

Alternative investment funds – the evaluation of managers’ abilities in the light of the amendments to the Act on Investment Fund

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The aim of the study is to verify the hypothesis that the application of new regulations concerning, among others, amendments to the Act on Investment Funds has increased the effectiveness of Polish portfolio managers of specialised open-ended investment funds. The directive in which the institution of alternative investment funds was introduced did not directly affect the profile or results of the fund, but due to appropriate regulations it expanded the group of investors, hence the suspicion that it may have influenced the managers by improving their management.

For the research, measures were used which evaluate the managers in terms of the results of fund, management style and their abilities to select assets and predict the market. According to the analysis, the managers reacted to the implementation of the new directive. However, a positive trend in SOIFs’ Management could only be noticed in a short period of time.

Keywords: efficiency, alternative investment funds, synthetic measure

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1. Introduction

The management's evaluation is most commonly combined with the efficiency of a given instrument, which is understandable from the investor's point of view. Yet, these terms are not equal. Until now, rarely was the evaluation of specialized investment funds' managers examined separately. It was more often combined with the evaluation of open-end investment funds, in spite of the differences in the functioning of these two institutions. There are two research trends in studies regarding the evaluation of managers in terms of the efficiency of Polish investment funds. The first approach employs classic indices, such as Sharpe's, Treynor's and Jensen's alpha, and their modifications. These measures emphasize both total and market risk as well as managers' abilities to select financial instruments (for instance: Czekaj, Woś, Żarnowski 2001; Zatoń 2001). In the second approach, innovative measures are employed which do not require an additional assumption regarding the standardisation of distribution of rates of return (for instance Dawidowicz 2007; Perez 2011). The evaluation of investment funds constructed in this way may also be considered the evaluation of management quality in terms of achieved results.

The evaluation of the efficiency of funds may also be carried out from the perspective of managers' abilities (Olbryś 2010; Homa, Mościbrodzka 2016; Perez 2012). For the purpose of such an evaluation the following were used: four-factor Jensen's alpha from the Carhart model, three-factor Jensen's alpha from the Fama-French model, as well as the modified market-timing models.

The above-mentioned approaches to the evaluation of fund investment efficiency are not identical. The first method indirectly examines the results of managers' activities, whereas the second method focuses on managers' abilities. Only the combination of these two methods provides a comprehensive assessment of investment funds' results.

This paper employs the instruments of multidimensional comparative analysis, with the aim of creating a synthetic measure which would evaluate these two aspects: namely, the results of managers' activity in one of the alternative investment funds groups, that is specialized investment funds (SOIFs), as well as managers' abilities to predict the market and to select assets. These served to verify a hypothesis, according to which the implementation of the Act on AIFs had a positive influence on the level of fund management, which was the main purpose of this paper. The measures, based on chosen indices, were determined in three time frames, both before and after the implementation of the directive.

The purpose of the Act of 31 March 2016¹ was to implement Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 on Alternative Investment Fund Managers. As a result of this Act, implemented into the Polish law, the institution of alternative investment funds (AIF) was introduced. It is defined as an institution of common investment whose core activities include collecting assets from various investors with the purpose to allocate the assets according to investors' interests and the investment policy. In Poland, specialised open-end investment funds (SOIFs), close-end investment funds (CIFs), alternative investment companies (AIC), and EU alternative investment funds belong to this category (EUAIF) (NBP 2018). There are many differences between the different types of investment funds, mainly concerning the type of fund titles, their liquidity and the possibility of "entry" into the fund. For SOIFs and CIFs, their externally managed AIFs are investment fund

¹ Ustawa z dnia 31 marca 2016 r. o zmianie ustawy o funduszach inwestycyjnych oraz niektórych innych ustaw (Dz.U. z 2016 r., poz. 615).

companies. According to the legislator, this type of activity will have to be, henceforth, performed under the supervision of the Polish Financial Supervision Authority (Polish: Urząd Komisji Nadzoru Finansowego – KNF), and entities with a status of alternative investment fund managers (AIFMs) will need to obtain an authorisation from the Polish Financial Supervision Authority.

For entities carrying out investment activities, currently classified as activities of alternative investment companies and their managers, the amendment meant that they had to adapt their existing activities to the provisions of the amended Act on Investment Funds. In addition to the licensing requirement for alternative fund managers and a number of organisational and operational obligations aimed at protecting investors, the directive introduces the possibility of offering and selling units or shares in alternative funds in other EU countries. The possibility of selling units or shares of alternative funds in Poland on the basis of Article 32 of the directive is a breakthrough in the current approach to offering participation in collective investment undertakings. This means that some investors in Poland will be able to invest in investment funds which qualify as alternative funds in other EU countries. The same principle (through the implementation of the Directive) applies to foreign investors, hence the attractiveness of instruments offered by Polish collective investment institutions is important. From the point of view of the investor, this attractiveness can be measured, among other things, by the level of efficiency of the instrument in question and therefore the level of efficiency of its managers. The directive did not directly affect the profile or performance of the fund, but thanks to appropriate regulations (e.g. the introduction of the institution of alternative investment fund manager) it extended the group of investors, hence the supposition that it may have influenced managers by improving their management (increasing their attractiveness in terms of achieved results).

2. Alternative investment funds

On 4 June 2016 the extensive amendment to the Act on Investment Funds was introduced into Polish law. This included the implementation of:

- Directive 2011/61/EU on Alternative Investment Fund Managers (AIFMs Directive),
- Directive 2014/91/EU amending Directive 2009/65/EC on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS) as regards depositary functions, remuneration policies and sanctions (Directive UCITS V).

The aim of these regulations was to introduce a law which would regulate the issue of external and internal supervision as well the functioning of Alternative Investment Funds Managers (AIFMs), i.e. funds which are not subject to Directive 2009/65/EC of the European Parliament and of the Council of 13 July 2009 on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS). According to the explanatory memorandum to this amendment, when regulating common requirements, the risks related to the activities of such entities, which play a significant role on the European market, that is entities which undertake transactions of great value and may influence the markets and other companies which are the objects of their investment, were taken into account. Moreover, the activity of such entities may lead to the spread or increase of the risk level within the financial system, including the risk of investors, contractors and other participants of the financial market.

In implementing the AIFMs Directive, the Polish legislator decided to regulate, in a single law, both the undertakings for collective investment in transferable securities (UCITS) and other forms of collective investment. As a result, the UCITS category includes open-end investment funds. On the other hand, close-end investment funds, specialised open-end investment funds, capital companies, limited partnerships and limited joint-stock partnerships, which gain capital from various investors, constitute a new category defined as Alternative Investment Funds. As the above-mentioned entities are categorized as AIFs, the managers of alternative investment funds (AIFMs) are considered:

- investment fund companies managing the close-end investment funds and specialised open-end investment funds,
- capital companies which fulfil all the above-mentioned requirements for their activity; in this case, an alternative investment fund becomes its own internal fund manager (AIFM),
- legal persons who are the sole general partners of those limited partnerships and limited joint-stock partnerships which fulfil all the above-mentioned requirements for performing an activity – as an external AIFM.

