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Free Float in the Polish Capital Market and Its Importance for Investors

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Abstract

Theoretical background: Free float (hereinafter referred to as FF) refers to the ratio of shares held by small investors (less than 5%) to all shares in a company. FF investors are generally unrelated to each other or to major shareholders and they constantly review the company's current stock market valuation and thus improve the stock market efficiency. This means that the higher the FF, the potentially higher liquidity and better valuation of the company's shares. A low FF recalls the institution of protecting the rights of minority shareholders, calls into question the sense of maintaining a public company status, and raises the potential risk of incorrect valuation. The literature generally lacks studies referring to all these issues as well as FF statistics in Poland.

Purpose of the article: The purpose of the article is to sum up the term "free float", analyze FF statistics on the Polish capital market, indicate the link between FF and market liquidity, identify potential risks associated with listed companies having low FF and to determine whether it makes sense for the strategic investor to maintain public company status with low FF.

Research methods: Theoretical analysis (including analysis of capital market laws) and statistical analysis.

Main findings: The research confirmed that the relationship between FF and stock market liquidity is positive, but only considering FF in nominal terms. On the Polish capital market, as the nominal level of

FF increases, market capitalization and trading liquidity increase largely and the average market spread decreases slightly. The article also points out important risks associated with low FF conditioning low liquidity, such as the risk of stock manipulation and the risk of incorrect company valuation. Potential areas for changing the law on squeeze-out/sell-out institutions due to the inadequacy of the FF percentage were also pointed out.

Introduction

Free float (hereinafter referred to as FF) generally refers to the ratio of shares held by small investors (holding less than 5% shares) to all shares in a company. Moreover, FF investors are generally unrelated to each other or to major shareholders and they constantly review the company's current stock market valuation and thus improve the stock market efficiency. This means that the higher the FF, the potentially higher liquidity and better valuation of the company's shares. A low FF, on the other hand, raises the need to protect the rights of minority shareholders, calls into question the sense of maintaining the public company status and highlights potential risks associated with incorrect company valuation. In conclusion, the main hypothesis of the article is that stocks with low nominal FF generate many risks for investors.

The purpose of the article is to sum up the "free float" term, analyze FF statistics on the Polish capital market – GPW [*Giełda Papierów Wartościowych*] (main stock regulated market) and NC (NewConnect alternative trading system), indicate the link between FF and market liquidity, identify potential risks associated with listed companies having low FF and determine whether it makes sense to maintain public company status with low FF. This study contributes to the existing finance literature (summarized later in this text) by presenting further evidence from the Polish market on the significance of FF in capital markets in general.

What is the "free float"?

In Polish law, a public company (also "listed company") is a company having at least one share formally admitted to trading on the GPW or NC (Journal of Laws of 2022, item 1500, Art. 4(20)). The concept of FF has several definitions:

1. Number of shares not held by large investors, i.e. entities holding at least 5% of shares in relation to all outstanding shares (Słoński et al., 2014).¹ The rules of the GPW require that a company on the GPW has a min. 15% share of small shareholders (<5%) (GPW, 2022).

¹ The same methodology is used by the website stooq.pl, from which the author downloaded data on the shareholdings of companies as of 9 January 2022.

2. Total number of outstanding shares, excluding shares held by strategic investors such as governments, corporations, controlling shareholders, and members of boards of directors and supervisory boards (Chan et al., 2004).

3. Shares not held by strategic investors (such as governments, corporations, key employees and other strategic investors), who buy shares for controlling the company rather than for financial purposes (Ding et al., 2016).²

4. Small/minor shareholders (Adamska & Grygiel-Tomaszewska, 2013).

5. Shareholders holding no more than 5% of the total number of votes at the shareholders' meeting and are not an affiliate of the issuer (NewConnect, 2019).

6. The registered shares of a listed issuer, less the shares (GPW Benchmark, 2019):

a) held by shareholders holding more than 5%, excluding, i.a. shares held by investment/pension funds and asset management institutions,

b) held by shareholders in which state-owned entities hold over 50% of shares,

c) being own shares (to be redeemed).

Regarding the all above, the author understands FF as shares held by investors not disclosed in the shareholding,³ holding less than 5% of shares (so-called **small investors**). The predominant purpose for small investors to acquire shares is usually an investment motive than a corporate-ownership. Small investors are more willing to sell shares in a short period of time than larger shareholders, being the main source of shares turnover liquidity.

However, it is important to distinguish a small investor and **minority investor/shareholder**. This is not a legal term, but according to Zięty (2011), a minority investor, in order to exercise his rights, must agree with other shareholders for the sake of achieving the required voting quota or shareholding in the company.⁴ In other words, every small shareholder is also a minority shareholder, but not *vice versa*.⁵ The second, broader and more commonly accepted meaning of minority right includes collective rights and all the rights that a shareholder has by virtue of owning shares, without depending on the shares held (Szumański, 2015). Thus, the minority right does not derive from a specific shareholding, but more often from the ability to influence the company (Pyka & Zięba, 2013). In turn, a **majority investor/shareholder** is a "person having decisive influence over the company's actions and its bodies" (Zięty, 2011). This definition is not based on achieving any specific shareholding (e.g. 50%+1). A strategic shareholder does not need to have capital majority in the

² This is the FF definition used by Standard & Poor's (S&P) and MSCI.

³ According to the Public Offering Act (Journal of Laws of 2021, item 1983), shareholders holding at least 5% of shares are subject to disclosure.

⁴ An example of a collective law is the provision that a special auditor can be appointed at the request of public company shareholders holding at least 5% of votes (Journal of Laws of 2021, item 1983, Art. 84).

⁵ A minority shareholder is a shareholder (or group of shareholders) with, for example, 5–10% of the company's shares, while a small investor may have, for example, just a few shares in the company.

company if the rest of the shares are dispersed among small investors who neither actively participate in the company's management nor communicate among themselves, e.g. Bank Pekao⁶ (Wajda, 2006).

Small investors/shareholders are more passive and do not get involved in the company's corporate affairs, as they mainly care about dividends or selling shares at a profit, tending to invest on a short-term basis and accounting for ~13% of stock market turnover (GPW, 2017). 94.6% of individual investors surveyed do not attend general meetings, mainly due to lack of time, lack of influence, high commuting costs, unfamiliarity with participation rules and cumbersome procedures (SII, 2019). This is all the more understandable given the fact that about 96% of them are not professionally engaged in investing on the stock market, and they treat future profits as an opportunity to diversify their portfolios or provide for retirement.

When calculating FF, the shareholdings of those investors/entities whose decisions depend on the will of another investor/entity should be added up (Journal of Laws of 2021, item 1983, Art. 87). An example is various (sub)investment funds managed by the same investment fund company (*towarzystwo funduszy inwestycyjnych*, TFI), holding shares of the same issuer. Decisions to buy certain shares into specific (sub)funds are generally made by the same group of fund managers, who rely on the decisions of a single investment committee within the TFI.

The general importance of free float for the stock trading liquidity (literature review)

The literature describes a clear and worldwide relationship between FF and trading liquidity. Although the level of FF and the ownership structure of listed companies are important for market efficiency, these issues are, in the author's opinion, not often addressed in financial literature (especially for the Polish market), hence, this manuscript contributes to an important research gap.

Regardless of the market development, the literature supports the thesis of direct positive relationship between the FF shares of companies and the liquidity of their stocks, which consequently means lower liquidity risk for a certain exchange market (Ding et al., 2016;⁷ El-Nader, 2018). This relationship is more apparent with stronger corporate governance environment. Higher shareholdings of financial institutions mean poorer liquidity as a result of reduced trading activity by small investors (El-Nader, 2018). In addition, a high FF can mitigate liquidity problems in the event of high market turbulence and crisis phenomena (Ding et al., 2016).

⁶ The shareholding is dispersed among PZU S.A (20%), PFR S.A. (12.8%), Aviva OFE (about 5%) and NN PTE S.A. (~5%), and small investors (57.1%) (www7).

⁷ The research on the liquidity-free float relationship across 55 countries over the period 2003–2011.

