announcement of a transfer in the other direction tends to be poorly perceived by the market (Sanger & McConnell, 1986; Kadlec & McConell, 1994; Jain & Kim, 2006). Increases in CAR returns following the announcement of a change of listing floor from NASDAQ to NYSE immediately following a change of listing were shown by Jain and Kim (2006), noting that while the increases during the period of the actual transfer are positive, most of the increases occur around the date of the announcement, and the highest CARs were observed in the period between the announcement of the change of listing floor and the actual transfer. Campbell and Tabner (2011) showed that firms switching from the less-regulated AIM to the more regulated main section of the London Stock Exchange show positive returns on the day of the decision announcement while for firms switching in the opposite direction both the returns on the announcement date and the transfer date are negative. Conversely, after the implementation of the decision, the pattern of returns is inverted for both categories of firms. This is consistent with the results of Dharan and Ikenberry (1995), who observed a negative return performance measured by CARs over three years after the change in listing location of -12.39% that move from NASDAQ to NYSE or to AMEX and from AMEX to NYSE. Jenkinson and Ramadorai (2013) showed that while companies switching from the AIM market to the regulated market experienced on average positive returns of around 5% one year after the event the CAR is around -11% . In contrast and as a result of the transition from the regulated market to AIM companies have experienced average negative returns of around 5% on the results of the transition followed by positive returns with a CAR of around 25% one year after the event. The positive effect of positive cumulative returns following the NYSE listing move further helped companies to broaden their investor base and increase their recognition among investors (Kadlec & McConnell, 1994; Jain & Kim, 2006).

Transfer of the company from the alternative market to the regulated market requires issuers to comply with a much higher regulatory, information and communication regime with the market. A diligent information policy

on the part of issuers reduces the asymmetry of information between those with strong ties to the company and other outside investors resulting in increased investor confidence and reduced risk. Consequently, the market reactions for company's transfer should be positive. These assumptions lead to the following hypothesis:

H1: As a company transfers from the alternative to the regulated market its investors achieve above-average returns.

In the context of the previously mentioned diversity of the information environment in stock exchanges with different information standards it should be taken into account that quantifying the quality of the information environment is extremely difficult, but there are some attempts in the empirical studies trying to do so. Leuz and Verrecchia (2000) list those economic quantities that can be measures of information asymmetry between a company and its shareholders: the bid-ask spread which is de facto the measure of trading costs, liquidity and price volatility.

Liquidity is one of the factors shaping investment returns achieved by investors because of its link to transaction costs. It can be understood as the ease of entering and exiting the market which encourages investment in securities and at the same time increases market security. Liquidity is a multi-dimensional and complex concept. Sarr and Lybek (2002) argue that liquidity has five dimensions: tightness, immediacy, depth, breadth, resiliency, but indicate these characteristics as overlapping to some extent and therefore most of the data do not fully correspond to them. The different dimensions of the liquidity are widely described in the literature (e.g., Kyle, 1985; Engle & Lang, 2001; Doman, 2011; Amihud & Mendelson, 2012; Włosik, 2017; Le & Gregoriou, 2020). Liquidity is consequently an important factor in asset pricing. The greater the liquidity of a financial instrument, the higher the price at which it can be sold. Therefore, investors prefer more liquid investments that are traded quickly and at a lower cost. Less liquid investments imply higher transaction costs and should therefore offer correspondingly higher expected returns to be as attractive as more liquid investments (Amihud & Mendelson, 1991). Indeed, with limited liquidity comes higher risk, so investors faced with the potential difficulty of reselling shares at the market price will demand a liquidity premium in the form of higher rates of return. Therefore, in a more liquid market trades are more likely to be concluded by investors, which is conducive to liquidity enhancement. According to research by Ang, Shtaubert and Tetlock (2013) over-the-counter stocks are far less liquid, disclose less information and exhibit lower institutional holdings than do listed stocks. Moreover, compared with premiums in listed markets the OTC illiquidity premium is several times higher, the size, value, and volatility premiums are similar, and the momentum premium is three times lower. Therefore, it is not surprising that some researchers, such

as Pagano, Panetta and Zingales (1998) argue that the main reason for a company to go public is that shareholders want their shares to be liquid.

Amihud and Mendelson (1986) presented a theoretical model describing the impact of liquidity on asset prices. They used the ratio of total daily volume to total absolute return as an indicator of liquidity. The market-observed expected return is an increasing and concave function of the spread. Less liquid assets with higher transaction costs are held by investors for longer periods and vice versa. The length of investors' holding periods is related to the bid-ask spread. Atkins and Dyl (1997) empirically confirmed a strong positive relationship for various stocks between the bid-ask spread and the inverse of the turnover ratio, which measures the holding period of a stock. They showed that the relationship between holding periods and bid-ask spreads is much stronger on the NASDAQ, where spreads are wider, than on the NYSE, where spreads are smaller. According to model of Acharya and Pedersen (2005), investors should be concerned about the performance and marketability of a security both in a market downturn and when liquidity 'dries up'. Their model shows that the required return on a security increases with the covariance between its illiquidity and market illiquidity, decreasing with the covariance between the security's return and market illiquidity, and decreasing with the covariance between its illiquidity and market return.

The effects of moving from one exchange to another in the context of stock liquidity (and transaction costs) are also studied in the literature. Amihud and Mendelson (1986), Sanger and McConnell (1986), Kadlec and McConnell (1994), Jain and Kim (2006) argue that trading liquidity improves when shares start to be traded on an organised exchange. Most often it is emphasized that such firms experience higher trading volumes and lower trading costs (usually measured by the bid-ask spread). However, some studies indicate that liquidity deteriorated (Park et al., 2016). Mortazian (2021) showed that companies moving from the main market of the London Stock Exchange to AIM worsen their information environment as measured by the liquidity and volatility of their shares upon entering AIM. The move from the main market to AIM results in a significant reduction in liquidity (measured by an increase in illiquidity of the Amihud index), bid-ask spread, and a reduction in the volatility of stock returns. According to Kwok (2020), market reactions to the announcement of a listing floor switch depend on liquidity—highly liquid firms do not show a significant market reaction around the announcement, but a much larger positive market reaction occurs for a low liquidity firm.

According to Vismara and others (2012), most of the offerings carried out on the alternative markets set up by stock exchanges in Europe are offered only to institutional investors and are the equivalent of private placements having little impact on the development of liquid trading. The specificity of the alternative market in Poland lies in its rather distinctive shareholding structure, which often consists of persons closely related to the company, i.e., founders,

employees, acquaintances, investors participating in previous private placements. On the alternative market, domestic individual investors account for the turnover of the vast majority of shares. On the NewConnect in Poland their average share of turnover between 2007 and 2020 was close to 81%, and in the second half of 2020 alone it was 91%. Hence, it is relatively more difficult to attract the interest of institutional investors on this market (share of turnover just over 14%) and foreign investors (around 5%), who largely focus their attention on the regulated market (own calculations based on <https://www.gpw.pl/analizy>, accessed 21st November 2021). Taking into consideration these details and given the availability of data it is assumed that companies moving from the alternative market to the regulated market of the WSE improve their information environment which can be measured by liquidity of stocks. It is hypothesised that:

H2: As a company transfers from the alternative to the regulated market there is an increase in liquidity of its shares.