A consequence of these changes is the limitation of legal forms in which an activity based on capital investments may be organized. Moreover, from this point forward, this type of activity will have to be performed under the supervision of the Polish Financial Supervision Authority, and alternative investment fund managers will be obliged to obtain an authorisation from the Polish Financial Supervision Authority. If the value of managed assets does not exceed 100 million euros, this obligation to obtain an authorisation is replaced with an obligation to obtain an entry to the register of alternative investment fund managers maintained by the Polish Financial Supervision Authority.

According to the transitional provisions of the amendment, these entities which, as of the date of the amendment's entry into force, perform activities within the scope reserved for AIFs and are not investment funds, are obliged to adjust their activity according to the new regulations up to 4 June 2017.

As the authors of UCITS V and AIFMs Directives argue, the changes implemented in the member states' legal order will lead to an increase of fund investment efficiency, both in the domestic and in the European market for financial services. Moreover, these new regulations will contribute to the orderly organization of the investment fund market in the Member States.

The new legislation applies to entities previously functioning in the collective investment market. It obliges them to make organisational changes, imposes further duties in reporting to the Polish Financial Supervision Authority and sometimes obliges an entity to have their activity authorised by the Polish Financial Supervision Authority. The new regulations concern investment fund companies and entities cooperating with them or with the funds under their management.

3. Performance evaluation of fund managers in the literature

The process of evaluating the effectiveness of mutual fund performance provides information about the magnitude of historical returns and incurred costs associated with an investment and should be conducted in three stages (Lawton, Jankowski 2009):

- 1) performance measurement,
- 2) performance attribution,
- 3) performance appraisal.

In the first stage, the returns that have been achieved by the fund in a given unit of time are measured. Performance measurement is an *ex-post* analysis of the investment (Feibel 2003). The second stage of the process of evaluating the performance of a fund's portfolio, i.e. the analysis of the sources of effectiveness of portfolio management, is definitely more difficult because the identification of these sources is very often a subjective analysis and takes place against the benchmark portfolio used. On the other hand, the third stage of the evaluation process involves the evaluation of the portfolio manager (Maginn et al. 2007). The two previous stages provide information on what performance has been achieved relative to an established benchmark portfolio and the sources of that performance. The third stage assesses the manager's investment skills (Lawton, Jankowski 2009).

Mutual fund rankings are usually done according to selected single-indicator measures of portfolio management performance. These measures determine how many units of income accrue per unit of risk taken. The main difference between the indices is the choice of the risk measure.²

One of the most commonly used indicators is the Sharpe ratio (Sharpe 1966), which, however, should only be used when returns have a normal distribution or the investor's utility function is a quadratic function (Tobin 1969). There are many alternative measures of performance, which, first of all, are based on a different (in relation to the standard deviation) way of measuring risk (Biglova et al. 2004). And here there are some discrepancies on the results of fund performance measures. Namely, Eling and Schumacher proved that there is a strong positive correlation of rankings according to different performance measures (Eling, Schuhmacher 2007; Eling 2008). Zakamouline (2010) conducted a correlation analysis of selected indicator performance measures and also showed that there is a strong relationship between most of the measures. On the other hand, the study of Ornelas, Silva and Fernandes (2012) pointed out that this is quite surprising because different performance measures represent different approaches to performance measurement and hence the results should not be so convergent.

The literature on investment fund efficiency research is dominated by studies focused on markets in countries such as the United States and the United Kingdom. This is mainly due to the fact that in these markets the funds have been operating much longer and on a much larger scale than in other countries.³ It is worth noting, however, that although empirical studies devoted to other countries are less frequent, their number is dynamically increasing. An example of this type of research is the work of Otten and Bams (2020). This work examined 506 equity funds operating in 5 European countries in the years 1991–1998: France, Spain, Holland, Germany and Italy, as well as in the United States. The authors showed that European funds perform better than funds from the United States.

In turn, the work of Klapper, Sulla and Vitta (2004) paid attention to the problems related to the difficulty of comparing investment funds operating in different countries due to the diversity of fund participants, participation in funds by non-resident investors and the availability, quality and comparability of statistical data. Additionally, the authors attempted to identify the factors determining the development of investment funds in mature and developing countries.

We can also find work that further assesses the ability of fund managers. For example, a study by Otten and Thevissen (2011) on 16,055 equity funds found that the growth of European funds had a negative impact on the assessment of the ability of managers who managed fund portfolios. It is worth noting that managers' performance is usually compared to benchmark portfolios fixed in

² For a broad overview of the index measures of portfolio management performance, see Bacon (2009).

³ A comprehensive overview of performance measures can be found in the work of Cogneau and Hubner (2009a; 2009b).

advance for a given fund. The relevance of the chosen benchmark portfolio to the managed portfolio and to the models used in the valuation process is, therefore, important.

Empirical studies conducted by: Lehmann and Modest (1987), Ahn, Conrad and, Dittmar (2003), Fletcher and Forbes (2002), Fletcher and Ntozi-Obwale (2008) have shown that methods using a benchmark portfolio in the performance evaluation process are sensitive to the selection of this benchmark portfolio and therefore it is a crucial element in determining the final performance evaluation of the investment portfolio management. Of the two basic features that should characterise an investment portfolio manager, accurate selection of securities and timing of transactions are important.

The literature on empirical studies devoted to selection and timing is vast. Initially, empirical studies devoted to the efficiency of funds' investment portfolios in terms of testing market timing and stock selection skills were based on the classical CAPM model. These were the works of Treynor (1965) and Jensen (1968), who were the first to use the concept of market timing to define the ability to predict market moves. The methodology proposed by Jensen (1969) was further developed by Black, Jensen and Scholes (1972) and Blume and Friend (1973).

The main shortcoming of this procedure was the assumption that the level of risk is constant over time, whereas many empirical studies have shown that mutual funds do not maintain a constant level of risk, which may suggest that managers use market timing strategies (Kon, Yen 1979; Fabozzi, Francis 1978, 1979, 1980; Miller, Gressis 1980). In reality, the level of risk exposure changes over time, which causes the results of the CAPM model estimates to be subject to error and thus lead to false conclusions because alpha, which is a measure of selection, is overstated (Roll 1978; Chang, Lewellen 1984; Grinblatt, Titman 1989; Lee, Rahman 1990) and negatively correlated with the value of the beta parameter, which measures the portfolio's exposure to systematic risk.