Rezaei and Tahernia (2013)⁸ also point out that firms may have an incentive to promote improvements in their stock market liquidity, as it can mitigate risks deriving from stock market fluctuations and lower the cost of raising capital (cost of funding). Viratama et al. (2022) conclude, that FF not only has a significant positive effect on stock liquidity but also is one of the things that investors consider when making investment decisions in the Indonesian capital market.

Even more interesting seem the conclusions of Heflin and Shaw (2000) who point out that firms with more concentrated ownership (therefore, lower FF) increase the risk of adverse selection faced by dealers, therefore, liquidity can be viewed as a decreasing function of adverse selection costs that is caused by information asymmetries among dealers and insiders (Glosten & Milgrom, 1985). Furthermore, stocks with higher FF have higher trading liquidity and this means lower risk of price volatility (Gheorghe & Panazan, 2022), implying that investors can open and close their positions without affecting their price, which improves theoretical investment returns. In addition, a higher FF reduces information asymmetry and information acquisition costs, as stocks are better (more efficiently) priced by a larger number of active investors. We should remember that the change/confirmation of the share price occurs only when a new transaction is made, so the company's share price (market valuation) depends mainly on FF investors. FF investors, unrelated to each other or the major shareholders, therefore, verify the company's current stock market valuation and, thus, improve the effective market valuation (Wang & Zhang, 2015). A relatively large FF, therefore, mitigates the risk of the company's market valuation being shaped "at the dictates" of key shareholders, because then such a "dictated" or somehow irrational price should be (in accordance with free market laws) "neutralized"⁹ by FF investors, who sell shares and bring the price down to the value of real expectations. The problem of low FF can also be analyzed in the context of corporate governance, although this is beyond the scope of this article.¹⁰

Nevertheless, illiquid stocks are unattractive to individual investors (especially those with larger portfolios) – the "density" of stock exchange order sheet there is

⁸ Based on a sample of 63 Iranian firms between 2005 and 2009.

⁹ Although individual investors may behave irrationally, their behavior should be corrected by the behavior of the other investors, who as a whole are more likely to fulfill the criteria of rationality in the sense of neoclassical economics and are less susceptible to behavioral implications. In the extreme case, when shares are held by only two investors, they are free to shape the price by trading among themselves. If, on the other hand, other unrelated investors join the trade, they should value the company individually, each in their own way, to make the stock price more realistic.

¹⁰ From a capital market perspective, a higher free float means a potentially higher level of corporate governance. This follows from the theoretical assumption that a company's management should be more transparent and meet the information needs of the broad market. This is the opposite of the situation when almost all shares are held by a single investor (blockholder), who receives "first-hand" information from the board anyway. From an agency theory point of view, however, the reverse is true – the more powerful a blockholder, the better from a corporate governance point of view, because the blockholder controls management better and, thus, reduces agency conflicts between him and the board (agents), but yet generates another agency conflicts between him and small/minority investors.

negligible, which leads to the fact that significant increases or decreases in the price are generated with a small turnover. In other words, in the case of illiquid shares, an investor:

- may invest a small amount (because there are not many investors willing to sell shares at all or to sell at a price acceptable to the buyer),
- may find it difficult to exit the market without affecting the price (because any order may be price-taking due to the lack of buyers).¹¹

These two arguments lead to conclusions that even a high rate of return on illiquid stocks may play no role in the overall portfolio due to the small value of the investment. After all, the idea of a public company is that the number of potential shareholders is large and the ability to get in and out of investments is relatively easy, as long as the FF is not too low. In the extreme case, if a public company had only one shareholder, the company would derive virtually no benefit from its status. Thus, when analyzing the significance of a FF for a company and its investors, one should consider in particular:

- percentage FF, mainly from a legal point (squeeze-out or sell-out),
- nominal FF, as the relatively large value of FF shares gives individual investors more opportunities to trade shares, even if the percentage FF is low,
- shareholder structure (fragmentation), since a larger number of key shareholders (>5%) brings greater verification of the company's operations than in the case of a single large shareholder.

Free float statistics on the Polish capital market

This part of the article will present FF statistics for the Polish capital market, consisting of the regulated stock market (GPW) and the alternative trading system NewConnect market (NC). In the case of the GPW, the FF share in the period 2010–2017 was rising, ranging from 41 to 49% (Figure 1), with an average of ~47%. This FF was calculated as the quotient of the sum of the value of FF shares to the sum of the value of shares registered of all companies on the GPW, so that the largest companies had the greatest impact on the overall FF level.¹²

¹¹ In the case of extremely low liquidity, in the absence of negative news about the company or the market, one can imagine a situation in which an investor first buys the company's shares, raising its price by 10%, and then after a few days sells the shares, lowering the price by, e.g. 15%.

¹² Note the different methodology for counting FF values than in Table 1 and further in this article.

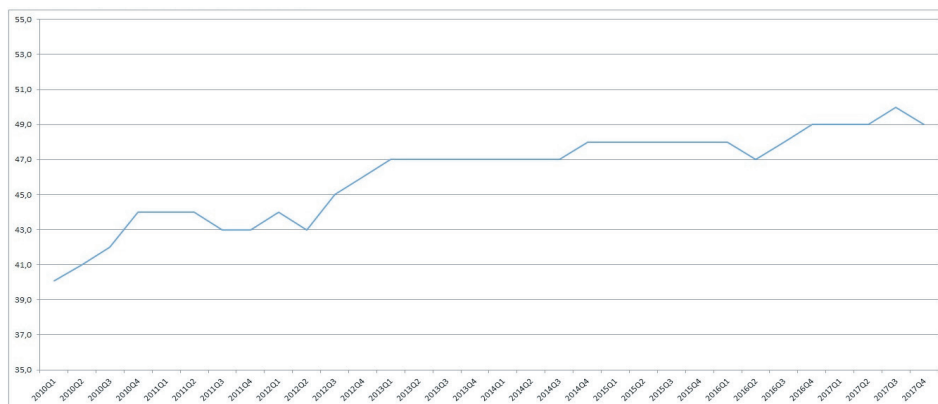


Figure 1. FF shares (%) on the GPW in 2010–2017

Source: (www3).

Furthermore, the last official market FF statistics for NC cover the period 2007–2014 (GPW, 2015). The average FF was ~22.7% with a downward trend (Figure 2).

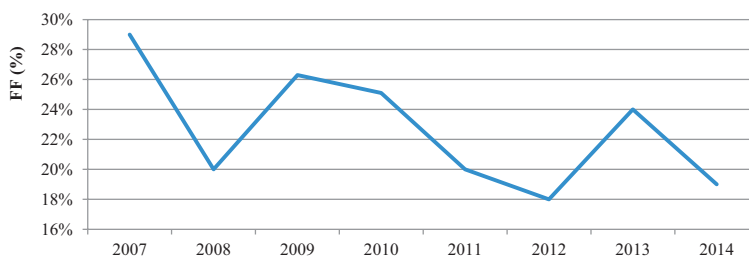


Figure 2. FF shares (%) on the NC between 2007 and 2014

Source: (GPW, 2015).

On 25 January 2018, among all companies constituting main GPW indices (WIG20, mWIG40, sWIG80), the lowest FF had Police¹³ (>4.2%) and Work Service (~10%) (www3).

In order to examine the current FF level and shareholder dispersion for Polish public companies, the author prepared the following statistics based on stooq.pl as of 9 January 2022. Firstly, on the regulated market (GPW):

– 413 companies were listed,

¹³ However, Police's shareholding structure is quite specific – Polish Government (86.95%, via Azoty Group and ARP) and OFE PZU "Złota Jesień" (15.94%).

– the average FF was 33.8% (capitalization-weighted 47.0%), the median was 31.9%,

– 25 companies (6.1% of all) had FF below 10% and 8 companies (1.9%) – below 5%.

Meanwhile, on the NewConnect (NC) market:

– 381 companies were listed,

– the average FF was 30.8% (capitalization-weighted 28.9%), the median was 27.1%,

– 46 companies (12.1%) had FF below 10% and 19 companies (5%) – below 5%.

