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Market Concentration in the Polish Investment Fund Industry

Abstract: The aim of the paper was to determine the level of market concentration in the Polish investment fund industry from 1998 to 2018 and to identify the causes of changes. Moreover, the intention of the study was to verify a hypothesis that competition on the market can be measured by the strength and direction of the correlation between the market positions of investment fund companies (IFCs) in subsequent periods of time. The study applied measures related to the concentration curve and certain special measures as well as the correlation coefficient to identify changes in the significance of entities operating in the industry. It was established that Poland's IFC market was generally characterised by a moderate or relatively low level of market concentration. However, the level of concentration altered noticeably over time. In general, the analysed period abounded in external, market and law-related factors that could be viewed as determinants of market concentration. Furthermore, it was found that, despite many new entities entering the market and the constantly changing attractiveness of products, the investment fund industry remained ossified, mainly due to the dominant role of some large and experienced IFCs.

Keywords: concentration, competition, investment fund companies

JEL classification codes: G23, D40

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Introduction

Market concentration is a process aimed to increase the market position of economic entities. It is generally assumed that market concentration results in revealing the power of individual market players. In theory, where the concentration level is high, the industry leader has a market advantage or the largest entities hold the dominant position collectively [Shughart, 2008]. Such a situation is typical of oligopolistic markets. A low concentration level, in turn, could imply a lack of market power or be characteristic of business entities with similar market shares. As the market concentration level increases, the probability of a lack of effective competition rises [cf. Bikker, Haaf, 2002a]. Therefore, in most cases, qualitative criteria taking into account the specific nature of an industry should be analysed along with quantitative criteria in order to assess competitiveness properly. This, in turn, might lead to demand for concentration measures with highly diverse characteristics.

It seems important to determine the intensity of market competition as well as business concentration and diversification due to several research effects in the context of the investment fund market. From a purely cognitive perspective, this permits a diagnosis of the situation and structure of the financial sector, while from a practical point of view, empirical investigations into competition and concentration are significant for investment fund companies, antitrust authorities, financial market supervisory authorities and investors themselves. First, the establishment of a relationship between the intensity of competition and the amount of fees and charges collected by funds as well as their profitability will support decisions made by investment fund companies in areas of activity contributing to improved effects of managing business organisations. Second, the results of the research will help consumer protection authorities predict strategic competitive behaviours. Third, due to insufficient knowledge and limited interest in investment funds among some prospective individual investors, the findings offer some indirect insight into the changes in the amount of fees and charges collected by investment funds and the quality of their services. This could result in an increased interest in such financial intermediaries in the future.

Generally, concentration measurement is one of the most common methods of capturing the features of market structures by both industry analysts and competition policy makers. Moreover, concentration analysis is the basic aspect of diagnosing the situation and structure of every market segment, and its results have significant cognitive values. Therefore, the main aim of this paper is to identify the level of market concentration in the Polish investment fund industry from 1998 to 2018 and to show how and why it changed. Moreover, the study aims to validate the hypothesis whereby market competition can be measured by the strength and direction of the correlation between the market positions of IFCs in two subsequent periods. The study applies traditional tools of descriptive statistics to measure the central tendency, dispersion and the shape of the distribution of market shares. The study also uses measures related

to the concentration curve, along with some special measures and a correlation coefficient to identify changes in the importance of entities in the industry.

The rest of this paper proceeds as follows. Section 2 includes a review of the literature on the concentration of financial markets, especially investment funds. Section 3 provides a description of the data and methods employed. Section 4 presents empirical results, divided into five subsections, and the final section provides concluding remarks for our study.

Literature review

This section provides up-to-date findings on the concentration of selected financial market industries, in particular the investment fund industry. Even though tools used in concentration level analysis are to an extent universal, a compilation of studies focusing on these rather than other segments of the economy is especially significant from a cognitive perspective. Research into various financial markets can help gain an insight into the similarities and differences of financial systems in individual countries.

Publications on the structure of financial markets, including concentration and competition, predominantly focus on analysing the banking sector, particularly in the United States [e.g. Rhoades, 2000; Demirgüç-Kunt et al., 2004; Allen, Gale, 2004]. Some studies examine this sector of the economy in other developed countries [e.g. Bourke, 1989; Martinez-Peria et al., 2004; de-Ramon, Straughan, 2019]. The popularity of research on the banking sector results from the fact that policy makers impose various restrictions, including antitrust restrictions, on the activities of financial institutions regardless of a country's economic development level.

A study by Kacperczyk, Sialm and Zheng [2005] can serve as an example of the most recognisable streams of research on the concentration of investment funds. While the study focused on portfolio concentration rather than fund market concentration, it is worthy of note because the authors introduced an industry concentration index (ICI) to the research. The authors defined this measure as the sum of the squared deviations of the value weights for each of 10 different industries held by a mutual fund, relative to the industry weights of the total stock market. Like the country concentration index (*CCI*), which is used in the literature to examine international mutual funds [Hiraki et al., 2015], the industry concentration index is related to the Herfindahl index, which is commonly used in industrial organisations to measure the concentration of companies in an industry. Similar studies can be found outside the United States. For example, Chen and Lai [2015] applied the normalised Herfindahl index to the Taiwanese mutual fund industry.

Research on investment fund market concentration is, for obvious reasons, less popular than research on the intensity of market competition in the banking sector. A study by Coates and Hubbard [2007], carried out on the US market, deserves particular attention. It was conducted to analyse competition in the

mutual fund industry in the 1985–2004 period. The researchers examined the structure and performance of the industry as well as price competition. They reported the number of funds, the number of IFCs, and the concentration for equity mutual funds measured by the Herfindahl-Hirschman index (*HHI*). The study concluded that the US fund industry concentration was relatively low, which means that no fund, IFC or small group of funds had a dominant market share. Moreover, new entries to the market were common and barriers to entry were limited.

Other studies worthy of mention include a popular work by Ferreira and Ramos [2009]. They examined market structures in 27 developed and emerging markets. The main goal of their study was to find determinants of investment fund industry competition and concentration. In the case of competition, they applied measures including the number of management companies per million inhabitants, the market share of foreign firms in a country, the average number of new companies to the total number of new management companies, and the average number of new management companies per million inhabitants. Meanwhile, concentration measures included the average market share of mutual fund companies, basic concentration ratios (*CR_n*), and the Herfindahl-Hirschman index. The researchers found that, although the investment fund industry was generally concentrated worldwide, large investment fund companies were present only in some markets. The paper by Ferreira and Ramos contributed to the literature by being the first study of investment fund industry concentration and competition around the world. The authors presented several important research findings, one being that countries with common law and higher stock market turnover were characterised by a low level of industry concentration.

Wang and Venezia [2012] investigated the relationship between industry concentration and performance for mutual funds in Taiwan. They identified industry concentration mainly by assessing the market structure, but also used two conventional measures: *CR5* and *HHI*. Their values were treated as regressors of mutual fund performance. They found that a higher degree of market concentration was related to poor average performance, which contradicted the structure-conduct-performance hypothesis.

Kumar [2016] analysed market concentration and competition in the Indian investment fund industry in the 2006–2015 period. His study employed measures including the concentration ratio and *HHI*, as well as an approach relying on the rank correlation coefficient of market share, which was based on ranking enterprises in the industry over two different periods of time. He determined that the Indian investment fund industry was highly concentrated and that market concentration increased over time despite the entry of new firms.

Fund market concentration in European countries was assessed by researchers including Cambón and Losada [2012]. They investigated the influence of credit institutions that attempted to introduce various financial products sold by a single entity on the investment fund competition level and market structure in Spain. The applied independent variables included fees and the variety

of funds offered by an IFC – measured by the number of funds. Concentration itself was measured with *HHI*. The researchers determined that there was no major difference with regard to market shares between the wholesale and retail segments of funds. They also found that not all revenue and cost components varied in line with fluctuations in the values of the managed assets.