To date, market timing has classically been studied using a parametric version of the HM model. Empirical studies include those conducted by: Henriksson (1984); Chang and Lewellen (1984); Fletcher (1995); Kao, Cheng, Chan (1998). A common conclusion from the empirical studies is that the managers of the funds studied did not use market timing strategies or were characterised by negative market timing.

Many empirical studies question the existence of extraordinary managerial skills, suggesting that their effects of performance may be due to experience or a lucky coincidence (Poole, Bianco, Giroux 2006). Research results have shown that there are groups of managers who achieve higher returns due to their skills (Kosowski et al. 2006). Similar conclusions, were drawn from their empirical studies based on Bayesian inference: (Baks, Metrick, Wachter 2001; Avramov, Vermers 2006).

With the development of the econometric and statistical instrument, more methods of market timing analysis, which took into account the changing level of portfolio risk over time, began to emerge. Examples of such studies are the works of Kon and Jen (1978), Fabozzi and Francis (1979) and Woodward and Anderson (2009), who included a binary variable in a regression model to create two different market characteristic lines (bull market and bear market). These studies showed that managers do not change portfolio exposure to market risk under the influence of changing market conditions. In the mid-1990s, Ferson and Schadt (1996) proposed a different approach to studying market sentiment and stock selection based on conditional performance evaluation (CPE) models. CPE models assume that managers change the structure of their investment portfolio as a result of incoming public information, thus changing the portfolio's exposure to market risk. Among empirical studies using conditional models, we can point to the works of Ferson and Warther (1996), Christopherson, Ferson and Glassman (1998) and Christopherson, Ferson and Turner (1999).

Taxonomic methods were also used to assess the investment attractiveness of financial instruments. An example of such work is the work of Tarczyński (2001), who based this assessment on the taxonomic measure of development (TMAI). Also in the works of Mościbrodzka (2018) and Mościbrodzka and Homa (2016, 2018, 2019) we can find examples of investment funds' evaluation in terms of risk and efficiency. However, none of these approaches were based on the assessment of both the fund's efficiency in terms of rates of return achieved and the ability of its managers.

4. Assessment methods for investment fund managers

The rates of return achieved by portfolio managers are not a sufficient criterion in the evaluation of portfolio management efficiency. The risk by which an investment portfolio is characterised constitutes the inherent part of the evaluation process. Hence, it is essential to assign the portfolio rates of return to the proper risk measures. In this way, the risk-adjusted measures of portfolio management efficiency are created. In the case of the fund investment market, it is assumed that a fund with high efficiency is not only one with a high performance, but also one whose manager is able to accurately foresee market fluctuations, skilfully select financial instruments, and consistently fulfil the assumptions regarding both the level of investment risk and the fund's statutory provisions (Perez 2012). According to the literature on this subject, there are no explicit instructions that determine which efficiency measures and under what conditions should be applied (Cogneau, Hubner 2009a, 2009b).

In order to provide a synthetic evaluation of the alternative investment funds' managers, a set of certain factors will be selected. These factors will evaluate the managers not only in terms of the results of particular investment funds, but also in terms of their management style and their ability to select assets and predict the market. Hence, in this paper such appraisal ratios will be employed:

- information ratio (IR) – which evaluates portfolio managers' skills in terms of the achieved rates of return in comparison to the market,
- tracking error (TE) – which evaluates the manager's investment style,
- Omega – which evaluates portfolio attractiveness in terms of results,
- modified Jensen's alpha (J^M) – which evaluates the manager's ability to assign the assets to the portfolio investment,
- Moses, Cheyney and Veit measure ($I_{MCV,P}$) – which evaluates the value of arbitrage achieved by the manager from the differences between the level of portfolio diversification and its market performance,
- market-timing measure (γ) – which evaluates the ability to employ the market-timing technique (predicting the short-term market trends).

All these above-mentioned factors will be briefly discussed in the following section.

4.1. Information ratio (IR)

This index is perceived to be one of the most important measures of the efficiency of portfolio managers. Its structure is based on the relation between the expected excess rate of return and the standard deviation of excess rates of return (Treynor, Fischer 1973):

$$IR = \frac{\overline{r_{M,P}}}{\sigma_{M,P}}$$

where:

$$r_{P,M}(t) = r_P(t) - r_M(t)$$

$r_P(t)$ – portfolio rate of return in the period t ,

$r_M(t)$ – benchmark rate of return in the period t ,

$\sigma_{M,P}$ – standard deviation of extra rates of return $r_{M,P}$.

In the case of historical data with negative rates of return, the portfolio manager's efficiency measure should employ an adjusted ratio according to the formula (Israelsen 2005):

$$IR^* = \frac{\overline{r_{M,P}}}{\sigma_{M,P}^{\frac{r_{M,P}}{|r_{M,P}|}}}$$

This measure is considered a measure of the management ability of each portfolio manager. A positive value indicates that the manager's results are higher than the market (outperformance). Grinold and Khan (2000) suggest a classification of IR , according to which the rational values range from 0.5 to 1.0. A negative index value suggests that the manager achieves lower rates of return than the market. If such a correlation persists for a long period, it is a serious argument for considering the option of replacing the manager.

4.2. Tracking error (TE)

There are two types of strategies employed by fund managers: active and passive. The active strategy, which is based on prediction models and uses available information, aims to find a more effective performance than regular portfolio diversification. The primary purpose of active strategies is the achievement of a higher rate of return than benchmark, considering management fees and commissions. On the other hand, the passive portfolio management strategy is focused on such diversification of the portfolio that it would replicate a certain benchmark or a certain standard portfolio. The fundamental assumption of this strategy is that the market reflects all the available information in prices. Hence, the aim is to create such a portfolio whose tracking error will possibly be small in comparison to a chosen benchmark. As a result, the question of matching the contents of the portfolio to the benchmark composition may be perceived as an optimization problem. Those who analysed management strategies include the following: Roll (1992), Treynor and Black (1973) and Rudolf, Wolter and Zimmermann (1999).

A measure which may be considered to evaluate management style is the so-called tracking error. Tracking error is a function of the standard deviation of the portfolio rates of return and the correlation index between the portfolio and benchmark rates of return. This may be presented as follows (Bacon 2009):

$$TE = \sigma_p \sqrt{(1 - \rho_{P,M})^2}$$

where:

- σ_p – standard deviation of portfolio rates of return,
- $\rho_{P,M}$ – correlation index between portfolio and benchmark rates of return.

According to Alford, Jones and Winkelmann (2003) the managers' investment styles may be categorized into:

- $TE < 1.0\%$ describes passive investment style,
- $1.0\% \leq TE \leq 3.0\%$ describes mixed investment style,
- $TE > 3.0\%$ describes active investment style.