In total, on both markets (GPW+NC), only 71 out of 794 companies (8.9%) had a FF below 10%, and only 27 companies (3.4%) – below 5% (Table 1). The GPW has a significantly higher FF (33.8% avg.) than the NC (30.8% avg.), and simultaneously has roughly half the number of companies with FF below the 10% (25 vs. 46) and 5% (8 vs. 19) levels. It should be noted, however, that the GPW is designed for larger companies.¹⁴ Current average FF values are slightly lower for the GPW (47%¹⁵ vs. 49% in 2017) and for the NC significantly higher (30.8% vs. 19% in 2014) than the historical values presented in Figure 1 and Figure 2, respectively. It is worth noting that according to Ding et al. (2016), in 2003–2011 the average FF was 74% globally, 75.6% in developed countries, 71.2% in developing countries and only 59.5% in Poland.¹⁶

Table 1. FF statistics summary for Polish public companies on the GPW and NC, as of 9 January 2022

As of 9 January 2022		GPW (regulated market)		NC (alternative trading system)	
FF (%)	median	31.9%		27.1%	
	average normal	33.8%		30.8%	
	capitalization-weighted average	47.0%		28.9%	
Numer of companies		413	% companies	381	% companies
companies with FF < 10%		25	6.1	46	12.1
companies with FF < 5%		8	1.9	19	5.0

Source: Author's own study based on (www4).

Figure 3 shows the FF for all Polish public companies on the GPW (381) and NC (413), which are ordered (X axis) from smallest to largest FF (in %).

¹⁴ The issuer's equity is min. PLN 60 mn or min. PLN 48 mn, if the shares have been traded for min. 6 months on other market (GPW, 2022).

¹⁵ A weighted average of stock market capitalization was used to keep the data comparable with Figure 1.

¹⁶ As explained by Ding, the number of observations from 2003 to 2011 (9y) in their research was only 992. This means that their research covered only 110 stocks yearly, out of +500 listed companies in Poland. This was probably a slice of the GPW market the highest liquidity ratio.

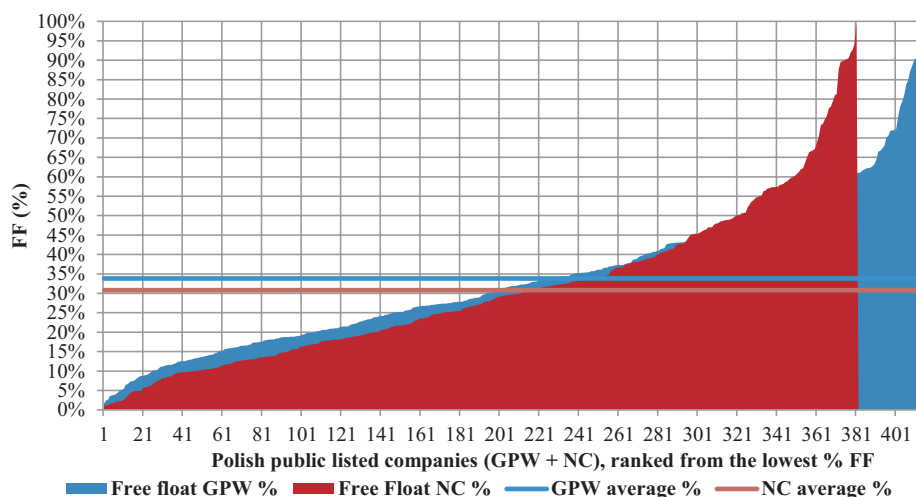


Figure 3. FF values for Polish public companies on the GPW and NC, as of 9 January 2022

Source: Author's own study based on (www4).

The author decided to focus on companies with the lowest FF. Table 2 shows 71 companies from the GPW (25) and the NC (46), which (as of 9 January 2022¹⁷) had a FF below 10%. The companies were ranked from the smallest nominal FF. The Polish abbreviation “SA” was omitted as all listed companies are joint stock companies.

Table 2. Degree of shareholder fragmentation of Polish listed companies with a FF below 10%, on the GPW and NC, as of 9 January 2022¹⁸¹⁹

No.	Ticker	Listed company	Market cap. (PLN mn)	FF (PLN mn)	FF (%)	Individual shareholders with shareholdings of at least 5% (in order of largest)				
1	AGP	Agromep ¹⁸	15.8	0.16	0.99	69.71%	22.32%	6.98%		
2	SYM	Symbio Polska	4.5	0.22	4.85	95.15%				
3	LBD	Lokaty Budowlane	22.8	0.27	1.17	52.42%	24.77%	21.64%		
4	TLO	Telesto ¹⁹	14.1	0.30	2.14	69.45%	15.67%	7.34%	5.40%	
5	MMC	MM Conferences	11.4	0.30	2.64	50.30%	47.06%			

¹⁷ The stooq.pl data provider did not have archival data (e.g. as of 31 December 2021), and the market as of 9 January 2022 was not significantly different from that of 31 December 2021, so the author sees no objections to this small time shift.

¹⁸ The FF diminished from 8.85 (31 December 2020) to 0.99% (9 January 2022) as the result of the issuer's share buyback program accepted by the extraordinary shareholders' meeting (NWZA) on 10 December 2020.

¹⁹ Since 15 November 2021, Telesto SA's share price skyrocketed with little trading from PLN 10 to max. PLN 595 (13 December 2021, capitalization PLN 975 mn!) and diminished to PLN 368 mn

No.	Ticker	Listed company	Market cap. (PLN mn)	FF (PLN mn)	FF (%)	Individual shareholders with shareholdings of at least 5% (in order of largest)						
6	ALU	Alumast	12.6	0.38	3.05	62.67%	20.75%	6.92%	6.61%			
7	VIA	Viatron	9.1	0.44	4.85	65.15%	30.00%					
8	QRT	Quart Development	32.1	0.57	1.77	45.31%	43.88%	9.04%				
9	SEV	Sevenet	25.6	0.58	2.27	41.33%	17.84%	8.87%	8.80%	8.29%	7.32%	5.28%
10	ABK	Abak	6.7	0.61	9.06	76.97%	8.40%	5.57%				
11	HPS	Hydrapres	16.4	0.68	4.12	50.66%	24.99%	20.23%				
12	SKN	Sakana	9.2	0.73	8.00	78.38%	6.84%	6.78%				
13	IBS	Noble Financials*	9.0	0.80	9.37	48.99%	21.36%	20.28%				
14	7LV	7levels	12.4	0.92	7.42	26.08%	25.25%	17.04%	16.73%	7.48%		
15	GTF	GO24.PL	10.5	0.97	9.31	36.65%	24.66%	24.32%	5.06%			
16	ICA	Incana	19.3	1.12	5.82	52.98%	41.20%					
17	MMD	Milestone Medical Inc	68.2	1.14	1.67	98.33%						
18	VKT	Vakomtek	16.0	1.32	8.26	56.00%	35.74%					
19	BGD	Biogened	23.6	1.39	5.89	40.90%	36.93%	16.28%				
20	CRP	Cereal Planet	19.6	1.41	7.18	30.94%	30.94%	30.94%				
21	INS	Indos	22.7	1.43	6.31	62.48%	31.21%					
22	4MB	4Mobility	18.9	1.56	8.22	51.47%	20.01%	12.68%	7.62%			
23	SUL	Summa Linguae ²⁰	145.0	1.60	1.10	63.70%	12.51%	10.29%	7.23%	5.17%		
24	JWW	JWW Invest*	23.0	1.70	7.38	50.91%	41.71%					
25	RCA	Rocca	49.7	1.79	3.60	48.24%	48.16%					
26	NTW	Netwise	24.4	1.86	7.63	63.94%	28.43%					
27	EDN	Edison	19.2	1.88	9.81	90.19%						
28	PRD	Procad*	21.0	1.90	8.95	61.80%	29.25%					
29	GTY	Grupa Trinity	20.1	1.95	9.73	31.94%	30.33%	28.00%				
30	ORG	Organic Farma Zdrowia	21.4	2.02	9.48	75.74%	8.21%	6.57%				
31	IUS	Union	20.9	2.08	9.92	90.08%						
32	SME	Simple*	59.0	2.20	3.70	96.30%						
33	BLT	Balticon	46.6	2.24	4.80	52.04%	43.16%					
34	CCR	Constance Care	33.4	2.26	6.77	74.65%	18.58%					
35	WHH	Werth-Holz	37.3	2.32	6.23	36.84%	32.55%	19.27%	5.11%			
36	AAS	Arts Alliance	28.9	2.46	8.51	69.01%	17.29%	5.19%				
37	MMA	Malkowski-Martech	34.3	2.99	8.73	91.27%						
38	ECK	Eurosnack	31.7	3.11	9.80	42.88%	35.83%	11.49%				