In Central and Eastern European countries (CEE), investment fund market concentration was examined only a few times and for relatively short periods. For instance, Kristek [2009] studied the concentration of the equity fund market in Croatia in the 2004–2008 period. He aimed to establish if the development of the capital market was related to the level of industry concentration. The measures of concentration were the classical ratios of the four, six and eight largest entities, the Herfindahl index, the coefficient of variation, and the Gini coefficient. The research revealed that the analysed group of equity funds belonged to moderately concentrated branches. However, the development of the capital market led to decreased concentration. This last conclusion was obtained only indirectly, without applying any regression models.

Plakys [2010] also examined the development of the investment fund industry and market concentration. He analysed two segments of the Lithuanian market: foreign and local investment funds, by applying measures such as the average market share of an IFC, popular concentration ratios, and *HHI*. The researcher observed some negative trends in the market and a correlation with several macroeconomic factors. His concentration analysis showed that the investment fund industry in Lithuania was highly concentrated, especially due to a small number of fund companies in existence. The enterprises had an influence on the functioning of the whole market: from the quality of service, competitiveness and distribution, to management fees. Nevertheless, there were some early signs that the concentration level in Lithuania was decreasing.

The best known studies of both the concentration and competitiveness of selected sectors of the Polish financial market include those by Jackowicz and Kowalewski [2002; 2007], Pawłowska and Kozak [2008], Pawłowska [2011], Kozak [2011], and Karkowska and Pawłowska [2017]. However, these studies are mainly concerned with the banking and insurance sectors. In Poland, studies of the investment fund industry are scarce and largely limited to reports by the National Bank of Poland (NBP), the Polish Financial Supervision Authority (KNF) and the Office of Competition and Consumer Protection (UOKiK), which use the basic measures of the concentration of the IFCs sector. To the best of our knowledge, there are only two academic studies of the concentration of entities operating in Poland in terms of the value of their net assets. Czempas and Palica [2007] observed a varying level of concentration in the Polish investment fund market in the 1998–2005 period using the Kukuła coefficient, while Stańczak-Strumiłło [2013] found a gradual decrease in the level of concentration among IFCs in the period from 1992 to 2010 with the *CR5* measure. This means that the analysis of market concentration for entities operating in the Polish investment fund industry is still topical and desirable.

Data and research design

The data set used in the study was composed of information about net asset values (NAVs) under management of individual investment fund companies (IFCs). Data for the 2005–2018 period came from reports by Poland's Chamber of Fund and Asset Management (IZFiA). Additionally, in order to extend the timeframe of the research, a unique private database¹ held by the authors was used, with archival reports for the 1998–2004 period. Ultimately, the examination of the concentration level among IFCs covered the period from 1998 to 2018. Moreover, in order to obtain a more precise picture of the investment fund market, a distinction was made by market type (capital market funds vs. non-public market funds) in the 2010–2018 period and by fund operation form (dedicated funds vs. non-dedicated funds) in the 2012–2018 period. The research considered a total of 61 investment fund companies and the collected dataset included information about both surviving and dissolved IFCs. However, the study sample was not free from a selection bias. It resulted from the fact that some small IFCs were not submitting their reports to the IZFiA. A description of the yearly NAVs of investment fund companies included in the study is presented in Table 1.

As shown in Table 1, net assets under management of IFCs increased during the last two decades. However, there were single years when the total value of net assets decreased, yet that was related to market changes, especially financial crises. In all annual periods, the assets of investment fund companies had a positive skewed distribution, which means that the mean was greater than the median and the tail of the curve's right-hand side was longer than that of the left-hand side. Moreover, the kurtosis values were much greater than zero in all studied yearly periods. This means that the values of assets under management of most investment fund companies were concentrated around the mean, which was a consequence of the occurrence of a leptokurtic distribution with long tails. These insights might be important when interpreting the values of concentration measures.

The calculated values of the basic concentration measures (*CR5* and *HHI*) might differ slightly from those presented by the National Bank of Poland (NBP) in its annual reports on the development of the Polish financial system. The discrepancies arise from the fact that we included a different number of investment fund companies in our research than the NBP does in its reports. Notably, some small IFCs were not members of the IZFiA and hence did not report their data to the Chamber.

¹ The authors dispose of the NAVs of funds operated in previous periods, i.e. 1997 and earlier. Because of the initial stage of the industry's development and a small number of IFCs in the early 1990s, we did not decide to use the data.

Table 1. Summary statistics for IFCs net assets, 1998–2018 (at end of period)

year (1)	total assets (2)	mean (3)	median (4)	st. deviat. (5)	minimum (6)	maximum (7)	kurtosis (8)	skewness (9)	coefficient of variation (10)	mean/total assets (11)
1998	1 788 493	149 041	31 371	340 478	254	1 216 825	11.237	3.316	2.284	0.083
1999	3 152 460	225 176	89 134	365 624	15 678	1 352 511	7.436	2.646	1.624	0.071
2000	7 097 996	443 625	196 527	644 195	13 864	2 552 444	7.990	2.710	1.452	0.063
2001	12 121 447	713 026	373 342	804 486	27 203	2 850 366	1.761	1.527	1.128	0.059
2002	22 765 981	1 339 175	802 507	1 643 961	34 235	5 439 258	2.681	1.846	1.228	0.059
2003	32 857 195	2 053 575	1 241 407	2 545 530	105 014	10 088 593	6.531	2.415	1.240	0.063
2004	37 723 483	1 985 446	1 130 246	2 918 245	172 252	13 002 323	12.308	3.300	1.470	0.053
2005	61 287 960	2 785 816	1 710 037	4 259 865	400	19 237 480	10.866	3.045	1.529	0.045
2006	98 837 950	4 118 248	1 738 421	5 883 090	2 849	23 263 382	4.648	2.196	1.429	0.042
2007	134 962 666	5 623 444	2 698 932	7 526 878	13 731	28 717 479	3.580	2.052	1.338	0.042
2008	74 200 549	2 748 168	1 227 345	3 189 424	15 279	12 308 388	1.967	1.587	1.161	0.037
2009	93 530 311	3 340 368	1 687 914	3 817 611	27 229	15 292 314	2.422	1.631	1.143	0.036
2010	116 128 846	3 746 092	1 972 933	4 285 644	32 638	18 058 815	2.954	1.704	1.144	0.032
2011	114 367 465	3 465 681	2 196 143	3 503 522	13 582	13 780 914	0.687	1.084	1.011	0.030
2012	145 830 051	3 941 353	1 777 642	4 480 887	7 127	15 363 533	0.286	1.171	1.137	0.027
2013	188 990 252	4 973 428	2 569 874	5 914 538	7 702	22 216 552	0.996	1.389	1.189	0.026
2014	209 016 406	5 359 395	2 745 722	6 589 831	5 373	25 540 852	1.244	1.448	1.230	0.026
2015	252 169 013	6 636 027	2 942 118	9 459 422	4 418	47 976 834	9.457	2.745	1.425	0.026
2016	258 922 263	6 315 177	2 865 054	9 295 244	20 166	50 154 182	11.764	2.992	1.472	0.024
2017	279 009 478	6 805 109	2 955 461	9 349 457	37 615	48 680 021	9.271	2.630	1.374	0.024
2018	256 834 894	6 264 266	2 121 297	10 455 257	24 285	53 444 666	10.842	3.054	1.669	0.024

Note: values in columns 2–7 are expressed in PLN thousand.

Source: own compilation.