There are other strands of research in the context of changes in listing markets which are worth emphasizing: the context of the operational performance of companies (Papaioannou, Travlos, & Viswanathan, 2003, 2009; Bessler et al., 2021, 2022), the achievement of important corporate goals (Kedia & Panchapagesan, 2011), the microstructure of the stock market (Brennan & Subrahmanyam, 1996; Amihud, Mendelson, & Lauterbach, 1997; Muscarella & Piwovar, 2001; Bennett & Wei, 2006).

2. Research methods and sample selection

The method used in the research is based on the event study method, which aims to measure the impact of various events on the market value of shares (Gurgul, 2006; Perepeczo, 2010). Three significant events related to the change of listing markets were identified as the announcement of the transfer (decision of the General Shareholders Meeting—GSM), the announcement of the approval of the prospectus by the supervisory authority (approval of the Polish Financial Supervision Authority—PFSA) and the change of listing floor (first listing on the regulated market of the Warsaw Stock Exchange—WSE).

The companies that changed their listing floor from the alternative market to the regulated market of the Warsaw Stock Exchange are the subject of the analysis. The research period covers 2007–2020. It is worth emphasising that this is the period beginning in 2007, i.e., the year in which the alternative market (NewConnect) was established on the Polish capital market and the first debuts took place there. However, the first transfer of a company to the regulated market of the WSE took place in 2008. In the case of two companies, for

which the transfer announcement dates were unavailable, the announcement of the prospectus submission to the supervisory authority was accepted.

The research sample included 71 companies, i.e., all companies that have changed listing floor between the establishment of the NewConnect and 2020. That accounted for approximately 11.5% out of the 620 debuts on this market between 2007 and 2020, and at the same time accounted for 20% of the debuts on the regulated market. Only 23 companies transferring from the alternative market to the regulated market made a new share issue at the same time, two of which additionally offered to sell existing shares. In most cases (48 companies) the value of the offering during the transfer is null.

In creating the research sample the authors were inspired by the research of Jenkinson and Ramadorai (2013) who noted that with the announcement of a company's intention to relocate to the main market other news is announced in parallel, which falls into four main categories: the announcement of financial or trading results, share issues or capital restructuring, acquisitions and disposals, and breaches of one or more listing rules. In earlier research, Campbell and Tabner (2011) hypothesised that a promotion to the main market from AIM is likely to be associated with positive news, while a move from the main market to AIM is likely to be associated with less favourable news reflecting the possibility that a change in listing may be a symptom rather than a cause of company performance. Jenkinson and Ramadorai (2013) tested the robustness of the results to the rejection of specific firms from the sample and found that the exclusion of firms publishing additional information alongside the news of a change in listing floor would not significantly alter the results and consequently the inference. Therefore, in this study companies with any of these types of simultaneous announcements were left in the sample in order to have a more representative set of companies changing listing floor. The observed stock splits or consolidations occurred outside the accepted estimation window.

There are different approaches to assessing investment performance in the literature and a description of the approaches and measures can be found among others in Perepeczo (2010), Kujawa and Ostrowska (2016), among others. In the event-driven approach, long-term performance for a particular stock is commonly measured by additional returns expressed by the Cumulative Abnormal Return (CAR) measure, which stands for cumulative additional return, or buy-and-hold returns (BHR). However, a portfolio of companies uses an aggregate approach for the study population in assessing long-term performance, measuring additional rates with the CAAR (Cumulative Average Abnormal Return) measure denoting the cumulative average abnormal return on the shares' portfolio achieved over the observation period. An important issue related to the CAAR model is the relation of the returns of a given company to the returns achieved on the benchmark. Thus, companies, which may have had their debut in diametrically different economic conditions, can still be compared with each other, as the measured value is the return excess over the benchmark. Because

each company has unique characteristics (i.e., different sectors, different financial situations, different motives for the IPO), the CAAR value was used in the analysis, which is expressed by the formula:

$$CAAR_{iT} = \sum_{t=1}^T AAR_{it} \tag{1}$$

$CAAR_{it}$ – cumulative average abnormal returns on the portfolio of shares in the observation period T ,

T – observation period, time interval measured in trading days,

N – number of companies in the analysed portfolio,

AAR_{it} – the average abnormal rate of return on stock i over the period t calculated as:

$$AAR_{it} = \frac{1}{N} \sum_{i=1}^N AR_{it} \tag{2}$$

AR_{it} – the abnormal rate of return on stock i achieved in period t :

- for companies listed on the WSE is calculated according to the formula:

$$AR_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} - \frac{WIG_t - WIG_{t-1}}{WIG_{t-1}} \tag{3}$$

- for companies listed on NewConnect is calculated according to the formula:

$$AR_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} - \frac{NCI_t - NCI_{t-1}}{NCI_{t-1}} \tag{4}$$

P_{it} – the price of stock i in period t ,

WIG_{it} – WIG Index in period t ,

NCI_{it} – NCI Index in period t .

The CAAR was estimated over a period of 45 days preceding and following the event. In addition, the analysis generated a CAAR curve for the period from the time of the event (i.e., event date $t = 0$) to 120 days after the event. This analysis is intended to indicate the results of an investment strategy in which an investor opens a long position in a particular company at the time of a particular event. The point $t = 0$ defines the date of the event:

- GMS: the announcement of the decision of the General Shareholders Meeting to list the company on the regulated market.
- PFSA: the announcement of the approval of the prospectus by the Polish Financial Supervision Authority.
- WSE: change of trading floor, i.e., first listing on the regulated market of the Warsaw Stock Exchange.

Points on the t -axis with negative values indicate days before and days to the right after the event. This reduces the analysis to a cohort approach, in which, despite the different event dates of these companies (i.e., different IPO dates), the same x -axis is adopted for all companies analysed.

As the calculation is done on the sample of stocks it was possible to also derive the Standard Error measure and further provide the Confidence Interval for the CAAR. Moreover, the Student's t -test for means and the Mood's test for medians were carried out to statistically verify the differences between the CAAR obtained from analysed events. For the normality testing the Shapiro-Wilk test was conducted.

Liquidity is related to the amount of demand and supply in the market and therefore to the relationship between buyers and sellers of securities. Trading activity in the market is measured by the number of transactions in a given period, the number of shares sold, the value of shares sold, the relative value of shares sold, the quotient of shares sold and put up for sale, the quotient of the value of shares sold and put up for sale (Lo & Wang, 2000). Various measures of liquidity can be found in the literature and have been discussed in detail by Amihud (2002), Saar and Lybek (2002), Goyenko, Holden and Trzcinka (2009), Olbryś (2013), Ma, Anderson and Marshall (2016), Le and Gregoriou (2020), among others. In the study the illiquidity index proposed by Amihud (2002) was used, which expresses the average daily return per monetary unit of trading volume on that day meaning that the higher its value the lower the liquidity of a given stock. It is an increasingly popular ratio used in empirical studies (Karolyi, Lee, & van Dijk, 2012; Lou & Shu, 2017; Aouadi, Arouri, & Roubaud, 2018; Włosik, 2018; Kwok, 2020; Mortazian, 2021).

$$\text{ILLIQ}_{iy} = \frac{1}{D_{iy}} \sum_{t=1}^{D_{iy}} \frac{|r_{iyd}|}{\text{VOLID}_{iyd}} \quad (5)$$

whereas:

- r_{iyd} – rate of return recorded by company i on day d of year y ,
- VOLID_{iyd} – the value, expressed in PLN, of the trading volume in shares of company i on day d of year y ,
- D_{iy} – the number of days on which the company was listed during the y year.