In the case of the active management style, the manager's aim is to achieve a higher excess rate of return at the cost of deviation from the risk level characteristic of the benchmark. Therefore, the manager is able to accept the higher level of expected tracking error value. The passive management style, on the other hand, which aims to create a portfolio with the lowest level of expected tracking error value, employs the principle of comparison between the portfolio risk and benchmark risk. As a result, an excess rate of return equals or is close to zero. In the literature on this subject, the investing strategies which are between active and passive ones are called *enhanced indexing* (Loftus 2000). According to these strategies, the manager builds a portfolio with a risk level similar to the risk of the benchmark, but not identical.

4.3. Jensen's alpha and its modification

Jensen's alpha (1968), which is the free term in the capital pricing model:

$$r_{P,F} = \alpha_p + \beta_p \cdot r_{M,F} + \varepsilon$$

where:

$$r_{P,F}(t) = r_p(t)$$

$$r_{M,F}(t) = r_M(t) - r_F(t)$$

$$r_F(t) \text{ – rate of return on the risk-free instrument in period } t,$$

describes the extra return on an investment in terms of a given level of systematic risk (it is included in the measures of the manager's efficiency). Namely, when $\alpha_p > 0$, the manager has extraordinary abilities to assign the assets to an investment portfolio. Hence, this measure describes to what degree a fund rate of return reflects higher average returns. However, Jensen's alpha cannot be employed while comparing the manager's efficiency of portfolios with different risks. The Jensen's alpha value is proportionate to the level of risk accepted by the manager, and the level of risk is measured by the beta index. In order to compare the rates of return on portfolios with different risks, the Black-Treynor measure should be created, described as follows (Treynor, Black 1973):

$$J^M = \frac{\alpha_P}{\beta_P}$$

The above measure is also called the modified Jensen's alpha. This measure may be used in creating portfolio rates of return rankings (Smith, Tito 1969) and it determines the amount of excess rate of return per systematic risk unit of a given portfolio.

4.4. Moses, Cheyney and Veit measure

The Moses, Cheyney and Veit measure is another modification of Jensen's alpha. In this measure the Jensen's alpha is multiplied by the excess rate of return and divided by non-systematic risk (Moses, Cheyney, Veit 1987):

$$I_{MCV, P} = \frac{\alpha_P \cdot (r_M - r_F)}{\frac{\sigma_P}{\sigma_M} - \beta_P}$$

Hence, this measure reflects the value of arbitrage achieved by the fund manager between the level of portfolio diversification (denominator) and its market performance (numerator).

4.5. Omega ratio

The main intention of the authors of the Omega ratio was to divide the rates of return distribution into two parts – attractive and unattractive (from the investor's point of view). In order to do that, a threshold rate of return was used, which constitutes a threshold separating these two parts. The Omega ratio expresses the relation of an average rate of return above the break-even point to an average rate of return below the break-even point (Shadwick, Keating 2002):

$$Omega = \frac{\sum_{i=1}^n \max(r_{Pi} - r_{wi}; 0)}{|\sum_{i=1}^n \min(r_{Pi} - r_{wi}; 0)|}$$

Its value provides information about the average positive excess rate above the minimal required rate of return per an average rate. The average rate is calculated from those rates of return which are lower than the minimal level. Hence, it may be argued that this ratio measures the "spread" between positive and negative standard deviations of the rates of return from the minimal required rate of return.

When using the Omega ratio to measure the portfolio attractiveness, the investors should prefer portfolios with a higher Omega ratio value. Such portfolios are more likely to guarantee a higher rate of return, equal or higher than the threshold values. This Omega function feature allows for the carrying out of analyses and comparisons of the attractiveness of portfolios in the case of various assets.

4.6. Market timing

The concept of market-timing refers to the identification of market trends. The manager who possesses such skills will adjust the assets of a given fund to the current situation on the market. Hence, in order to test the manager's abilities in terms of predicting the market changes, classic market-timing models are employed in which the variable representing the market is included. In practice, the portfolio rate of return, whose substitute is the proper stock index or the excess portfolio rate of return over the risk-free rate of return, is most commonly used. The classic market-timing models include the following:

- Treynor-Mazuy model (1966): $r_{p,F} = \alpha_p + \beta_p \cdot r_{M,F} + \gamma_p \cdot r_{M,F}^2 + \varepsilon$,
- Henriksson-Merton model (1981): $r_{p,F} = \alpha_p + \beta_p \cdot r_{M,F} + \gamma_p \cdot \max(0; -r_{M,F}) + \varepsilon$.

In both models the ability to employ the market-timing technique (short-term market trends) is represented by a certain parameter whose value comprises a correction of the possible pessimistic expectations of the manager towards the future market rate value. The value of this parameter indicates the degree of the manager's ability. If this parameter's value is higher than zero, then it means that the manager's predictions are accurate. In contrast, if this parameter is close to zero, it indicates that the manager shows no ability in predicting the market. A highly negative value of this parameter's estimator suggests a negative impact of this market-timing technique on the portfolio value.

5. The results of the analysis

5.1. Data and benchmark description

In my analysis I examined 45 specialised investment funds with a diverse investment policy, which were listed between January 2013 and February 2020, namely:

- 14 equity funds (EFs): universal funds (UFs) and small and medium-sized enterprises funds (SMEFs),
- 14 mixed funds (MFs): active allocation funds (AAFs), stable growth funds (SGFs), capital protection funds (CPFs), absolute return funds (ABFs),
- 17 debt funds (DFs): Polish universal debt funds (PUDFs), Polish Treasury debt funds (PTDFs), Polish long-term debt funds (DPD) and corporate debt bonds (CDB).

In the process of fund performance evaluation, reference standards, in other words benchmarks, are very important. Therefore, it is crucial to provide an accurate benchmark structure and the accurate selection of its elements, so that the benchmark can be used in the process of evaluating certain types of investment funds. However, providing an accurate benchmark structure of a given group of funds may become an extremely problematic issue. Nevertheless, it is impossible to create an ideal reference standard for all investment funds (Haugen 1996). In practice, almost all funds have their own benchmark determined in their investment brochure, which definitely facilitates the evaluation of management's efficiency. An obstacle may occur in the case of funds with an unstable investment policy or with a policy that does not fully reflect their benchmark.

I obtained the information about AIF's benchmark and their investment policy from the internet website analizy.pl. Based on this information, market models were created, and they will be used

in further evaluation (Table 4 in Appendix). I used the rate of return on ten-year Treasury bonds as a risk-free rate. Importantly, analysis of the behaviour of the main stock market indices on which the funds' benchmarks were based showed no significant change in market behaviour either before or after the introduction of the Directive.