This paper endeavours to verify two hypotheses. The first one states that the investment fund industry is not concentrated, which means that there is no company or small group of IFCs that has a dominant market share. This hypothesis will be validated only indirectly by means of eight measures of concentration. However, some values of concentration ratios (*CR5*, *HHI* and the Gini coefficient) will be applied to indicate the level of concentration. Moreover, the intensity of market competition could be examined in each studied period to observe either an increase or decrease.

The second hypothesis holds that the market shares of entities do not change considerably over time. This means that the market shares of IFCs over two consecutive periods (years) are correlated. Due to the dynamic growth of the market as well as the value of investment fund assets in Poland during the past two decades, a procedure was chosen that allowed IFCs to be ranked in terms of market share values rather than calculations of the correlation coefficient values for the shares themselves. In order to understand whether the rank (position) changes according to market shares, we used the Spearman rank correlation coefficient, which is robust to outliers. We used the following formula [cf. Huij and Derwall, 2008]:

$$r_s = 1 - \frac{6 \sum_{i=1}^n d_i^2}{n(n^2 - 1)} \quad (1),$$

where: r_s is the Spearman rank correlation coefficient; d_i is the difference between the ranks of fund i in two consecutive periods; and n is the number of entities in the market in the analysed period.

The rank correlation coefficient of investment fund companies is calculated to identify the change in the importance of the entities in the industry in two consecutive periods of time. A high positive and statistically significant rank correlation coefficient indicates that there is not much difference in the ranks of market share over the years. A low value of the rank correlation coefficient indicates that the compared rankings are dissimilar.

The U -statistic determines the significance level of the Spearman rank correlation coefficient and is calculated as follows:

$$U = \frac{r_s}{\sqrt{\frac{1}{n-1}}} \quad (2).$$

If the estimated values of the U -statistic are higher than the critical value U_α for the significance level α , it can be assumed that the critical values for the significance levels of 10%, 5% and 1% are 1.65, 1.96 and 2.58 respectively.

The market concentration measures were selected at the stage of planning the research. Due to the sensitivity of the obtained results to the applied methodological solutions, we decided to use four groups of measures to assess the

impact of individual market players. Eight tools in total were used for measuring the intensity of market competition. When it comes to interpreting the results, we are aware of the general nature of the ratios. It is consequently necessary to take into account the specificity of the market, the level of its sophistication and institutional development. All the concentration measures employed in the study were based on the net values of assets held by individual funds managed by IFCs.

The first group of measures used is the classical concentration ratios, which make it possible to compare the shares of n largest entities operating in the market in the total net assets of all funds. The $CR5$, $CR10$ and $CR15$ indicators, corresponding to the shares of the top five, ten and fifteen market players respectively, were used to perform the examination. The indicators are calculated according to the following formula [e.g. Moschandreas, 2000]:

$$CRn = \frac{NAV_n}{NAV_m} \quad (3),$$

where: NAV_n is the net asset value of n largest IFCs; NAV_m is the total value of the net assets of all entities examined in the market in the analysed period. The indicators are often called structure indicators and constitute a basis for establishing the degree of concentration of the top entities, including the extent of the market. It should be mentioned that $CR4$ and $CR5$ are mostly used to measure market concentration. For instance, we could identify five levels of concentration by means of $CR5$: (i) low concentration, denoting a highly competitive industry (below 0.4); (ii) moderately low concentration, meaning monopolistic competition (from 0.4 to 0.5); (iii) moderately high concentration, indicating a loose oligopoly (from 0.5 to 0.7); (iv) high concentration, indicating a tight oligopoly (from 0.7 to 0.8); and (v) very high concentration, signalling a dominant firm with a competitive fringe (above 0.8) [cf. Naldi and Flamini, 2014].

The second group of measures applied are indicators based on ranking lists constructed in accordance with the analysed characteristics. This study adopts IFC size as the element determining a given entity's rank. The following two indicators are employed within the available group of tools: the Rosenbluth index and the Gini coefficient.

The Rosenbluth index, which is also referred to as the Hall-Tideman index [1967], is calculated from the following formula [Bikker, Haaf, 2002b]:

$$RI = HTI = \frac{1}{2 \sum_{i=1}^n is_i} - 1 \quad (4),$$

where: i is the entity's position when IFCs are ranked in the descending order of size, and s_i is the market share of entity i . The advantage of RI is some appreciation of small entities in the calculation. It should be noted that the small-

ler IFC, the larger its rank. Thus, a distant position in the ranking increases its contribution to the index. The *RI* ranges between 0 and unity, being close to 0 for an infinite number of equal-sized companies, and reaching 1 in the case of a monopoly [cf. Bikker, 2004].

The structure of the Gini coefficient (*GI*) is based on similar assumptions. Both indicators can be introduced with the application of the so-called relative concentration curve. The graph, which is the so-called Lorenz curve, can be plotted by means of cumulative market shares against the cumulative percentage of the corresponding entities starting from the largest one. The Gini coefficient is a measure of the degree of inequality in the distribution of market shares and is calculated as follows [Jackowicz, Kowalewski, 2002]:

$$GI = GC = 1 + \frac{1}{n} - \frac{2}{n} \sum_{i=1}^n i s_i \quad (5).$$

The coefficient was originally designed to measure income inequality and is still applied by institutions such as the World Bank. *GI* takes values between 0 and 1, since a higher concentration implies greater inequality. We decided to classify the different levels of the coefficient into six groups and interpreted them as: very weak inequality (below 0.1); weak inequality (from 0.1 to 0.25); medium inequality (from 0.25 to 0.5); moderately strong inequality (from 0.5 to 0.7); strong inequality (from 0.7 to 0.9); and very strong inequality (above 0.9).

The next measure, the Herfindahl-Hirschman index, is probably one of the best known and most widely employed concentration ratios. The *HHI* is a tool for determining market power for the purpose of antitrust enforcement. It is calculated as a sum of the squares of IFC sizes measured as market shares. However, the index stresses mostly the significance of the largest entities in the market. The method of weighting shares makes the application of *HHI* particularly recommendable when data on small entities are inaccurate. It is calculated according to the following formula [e.g. Laderman, 1995]:

$$HHI = \sum_{i=1}^n s_i^2 \quad (6).$$

The *HHI* is one of the most popular ratios adopted by antitrust authorities. For instance, the US Department of Justice, in its current guidelines, uses the following three categories of the index: low concentration (below 0.15), moderate concentration (between 0.15 and 0.25), and high concentration (above 0.25). The European Union's antimonopoly law distinguishes three slightly different levels: below 0.1; between 0.10 and 0.20; and above 0.20. However, some researchers [cf. Hart, 1975] have expressed reservations about the Herfindahl-Hirschman index, saying it is highly sensitive to the entry of the smallest entities in oligopolistic markets. Consequently, there are several

variations of how the index is calculated [e.g. Hannah, Kay, 1977; Davies, 1980; Kwoka, 1985].

One such modification of the *HHI* is an indicator called the comprehensive concentration index (*CCI*), which was introduced by Horvath [1970]. This indicator eliminates the influence of the leading entity in the market and attributes greater significance to other players. The *CCI* intends to reflect both the relative size of the largest IFC and the dispersion of all IFCs in the distribution by size. The measure based on the sum of the squares of IFC sizes is defined as [e.g. Xu, 2005]:

$$CCI = s_1 + \sum_{i=2}^n s_i^2(2 - s_i) \quad (7).$$

The values of the *CCI* range between $\frac{3n^2 - 3n + 1}{n^3}$ and 1. In a market with a large number of equal participants the *CCI* tends to 0, while the maximum value of the index corresponds to a market of pure monopoly [Parida and Acharya, 2016].