The advantages of this measure are aptly summarized by Lou and Shu (2017). First, the Amihud measure has a simple construction that uses the absolute value of the daily return-to-volume ratio to capture price impact. Second, the measure uses daily data and therefore provides a longer time series relative to intra-daily proxies. Third, the measure has a strong positive relationship with expected stock return and thus, it helps in examining and understanding liquidity measurement and liquidity premium.

Based on the rate the high and low liquidity pools of companies were selected, i.e., the high liquidity sample consists of the companies, which had rate lower than the median for the entire population. The rates were calculated based on the 90 days window (from -45 days before event, to 45 after a particular event).

To test the differences of liquidity for various events, the Student's *t*-test for means and Wilcoxon's test for medians were performed. For the normality testing the Shapiro-Wilk test was conducted.

3. Results

3.1. Transfer and rates of return

Figure 1 below shows the CAAR curve estimated for 71 companies listed on NewConnect that subsequently migrated to the regulated market of the WSE.

The transfers themselves are followed by a decrease in market returns. It is the announcement of the transfer of a company and the institutional confirmation by the supervision of the company's readiness for this transfer resulting from the approval of the prospectus that creates positive market reactions. The above data shows that the PFSA acceptance can be seen as a positive signal sent to investors, indicating that the company is developing, but also that preparatory processes are underway due to the need to meet the high requirements

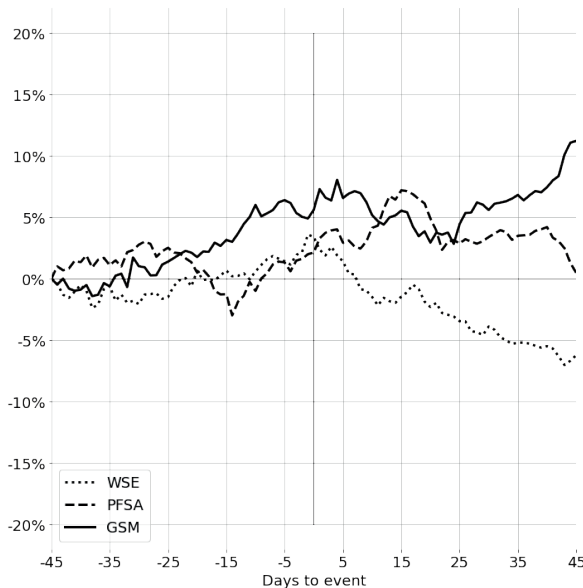


Figure 1. CAAR curve for -/+ 45 days for all companies
 Source: Own calculations.

associated with a listing on the main floor. The positive reaction of the market is the result of the supervisor's decision to approve the prospectus, which is an institutional and legal confirmation of the company's compliance with the high regulatory requirements. At the same time it is an authentication by the supervisory institution of the company's readiness status to be listed on the main floor of the stock exchange. The mere transfer of a company from a less-regulated to more-regulated market results in a decrease in market value after the change of listing floor, as confirmed by previous results of studies carried out in other markets.

The CAAR values for 0 and 45 days (starting from -45) are presented in Table 1 below. They indicate the statistical significance only for the GSM event—the average value of CAAR is around 11.2%. The remaining events do not exhibit statistically significant CAAR.

Table 1. CAAR values for 0 and 45 days

Event	Time horizon	CAAR (%)	t-statistics
GSM	[-45, 0]	5.6	1.5763
	[-45, 45]	11.2	2.1460**
PFSA	[-45, 0]	2.1	0.6526
	[-45, 45]	-0.8	0.1117
WSE	[-45, 0]	3.4	1.0454
	[-45, 45]	-6.2	-1.2071

Note: The *, ** and *** symbols indicate significance at 10, 5 and 1%, respectively.

Source: Own calculations.

The findings can be explained by reports by Diamond and Verrecchia (1991) and Leuz and Verrecchia (2000), according to which companies changing voluntarily from a lower- to a higher-regulated listing market opt for a higher level of disclosure to reduce information asymmetry and thus experience an increase in liquidity by attracting increased demand. Consequently, this leads to a reduction in the cost of raising capital, and from the point of view of the investor providing the capital to a reduction in returns. This therefore confirms the idea that information uncertainty is a cross-cutting risk factor and is offset by higher stock returns.

Another interesting explanation is the concept of Zhang (2006), according to whom the likely source of temporary price and return increases is the lack of full information flow to share prices resulting from higher information uncertainty, as investors tend to underreact to new information when there is greater uncertainty about its impact on the value of the company. A rational explanation for the post-IPO declines can be substantiated by the concept of

Loughran and Ritter (1997). They suggest that the decision of companies to conduct a share offering usually follows a period of good operational performance, which then deteriorates. They explain that companies usually improve their operational performance in the last period before the issue. The market seems to overestimate this improvement and underestimate long-term, moderately reversible trends in operating performance.

Consequently, at the time of debut, market prices reflect the capitalisation of this temporary operational improvement, and when this specificity of the temporariness of improved operational performance becomes evident, the shares underperform. The collapse of the share price on transfer to a more challenging trading floor indicates that this is not a good time for shareholders to exit. In the authors' opinion, shareholders intending to divest are aware of this fact,