5.2. The evaluation of management of AIF during the examined period – single-factor analysis

In order to verify the previously made hypothesis, in the next section of this paper 6 window functions were created:

- O3_before – covering a period of three years before the implementation of regulations,
- O2_before – covering a period of two years before the implementation of regulations,
- O1_before – covering a period of one year before the implementation of regulations,
- O1_after – covering a period of one year after the implementation of regulations,
- O2_after – covering a period of two years after the implementation of regulations,
- O3_after – covering a period of three years after the implementation of regulations.

The transitional period determined by the Polish legislator is not included in the evaluation and is treated as an event window.

Subsequently, using weekly rates of return of AIFs and their benchmarks, I calculated individual measures of management's efficiency in terms of the following: rates of return achieved by AIF in comparison to the market, the manager's investment style, portfolio attractiveness, the manager's ability to select assets, the value of arbitrage achieved by the manager between the level of portfolio diversification and its market performance, and the manager's ability to predict short-term market trends. The results of particular AIFs are not presented,⁴ but the differentiation of individual indices, in appropriate window functions, is shown in Figure 1. As the Omega index, calculated in regard with the market rate, was highly correlated with *IR* (in all window functions the correlation index between these indices exceeded the value of 0.6 each time) in further analysis, only the Omega index calculated in regard to free-risk rate was used.

According to Chybalski (2009), the managing of an investment portfolio may be considered good or very good if the *IR* index value equals at least 0.5. As can be easily seen, the value of this measure was lower than 0.5 during the periods prior to the implementation of the regulations. What is more, on average, 20% of funds (most of which are equity funds) had a result below 0, which may suggest that their efficiency was lower than the efficiency of the market on which they operated. Additionally, before the implementation of the regulations, regardless of whether viewed from a short-term or long-term perspective, one may notice asymmetry on the left side in the *IR* distribution. This means that the efficiency of most of the analysed funds was in the range of 0–0.4, and in the case of other funds the efficiency was much lower. After the implementation of the regulations, on the other hand, the results were reversed, that is in the *IR* distribution of the analysed group of funds the asymmetry was on the right side. This may suggest an increase in the AIF groups with lower efficiency than the market (almost half of them; mainly the equity investment funds had worse results than the market one year after the implementation of the regulations). On the other hand, this may also indicate

⁴ Because of certain limits, the AIF results are not enclosed to this paper, but they are available on request.

the appearance of other, well-managed funds (namely debt AIFs). The most significant differentiation may be noticed one year after the implementation of the regulations, but in longer periods the IR parameters did not change considerably.

The differences in the activity of AIFs during the periods both before and after the implementation of the regulations may be easily observed in the case of the evaluation of investment style. In short periods (one year before and after) a significant differentiation in the management style may be noticed; AIFs whose managers preferred to choose active strategies, and were mainly the managers of equity SOIFs, were noticed. However, a great number of the managers of SOIFs preferred passive strategies of investment. It is also worth emphasizing that the value of TE (tracking error) decreased along with the extension of the examined periods, both before and after the implementation of the regulations.

Another interesting thing may be the behaviour of the modified Jensen's alpha. This measure absolutely changed its distribution after the implementation of the regulations. We should bear in mind that a high value of this index is evidence of the manager's ability regarding the selection of assets, expressed in the amount of excess rate of return per systematic risk unit of a given portfolio. During the periods prior to the implementation of the regulations, the differentiation of excess rates of return in a typical volatility range was more than 3.5 times greater than during comparable periods after the implementation of regulations, despite the fact that the average value did not change significantly (at least during the one-year window function). A similar trend may also be noticed in the case of the evaluation of the arbitrage value achieved by the manager between the level of portfolio diversification and its market performance. In this case, the decrease in differentiation of the results after the implementation of regulations, in relation to a similar period but before the implementation of regulations, is visible.

In the case of the evaluation of the manager's abilities to predict the market, there are no visible trends indicative of a change caused by the implementation of the regulations. Of course, it may be noticed that the average evaluation decreased significantly ($p = 0.0015$), but the distribution's properties did not change relevantly.

5.3. Synthetic AIF management evaluation

In order to provide a full evaluation of the AIF manager's methods and efficiency, the methods of multidimensional comparative analysis were used. The measure of the evaluation of the AIF manager's abilities was created on the basis of synthetic development measure.⁵ This belongs to the group of so-called standard methods. The analysed AIFs were accepted as statistical units, whereas the previously discussed indices indicating the manager's abilities were the diagnostic features. This method assumes that the values of variables are standardized (Panek, Zwierzchowski 2013), possess features of stimulants, and are not significantly correlated (Zeliaś 2000). The standard development method is carried out in three stages. Firstly, an abstractive object is determined, that is a development standard with the highest values of each variable and anti-standard with the lowest values of each variable. Secondly, similarities between other objects and the best abstractive object are examined by determining the distance of each object from the development standard. The more similar to the

⁵ The standardized sums method provided similar results of ranking.

standard an object is, the higher the level of complex phenomenon for this object is (Bock, Diday 2000). As the set of diagnostic variables referring to AIFs was measured using the same ranges, and no distance scales were used for these variables, the distance between the objects was calculated using the Euclidean metric (Panek, Zwierzchowski 2013). Finally, in the last step, a development measure for each object is established (Michalski 1996):

$$s_i = 1 - \frac{d_{i0}}{d_0}$$

where:

- s_i – development measure for object I ,
- d_{i0} – the distance between object i and the development standard,
- d_0 – the distance between the standard and anti-standard.

Using the results achieved after applying this method, and employing the criterion of the decreasing value of development measure, it is possible to make a ranking of examined objects. In order to accurately evaluate the changes over time, the features' standards and features' anti-standards for particular window functions were chosen jointly for subperiods. In this case, synthetic development measures are obtained, which enable both the organization of the objects on the development scale and the evaluation of the size and directions of changes occurring within this scope over the analysed period (Grabiński 1985).

Based on the results, a synthetic measure was constructed, of which the distribution in particular periods is entered in Table 2 and illustrated on Figure 2.

Subsequently, the hypothesis that the implementation of new Directive AIFMs had a positive impact on AIFs' management style was verified. Therefore, the equality test of mean development measures from particular subperiods (H_0) was conducted, including alternative hypothesis that either these mean values changed significantly (H_1 – two sided hypothesis), or that the mean values, after the Directive was implemented, were higher (or lower) than the mean values before the implementation of the regulations. (H_2 – one-sided hypothesis). Thereby, the evaluations of the managers in short (one-year), medium (two-year) and long (three-year) periods were examined. The results of this testing are shown in Table 3.

It may be easily observed that this event had a positive influence on the AIF managers' abilities only in the short period of investment. The mean results not only differed relevantly, but also concluded that a year after the implementation of regulations the means results were higher than a year before the Directive was implemented. No such correlation may be observed in the long-term perspective. Of course, there are significant differences regarding the synthetic evaluation of the AIF managers' abilities in 2-year and 3-year periods, both before and after the regulations were introduced; these differences unfortunately are negative. In other words, in the long-term context, the managers' results are lower since the implementation of the directive.