The last measure of concentration is the standardised entropy index (*SEI*), which is theoretically borrowed from the theory of physics and information. Entropy is used here as a measure of the degree of competitiveness [Nawrocki and Carter, 2010]. It should be mentioned that there is an inverse relationship between the value of the *SEI* and the degree of concentration. The index is calculated as follows [cf. Bikker, Haaf, 2002b]:

$$SEI = \frac{\sum_{i=1}^n s_i \ln\left(\frac{1}{s_i}\right)}{\ln(n)} \quad (8).$$

The formula shows that the index has an additivity property that is reflected in the logarithmic calculation. The entropy index takes values between 0 and $\ln(n)$. When the value of *SEI* is 0, it indicates a monopolistic character, and if the index has the highest value of $\ln(n)$, the market shares of all the entities are equal and market concentration is the lowest [cf. Hart, 1971].

The above division into four groups of measures results from the correlation of the values of individual concentration ratios. The values of the Pearson correlation coefficients for the applied measures of concentration are presented in Table 2.

Despite the adopted assumptions, the coefficient of correlation between the concentration ratios from various groups, e.g. *CRn* and *HHI*, took high values (see Tab. 2). Meanwhile, the Gini coefficient was the measure least correlated with other ratios, whereas the standardised entropy index was characterised by a negative correlation compared to the remaining measures.

Table 2. Pairwise correlation coefficients of concentration measures used in the study

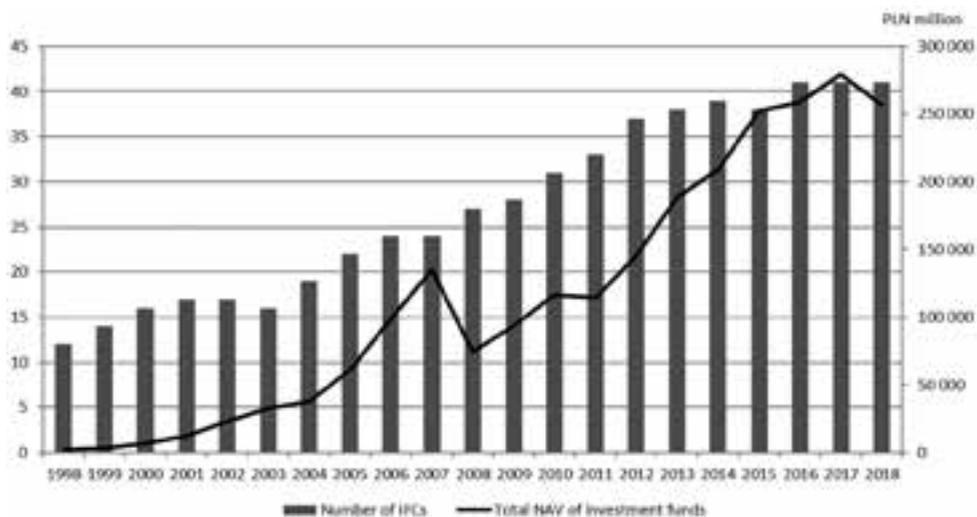
	CR5	CR10	CR15	HHI	CCI	RI	GI	SEI
CR5	1.0000	0.9812	0.9692	0.9411	0.9236	0.9686	-0.1022	-0.6489
CR10	0.9812	1.0000	0.9848	0.9427	0.8961	0.9813	-0.1913	-0.5854
CR15	0.9692	0.9848	1.0000	0.9321	0.8770	0.9775	-0.2764	-0.5238
HHI	0.9411	0.9427	0.9321	1.0000	0.9610	0.9731	-0.0877	-0.6972
CCI	0.9236	0.8961	0.8770	0.9610	1.0000	0.9227	0.0265	-0.7465
RI	0.9686	0.9813	0.9775	0.9731	0.9227	1.0000	-0.2163	-0.5872
GI	-0.1022	-0.1913	-0.2764	-0.0877	0.0265	-0.2163	1.0000	-0.6488
SEI	-0.6489	-0.5854	-0.5238	-0.6972	-0.7465	-0.5872	-0.6488	1.0000

Source: own compilation.

Results

Investment funds play a major role in Poland's financial sector. Their increasing involvement in the Polish financial market and cooperation with its traditional segments show that the country's investment fund industry is still developing. The dynamic growth of the industry can be illustrated by the value of the managed assets and the number of IFCs (Figure 1).

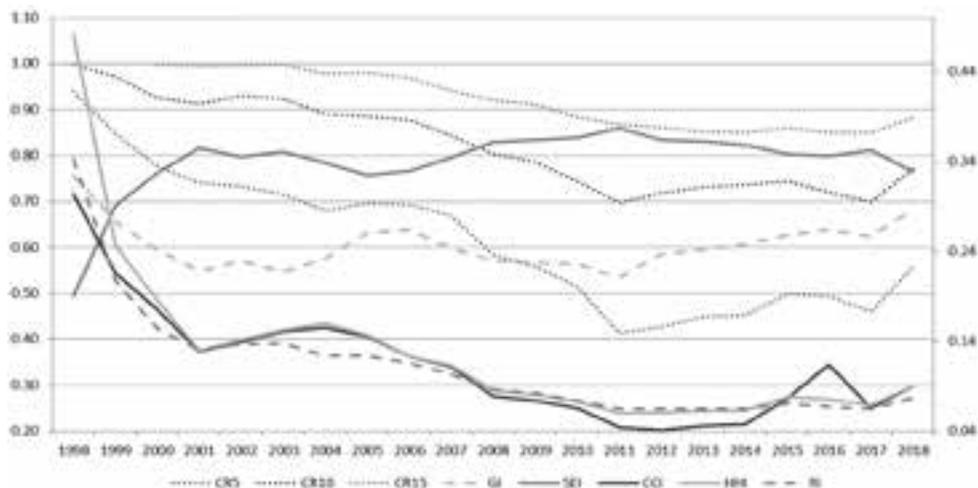
Figure 1. Total net asset value (NAV) and the number of IFCs in the Polish investment fund industry, 1998–2018



Source: own compilation based on data by Poland's Chamber of Funds and Asset Management (IZFiA).

The analysis of concentration measures for the Polish investment fund industry from 1998 to 2018 made it possible to distinguish four sub-periods. The periods correspond to the developmental phases of the IFCs industry (presented above). Figure 2 shows the levels of classical concentration ratios, the Gini coefficient, the comprehensive concentration index, and the standardised entropy index (left scale) juxtaposed with the Herfindahl-Hirschman index and the Rosenbluth index (right scale).

Figure 2. Market concentration measures for the Polish investment fund industry, 1998–2018



Source: own compilation.

Market concentration: 1998–2001 subperiod

The years 1998–2001 saw a significant decrease in the concentration level among IFCs from high or very high to moderate levels. The values of almost all the analysed ratios dropped. This was in particular true of the *HHI*, *RI* and *CCI*. Meanwhile, the value of the *SEI* increased due to the specific character of this measure. The sharp decline in the level of concentration at the end of the last decade of the 20th century and the start of the first decade of the 21st century (with the *HHI* falling by 73 percent and *RI* decreasing by 62 percent) resulted primarily from a growing interest in the investment fund market among domestic financial groups, especially those focusing on the banking and insurance sectors. They formed IFCs to create a comprehensive range of savings and investment options for both current and future clients. The number of IFCs increased from eight at the beginning of 1997 to 17 at the end of 2001. The selected time span exhibited a high coefficient of variation (*CV*) and a high ratio of the mean to total assets, as shown in the summary statistics (Table 1). The coefficient of variation, which is a relative standard

deviation, indicates a high variability of IFC net assets and moderately strong inequality in the distribution of market shares.