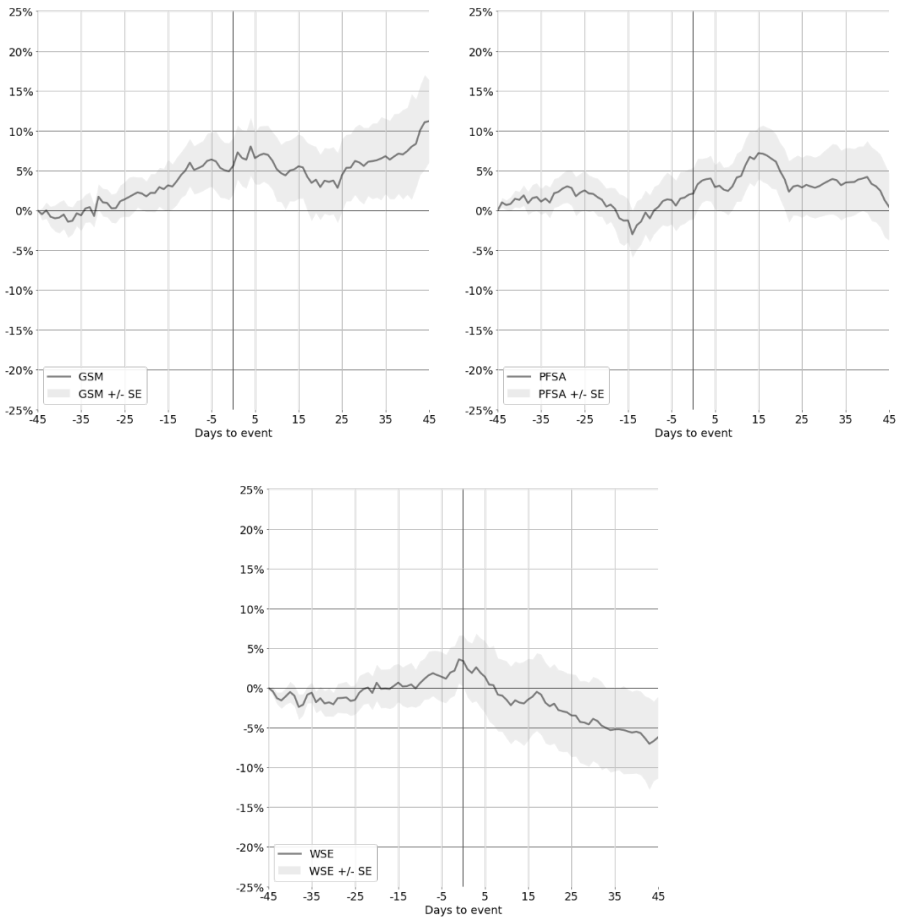


Figure 2. CAAR curves for $-/+$ 45 days for all companies along with confidence interval

Source: Own calculations

which is confirmed by the fact that out of 71 transfers in the analysed period only two companies offered to sell existing shares. At the same time, as many as 43 companies did not carry out an offer at all at the time of the transfer.

As part of the analysis a comparison of the ranges of variation for each curve was also carried out. Figure 2 presents the CAAR curves along with the confidence interval.

The Mood's test and Student's *t*-test of equality of respectively medians and means were carried out with the aim of verifying the hypothesis H_0 , indicating the equality of the median/mean CAAR at the end of the analysed period ($t = 45$), for the respective pairs of events: GSM and PFSA, GSM and WSE, and PFSA and WSE. The *p*-values for the respective pairs of events are presented in Table 2.

Table 2. The tests for the respective pairs of events all companies, -/+ 45 days

Pair	Median		Mean	
	statistics	<i>p</i> -value	statistics	<i>p</i> -value
GSM-PFSA	1.08	0.2980	1.60	0.1130
GSM-WSE	6.43	0.0112	2.38	0.0194
PFSA-WSE	1.41	0.2354	1.00	0.3173

Note: The Shapiro-Wilk test for normality has been performed. The CAAR measures are normally distributed for all events with a 1% significance level. The Shapiro-Wilk test statistics (*p*-values) for GSM, PFSA, and WSE respectively: 0.9431 (0.0215), 0.9845 (0.6107), 0.9774 (0.3509).

Source: Own calculations.

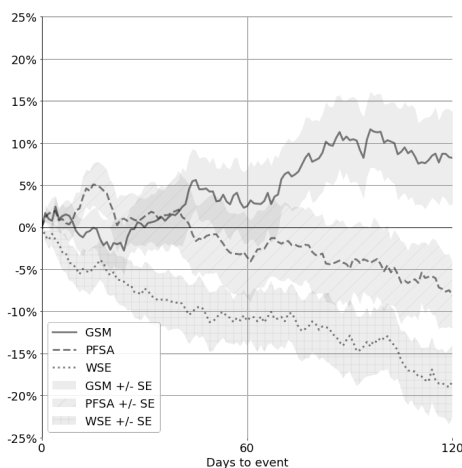


Figure 3. CAAR curve for 0–120 days for all companies

Source: Own calculations.

According to the results in Table 2, at the 5% significance level the hypothesis of equality of means (median) can be rejected only for the pair of GSM and WSE events. That is at 45 days after the event the expected (median) returns for the GSM and WSE events indicate statistical differences. For the other pairs of events the hypothesis of the difference of these averages (medians) cannot be rejected.

In addition, the analysis involved the construction of a CAAR curve for the period from the event to 120 days after the event presented on Figure 3.

The corresponding tests have been also carried out to verify hypothesis H_0 , indicating equality of the median-/-means CAAR at the end of the period analysed ($t = 120$), for the relevant pairs of events: GSM and PFSA, GSM and WSE, and PFSA and WSE. The tests' results for the respective pairs of events are presented in Table 3.

Table 3. The tests for the respective pairs of events all companies, 0–120 days

Pair	Median		Means	
	statistics	<i>p</i> -value	statistics	<i>p</i> -value
GSM-PFSA	4.80	0.0285	2.40	0.0180
GSM-WSE	4.61	0.0318	3.79	0.0002
PFSA-WSE	0.01	0.9245	1.74	0.0844

Note: The Shapiro-Wilk test for normality was performed. The CAAR measures are normally distributed for all events with a 1% significance level. The Shapiro-Wilk test statistics (*p*-values) for GSM, PFSA, and WSE, respectively: 0.9452 (0.0199), 0.9155 (0.0003), 0.9555 (0.0328).

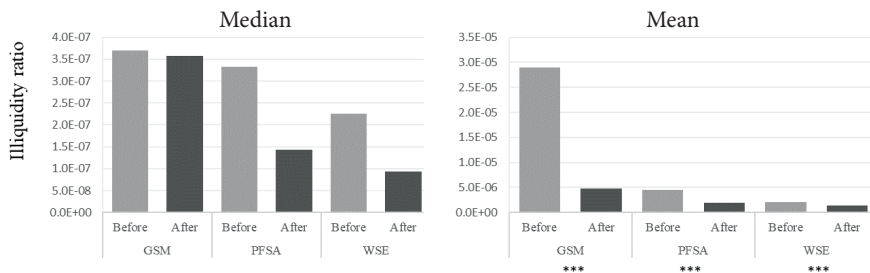
Source: Own calculations.

According to Table 3, at a significance level of 5%, the hypothesis of equality of means for all pairs of events only can be rejected (for medians, it applies to GSM-PFSA and GSM-WSE). This means that at 120 days after the event, the CAAR rates for the events: GSM and PFSA, GSM and WSE, and PFSA and WSE indicate that the levels are statistically significantly different (for the median test, only for PFSA-WSE pair H_0 cannot be rejected).

3.2. Transfer and liquidity

In this section, we investigate the impact of a particular event on liquidity. In Figure 4 we present results in Amihud illiquidity ratio units as well as in trading volume.

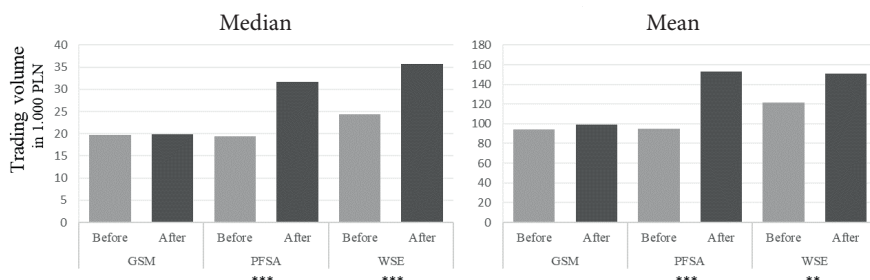
The results of the analyses indicate that the transfer of companies from the alternative market to the regulated market of the Warsaw Stock Exchange is associated with a decrease in the Amihud illiquidity ratio, which means an improvement in the liquidity of the traded shares. At the same time, the biggest change in liquidity concerns the announcement of the change of listing market



Note: *** symbol indicate differences between *Before* and *After* at 1% significance.