(9 January 2022, PLN 603 mn). As a result, the issuer reported in ESPI Report 6/2021 (28 December 2021) that “the significant increase in the share price by even a few thousand percent has no source in actual economic events or the company’s financial situation”. Therefore, in order not to distort the picture of this analysis, the share price was capped at PLN 14.09 as the volume-weighted average price for the period January 2020 – September 2021.

²⁰ The company closed a subscription for new 1,360,962 shares in early 2022, which eventually increased the FF to 18.16%.

No.	Ticker	Listed company	Market cap. (PLN mn)	FF (PLN mn)	FF (%)	Individual shareholders with shareholdings of at least 5% (in order of largest)						
39	PFG	Prefa Group	194.0	3.14	1.62	78.38%	20.00%					
40	SPK	SPARK VC	153.0	3.38	2.21	45.29%	17.70%	17.40%	17.40%			
41	TOS	Tamex Obiekty Sportowe	64.6	3.69	5.71	32.97%	30.95%	30.37%				
42	CZT	Czerwona Torebka*	42.0	3.70	8.84	33.00%	29.04%	16.18%	12.94%			
43	XBS	XBS Pro-Log	38.2	3.80	9.96	90.04%						
44	TXF	Taxus Fund	85.5	3.87	4.53	87.42%	8.05%					
45	I2D	i2 Development*	111.0	4.20	3.82	48.19%	47.99%					
46	CFS	Centrum Finansowe	45.2	4.37	9.67	90.33%						
47	MPH	Master Pharm*	97.0	4.40	4.50	66.05%	14.67%	7.96%	6.82%			
48	CDA	CDA	219.0	4.73	2.16	63.57%	34.27%					
49	EMA	Elemental Asia	105.0	5.08	4.84	67.23%	20.23%	7.70%				
50	PRS	Prymus	59.9	5.72	9.56	42.86%	33.53%	8.79%	5.26%			
51	FEE	Feerum*	83.0	6.20	7.46	52.87%	18.96%	8.10%	6.93%	5.68%		
52	RAF	Fabryka Obrabiarek RAFAMET*	74.0	6.50	8.73	91.27%						
53	ELQ	ELQ	140.0	7.00	5.00	95.00%						
54	RDL	Radpol*	122.0	8.10	6.63	93.37%						
55	PLX	PTS Plast-Box*	113.0	8.90	7.84	36.19%	24.39%	22.37%	9.21%			
56	OTM	ZPC Otmuchów*	91.8	9.10	9.87	66.17%	14.99%	8.97%				
57	BPX	BPX	110.3	9.44	8.56	67.24%	11.13%	7.02%	6.05%			
58	OVO	Ovostar Union NV*	399.0	9.50	2.39	70.24%	11.76%	10.39%	5.22%			
59	KRI	Kredyt Inkaso*	255.0	13.70	5.37	61.49%	33.14%					
60	XPL	XPlus	211.5	20.58	9.73	90.27%						
61	RON	Ronson Development SE*	417.0	20.9	5.00	95.00%						
62	NVT	Novita*	430.0	35.5	8.25	64.11%	27.64%					
63	BST	Best*	575.0	40.9	7.12	78.48%	14.40%					
64	PCE	Police*	1,421.8	50.9	3.58	62.86%	13.13%	12.96%	7.47%			
65	CPG	Capital Park*	1,068.0	55.2	5.17	72.94%	21.89%					
66	ZAP	Zakłady Azotowe Puławy*	1,548.0	62.2	4.02	95.98%						
67	CFI	CFI Holding*	798.0	68.6	8.60	24.76%	17.59%	13.77%	13.01%	12.9%	9.38%	
68	ZWC	Grupa Żywiec*	5,136.0	84.2	1.64	65.16%	33.20%					
69	OPG	CPI FIM (ORCO GROUP)*	3,615.0	97.2	2.69	97.31%						
70	PEP	Polenergia*	3,412.8	221.8	6.50	51.64%	22.82%	8.15%	5.62%	5.27%		
71	ENG	Energa*	3,192.0	289.8	9.08	90.92%						

* if listed on the GPW

Source: Author's own study based on (www4; www6).

As can be seen in Table 2, only 27 companies (3.4%) on both markets (GPW + NC) have a FF lower than 5%, of which 8 have less than 2%. The 71 companies had an average of 2.66 shareholders with stakes above 5%, while 16 companies (22.5% of 71) had only one disclosed owner holding more than 5% shares (the average share of 93.1%).

Table 3 shows turnover statistics for the same group of 71 companies. Data on capitalization and FF comes from stooq.pl, while trading statistics for 2021 comes from the official GPW (gpw.pl) and the NC (<https://newconnect.pl/>) spreadsheets. The companies were ordered from the smallest nominal FF²¹ value, taking particular account of data on shareholder fragmentation, i.e. the shares of individual shareholders with more than 5% of shares.

Table 3. Stock market statistics of Polish listed companies with a FF below 10%, on the GPW and NC, as of 9 January 2022

No.	Listed company	Nom. FF (PLN mn)	Market capitalization (PLN mn)	FF (%)	Turnover 2021 (PLN mn)	Equities turnover ratio 2021 (%) ²²	Average spread 2021 (bp)
1	Agromep	0.2	15.8	0.99	0.60	14.20	480
2	Symbio Polska	0.2	4.5	4.85	0.00	0.00	0
3	Lokaty Budowlane	0.3	22.8	1.17	0.06	13.90	0
4	MM Conferences	0.3	11.4	2.64	1.62	14.00	735
5	Telesto	0.3	14.1	2.14	2.86	2.20	469
6	Alumast	0.4	12.6	3.05	1.37	18.70	568
7	Viatron	0.4	9.1	4.85	0.05	1.10	0
8	Quart Development	0.6	32.1	1.77	0.85	11.20	773
9	Sevenet	0.6	25.6	2.27	7.93	32.50	265
10	Abak	0.6	6.7	9.06	0.72	10.00	413
11	Hydrapres	0.7	16.4	4.12	0.18	1.20	462
12	Sakana	0.7	9.2	8.00	2.02	81.00	562
13	Noble Financials*	0.8	9.0	9.37	0.30	5.30	0
14	7levels	0.9	12.4	7.42	1.37	9.50	496
15	GO24.PL	1.0	10.5	9.31	0.04	0.10	0
16	Incana	1.1	19.3	5.82	0.18	1.20	585
17	Milestone Medical Inc	1.1	68.2	1.67	0.73	5.90	0
18	Vakomtek	1.3	16.0	8.26	0.72	3.10	815
19	Biogened	1.4	23.6	5.89	1.68	12.60	401
20	Cereal Planet	1.4	19.6	7.18	0.07	2.40	619
21	Indos	1.4	22.7	6.31	0.81	43.40	392
22	4Mobility	1.6	18.9	8.22	0.88	4.80	475
23	Summa Linguae	1.6	145.0	1.10	1.79	1.30	353
24	JWW Invest*	1.7	23.0	7.38	1.17	16.60	344

²¹ Nominal (nom.) free float is the product of free float (%) and the company's stock market capitalization.

²² Annualized avg. volume for current period to average number of shares introduced to trading in this period.