The decrease of concentration was also a consequence of growing market competition among IFCs (particularly in 2000 and 2001) stemming from both market and law-related factors. Market factors included the launch of many new types of funds, such as those created by Skarbiec IFC², which, thanks to the move, in 2000 clearly outdistanced Pioneer IFC and established itself as the market leader. Some of the new types of funds gained significant capital from both retail and institutional clients. In addition, increased competition was a result of the introduction of dividend funds (in 2000) and term funds (in 2001), mainly by medium-sized IFCs. These funds, thanks to tax benefits offered to companies, attracted large amounts of capital, which enabled IFCs managing them to overtake many competitors. A similar effect was observed at the end of 2001 when IFCs attracted many individual investors who sought to protect their savings against capital gains tax by buying investment fund units (partly transferring their money from bank deposits). Another important incentive was offered by high rates of return on bond funds in 2001. The biggest beneficiaries were IFCs belonging to banking groups (PKO/Credit Suisse IFC and ING IFC), which attracted the largest volumes of new capital through a widespread and efficient distribution network and intensive marketing. Paradoxically, market concentration declined during unprecedented consolidation processes in the Polish IFCs industry. However, these processes were insignificant from the perspective of market concentration as IFCs with a small market share were usually taken over by bigger market players (e.g. Union Investment IFC and Forum-Zachodnie IFC in 2000, and Pekao/Alliance IFC in 2001).

Market concentration: 2002–2004 subperiod

The 2002–2004 subperiod marked a slight increase in the level of concentration in the Polish IFCs industry. This was reflected by some indicators, such as the *HHI* and *CCI* as well as the *SEI* and *GI*. This last index grew up until 2006. Meanwhile, the classical concentration ratios and *RI* did not confirm this trend. The increase in concentration resulted from greater efficiency in raising capital by large and medium-sized IFCs, mainly those belonging to banking and insurance groups with a dominant position on the Polish financial market. A standout example was Poland's largest asset manager, Pioneer Pekao IFC, whose market share increased by 10.5 percentage points from 2002 to 2004. In 2002, leading banks and insurers managed to encourage many people to entrust their savings to investment funds, particularly those with exposure to the fixed-income market, taking advantage of factors including the anti-tax impulse, when less well-known investment funds were promoted as a safe and potentially more profitable alternative to bank depos-

² The names of the IFCs used in the article refer to the names existing in a given period.

its. Demand for fund units, especially those offered by bond funds, was also favoured by microeconomic factors, such as their attractive performance, though less impressive than in 2001. That was, to a large extent, a consequence of a series of significant interest rate cuts by the central bank. In 2001 and 2002, the reference rate was reduced 15 times and dropped from 19% to 6.75%. Meanwhile, in 2003 and 2004, large and some medium-sized IFCs with a wide range of funds with equity market exposure, strengthened their market position as a result of an upward trend on the Warsaw Stock Exchange (WSE). By offering balanced and equity funds (including those focusing on medium-sized and small companies) through effective distribution channels (notably banking and insurance), IFCs were able to reach clients ready to take a higher investment risk in exchange for potentially higher rates of return. The increased level of concentration was also made possible by a small number of new IFCs (only five) entering the market in that period and insignificant consolidation and liquidation deals (PDM IFC, TDA IFC, Invesco IFC and PBK Atut IFC). The market could then be described as moderately concentrated or relatively highly concentrated. Moreover, the increased level of concentration might have impacted market competition (see Table 2).

Market concentration: 2005–2011 subperiod

From 2005 to 2011, intra-sector concentration decreased considerably in all the analysed measures, mainly in the case of *HHI*, *CCI* and *RI*. A vast majority of concentration ratios in 2011 reached or approached their all-time lows. The only exception was *CR15*, which continued to decrease for the next three years. In the initial phase of this subperiod until 2008, the decreasing concentration in the IFCs industry was largely a consequence of a shrinking market share of Pioneer Pekao IFC, Poland's largest IFC. Its share decreased by 14.8 percentage points from 2005 to 2008. At the same time, the market share of the next three biggest IFCs – BZ WBK AIB IFC, PKO IFC and ING IFC – increased significantly. These IFCs primarily focused on offering equity and hybrid funds to retail clients through a wide network of bank branches. Such funds usually performed well due to bullish trends on the stock market. During the studied period, these products recorded a considerable increase in NAV, due to both a growing value of shares in their portfolios and a large net inflow of capital, especially in 2006 and 2007. The net inflow of capital was largely a consequence of aggressive promotion of equity funds, based on their attractive historical performance, particularly in comparison with bank deposits. In 2009–2011, the rate at which IFCs industry concentration declined slowed down slightly, with the exception of the *CR5* and *CR10* ratios, which dropped considerably. Net inflows in those years were remarkably lower than before the outbreak of the financial crisis. Moreover, investors at the time exhibited a preference for low-risk funds. Apart from the largest IFCs, some medium-sized companies (e.g. Union Investment IFC and Aviva Investors Poland IFC) specialised in such funds. They joined the group of the

largest market entities as well as the most dynamically operating independent IFCs specialising in private equity funds³, including dedicated funds (Forum IFC, Copernicus Capital IFC and Ipopema IFC).

Interestingly, the number of IFCs operating in the investment fund industry increased substantially from 2005 to 2011. During that time, the Polish Financial Supervision Authority (and its predecessor, the Securities and Exchange Commission) issued 34 permits for IFCs, allowing them to manage investment funds, primarily for domestic entities created by individuals, including experienced fund managers. This was definitely influenced by a reduction in capital requirements for IFCs after the new “Act on Investment Funds” came into force in July 2004. Other factors contributing to the increased interest in establishing IFCs (including those intended for institutional entities) were opportunities for offering new types of funds and new fund constructions. Examples included private equity funds and securitisation funds. The significant growth in the number of IFCs, however, did not have a noticeable impact on the level of cross-sector competition and concentration in the sector. This was because the majority of new IFCs offered mainly niche, often non-public, funds and did not have their own broad distribution networks. Most fund distributors used closed architecture, i.e. limited the sale of funds only to products belonging to the IFC managed by their own group. As a result, these entities, with the few above-mentioned exceptions, did not manage to raise significant capital, so they did not threaten the position of large IFCs associated with banks and insurance companies. This was especially true of private equity funds. Moreover, numerous ownership changes, in particular those following the financial crisis, were not significantly reflected in the degree of concentration in the IFCs industry. Such changes were usually related to medium-sized and small companies. Nevertheless, the changing market structure makes it possible to define the IFCs industry as moderately or low concentrated according to most measures. To conclude, the studied period abounded in external, market and law-related factors that could be viewed as determinants of market concentration.

Market concentration: 2012–2018 subperiod

From 2012 to 2018, a slight increase could again be observed in the level of concentration despite a growing number of IFCs. According to the Polish Financial Supervision Authority, 61 IFCs were active on the market at the end of 2018, which was 11 more than seven years earlier. As a result, the values of most ratios rose, with the highest increase in the case of *CR5* and the industry’s density indices (*HHI* and *CCI*). The exception to this trend was 2017 when, due to changes in the taxation of closed-end fund (CEFs) income, the values of concentration measures decreased. As a result, at the end of the

³ Under the “Act on Investment Funds and Management of Alternative Investment Funds”, private equity funds usually operate on the Polish financial market as so-called non-public asset funds (NPAFs), generally in the form of closed-end funds (CEFs).

analysed period, most of the concentration ratios returned to levels observed in 2008–2010, and the *GI* increased back to a level last recorded in the late 1990s. This means that the analysed industry has become more concentrated in recent years. Thus, the market could be described as low or moderately concentrated, with a high degree of inequality in the distribution of market shares.