Figure 4. Illiquidity ratio before and after GSM, PFSA and WSE

Source: Own calculations.



Note: *** and ** symbols indicate differences between *Before* and *After* at 1% and 5% significance respectively.

Figure 5. Trading volume before and after GSM, PFSA and WSE

Source: Own calculations.

announced by the GSM itself. Thus, it is not only the change in the information environment resulting from different regimes of communication with investors that causes increased demand for the company’s shares, but the announcement of this change by the GSM and the fact that the PSFA has approved the prospectus prepared by the company.

Figure 5 presents the median trading volume 45 days before and 45 after the event are presented. The results remain consistent with those presented on the illiquidity rate above—the most significant difference in median trading volume can be observed in for PFSA and WSE events.

Figure 6 indicates CAAR curves for correspondingly high ILLIQ values, i.e., above the median of all companies.

The *p*-value of equality of medians/means for high ILLIQ companies gives grounds to reject hypothesis H_0 for the pair of GSM and WSE events (Table 4). This means that the cumulative levels of returns for lower average liquidity companies are statistically different for the GSM announcement event from the WSE listing event.

Figure 7 shows the CAAR curve for companies with low ILLQs.

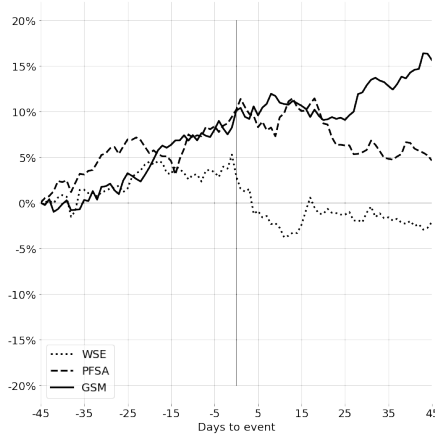


Figure 6. CAAR curve for \pm 45 days for high ILLIQ companies
Source: Own calculations.

Table 4. The tests for the respective pairs of events—high ILLIQ companies

Pair	Median		Mean	
	statistics	<i>p</i> -value	statistics	<i>p</i> -value
GSM-PFSA	5.08	0.0242	1.20	0.1167
GSM-WSE	7.81	0.0052	1.98	0.0520
PFSA-WSE	1.52	0.2181	0.84	0.4058

Note: The Shapiro-Wilk test for normality was performed. For the GSM and WSE the CAAR measures are normally distributed with 1% significance level. The Shapiro-Wilk test statistics (*p*-values) for GSM, PFSA, and WSE respectively: 0.9389 (0.0769), 0.9648 (0.3334), 0.9260 (0.0304).

Source: Own calculations.

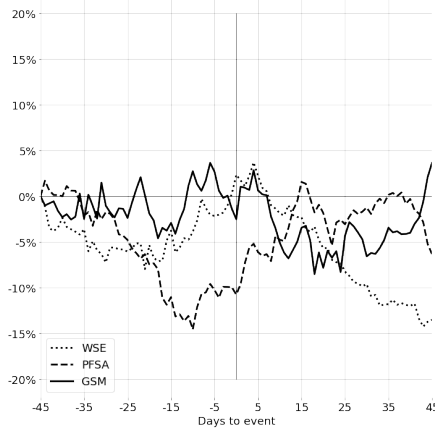


Figure 7. CAAR curve for \pm 45 days for low ILLIQ companies
Source: Own calculations.

The p -value of the tests of equality of medians/means for companies with a low ILLIQ index value does not warrant rejection of hypothesis H_0 (Table 5). For companies with higher liquidity the response to individual events, as measured by the CAAR value for point $t = 45$, is similar for the events analysed.

Table 5. The tests for the respective pairs of events—low ILLIQ companies

Pair	Median		Mean	
	statistics	p -value	statistics	p -value
GSM-PFSA	0.03	0.8531	1.03	0.3088
GSM-WSE	2.35	0.1252	1.44	0.1571
PFSA-WSE	0.02	0.8867	0.64	0.5226

Note: The Shapiro-Wilk test for normality was performed. The CAAR measures are normally distributed for all events with a 1% significance level. The Shapiro-Wilk test statistics (p -values) for GSM, PFSA, and WSE, respectively: 0.9870 (0.9911), 0.9728 (0.6373), 0.9756 (0.7704).

Source: Own calculations.

The analysis related to both the abnormal returns and the liquidity is presented in Table 6. The companies were grouped into two baskets: low and high liquidity (based on the median of the Illiquidity ratio). The t -test statistics were calculated for this categorization for selected post-event days, where H_0 states that CAAR is equal to 0.

The following conclusions can be drawn. First, for the post-WSE transition the average CAAR values decrease for all of the company types (i.e., liquidity). Second, the highest average returns are generated after the GSM event especially for low liquidity companies. Third, event vs. companies' liquidity is statistically different for various combinations (i.e., the various types of liquidity companies react differently on the same event).

Conclusions

The results of the analyses and the conclusions drawn from them are largely consistent with the empirical studies described in the article and which were conducted based on observations made on global markets (e.g., Jain & Kim, 2006; Campbell & Tabner, 2011; Vismara et al., 2012; Jenkinson & Ramadorai, 2013; Kwok, 2020; Mortazian, 2021). Considering the initial time horizon of $-45/+45$ days, CAAR was highest for GSM events amounting to 11.2% and was statistically significantly different from CAAR for WSE event. For the time horizon of $0/+120$ days, i.e. the GSM event seems to provide the most significant uplift of CAAR amounting to on average 14.7% for the low-liquidity companies.