In order to confirm the hypothesis that the abilities of AIF managers have changed under the influence of the introduction of the new regulation, a synthetic measure was additionally constructed for classic investment funds, which were no longer directly affected by the directive. The measure evaluating the skills of managers was built on the basis of the same indicators for 38 investment funds with similar investment policies. The development of the measure is illustrated by Figure 3. In turn, the results of verification (hypotheses were set as for SOIF) are presented in Table 3.

It is clear that there is no significant effect of the introduction of the directive on the assessment of the skills of AIF managers in the short term, which supports the hypothesis that the introduction of the new regulation had no influence on classical investment fund managers. On the other hand, in the long term we see significant differences in the synthetic skills assessment of managers, but as for AIF managers, unfortunately these differences are negative, i.e. in a long-term context the performance of managers is weaker than in the relevant sub-period before the phenomenon. This is indicative of a general trend in the performance of managers of both the OIF and SOIF.

6. Conclusion

According to the new regulations, the management function may be assigned by Investment Fund Companies (IFCs) to other entities which fulfil legal requirements and possess the proper organizational and financial means to protect investor's interest. This kind of assignment, among others, within SOIFs, may refer to a professional broker or other Investment Fund Company separately authorised by Polish Financial Supervision Authority.

According to the analysis conducted in this paper, the managers reacted to the implementation of the new Directive. However, a positive trend in SOIFs' management could be noticed only in a short period after the implementation of the new regulations. The development measure which describes the degree of the AIFMs' abilities increased significantly only in this window function. Looking at this issue in a long-term perspective, it may be easily observed that the management's level, unfortunately, decreased significantly. This may indicate that the managers' reaction was only temporary and after the transitional period and once the situation on the AIF market stabilised, the managers resumed their previous management styles. Of course, it does not refer to all of the SOIF managers. It is worth emphasizing that a great number of debt funds improved their results, hence their efficiency as well. This suggests that manager's abilities increased. On the other hand, the evaluation of a great number of funds, especially equity funds, worsened.

Despite the fact that the Directive concerned mostly a new group of entities, that is alternative investment companies (AICs), the SOIF managers also noticed the implementation of the new regulations, and a certain number of SOIFs replaced their managers during the transitional period. The fact that the managers noticed the implementation of the new regulations is reflected in the differentiation of particular indices of evaluation of AIF managers' abilities. The distributions of these indices within the study group differed significantly in terms of symmetry and the scattering of results (the level of scattering decreased relevantly after the Directive was introduced).

The issue of evaluation of managers' abilities in entities which are obliged to perform their activities under the supervision of the Polish Financial Supervision Authority appears to be interesting in terms of the influence that the new regulations had on AIF management style and their efficiency. Hence, future analysis will include the remaining entities of the AIF group.

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Appendix

Table 1

Test of equality of means (for individual fund performance indicators)

	O1		O2		O3	
	T	p	T	p	T	p
γ	3.0556	0.0030	2.9795	0.0038	0.8493	0.3983
J^M	0.4125	0.6813	3.7176	0.0004	5.5622	0.0000
$I_{MCV, P}$	0.8270	0.4127	0.5032	0.6172	0.8633	0.3923
TE	3.2563	0.0018	-1.0173	0.3146	-1.2533	0.2166
IR	0.1850	0.8539	1.8534	0.0673	2.6520	0.0095
Omega	-12.3541	0.0000	1.7712	0.0804	-11.7332	0.0000

Source: own study.

Table 2

Descriptive statistics for the evaluation of AIFMs

Development measure	Mean	Standard deviation	Volatility index	Median	Range Q3-Q1	Skewness	Kurtosis	Min	Max
O3_before	0.3803	0.0837	0.2201	0.3869	0.1427	-0.4292	-0.6084	0.1498	0.4850
O2_before	0.3444	0.0550	0.1596	0.3683	0.0696	-1.0663	0.6249	0.1751	0.4259
O1_before	0.3410	0.0474	0.1389	0.3504	0.0576	0.2294	1.5434	0.2251	0.4966
O1_after	0.3667	0.0643	0.1753	0.3718	0.0788	-0.2682	0.0599	0.2117	0.4844
O2_after	0.3169	0.0715	0.2257	0.3189	0.0725	0.1234	1.9376	0.1033	0.5379
O3_after	0.2323	0.0604	0.2602	0.2310	0.0578	1.1128	5.3747	0.0693	0.4804

Source: own study.

Table 3

Test of equality of means (for measure evaluating the abilities of AFI managers)

	O1	O2	O3
Value of the test statistic	-2.1518	2.0495	9.6153
H1 p-value	0.0342	0.0434	0.0000
H2 p-value	0.0171	0.0217	0.0000

Source: own study.

Table 4

Test of equality of means (for measure evaluating the abilities of OFI managers)

	O1	O2	O3
Value of the test statistic	2.6914	3.3433	0.7201
H1 p-value	0.0088	0.0013	0.4737
H2 p-value	0.0044	0.0007	0.2369

Source: self-study.

Table 5

Table of AIFs

Fund	Mark	Benchmark
AGIO Agresywny Spółek Wzrostowych (AGIO SFIO)	AU_01	100% WIG
ALIOR Agresywny (ALIOR SFIO)	AU_02	90% WIG + 10% WIBID 3M
ALIOR Stabilnych Spółek (ALIOR SFIO)	AU_03	90% WIG + 10% WIBID 3M
Ipopema Akcji (Ipopema SFIO)	AU_04	90% WIG + 10% WIBID 6M
MetLife Akcji Polskich (Światowy SFIO)	AU_05	50% WIG20 + 40% mWIG40 + 10% WIBID 1M
QUERCUS Agresywny (Parasolowy SFIO)	AU_06	100% WIG
Santander Prestiż Akcji Polskich (Santander Prestiż SFIO)	AU_07	95% WIG + 5% WIBID O/N
Skarbiec – Top Funduszy Akcji SFIO	AU_08	70% WIG20 + 30% WIBID 3M
Superfund Akcji (Superfund SFIO)	AU_09	100% WIG
Ipopema Short Equity (Ipopema SFIO)	AU_10	100% WIG20short
QUERCUS lev (Parasolowy SFIO)	AU_11	100% WIG20lev
QUERCUS short (Parasolowy SFIO)	AU_12	100% WIG20short
AGIO Akcji Małych i Średnich Spółek (AGIO SFIO)	AMiS_13	70% mWIG40 + 20% sWIG80 + 10% WIBID O/N
MetLife Akcji Małych Spółek (Światowy SFIO)	AMiS_14	90% sWIG80 + 10% WIBID 1M
ALIOR Multi Asset (ALIOR SFIO)	MAA_01	50% WIG + 50% TBSP
ALIOR Spokojny dla Ciebie (ALIOR SFIO)	MSW_02	30% WIG + 70% TBSP
ALIOR Stabilny na Przyszłość (ALIOR SFIO)	MSW_03	60% TBSP + 40% WIG