The increased concentration among IFCs was primarily associated with fundamental changes in Poland's investment fund industry. During this period, demand for CEFs, and in part also for specialised open-end funds (SOEFs), increased significantly, especially until 2016. This in particular applied to non-public asset funds (NPAFs) targeted at specific institutions or individual investors⁴. Their huge popularity resulted chiefly from the tax benefits they offered⁵. This led to a reversal in the downward trend that was observed at the end of the previous sub-period in the level of concentration on the NPAFs market. In 2012–2017, a vast majority of the concentration measures in this segment increased. To the greatest extent this applied to the industry's density indices (*HHI* and *CCI*). This was a consequence of the fact that the largest entities in this market (Ipopema IFC, Forum IFC, Skarbiec IFC and Copernicus Capital IFC) turned out to be the most effective in raising capital from investors. A similar process took place in the case of the dedicated funds segment, which was dominated by the same entities, alongside PZU IFC.

In addition, until 2016 there was growing availability of and demand for absolute return funds, directed mainly at affluent and experienced individual investors, often as part of private banking and wealth management services⁶. Demand was also high for other types of CEFs targeted at individuals and institutions. This trend contributed to the growth of some private, small and medium-sized IFCs that specialised in offering non-retail funds. As a result, the NAV growth rate for their funds was much higher than that for large IFCs managing mainly retail funds. In 2015, Ipopema IFC became the largest IFC on the Polish market, taking over from PZU IFC, which was the No. 1 market player for the previous three years. The observations are confirmed by a considerable increase in the means and medians over that time. Moreover, the values of assets managed by most IFCs were concentrated around the mean, which indicated the peakedness of their distribution.

⁴ The NAV of NPAFs increased from PLN 13.8 billion at the end of 2011 to PLN 103.6 billion at the end of 2016 [IZFiA, 2012; IZFiA, 2017].

⁵ Until the end of 2016, all income from CEFs and SOEFs (which were subject to the same investment rules and restrictions as CEFs) was exempt from corporate income tax (CIT). As a result, such funds offered an opportunity to obtain external financing without encumbering enterprises' own assets. Another advantage was that payments could be made in the form of securities or shares rather than just cash [NBP, 2011].

⁶ The NAV of absolute return funds increased from PLN 3 billion at the end of 2011 to PLN 15.1 billion at the end of 2017 [IZFiA, 2012; IZFiA, 2018]. This trend reversed in 2018 when the NAV fell to PLN 8.9 billion due to the funds' unsatisfactory performance and the disclosure of the so-called Getback affair, which strongly affected funds managed by several private IFCs closely related to that company.

Some legal changes contributed to the increased number of non-public funds and the growing value of their assets. These in particular included an amendment to the Act on Investment Funds of September 2011. The amendment simplified the procedure for launching CEFs whose investment certificates were neither offered through public offerings nor admitted to trading on the regulated market, or entered into alternative trading systems (ATSS)⁷. Meanwhile, IFCs that only managed open-end funds (OEFs), which are targeted mainly at a wide range of retail clients, lost some of their importance. This in particular concerned IFCs that focused on products related to the stock market. Due to unfavourable trends on the WSE, such products were not very popular among customers for the most part of the period. All these developments led to a slight decline in concentration indicators in the capital market fund segment from 2012 to 2017 (except for *GI*) and on the non-dedicated fund market.

The abolition of the possibility of a CIT exemption for certain types of income in the case of CEFs and some SOEFs reversed this trend for a short period. Many private equity funds created exclusively for tax optimisation purposes ceased to function at the end of 2016 and in 2017. The decrease in the assets of such funds had the greatest impact on the largest IFC, i.e. Ipopema IFC, whose market share fell by 1.9% in 2017. The market shares of three other top-five IFCs also declined that same year for other reasons. However, in 2018, concentration ratios increased again, mainly due to a notable increase (by 8.1 p.p. in total) in the market share of the two largest IFCs, Ipopema IFC and PKO IFC. In the case of Ipopema IFC, the increase was caused by the NAV growth of NPAFs, while PKO IFC saw its market share rise due to the NAV growth of capital market funds. A significant increase in the degree of concentration in 2018 was also noticeable in individual segments of the investment fund market. The highest growth could be observed for the measures of market density (*HHI* and *CCI*) and the *RI* ratio. These indicators frequently reached their highest values, especially compared with the beginning of the decade⁸.

Factors limiting the level of competition in the IFCs industry in 2012–2018 included the lack of market power from new entities and intensive consolidation processes in the asset management sector, especially from 2015 to 2018. In the first instance, despite the fact that 17 new IFCs appeared on the Polish market, according to the Polish Financial Supervision Authority, none of them managed to reach a market share of at least 1% as of the end of 2018. Some

⁷ After the legal changes, the creation of such funds no longer required permission from the Polish Financial Supervision Authority. The only requirement was that a fund had to be entered in the register of investment funds. Fund operators were also expected to send their articles of association to the supervisory body, along with information about how much money they raised from clients. This significantly lowered the costs of creating such funds, as a result of which their number grew dynamically over the next few years. According to NBP data, at the end of 2016 the number of NPAFs, including sub-funds, stood at 489, up from 251 at the end of 2011.

⁸ Data on the structure of the investment fund market, broken down by capital market and non-public market funds as well as by dedicated funds and non-dedicated funds, have been available since 2010 and 2012 respectively.

of the newcomers, such as Amundi Polska IFC, Templeton Asset Management (Poland) IFC, and Raiffeisen IFC, were owned by large international financial groups. Most of the new IFCs offered specialised funds, many of which were targeted exclusively at affluent retail and institutional clients. More importantly, however, it turned out that there was an unprecedented intensification of IFC mergers and acquisitions, which increased the level of concentration in the industry. This trend was chiefly attributable to legal issues, in particular the implementation of the MiFID II Directive and the MiFIR Regulation⁹. The expected negative, long-term consequences of these new regulations affected the long-term plans of some IFC owners concerning their presence in the investment fund industry. In particular, the new regulations limited the possibility of offering kickbacks to distributors and introduced new obligations on IFCs to provide information, which could potentially increase their costs while lowering the revenues. As a result, some IFCs modified their business profiles, for example by limiting themselves exclusively to CEFs. They also limited their share in the ownership structure or withdrew from the Polish market altogether (e.g. KBC IFC, Legg Mason IFC, NN Investment Partners IFC and Union Investment IFC)¹⁰. Other factors contributing to limitations in market concentration included the renationalisation of the Polish financial sector¹¹, corporate restructuring efforts aimed at optimising business operations (e.g. merger of Noble Funds IFC with Open Finance IFC and a merger between BGŻ BNP Paribas IFC and Raiffeisen IFC), and acquisitions made by some IFCs seeking to rapidly increase their market share (e.g. takeovers of SKOK IFC and BPH IFC by Altus IFC).

Due to some of these mergers and acquisitions, the actual level of concentration in Poland's IFC industry has in recent years increased to a greater extent than suggested by calculations. The government currently controls eight IFCs (PKO IFC, PZU IFC, Pekao IFC, Alior IFC, KGHM IFC, MS IFC, PFR IFC, and Energia IFC) either directly or indirectly. Their combined market share was around 30 percent at the end of 2018.

To sum up, we did not observe any company or a small group of IFCs that would have a dominant market share. Nevertheless, the level of market concentration should in general be described as moderate or relatively low. It altered markedly over time.

⁹ These regulations formally entered into force in Poland in April 2018, but they were adopted in 2014, which means IFC owners knew about them much earlier and could adjust their business decisions accordingly.

¹⁰ In the last two cases, transactions have not been finalised yet. ING Bank Śląski signed a preliminary agreement to acquire a 45% stake in NN Investment Partners IFC in December 2018, and in October 2018 Generali announced it would acquire 100% of Union Investment IFC from Union Asset Management Holding.

¹¹ The consequence of the government taking control of Bank Pekao in 2017 was the takeover of Pioneer Pekao IFC and its renaming to Pekao IFC. Ultimately, the government intends to merge Pekao IFC with PZU IFC, which will increase the degree of concentration. At the end of 2018, these two IFCs were the third- and fourth-largest on the market respectively.