No.	Listed company	Nom. FF (PLN mn)	Market capitaliza- tion (PLN mn)	FF (%)	Turnover 2021 (PLN mn)	Equities turnover ratio 2021 (%)	Average spread 2021 (bp)
25	Rocca	1.8	49.7	3.60	1.17	1.20	609
26	Netwise	1.9	24.4	7.63	2.87	9.80	466
27	Procad*	1.9	21.0	8.95	0.93	5.40	0
28	Edison	1.9	19.2	9.81	2.95	37.70	593
29	Grupa Trinity	2.0	20.1	9.73	1.42	18.50	0
30	Organic Farma Zdrowia	2.0	21.4	9.48	0.17	0.90	540
31	Union	2.1	20.9	9.92	0.21	3.30	606
32	Simple*	2.2	59.0	3.70	5.24	8.40	118
33	Balticon	2.2	46.6	4.80	3.53	69.20	458
34	Constance Care	2.3	33.4	6.77	0.18	12.90	500
35	Werth-Holz	2.3	37.3	6.23	0.51	2.50	705
36	Arts Alliance	2.5	28.9	8.51	0.36	1.00	546
37	Małkowski-Martech	3.0	34.3	8.73	1.62	7.30	671
38	Eurosnack	3.1	31.7	9.80	2.22	6.80	511
39	Prefa Group	3.1	194.0	1.62	3.75	5.70	676
40	SPARK VC	3.4	153.0	2.21	0.25	25.20	670
41	Tamex Obiekty Sportowe	3.7	64.6	5.71	8.82	27.10	515
42	Czerwona Torebka*	3.7	42.0	8.84	1.09	2.40	465
43	XBS Pro-Log	3.8	38.2	9.96	1.39	4.30	369
44	Taxus Fund	3.9	85.5	4.53	0.00	0.00	0
45	i2 Development*	4.2	111.0	3.82	7.44	7.40	340
46	Master Pharm*	4.4	97.0	4.50	3.09	3.60	213
47	Centrum Finansowe	4.4	45.2	9.67	1.36	3.50	376
48	CDA	4.7	219.0	2.16	3.94	14.10	188
49	Elemental Asia	5.1	105.0	4.84	12.18	35.70	378
50	Prymus	5.7	59.9	9.56	4.42	6.60	310
51	Feerum*	6.2	83.0	7.46	1.42	1.40	372
52	Fabryka Obrabiarek RAFAMET*	6.5	74.0	8.73	2.41	3.30	118
53	ELQ	7.0	140.0	5.00	0.72	74.90	324
54	Radpol*	8.1	122.0	6.63	24.40	21.70	112
55	PTS Plast-Box*	8.9	113.0	7.84	19.77	20.90	106
56	ZPC Otmuchów*	9.1	91.8	9.87	16.02	18.30	200
57	BPX	9.4	110.3	8.56	1.84	134.00	412
58	Ovostar Union NV*	9.5	399.0	2.39	10.34	2.30	69
59	Kredyt Inkaso*	13.7	255.0	5.37	1.43	0.70	425
60	XPlus	20.6	211.5	9.73	4.77	9.70	343
61	Ronson Development SE*	20.9	417.0	5.00	16.73	4.90	157
62	Novita*	35.5	430.0	8.25	14.18	3.20	158
63	Best*	40.9	575.0	7.12	0.82	0.20	312
64	Police*	50.9	1421.8	3.58	10.38	0.70	127
65	Capital Park*	55.2	1068.0	5.17	21.11	2.60	150
66	Zakłady Azotowe Puławy*	62.2	1548.0	4.02	17.32	1.00	91
67	CFI Holding*	68.6	798.0	8.60	7.31	93.00	253
68	Grupa Żywiec*	84.2	5136.0	1.64	15.18	0.30	59

No.	Listed company	Nom. FF (PLN mn)	Market capitalization (PLN mn)	FF (%)	Turnover 2021 (PLN mn)	Equities turnover ratio 2021 (%)	Average spread 2021 (bp)
69	CPI FIM (ORCO GROUP)*	97.2	3615.0	2.69	3.86	0.50	426
70	Polenergia*	221.8	3412.8	6.50	85.68	2.60	69
71	Energa*	289.8	3192.0	9.08	67.03	3.10	34
	Average (1–67)	8.0	150.6	6.14	4.0	15.22	342.9
	Average (1–71)	17.4	360.3	6.15	6.3	14.47	341.0

* if listed on the GPW

Source: Author’s own study based on (www4; www6; www2).

Due to the outlier observations, the author took 67 companies for further analysis (red circle), dropping Grupa Żywiec, CPI FIM, Polenergia and Energa (Figure 4).

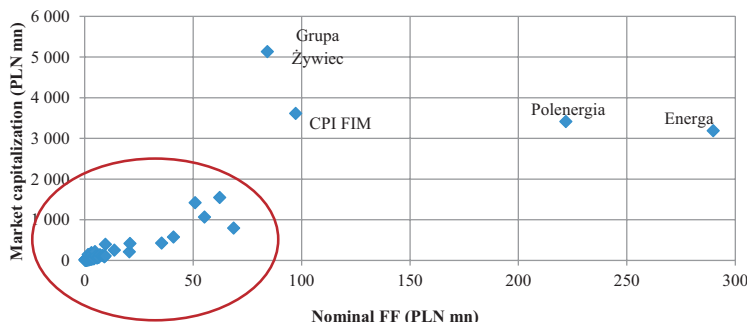


Figure 4. Ratio FF (nom.) to stock market capitalization for selected 71 companies on the GPW and NC, as of 9 January 2022

Source: Author’s own study based on (www4).

Figure 5 shows 56 companies (83.6%) with market capitalization below PLN 200 mn and 58 companies (86.6%) with nominal FF below PLN 10 mn (green circle). There is a positive correlation between nominal FF and market capitalization. The linear regression coefficient R^2 amounts to 0.85 so it can be assumed that nominal FF explains the volatility of market capitalization to a very high degree. The correlation coefficient is also very high (0.924). There were similar observations for all 790²³ public companies (Figure 6).

²³ Two companies were excluded due to outliers (turnover too low vs capitalization – UniCredit, Santander) and two companies were excluded due to missing turnover data (Bio Planet, VR Factory Games).

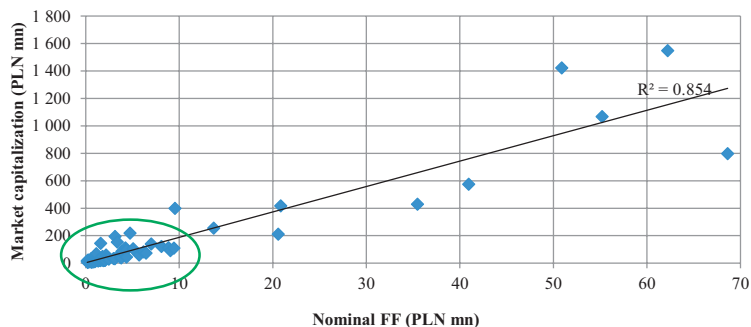


Figure 5. Ratio FF (nom.) to stock market capitalization for selected 67 companies on the GPW and NC, as of 9 January 2022

Source: Author's own study based on (www4).

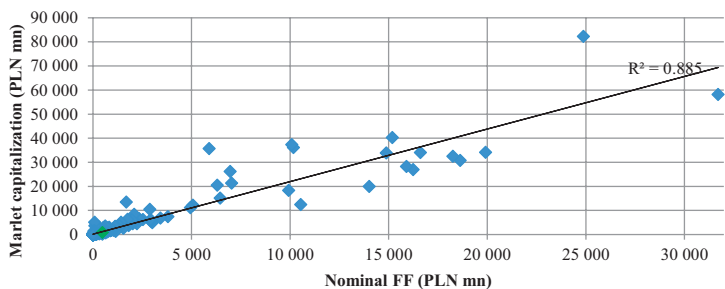


Figure 6. Ratio FF (nom.) to stock market capitalization for selected 790 companies on the GPW and NC, as of 9 January 2022

Source: Author's own study based on (www4).