Table 5, cont'd

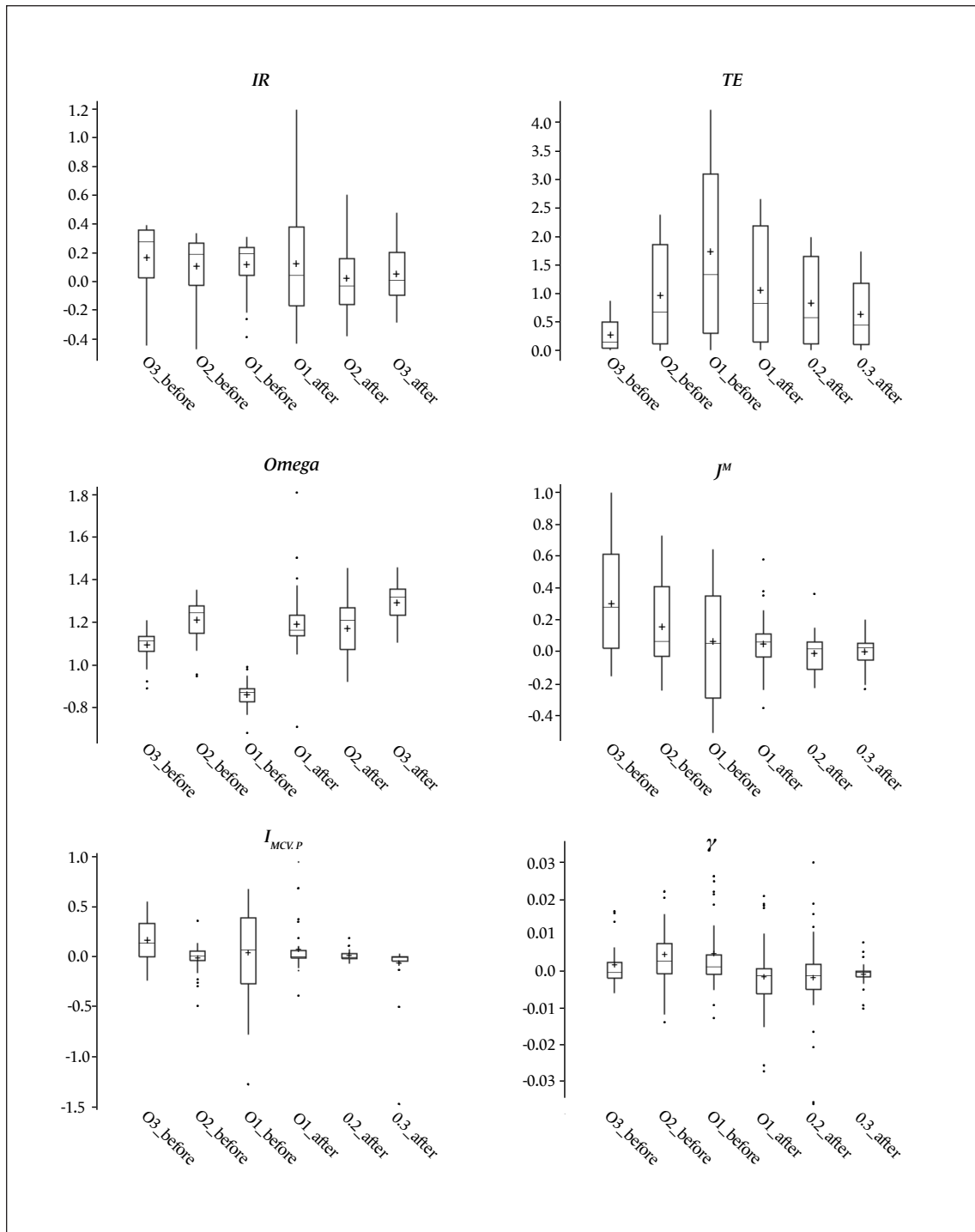
Fund	Mark	Benchmark
Ipopema Emerytura Plus (Ipopema SFIO)	MSW_04	65% TBSP + 35% WIG
Skarbiec - Top Funduszy Stabilnych SFIO	MSW_05	30% WIBID 3M + 70% WIG20
Investor Bezpiecznego Wzrostu (Investor SFIO)	MOK_06	100% WIBID 6M
MetLife Ochrony Wzrostu (Światowy SFIO)	MOK_07	70% WIG + 30% WIBID 3M
Pekao Zmiennej Alokacji (Pekao Strategie Funduszowe SFIO)	MOK_08	40% WIG20 + 60% WIBID 3M
Millennium Absolute Return (Millennium SFIO)	MASZ_10	100% WIBID 3M
NN (L) Dynamiczny Globalnej Alokacji (NN SFIO)	MASZ_11	100% WIBID 3M
NN (L) Stabilny Globalnej Alokacji (NN SFIO)	MASZ_12	100% WIBID 3M
Opera Alfa-plus.pl (Opera SFIO)	MASZ_13	100% WIBID 3M
QUERCUS Global Balanced (Parasolowy SFIO)	MASZ_14	100% WIBID 3M
QUERCUS Parasolowy SFIO Subfundusz Stabilny	MASZ_15	100% WIBID 3M
Ipopema Konserwatywny (Ipopema SFIO)	DPU_01	100% WIBID 6M
MetLife Konserwatywny Plus (Światowy SFIO)	DPU_02	100% WIBID 1M
Pekao Spokojna Inwestycja (Pekao Funduszy Globalnych SFIO)	DPU_03	100% WIBID 1M
QUERCUS Dłużny Krótkoterminowy (Parasolowy SFIO)	DPU_04	100% WIBID 6M
SGB Bankowy (Generali Fundusze SFIO)	DPU_05	100% WIBID 1M
Investor Dochodowy (Investor SFIO)	DPS_06	100% WIBID 3M
Santander Prestiż Dłużny Krótkoterminowy (Santander Prestiż SFIO)	DPS_07	100% WIBID 3M
Generali Obligacje Aktywny (Generali Fundusze SFIO)	DPD_08	100% WIBID 3M
QUERCUS Obligacji Skarbowych (Parasolowy SFIO)	DPD_09	100% WIBID 3M
Santander Prestiż Obligacji Skarbowych (Santander Prestiż SFIO)	DPD_10	100% TBSP
AGIO Kapitał SFIO	DOK_11	100% TBSP