Table 6. CAAR summary results table for post-event analysis

Event	Days post event	All firms		Low liquidity firms		High liquidity firms	
		CAAR (%)	t-statistics	CAAR (%)	t-statistics	CAAR (%)	t-statistics
GSM	[0, 5]	1.0	0.7901	-0.2	-0.1170	3.5	1.6619
	[0, 10]	-0.4	-0.2156	-0.5	-0.2472	0.3	0.0708
	[0, 20]	-2.7	-1.0048	-2.4	-0.7708	-2.5	-0.5122
	[0, 30]	0.0	-0.0065	2.8	0.6647	-3.6	-0.6275
	[0, 40]	1.8	0.4668	3.5	0.7451	0.2	0.0339
	[0, 50]	4.2	1.0344	4.6	0.9708	4.8	0.6194
	[0, 60]	2.5	0.5613	3.2	0.6245	3.4	0.4078
	[0, 90]	10.3	2.0389**	10.9	1.8988**	12.4	1.2621
	[0, 120]	8.2	1.4934	14.7	2.4725***	0.5	0.0504
PFSA	[0, 5]	0.8	0.5445	-0.1	-0.0443	2.0	0.9223
	[0, 10]	2.0	0.9472	0.7	0.3196	3.6	0.8804
	[0, 20]	2.8	0.9808	1.6	0.4787	4.6	0.9243
	[0, 30]	1.3	0.3519	-0.1	-0.0279	3.2	0.5116
	[0, 40]	2.1	0.4479	-1.1	-0.2370	6.7	0.7267
	[0, 50]	-0.8	-0.1792	-2.6	-0.5182	1.7	0.1901
	[0, 60]	-3.6	-0.7355	-4.9	-0.9018	-1.4	-0.1635
	[0, 90]	-4.9	-1.0394	-5.5	-1.1219	-3.6	-0.3942
	[0, 120]	-8.1	-2.0395**	-4.1	-0.7442	-13.6	-2.4056***
WSE	[0, 5]	-2.0	-0.9459	-2.7	-1.5058	-1.4	-0.3292
	[0, 10]	-4.9	-2.2083**	-5.8	-2.3709**	-3.8	-0.9638
	[0, 20]	-5.7	-2.2835**	-2.9	-1.0859	-9.5	-2.1801**
	[0, 30]	-7.3	-2.3200**	-2.6	-0.7033	-13.5	-2.4791***
	[0, 40]	-8.9	-2.7928***	-6.2	-1.5674	-12.3	-2.2974**
	[0, 50]	-11.2	-3.1572***	-7.3	-1.7241**	-16.0	-2.7229***
	[0, 60]	-11.1	-3.6708***	-5.5	-1.4672	-18.1	-3.7447***
	[0, 90]	-12.9	-3.0129***	-5.5	-1.0636	-22.2	-3.1995***
	[0, 120]	-18.3	-4.2520***	-6.7	-1.2714	-32.7	-4.8707***

Note: The ** and *** symbols indicate significance at 5% and 1%, respectively.

Source: Own calculations.

The hypothesis concerning the market value of shares as a result of the transfer of companies from the alternative market to the regulated market of the Warsaw Stock Exchange has been verified negatively, as there is a decrease in it. It is the announcement of the company's transfer decided by the GSM and the institutional confirmation by supervision of the company's readiness for this transfer resulting from the approval of the prospectus that creates the market value. On the other hand, the hypothesis regarding the improvement in the liquidity of the shares as a result of the company's transfer and the analysed events preceding the transfer was confirmed. PFSA and WSE events provided statistically significant liquidity changes—after PFSA and WSE trading volume of the companies usually grows.

The results of the research have an applied dimension for managers and investors, as they indicate the directions of changes in the market value of shares and their liquidity as a result of the events discussed in the article. Given that share price reaction may also reflect other information that becomes available at the time of the listing announcement, conclusions on performance and liquidity in these two types of markets based on this research may also be limited. In future research also the division by industry could be taken into consideration as it was not used primarily because of the shallowness of this market in Poland and the still limited research group.

In the context of the literature discussed and the results of the empirical research carried out, it would be appropriate to consider Asyngier's (2015) rightly suggested call for the introduction in Poland of regulations allowing the transfer of listings from the regulated market to the alternative market, which could protect small investors from difficulties in selling delisted shares. This is particularly important considering the trends in the IPO market in Poland indicating the declining numbers of initial public offerings and increasing records of delisting—the trend observed also on the developed market, for instance in the US (Doidge, Karolyi, & Stulz, 2017).

References

- Acharya V. V., & Pedersen, L. H. (2005). Asset pricing with liquidity risk. *Journal of Financial Economics*, 77(2), 375–410. <https://doi.org/10.1016/j.jfineco.2004.06.007>
- Ahmed, S., Aney, M. S., & Banerji, S. (2019). *Migration of SMEs in the Bombay Stock Exchange: A different look at the SME financing issues*. The International Growth Centre, Final Report.
- Amihud, Y. (2002). Illiquidity and stock returns: Cross-section and time-series effects. *Journal of Financial Markets*, 5(1), 31–56. [https://doi.org/10.1016/S1386-4181\(01\)00024-6](https://doi.org/10.1016/S1386-4181(01)00024-6)
- Amihud, Y., Mendelson, H. (1986), Asset pricing and the bid-ask spread. *Journal of Financial Economics*, 17(2), 223–249. [https://doi.org/10.1016/0304-405X\(86\)90065-6](https://doi.org/10.1016/0304-405X(86)90065-6)

- Amihud, Y., & Mendelson, H. (1991). Liquidity, asset prices and financial policy. *Financial Analysts Journal*, 47(6), 56–66. <https://doi.org/10.2469/faj.v47.n6.56>
- Amihud, Y., & Mendelson, H. (2012). Liquidity, the value of the firm, and corporate finance. *Journal of Applied Corporate Finance*, 24(1), 17–32. <https://doi.org/10.1111/j.1745-6622.2012.00362.x>
- Amihud, Y., Mendelson, H., & Lauterbach, B. (1997). Market microstructure and securities values: Evidence from the Tel Aviv exchange. *Journal of Financial Economics*, 45, 365–390. [https://doi.org/10.1016/S0304-405X\(97\)00021-4](https://doi.org/10.1016/S0304-405X(97)00021-4)
- Ang, A., Shtauber, A. A., & Tetlock, P. C. (2013). Asset pricing in the dark: The cross-section of OTC stocks. *Review of Financial Studies*, 26(12), 2985–3028. <https://doi.org/10.1093/rfs/hht053>
- Asyngier, R. (2013). Wprowadzanie akcji do obrotu na rynku NewConnect na tle głównych alternatywnych systemów obrotu w Europie. *Annales Universitatis Mariae Curie-Skłodowska. Sectio H. Oeconomia*, 47(2), 7–16.
- Asyngier, R. (2015). Wpływ zmiany rynku notowań na cenę akcji polskich spółek giełdowych. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse, Rynki Finansowe, Ubezpieczenia*, 862(75), 19–30. <https://doi.org/10.18276/frfu.2015.75-02>
- Atkins, A. B., & Dyl, E. A. (1997). Transactions costs and holding periods for common stocks. *Journal of Finance*, 52, 309–325. <https://doi.org/10.1111/j.1540-6261.1997.tb03817.x>
- Aouadi, A., Aroui, M., & Roubaud, D. (2018). Information demand and stock market liquidity: International evidence. *Economic Modelling*, 70, 194–202. <https://doi.org/10.1016/j.econmod.2017.11.005>
- Bacmann, J. F., Dubois, M., & Ertur, C. (2002). Valuation effects of listing on a more prominent segment of the stock market: Evidence from France. *European Financial Management*, 8(4), 479–493. <https://doi.org/10.1111/1468-036X.00200>
- Bennett, P., & Wei, L. (2006). Market structure, fragmentation, and market quality. *Journal of Financial Markets*, 9(1), 49–78. <https://doi.org/10.1016/j.finmar.2005.12.001>
- Bessler, W., Beyenbach, J., Rapp M. S., & Vendrasco, M. (2021). The global financial crisis and stock market migrations: An analysis of family and non-family firms in Germany. *International Review of Financial Analysis*, 74, 101692. <https://doi.org/10.1016/j.irfa.2021.101692>
- Bessler, W., Beyenbach, J., Rapp, M. S., & Vendrasco, M. (2022). Why do firms down-list or exit from securities markets? Evidence from the German Stock Exchange. *Review of Managerial Science*. <https://doi.org/10.1007/s11846-022-00554-4>
- Brennan, M. J., & Subrahmanyam, A. (1996). Market microstructure and asset pricing: On the compensation for illiquidity in stock returns. *Journal of Financial Economics*, 41(3), 441–464. [https://doi.org/10.1016/0304-405X\(95\)00870-K](https://doi.org/10.1016/0304-405X(95)00870-K)
- Campbell, K., & Tabner, I. T. (2011). *Bonding, firm value and liquidity: An analysis of migrations between the AIM and the official list of the London Stock Exchange*. <https://doi.org/10.2139/ssrn.1608403>
- Dang, V. A., Michayluk, D., & Pham, T. P. (2018). The curious case of changes in trading dynamics: When firms switch from NYSE to NASDAQ. *Journal of Financial Markets*, 41, 17–35. <https://doi.org/10.1016/j.finmar.2018.07.001>