For 9 companies with nominal FF above PLN 10 mn (Figure 7), the average percentage FF was 6.32%. Simultaneously, no relationship between nominal and percentage FF can be seen – the R2 coefficient is only 0.001 and the correlation is 0.033.

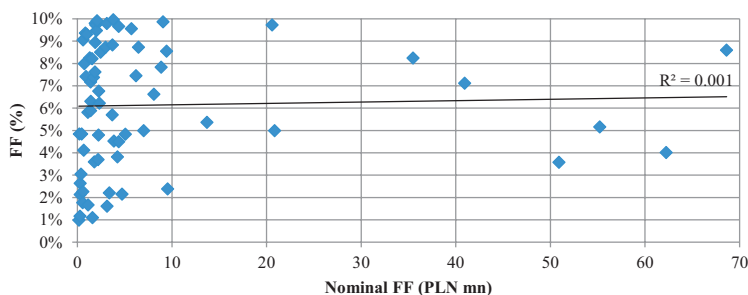


Figure 7. Ratio of FF (nom.) to FF (%) for selected 67 companies on the GPW and NC, as of 9 January 2022

Source: Author's own study based on (www4).

Figure 8 shows the average correlation between the nominal FF and the total turnover of a company's shares in 2021.²⁴ The R2 coefficient has a low value of 0.29, so the nominal FF explains only 29% of the variation in the company's total stock turnover. The correlation is significantly positive (0.539). If we take only companies with a nominal FF of less than PLN 10 mn to determine the trend, then the R2 coefficient increases to 0.40 and the correlation to 0.64. However, for all public companies in Poland (Figure 9), all coefficients are significantly stronger (0.58 and 0.763, respectively).

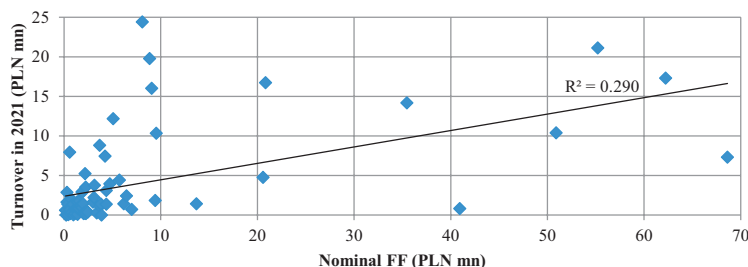


Figure 8. Ratio FF (nom.) (as of 9 January 2022) to stock market turnover in 2021 for selected 67 companies on the GPW and NC

Source: Author's own study based on (www4; www6; www2).

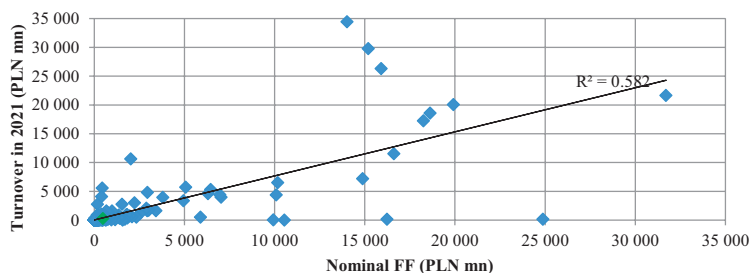


Figure 9. Ratio FF (nom.) (as of 9 January 2022) to stock market turnover in 2021 for 790 companies on the GPW and the NC.

Source: Author's own study based on (www4; www6; www2).

Figure 10 shows the relationship between the nominal FF and the average market spread in 2021.²⁵ Here, we observe a slight negative correlation (-0.281) with a linear regression coefficient R2 of only 0.08, but for 9 companies with a nominal FF above PLN 10 mn, the correlation increases significantly to -0.57 and the R2 to 0.32. As the nominal FF increases, the average price spread decreases slightly.

²⁴ Value single-counted, covering only electronic order book trades.

²⁵ Spread – the difference between the best bid and ask price before each transaction, weighted by turnover value in basic points (bp).

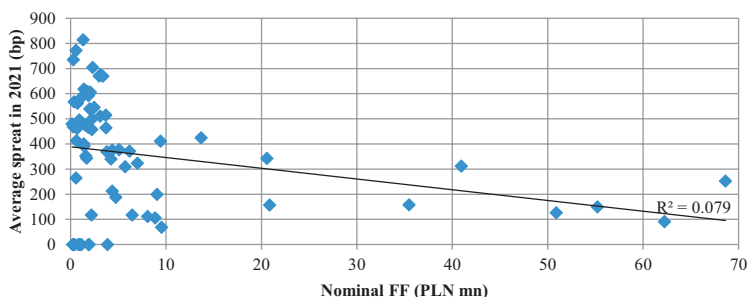


Figure 10. Ratio FF (nom.) (as of 9 January 2022) to average market spread in 2021 for selected 67 companies on the GPW and the NC

Source: Author's own study based on (www4; www6; www2).

The results of the above analysis essentially confirm the conclusions of Ding et al. (2016), that there is a positive correlation between the company FF and the stock liquidity. However, this conclusion is true only for nominal FF.²⁶ In Poland, as the nominal FF increases, market capitalization and trading liquidity increase largely (although for the group of companies with lower nominal FF this correlation is weaker) and the average market spread decreases slightly. The correlation factors are presented in Table 4. Note that for the sample of 790 companies, all nominal FF correlations (except the average spread) are stronger.

Table 4. Correlation factors between FF and other variables for companies on the GPW and NC

	Correlation ratios			
	FF (PLN mn)		FF (%)	
	67	790	67	790
Number of companies in sample	67	790	67	790
Market capitalization (PLN mn)	0.924	0.941	-0.152	0.086
Turnover (PLN mn)	0.539	0.763	-0.045	0.148
Average spread (bp)	-0.281	-0.200	0.018	-0.257
Nominal FF (PLN mn)	1.000	1.000	0.033	0.150
FF (%)	0.033	0.150	1.000	1.000

Source: Author's own study based on (www4; www6; www2), calculated in Excel.

²⁶ Unfortunately, some investors base their investment decisions on FF percentages, taking, for example, a level of 15–20% as a value that guarantees liquid trading. Meanwhile, investors looking for liquid stocks should look at either market capitalization or nominal FF, which are strongly correlated with each other (which does not seem obvious to everyone, Figures 5 and 6) and, at the same time, with trading liquidity (Figures 8 and 9).

The importance of free float for the investors

In the author's opinion, leaving a company with a low FF, especially with low trading liquidity and the dominance of a single shareholder, adds little value to the market. To clarify the author's reasoning, here are the main advantages and disadvantages of listing a company on the stock market. The main advantages include:

- raising (theoretically non-refundable) capital through the issuance of shares,
- increased prestige, credibility and transparency of the company,
- promotion of the company's products and services,
- easier valuation of the company, easier access to financial data (e.g. the possibility of using the comparative method),
- possibility of motivating employees through option programs.

On the other hand, the status of a public company generates real costs and risks for the issuer and its management, as it means, i.a.:

- strict disclosure obligations of the company, including public current and periodic reports and confidential information in accordance with the MAR Regulation,
- publication of notifications received from shareholders on exceeding legally defined thresholds for the total number of votes in the company,
- information obligations for persons performing managerial duties in the company and their relatives to report their own transactions in the issuer's shares,
- application of the basic principles of corporate governance expected by the market,
- application of clear accounting policies,
- making public the know-how, financial information, operational knowledge about the company and other information that can be used by the issuer's competitors, including unlisted companies in the same industry, and
- being subject to the market supervisor (i.e. KNF), which may impose administrative penalties on the company and its management for, i.a., failing to comply with the aforementioned disclosure obligations.