IFC rankings: 1998–2018 period

Considering the above, it is justified to check whether the market shares of individual entities have changed considerably over the years. The observations were conducted by calculating correlation coefficients. Due to the dynamic growth of the market, we decided to use a nonparametric measure of rank correlation (Table 3).

Table 3. Spearman's rank correlation coefficients of investment fund companies in Poland in two consecutive periods, 1998–2018

Period	R_s	U
1999/1998	0.8901	3.2093***
2000/1999	0.5294	2.0504**
2001/2000	0.6863	2.7451**
2002/2001	0.8591	3.4363***
2003/2002	0.8397	3.2522***
2004/2003	0.9342	3.9635***
2005/2004	0.9379	4.2979***
2006/2005	0.9739	4.6707***
2007/2006	0.9539	4.5748***
2008/2007	0.9118	4.6492***
2009/2008	0.9817	5.1009***
2010/2009	0.9617	5.2674***
2011/2010	0.8656	4.8968***
2012/2011	0.9569	5.7411***
2013/2012	0.9507	5.7826***
2014/2013	0.9710	5.9853***
2015/2014	0.9648	5.8684***
2016/2015	0.9801	6.1984***
2017/2016	0.9741	6.1609***
2018/2017	0.9433	5.9659***

Note: ** – significant at the 5% level; *** – significant at the 1% level

Source: own compilation.

The calculations of the Spearman rank correlation coefficient of investment fund companies in Poland in the 1998–2018 period indicate that for a vast majority of two-year successive periods (except for 1999–2000 and 2000–2001¹²), IFCs rankings did not change noticeably. The rank correlation

¹² Lower rank correlation coefficients in these years (below 0.7) were primarily a consequence of an inflow of substantial capital to dividend funds managed by medium-sized and small companies (in 2000 – mainly Skarbiec IFC) and bond funds managed by firms belonging to large

coefficients were highly positive and statistically significant (Table 3). In 70 percent of the cases, the coefficient exceeded 0.9, while for a further 20 percent it ranged between 0.8 and 0.9. The importance of Polish investment fund industry entities, in terms of their rankings in two consecutive periods, did not change significantly with the changing level of market concentration. Similar results were obtained for capital market and non-dedicated funds during this decade (all values above 0.9). Meanwhile, the figures for the other two analysed market segments (dedicated funds and non-public market funds) were slightly lower. The results are available upon request.

It seems that the main reason for these insignificant changes in the rankings is that since its early days the market has been strongly dominated by IFCs affiliated with large financial groups that first entered the Polish investment fund market. They at the time achieved a first-mover advantage and secured privileges in the distribution of funds. This did not change significantly when many new entities entered the market because most of them operated in specific market niches and did not have their own distribution networks. Furthermore, price competition (management fees) and product competition have also played a role.

To sum up, although the Polish investment fund market shows a moderate or relatively low level of concentration, competition is generally limited, as reflected in stable IFC rankings over time.

Summary and implications for future research

The study aimed to draw and interpret a picture of Polish investment fund industry concentration from 1998 to 2018 using an extensive range of statistical indicators. The research findings, obtained by calculating the values of various types of concentration measures, provide potential variables for further research. They can be used alongside econometric models to analyse how market structures depend on market and economic factors. Our study may provide a basis for further analyses aimed at identifying the determinants of market concentration, e.g. external, market and law-related factors. At the same time, market concentration can be treated as one of the coefficients that impact the development of various industries as well as competition.

Based on our calculations, we found that the Polish IFCs market was generally characterised by a moderate or relatively low level of market concentration, as evidenced by, *inter alia*, low and medium values of *CR5*, *HHI* and *GI*, observed for the greater part of the study period. This made it possible to positively validate the first research hypothesis. Both exogenous and endogenous determinants of competitiveness influenced the level of industry concentration. Among the former, the greatest importance should be attributed to changes

banking groups (at the end of 2001, after the introduction of capital gains tax) – Pioneer Pekao IFC, PKO/Credit Suisse IFC and ING IFC.

in the legal and tax environment. They affected demand for certain types of investment funds offered by IFCs, including dividend funds and non-public asset funds, while leading to modifications in capital requirements by either facilitating or hindering the entry of new entities to the market. Legal and tax changes enabled the launch of new types of funds and new legal structures, thus affecting demand for products offered by specific IFCs. Some of the legislative changes also impacted the endogenous determinants of competitiveness. This in particular concerned fund distribution and product policies. An important role was also played by various promotional activities, which differed from one another in terms of the messages delivered and the tools used. On a small scale, competition was influenced by the pricing policy (i.e. management fees), which has been gaining importance in recent years in some developed markets, especially the United States.

We decided to use several concentration examination methods divided into four groups of measures: classical concentration ratios for n largest entities, indicators based on ranking lists, metrics calculated as a sum of the squares of market shares, and entropy – a measure of the degree of competitiveness. Most of them led to similar, yet not identical, results. Some amplitudes of concentration levels occurred at a time of rapid changes in the market. In general, classical concentration ratios were as accurate in capturing the market positions of the analysed economic entities as more sophisticated metrics. Nevertheless, for practical reasons, we prefer to use measures with specified boundary values of concentration levels (*CR5*, *HHI* and *GI*).

The second research hypothesis was also confirmed. As we proved, the market shares of IFCs did not change considerably over the study period, as evidenced by the high positive values of rank correlation coefficients in the vast majority of two-year consecutive periods. Despite many new entities entering the market and the constantly changing attractiveness of products offered by IFCs, the investment fund industry remains ossified, mainly due to the dominant role of entities belonging to financially strong corporations with wide and effective distribution networks (mainly banking) and some IFCs managing non-public asset funds.

Our findings not only provide novel insights into the literature on market competitiveness in the investment fund industry in emerging markets, but also have clear implications for policy makers. This seems to be particularly significant in view of the growing importance of this industry on the Polish financial market amid developments including the introduction of new occupational pension schemes (PPK). Our findings are also relevant in the context of consolidation processes that have intensified in recent years, largely due to the European Union's MiFID Directive, which has introduced increased reporting requirements and posed new technology challenges.

References

- Allen F., Gale D. [2004], Competition and Financial Stability, *Journal of Money, Credit and Banking*, 36(3): 453–480.
- Bikker J.A. [2004], *Competition and Efficiency in a Unified European Banking Market*, Edward Elgar Publishing Limited, Cheltenham, Northampton.
- Bikker J.A., Haaf K. [2002a], Competition, concentration and their relationship: An empirical analysis of the banking industry, *Journal of Banking & Finance*, 26: 2191–2214.
- Bikker J.A., Haaf K. [2002b], Measures of Competition and Concentration in the Banking Industry: A Review of the Literature, *Economic and Financial Modelling*, 9: 5–98.
- Bourke Ph. [1989], Concentration and other determinants of bank profitability in Europe, North America and Australia, *Journal of Banking and Finance*, 13: 65–79.
- Cambón M.I., Losada R. [2012], Competition and structure of the mutual fund industry in Spain: The role of credit institutions, *CNMV Working papers*, 54.
- Chen X., Lai Y.-J. [2015], On the concentration of mutual fund portfolio holdings: Evidence from Taiwan, *Research in International Business and Finance*, 33: 268–286.
- Coates IV J.C., Hubbard R.G. [2007], Competition in the Mutual Fund Industry: Evidence and Implications for Policy, *The Journal of Corporation Law*, 33(1): 151–222.
- Czempas J., Palica Z. [2007], Koncentracja aktywów netto otwartych funduszy inwestycyjnych, *Wiadomości Statystyczne*, 5: 23–32.
- Davies S. [1980], Measuring Industrial Concentration: An Alternative Approach, *The Review of Economics and Statistics*, 62(2): 306–309.
- Demirgüç-Kunt A., Laeven L., Levine R. [2004], Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation, *Journal of Money, Credit and Banking*, 36 (3/2): 593–622.
- Ferreira M.A., Ramos S.B. [2009], Mutual Fund Industry Competition and Concentration: International Evidence, *SSRN Working Paper*.
- Hall M., Tideman N. [1967], Measures of Concentration. *Journal of the American Statistical Association*, 62(317): 162–168.
- Hannah L., Kay J.A. [1977], *Concentration in modern industry. Theory, measurement and the UK experience*, Macmillan, London.
- Hart P.E. [1971], Entropy and Other Measures of Concentration, *Journal of the Royal Statistical Society. Series A (General)*, 134(1): 73–85.
- Hart P.E. [1975], Moment Distributions in Economics: An Exposition, *Journal of the Royal Statistical Society, Series A*, 138(3): 423–434.
- Hiraki T., Liu M., Wang X. [2015], Country and industry concentration and the performance of international mutual funds, *Journal of Banking & Finance*, 59: 297–310.
- Horvath J. [1970], Suggestion for a comprehensive measure of concentration, *Southern Economic Journal*, 36(4): 446–452.
- Huij J., Derwall J. [2008], “Hot Hands” in Bond Funds, *Journal of Banking & Finance*, 32(4): 559–572.
- IZFiA [2012], *Izba Zarządzających Funduszami i Aktywami. Raport 2011*, Warszawa.
- IZFiA [2017], *Izba Zarządzających Funduszami i Aktywami. Raport 2016*, Warszawa.