- De Carvalho, A. G., & Pennacchi, G. G. (2012). Can a stock exchange improve corporate behavior? Evidence from firms' migration to premium listings in Brazil. *Journal of Corporate Finance*, 18(4), 883–903. <https://doi.org/10.1016/j.jcorpfin.2011.01.003>
- Dharan, B. G., & Ikenberry, D. L. (1995). The long-run negative drift of post-listing stock returns. *Journal of Finance*, 50(5), 1547–1574. <https://doi.org/10.2307/2329326>
- Diamond, D. W., & Verrecchia, R. E. (1991). Disclosure, liquidity, and the cost of capital. *Journal of Finance*, 46(4), 1325–1359. <https://doi.org/10.2307/2328861>
- Doidge, C., Karolyi, G. A., & Stulz, R. M. (2017). The U.S. listing gap. *Journal of Financial Economics*, 123(3), 464–487. <https://doi.org/10.1016/j.jfineco.2016.12.002>
- Doman, M. (2011). *Mikrostruktura giełd papierów wartościowych*. Poznań: Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu.
- Engle, R. F., & Lange, J. (2001). Predicting VNET: A model of the dynamics of market depth. *Journal of Financial Markets*, 4(2), 113–142. [https://doi.org/10.1016/S1386-4181\(00\)00019-7](https://doi.org/10.1016/S1386-4181(00)00019-7)
- Goyenko, R. Y., Holden, C. W., & Trzcinka, C. A. (2009). Do liquidity measures measure liquidity?. *Journal of Financial Economics*, 92(2), 153–181. <https://doi.org/10.1016/j.jfineco.2008.06.002>
- Gurgul, H. (2006). *Analiza zdarzeń na rynkach akcji. Wpływ informacji na ceny papierów wartościowych*. Kraków: Oficyna Ekonomiczna.
- Hadro, D., & Pauka, M. (2019). Underpricing on the selected European alternative investment markets. *e-Finanse*, 15(2), 87–94. <https://doi.org/10.2478/efqf-2019-0014>
- He, J., Huang, H. H., & Zhang S. (2022). Correlation ambiguity, listing choice, and market microstructure. *Journal of Management Science and Engineering*, 7(1), 61–97. <https://doi.org/10.1016/j.jmse.2021.08.003>
- Jain, P. K., & Kim, J. (2006). Investor recognition, liquidity, and exchange listings in the reformed markets. *Financial Management*, 35(2), 21–42. <https://doi.org/10.1111/j.1755-053X.2006.tb00140.x>
- Jenkinson, T., & Ramadorai, T. (2013). Does one size fit all? The consequences of switching markets with different regulatory standards. *European Financial Management*, 19, 852–886. <https://doi.org/10.1111/j.1468-036X.2013.12021.x>
- Kadlec, B. G., & McConnell, J. J. (1994). The effect of market segmentation and illiquidity on asset prices: Evidence from exchange listings. *Journal of Finance*, 49(2), 611–636. <https://doi.org/10.1111/j.1540-6261.1994.tb05154.x>
- Karolyi, G. A., Lee, K. H., & van Dijk, M. A. (2012). Understanding commonality in liquidity around the world. *Journal of Financial Economics*, 105(1), 82–112. <https://doi.org/10.1016/j.jfineco.2011.12.008>
- Kedia, S., & Panchapagesan, V. (2011). Why do only some Nasdaq firms switch to the NYSE? Evidence from corporate transactions. *Journal of Financial Markets*, 14(1), 109–126. <https://doi.org/10.1016/j.finmar.2010.07.002>
- Kordela, D. (2011). Przejście z NewConnect na rynek regulowany GPW – nowy trend czy naturalna droga rozwoju spółki?. *Zeszyty Naukowe Uniwersytetu Szczecińskiego*, 639(37), 473–482.
- Kordela, D. (2013). *NewConnect – rynek giełdowy dla małych i średnich przedsiębiorstw*. Warszawa: CeDeWu.

- Kujawa, S., & Ostrowska, E. (2016). Analiza zdarzeń i jej zastosowanie w finansach behawioralnych. *Finanse, Rynki Finansowe, Ubezpieczenia*, 4(82/2), 191–200. <https://doi.org/10.18276/frfu.2016.4.82/2-15>
- Kwok, J. K. H. (2020). Does switching trading venues create value? Evidence from Hong Kong. *Journal of Asian Business and Economic Studies*, 27(2), 209–222. <https://doi.org/10.1108/JABES-09-2019-0080>
- Kyle, A. S. (1985). Continuous auctions and insider trading. *Econometrica*, 53(6), 1315–1336. <https://doi.org/10.2307/1913210>
- Le, H., & Gregoriou, A. (2020). How do you capture liquidity? A review of the literature on low-frequency stock liquidity. *Journal of Economic Surveys*, 34(5), 1170–1186. <https://doi.org/10.1111/joes.12385>
- Leuz, C., & Verrecchia, R. E. (2000). The economic consequences of increased disclosure. *Journal of Accounting Research*, 38, 91–124. <https://doi.org/10.2307/2672910>
- Lizińska, J., & Czapiewski, L. (2014). Performance of Polish IPO firms: Size and profitability effect. *Gospodarka Narodowa*, 1, 53–71. <https://doi.org/10.33119/GN/100877>
- Lizińska, J., & Czapiewski, I. (2015). Determinanty underpricingu w Polsce i na innych rynkach wschodzących. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 386, 112–125.
- Ljungqvist, A. (2007). IPO underpricing. In: B. E. Eckbo (Ed.), *Handbook of corporate finance* (pp. 375–422). North Holland: Elsevier.
- Lo, A., & Wang, J. (2000). Trading volume: Definitions, data analysis, and implications of portfolio theory. *Review of Financial Studies*, 13(2), 257–300. <https://doi.org/10.1093/rfs/13.2.257>
- Lou, X., & Shu, T. (2017). Price impact or trading volume: Why is the Amihud (2002) measure priced?. *Review of Financial Studies*, 30(12), 4481–4520. <https://doi.org/10.1093/rfs/hhx072>
- Loughran, T., & Ritter, J. R. (1997) The operating performance of firms conducting seasoned equity offerings. *Journal of Finance*, 52(5), 1823–1850. <https://doi.org/10.1111/j.1540-6261.1997.tb02743.x>
- Loughran, T., & Ritter, J. R. (2004). Why has IPO underpricing changed over time?. *Financial Management*, 3(4), 5–37.
- Ma, R., Anderson, H. D., and Marshall, B. R. (2016). International stock market liquidity: A review. *Managerial Finance*, 42(2), 118–135, doi:10.1108/MF-04-2015-0096
- Mizerka, J., & Lizińska J. (Eds.). (2017). *Pierwsze oferty publiczne w Polsce i na świecie. Kontrowersje wokół anomalii rynkowych*. Warszawa: CeDeWu.
- Mortazian, M. (2021). Liquidity and volatility of stocks moved from the main market to the Alternative Investment Market (AIM). *Asia-Pacific Financial Markets*, 29, 195–220. <https://doi.org/10.1007/s10690-021-09344-6>
- Muscarella, C., & Piwowar, M. (2001). Market microstructure and securities values: Evidence from the Paris Bourse. *Journal of Financial Markets*, 4(3), 209–229. [https://doi.org/10.1016/S1386-4181\(00\)00022-7](https://doi.org/10.1016/S1386-4181(00)00022-7)
- Olbryś, J. (2103). Zastosowanie wybranych miar płynności aktywów kapitałowych na Giełdzie Papierów Wartościowych w Warszawie S.A. *Zarządzanie i Finanse*, 11(3/2), 65–77.
- Pagano, M., Panetta, F., & Zingales, L. (1998). Why do companies go public? An empirical analysis. *Journal of Finance*, 53(1), 27–64. <https://doi.org/10.1111/0022-1082.25448>