The negative balance of benefits and costs resulting from, i.a., too low stock market valuation (in the opinion of management and key shareholders), too many disclosure obligations, and onerous minority shareholder protection regulations may lead to a decision by the shareholders' meeting to delist the company shares.²⁷ In extreme cases, delisting can occur as a result of a merger or acquisition by another entity, as a result of the issuer's bankruptcy, or at the request of the market supervisor due to a violation of law by the issuer (Journal of Laws of 2022, item 1500, Art. 20; Journal of Laws of 2021, item 1983, Art. 96). Delisting of a public company entails negative consequences for small investors (who have a conflict of interest to majority

²⁷ Between 2016 and 2021, there were 71 IPOs on the GPW, but also 131 companies were delisted, reducing the number of issuers by 60 (www6).

shareholders), as their access to information about the company and the scope of their protection is reduced.

In addition, if the company's FF is extremely low and the shareholding is dominated by one large entity, the sense of maintaining public company status in the long term is questionable. Listing a company solely for the sake of reputation, prestige or transparency (if the market perceives such values in the issuer at all) is, in the author's opinion, economically unjustified. In addition, listing a company on the stock market provides a dangerous tool – a stock market valuation, often treated uncritically as the best possible and not subject to discussion (“market valuations are not discussed”), even if the market has zero activity.

Justifications for maintaining the status of a public company with a low FF and with a single dominant shareholder in theory could include:

– the planned issuance of new shares to recapitalize the company, while retaining control of the company,

– reluctance of key shareholders to commit resources to organize a delisting or squeeze-out²⁸ due to the planned sale of the company in the short term – key shareholders would prefer to focus on the search for an investor and not “drown costs” in delisting,

– using the (rising/higher) stock market price (not excluding manipulation of the price) as a justification for appropriate valuation of the company's (assets) and reaping the benefits in the event of, i.a.:

a) early purchase of the company (including outside the market) at an attractive, significantly lower price,²⁹

b) the planned sale of the company to a strategic investor,

c) an increase in the value of the assets of an investment fund holding shares of this company (which could encourage investors to invest in the fund),

d) the collection by the asset manager of a commission on the increase in the value of the assets of the aforementioned investment fund (success fee),

e) earning additional income from the increase in the valuation of investments in the assets of the company that acquired the shares of this public company.

According to Polish law (Journal of Laws of 2021, item 1983, Art. 82–83), if the dominant shareholder of a listed company (alone or in concert with others) has reached 95% of the total number of votes in that company, within three months:

– the dominant shareholder of the company may force other shareholders to sell all the shares compulsorily (compulsory buyout, **squeeze-out**), or

– a minority shareholder of the company may demand that the dominant shareholder repurchase shares from it (demand to repurchase shares, **sell-out**).

²⁸ And they could do so within a maximum of three months of reaching the 90% shareholding threshold.

²⁹ Altus TFI funds used a similar technique when they bought shares in Centrum Finansowe, for which the Polish Financial Supervision Authority (*Komisja Nadzoru Finansowego*, KNF) fined Altus TFI PLN 1.2 mn.

The fundamental purpose of a squeeze-out is to facilitate the acquisition of control of a public company and to negate the “free riders problem”,³⁰ that is, shareholders hoping for future growth in the company’s shares thanks to the actions of a strategic investor. Squeeze-out can also be used as a remedy for the abuse of corporate powers by minority shareholders, which can in extreme cases lead to paralysis of the company’s operations (Puchalski, 2015).

The squeeze-out rule serves to protect minority shareholders in the case of a significant concentration of a public company’s shareholding, as then small shareholders could potentially have a problem selling their shares (due to reduced liquidity) and, unable to find a willing buyer, in the absence of a strategic shareholder’s buyout, they would be “trapped” in the company (Wajda, 2007), which would eventually be pulled off the stock exchange (delisting).

It should be, therefore, noted that the maximum FF of 5%, at which demands for squeeze-out and sell-out take effect, is unreliable, as the same FF percentage can mean a completely different trading liquidity or market spread. A better solution would be to make the legal eligibility for those legal actions based on nominal rather than percentage FF. It should be easier for a minority shareholder to exit a company when trading liquidity is high, and this is correlated more with nominal FF rather than in percents. As for smaller companies, with lower nominal FF, smaller capitalization and trading liquidity, this percentage ratio (conditioning sell-out/squeeze-out) should, therefore, be lower than 95%. Perhaps nominal values should, therefore, be introduced in all capital market laws in addition to percentage thresholds.

Free float vs. risk of correct stock valuation and price manipulation

Public company status for a company of low FF is unlikely to add significant value for a rational new strategic shareholder. The market capitalization of such company should only be a guide for determining the fair price as part of the M&A process. Polish accounting law considers fair value to be the amount for which an asset could be exchanged, and a liability settled, in an arm’s length transaction, between interested and knowledgeable, unrelated parties³¹ and the fair value of financial instruments traded in an active market is the market price less the costs associated with carrying out the transaction, if they were significant (Journal of Laws of 2021, item 217, Art. 28(6)). The stock market price resulting from manipulation cannot be considered fair value, nor can the stock price of a company with negligible trading³² or minimal

³⁰ Stowaway shareholders (free riders) are understood as shareholders holding a very small stake, but counting on the future growth of the company and attractive dividends. Despite their passive attitude, they want to obtain the benefits that result from the actions of the majority shareholders.

³¹ This is particularly important because unrelated parties are valuing independently, making such valuation potentially more efficient (less speculative, more fundamental).

³² One cannot treat stock market valuation as a non-negotiable valuation on the basis of the “market

FF.³³ Let us emphasize again that for public companies, every stock market valuation should not be accepted uncritically, as such valuation must first and foremost come from an active market.

A strategic investor, making a rational decision to acquire a company with a low FF, should rely more on the company's fundamental valuation (and financial due diligence) than on a valuation derived from the current/historical market price of the stock, which in this case was simply unreliable and could not be the basis for calculating the fair valuation of such a company. Low FF and accompanying low trading liquidity, from the point of view of a rational investor, should always be warning signals to perform an independent fundamental valuation, including a financial comparative performance analysis against the industry.

A large nominal FF is, in the author's opinion, of considerable importance for the safety of share trading and the prevention of market abuse, as it is a natural barrier to market manipulation. Since we have confirmed the relationship between nominal FF and trading liquidity, it can be concluded that the higher the nominal FF, the more capital a manipulator must have in order to influence the share price. A low nominal FF means that with little capital one can influence the price of a company with a significant capitalization. Companies with a low FF are, therefore, characterized by an increased risk of price manipulation.³⁴ The higher the trading liquidity, the lower the price volatility and the lower the risk of price manipulation (Martysz, 2015). However, exceeding a 5% shareholding triggers an obligation to disclose themselves to the shareholder, so manipulators usually act as a group in order not to exceed this threshold and reveal themselves.

According to Table 1, companies with FF below 5% are extremely rare (1.9% on the GPW and 5% on the NC), so it is difficult to consider it rational behavior to keep a company with a low FF publicly traded. It is worth noting, by the way, the company Telesto (commentary in the bottom footnote next to Table 2), where a low FF (especially nominal) definitely promoted a very high volatility of the share price – according to the author, in this case there was a manipulation of the share price.

Another example of the low FF impact on the risk of share price manipulation is the case of EGB Investments (EGB), formerly on the NC (2010–2017). On 12 September 2014, a tender offer for EGB shares ended and the strategic investor held 82.11% shares, but together with two EGB's board members over 98.45% of EGB shares (www5, report 25/2014). Other (small) shareholders owned only 1.55% shares admitted to trading, while the FF was 3.61%.³⁵ Despite initial signals from the

always tells the truth" dogma, without verifying that the trading market actually meets the criterion of activity.

³³ At the extreme, one can imagine a situation where 99.99% of the shares are held by one entity and the share price is determined by transactions made by 3–4 manipulators holding the remaining shares.

³⁴ As an example, four companies from the former Polish WIRR market with very small FF became subject to pool manipulation in 1996–1998 (Martysz, 2015).