- IZFiA, Analizy Online [2018], *Aktywa funduszy inwestycyjnych (grudzień 2017)*, Warszawa.
- Jackowicz K., Kowalewski O. [2002], Koncentracja działalności sektora bankowego w Polsce w latach 1994–2000, *Materiały i studia NBP*, 143, Warszawa.
- Jackowicz K., Kowalewski O. [2007], Dekompozycja miar koncentracji i dywersyfikacji działalności. Przypadek sektora polskich banków komercyjnych, *Bank i Kredyt*, 38(5): 36–52.
- Kacperczyk M., Sialm C., Zheng L. [2005], On the industry concentration of actively managed equity mutual funds, *Journal of Finance*, 60(4): 1983–2010.
- Karkowska R., Pawłowska M. [2017], The concentration and bank stability in Central and Eastern European countries, *NBP Working Paper*, 272.
- Kozak S. [2011], Czynniki wpływające na poziom koncentracji sektora ubezpieczeń nie na życie w Polsce w latach 2002–2009, *Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach*, 90: 135–147.
- Kristek I. [2009], Measuring industry concentration of equity investment funds in the Republic of Croatia, *Interdisciplinary Management Research*, 5: 415–423.
- Kumar R. [2016], Market concentration and competition in Indian mutual fund industry, *ELK Asia Pacific Journal of Finance and Risk Management*, 7(3): 37–65.
- Kwoka J. [1985], The Herfindahl Index in Theory and Practice, *Antitrust Bulletin*, 30: 915–947.
- Laderman E.S. [1995], Changes in the Structure of Urban Banking Markets in the West, *Economic Review: Federal Reserve Bank of San Francisco*, 1: 21–34.
- Martinez-Peria M.S., Soledad M., Mody A. [2004], How Foreign Participation and Market Concentration Impact Bank Spreads: Evidence from Latin America, *Journal of Money, Credit and Banking*, 36(3): 511–537.
- Moschandreas M. [2000], *Business Economics*, 2nd ed., Thomson, London.
- Naldi M., Flamini M. [2014], The CR4 Index and the Interval Estimation of the Herfindahl-Hirschman Index: An Empirical Comparison (June 11, 2014). Available at SSRN: <https://ssrn.com/abstract=2448656>
- Nawrocki D., Carter W. [2010], Industry competitiveness using Herfindahl and entropy concentration indices with firm market capitalization data, *Applied Economics*, 42(22): 2855–2863.
- NBP [2011], *Raport o rozwoju systemu finansowego w 2010 r.*, Warszawa.
- NBP [2018], *Rozwój systemu finansowego w Polsce w 2017 r.*, Warszawa.
- Parida T.K., Acharya D. [2016], Competition in Indian life insurance industry: Post liberalisation evidence, *International Journal of Business Competition and Growth*, 5(1–3): 110–136.
- Pawłowska M., Kozak S. [2008], Przystąpienie Polski do strefy euro a efektywność, poziom konkurencji oraz wyniki polskiego sektora finansowego, *Materiały i Studia*, 228: 1–54.
- Pawłowska M. [2011], Competition in the Polish banking market prior to recent crisis for the period 1997–2007 – empirical results obtained with the use of three different models, *Bank i Kredyt*, 42(5): 5–40.
- Plakys M. [2010], Foreign and local investment funds: development and concentration in Lithuania, [in:] The 6th International Conference “Business and Management 2010”: Selected papers, vol. 1. R. Ginevičius, A.V. Rutkauskas, R. Počas (eds.), May 13–14, 2010, Vilnius, Lithuania, *Technika*: 469–475.

- de-Ramon S., Straughan M. [2019], The evolution of competition in the UK deposit-taking sector, 1989–2013, *The European Journal of Finance*, Forthcoming.
- Rhoades S.A. [2000], Bank Mergers and Banking Structure in the United States, 1980–1998, *Staff Study 174*, Board of Governors of the Federal Reserve System, August 2000.
- Shughart II, W.F. [2008], Industrial Concentration, in: D.R. Henderson (ed.), *The concise encyclopedia of economics*, Indianapolis, Liberty Fund Inc.
- Stańczak-Strumiłło K. [2013], *Uwarunkowania rozwoju funduszy inwestycyjnych w Polsce*, Difin, Warszawa.
- Xu J. [2005], *Market Research Handbook: Measurement, Approach and Practice*, iUniverse, Lincoln.
- Wang Ch-Ch., Venezia Ch.C. [2012], The Effect of Market Structure on Mutual Fund Performance in Taiwan, *International Business & Economics Research Journal*, 11(5): 487–496.

Koncentracja polskiego rynku funduszy inwestycyjnych

Streszczenie: Celem artykułu było określenie poziomu koncentracji polskiego rynku funduszy inwestycyjnych w latach 1998–2018 oraz zidentyfikowanie przyczyn jej zmian. Ponadto, zamiarem autorów było zweryfikowanie hipotezy mówiącej o możliwości dokonywania pomiaru konkurencji w branży poprzez ustalenie siły i kierunku korelacji pomiędzy pozycjami rynkowymi towarzystw funduszy inwestycyjnych (TFI) w kolejno następujących po sobie okresach. W artykule zastosowano miary związane z krzywą koncentracji oraz tzw. miary specjalne, jak również współczynnik korelacji, w celu identyfikacji zmian znaczenia podmiotów funkcjonujących w branży. Ustalono, że rynek TFI w Polsce charakteryzował się umiarkowanym lub stosunkowo niskim poziomem koncentracji. Jednakże poziom ten zmieniał się wyraźnie w analizowanym okresie. Generalnie w badanym horyzoncie czasowym dostrzeżono występowanie wielu czynników zewnętrznych, głównie o podłożu rynkowym oraz związanych ze zmianami legislacyjnymi, które można uznać za determinanty koncentracji rynku funduszy. Ponadto zauważono, że pomimo wielu nowych podmiotów wchodzących na rynek i stale zmieniającej się atrakcyjności produktów oferowanych przez TFI, branża funduszy była wciąż silnie spetryfikowana, głównie z powodu dominującej roli niektórych dużych i posiadających duże doświadczenie TFI.

Słowa kluczowe: koncentracja, konkurencja, towarzystwo funduszy inwestycyjnych

Kody klasyfikacji JEL: G23, D40

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