- Panfil, M. (2013). Analiza porównawcza NewConnect i innych europejskich rynków alternatywnego systemu obrotu akcjami. *Zeszyty Naukowe Uniwersytetu Szczecińskiego*, 768(63), 347–368.
- Papaioannou, G. J., Travlos, N. G., & Viswanathan, K. G. (2003). The operating performance of firms that switch their stock listings. *Journal of Financial Research*, 26(4), 469–486. <https://doi.org/10.1111/1475-6803.00069>
- Papaioannou, G. J., Travlos, N. G., & Viswanathan, K. G. (2009). Visibility effects and timing in stock listing changes: Evidence from operating performance. *The Quarterly Review of Economics and Finance*, 49(2), 357–377. <https://doi.org/10.1016/j.qref.2007.09.007>
- Park, J. H., Binh, K. B., & Eom, K. S. (2016). The effect of listing switches from a growth market to a main board: An alternative perspective. *Emerging Markets Review*, 29, 246–273. <https://doi.org/10.1016/j.ememar.2016.08.006>
- Pastusiak, R. (2011). Rynki alternatywne w Europie. Londyński Alternative Investment Market a NewConnect. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 174, 293–304.
- Perepeczo, A. (2010). Analiza zdarzenia i jej zastosowania. *Zeszyty Naukowe Uniwersytetu Szczecińskiego*, 632(33), 35–51.
- Podedworna-Tarnowska, D. (2018). Niedowartościowanie w procesie IPO spółek migrujących z rynku NewConnect na rynek główny Giełdy Papierów Wartościowych w Warszawie. *Zarządzanie i Finanse*, 16(4/1), 151–163.
- Podedworna-Tarnowska, D. (2020). Niedowartościowanie spółek debiutujących na rynku głównym i alternatywnym Giełdy Papierów Wartościowych w Warszawie. In P. Antonowicz, P. Galiński, P. Pisarewicz (Eds.), *Perspektywa ekonomiczna, finansowa i prawna kreowania wartości w gospodarce* (pp. 267–281). Gdańsk: Wydawnictwo Uniwersytetu Gdańskiego.
- Pomykalski, P., & Domagalski, M. (2015). IPO Underpricing and financial analysts' forecast accuracy in Poland. *Acta Universitatis Lodzianensis, Folia Oeconomica*, 1(310), 117–132. <https://doi.org/10.18778/0208-6021.310.09>
- Radke, M. (2020). The position of NewConnect against the Alternative Markets of European countries. The impact of GDP on volatility in the indices and turnover value. *Journal of Economics and Management*, 40(2), 109–131. <https://doi.org/10.22367/jem.2020.40.06>
- Ritter, J. R. (1984). The “hot issue” market of 1980. *The Journal of Business*, 57(2), 215–240. <http://doi.org/10.1086/296260>
- Sarr, A., & Lybek, T. (2002). *Measuring liquidity in financial markets*. (IMF Working Paper, No. 02/232).
- Sanger, G. C., & McConnell, J. J. (1986). Stock exchange listings, firm value, and security market efficiency: The impact of NASDAQ. *The Journal of Financial and Quantitative Analysis*, 21(1), 1–25. <https://doi.org/10.2307/2330987>
- Sieradzki, R. (2016). *Niedowartościowanie pierwotnych ofert publicznych na przykładzie akcji notowanych na Giełdzie Papierów Wartościowych w Warszawie*. (Niepublikowana rozprawa doktorska). Uniwersytet Ekonomiczny w Krakowie.
- Tomaszewski, J. (2012). Obowiązki informacyjne spółek notowanych na rynku NewConnect GPW S.A. w świetle rozwiązań europejskich giełdowych platform ASO. *Prace Naukowe Wyższej Szkoły Bankowej w Gdańsku*, 27, 115–127.

- Vismara, S., Paleari, S., & Ritter, J. (2012). Europe's second markets for small companies. *European Financial Management*, 18(3), 352–388. <https://doi.org/10.1111/j.1468-036X.2012.00641.x>
- Welch, I., & Ritter, J. (2002). A review of IPO activity, pricing and allocations. *The Journal of Finance*, 57(4), 1795–1828. <https://doi.org/10.1111/1540-6261.00478>
- Włosik, K. (2017). Płynność przy wycenie akcji na Giełdzie Papierów Wartościowych w Warszawie. *Ruch Prawniczy, Ekonomiczny i Socjologiczny*, 79(2), 127–141. <https://doi.org/10.14746/rpeis.2017.79.2.11>
- Zarzecki, D., & Wołoszyn, A. (2013). The impact of the January effect on the IPO underpricing in Poland. *Folia Oeconomica Stetinensia*, 13(1), 121–135. <https://doi.org/10.2478/fofi-2013-0010>
- Zarzecki, D., & Wołoszyn, A. (2016). The impact of value and growth companies on IPO underpricing on the Polish capital market. *Finanse, Rynki Finansowe, Ubezpieczenia*, 4(82), 325–334. <https://doi.org/10.18276/frfu.2016.4.82/2-28>
- Zhang, X. (2006). Information uncertainty and stock returns. *Journal of Finance*, 61(1), 105–137. <https://doi.org/10.1111/j.1540-6261.2006.00831.x>
- Zygmantowski, P. (2017). *Determinanty rozwoju rynku akcji NewConnect*. Warszawa: CeDeWu.