³⁵ 3.61% = board member J.M. Niewiarowska (2.06%) + other FF investors (1.55%).

board, EGB's general meeting did not pass a resolution on delisting. In November 2015, EGB's FF dropped further to 1.14% (149,315 shares), when 98.86% shares were bought by Altus TFI funds (www5, report 10/2015). In February 2017, the FF temporarily increased to 2.52%,³⁶ at the end of May 2017, it fell to 0.62% and in September 2017, EGB was delisted due to its merger with GetBack (GB). In June 2019, the prosecutor's office arrested five people suspected of manipulating EGB's share price. The Financial Supervision Authority found that GB overpaid seven times when it bought EGB shares (www1). According to the author, the very low FF of EGB may have been important factor for the success of the supposed market manipulation.

Conclusions

The research confirmed that the relationship between FF and stock market liquidity is positive, but only considering nominal (not percentage) FF. On the Polish capital market, as the nominal level of FF increases, market capitalization and trading liquidity increase to a large extent (although for the group of companies with lower nominal FF this relationship is weaker) and the average market spread decreases to a small extent. The article also points out important risks associated with low FF, indirectly causing low liquidity problems, such as the risk of price manipulation and the risk of incorrect company valuation. It also pointed out the need to change the law on squeeze-out/sell-out institutions due to the unreliability of the FF rate determined as a percentage of shares (95% shares held by one or related investors), as for smaller companies, with lower nominal FF, smaller capitalization and trading liquidity, this percentage ratio should be lower. Thus, the hypothesis that companies with low nominal FF generate many risks (mostly liquidity risk and effective valuation/manipulation risk) for investors should be confirmed and this article should lead to highlighting those risks.

References

- Adamska, A., & Grygiel-Tomaszewska, A. (2013). *Ochrona interesów akcjonariuszy mniejszościowych spółki publicznej w upadłości*. Retrieved from <http://www.twoj.europa.pt.pl/pliki/2/12/Akcjonariusze-mnijeszosciowi-w-upadlosci.pdf>
- Chan, K., Chan, Y., & Fong, W. (2004). Free float and market liquidity: A study of Hong Kong government intervention. *The Journal of Financial Research*, 27(2), 179–197.
doi:10.1111/j.1475-6803.2004.t01-1-00078.x

³⁶ As of 13 February 2017, EGB's FF was 1.14% (nominally PLN 2.2 mn) with a stock market capitalization of PLN 194.5 mn – in the author's opinion, these are extreme values compared to Table 2.

- Ding, X., Ni, Y., & Zhong, L. (2016). Free float and market liquidity around the world. *Journal of Empirical Finance*, 38, Part A, 236–257. doi:10.1016/j.jempfin.2016.07.002
- El-Nader, G. (2018). Stock liquidity and free float: Evidence from the UK. *Managerial Finance*, 44(10), 1227–1236. doi:10.1108/MF-12-2017-0494
- Gheorghie, C., & Panazan, O. (2022). The influence of specific indicators on the volatility of shares on the Bucharest Stock Exchange during the Covid-19 pandemic. *12th International Scientific Conference "Business and Management 2022"*. Vilnius. doi:10.3846/bm.2022.697
- Glosten, L.R., & Milgrom, P.R. (1985). Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of Financial Economics*, 14(1), 71–100. doi:10.1016/0304-405X(85)90044-3
- Hefflin, F., & Shaw, K. (2000). Blockholder ownership and market liquidity. *Journal of Financial and Quantitative Analysis*, 35(4), 621–633. doi:10.2307/2676258
- GPW. (2015). *Raport o rynku NewConnect*. Retrieved from https://www.gpw.pl/pub/files/PDF/2015-05-25_NEWCONNECTraport2015.PDF
- GPW. (2017). *Przewodnik dla emitentów giełdowych. Droga po kapital*. Retrieved from https://www.gpw.pl/pub/GPW/jak_za_czac/GPW_przewodnik_dla_emitentow_gie.pdf
- GPW. (2022). *Regulamin Giełdy*. Retrieved from https://www.gpw.pl/pub/GPW/files/PDF/regulacje/Regulamin_Giełdy.pdf
- GPW Benchmark. (2019). *Regulamin ustalania liczby akcji w wolnym obrocie*. Retrieved from https://www.gpw.pl/pub/GPW/pdf/PWPA_3.0-regulamin-załącznik-3-regulamin_ustalania_licz-by_akcji_w_wolnym_obrocie.pdf
- Martysz, C.B. (2015). *Manipulacja instrumentami finansowymi i insider trading. Analiza prawno-ekonomiczna*. Warszawa: Wolters Kluwer.
- NewConnect. (2019). *Regulamin ASO*. Retrieved from https://newconnect.pl/pub/NEWCONNECT/regulacje_prawne/Regula_min_ASO_UTP.pdf
- Puchalski, A. (2015). Polska regulacja przymusowego wykupu akcji w spółkach publicznych na tle prawa unijnego. *Przegląd Prawa Handlowego*, 1/2015.
- Pyka, M., & Zięba, M. (2013). Zasada ochrony praw współników mniejszościowych w spółce kapitałowej. *Przegląd Prawa Handlowego*, 2/2013.
- Rezaei, E., & Tahernia, A. (2013). The relationship between the percentages of free float shares and liquidity of shares in the companies accepted in Tehran Stock Exchange. *African Journal of Business Management*, 7(37), 3790–3798.
- SII (Stowarzyszenie Inwestorów Indywidualnych). (2019). *Ogólnopolskie Badanie Inwestorów*. Retrieved from <https://www.sii.org.pl/13077/edukacja/badania-i-rankingi/ogolnopolskie-badanie-inwestorow-obi-2019.html>
- Słoński, T., Ligus, M., & Rudnicki, J. (2014). Ryzyko inwestycji w akcje spółek związanych z produkcją energii odnawialnej. *Zarządzanie i Finanse*, 3(2), 142–156.
- Szumański, A. (2015). Granice ochrony akcjonariuszy mniejszościowych w spółkach kapitałowych. *Przegląd Prawa Handlowego*, 9/2015.
- Ustawa z dnia 29 lipca 2005 r. o obrocie instrumentami finansowymi (Journal of Laws of 2022, item 1500, as amended).
- Ustawa z dnia 29 lipca 2005 r. o ofercie publicznej i warunkach wprowadzania instrumentów finansowych do zorganizowanego systemu obrotu oraz o spółkach publicznych (Journal of Laws of 2021, item 1983, as amended).
- Ustawa z dnia 29 września 1994 r. o rachunkowości (Journal of Laws of 2021, item 217, as amended).
- Viratama, D.I., Hasnawati, S., & Hendrawaty, E. (2022). Free float and volatility effect on stock liquidity in Indonesia Stock Exchange. *Asian Journal of Economics, Business and Accounting*, 22(23). doi:10.9734/ajeba/2022/v22i23869
- Wajda, D. (2006). Problemy związane z uczestnictwem akcjonariuszy mniejszościowych w walnych zgromadzeniach. *Przegląd Prawa Handlowego*, 7/2006.

Wajda, D. (2007). *Ochrona akcjonariuszy mniejszościowych w kodeksie spółek handlowych*. Warszawa: Wolters Kluwer.

Wang, Q., & Zhang, J. (2015). Does individual investor trading impact firm valuation?. *Journal of Corporate Finance*, 35, 120–135. doi:10.1016/j.jcorpfin.2015.08.001

Zięty, J.J. (2011). *Ochrona akcjonariuszy mniejszościowych w prywatnej spółce zależnej*. Olsztyn: Wyd. UWM.

www1: <https://forsal.pl/artykuly/1417431,manipulacja-kursem-spolki-egb-investments-podejrzeni-afera-getback.html>

www2: <https://newconnect.pl/statystyki-okresowe>

www3: [https://stockbroker.pl/free float/](https://stockbroker.pl/free_float/)

www4: <https://stooq.pl/>

www5: <https://www.capitea.pl/relacje-inwestorskie/polaczenie-getback-s-a-z-egb-investments-s-a/egb-raporty-historyczne-espi-m>

www6: <https://www.gpw.pl/statystyki-gpw>

www7: <https://www.pekao.com.pl/relacje-inwestorskie/akcje/akcjonariat.html>