Table 5, cont'd

Fund	Mark	Benchmark
BPS Obligacji Korporacyjnych (BPS SFIO)	DOK_12	100% WIBID 6M
Generali Profit Plus (Generali Fundusze SFIO)	DOK_13	100% WIBID 1M
Millennium Obligacji Korporacyjnych Millennium SFIO)	DOK_14	100% WIBID 1M
Opera Tutus-plus (Opera SFIO)	DOK_15	100% WIBID 1M
QUERCUS Ochrony Kapitału (QUERCUS Parasolowy SFIO)	DOK_16	10% WIG20 + 90% WIBID 1M
Santander Prestiż Obligacji Korporacyjnych (Santander Prestiż SFIO)	DOK_17	100% WIBID 3M

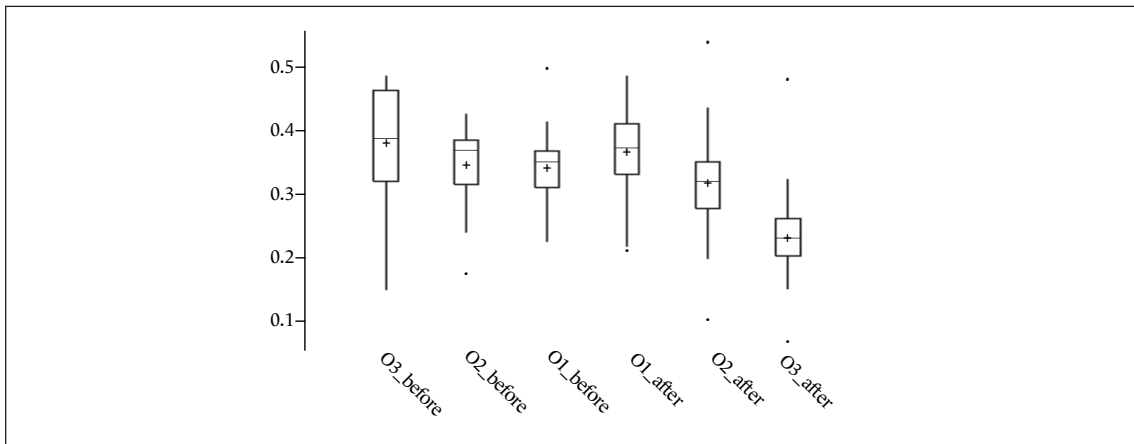
Source: own study.

Figure 1
Boxplots for indices evaluating AIF managers



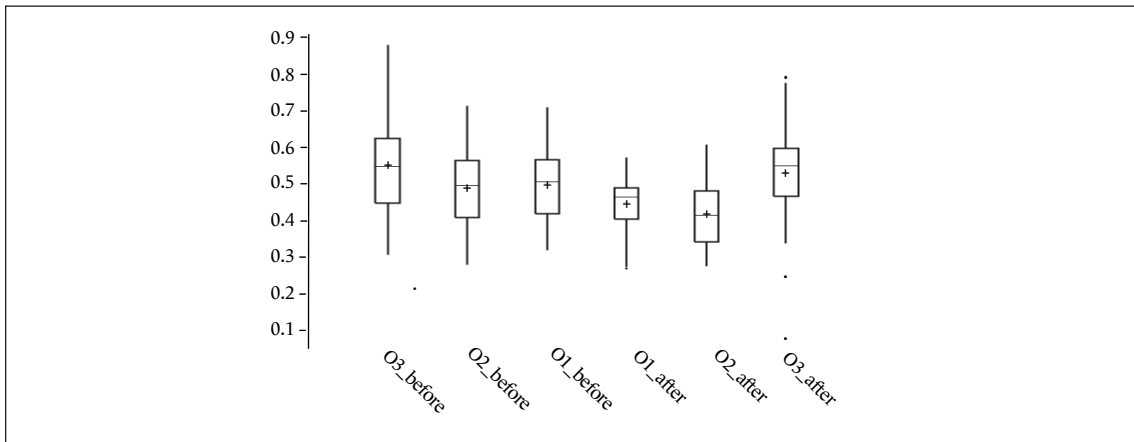
Source: own study.

Figure 2
Boxplots for synthetic measure evaluating the abilities of AFI managers



Source: own study.

Figure 3
Boxplots for synthetic measure evaluating the abilities of OIF managers



Source: self-study.

Alternatywne fundusze inwestycyjne – ocena umiejętności zarządzających w świetle zmian w ustawie o funduszach inwestycyjnych

Streszczenie

Celem badania jest weryfikacja hipotezy, że zastosowanie nowych regulacji dotyczących m.in. nowelizacji ustawy o funduszach inwestycyjnych zwiększyło efektywność polskich zarządzających portfelami specjalistycznych funduszy inwestycyjnych otwartych. Ustawa ta wprowadziła do polskiego prawa instytucję alternatywnych funduszy inwestycyjnych, czyli instytucję wspólnego inwestowania, której przedmiotem działalności jest zbieranie aktywów od wielu inwestorów w celu ich lokowania w interesie tych inwestorów zgodnie z określoną polityką inwestycyjną. W Polsce do tej kategorii zalicza się specjalistyczne fundusze inwestycyjne otwarte, fundusze inwestycyjne zamknięte, alternatywne spółki inwestycyjne oraz unijne alternatywne fundusze inwestycyjne. Poza wymogiem licencjonowania zarządzających funduszami alternatywnymi oraz wieloma obowiązkami organizacyjnymi i operacyjnymi, mającymi na celu ochronę inwestorów, dyrektywa wprowadza między innymi możliwość oferowania i sprzedaży jednostek lub udziałów w funduszach alternatywnych na terenie innych państw członkowskich. Oznacza to, że część inwestorów w Polsce będzie mogła dokonywać inwestycji w fundusze inwestycyjne, które zaliczają się do funduszy alternatywnych w innych państwach członkowskich UE. Ta sama zasada (dzięki wdrożeniu dyrektywy) dotyczy inwestorów zagranicznych, stąd też ważna jest atrakcyjność instrumentów oferowanych przez polskie instytucje zbiorowego inwestowania. Atrakcyjność ta z punktu widzenia inwestora może być mierzona m.in. poziomem efektywności danego instrumentu, a zatem poziomem efektywności zarządzających nim.

Ocenę zarządzania najczęściej łączy się z efektywnością danego instrumentu, co jest niejako zrozumiałe z punktu widzenia inwestora, ale nie są to pojęcia tożsame. Do tej pory rzadko poddawano analizie ocenę zarządzających SFIO jako osobnej grupy funduszy inwestycyjnych. Częściej w ocenach łączono je z grupą otwartych funduszy inwestycyjnych, mimo istnienia różnic w funkcjonowaniu tych dwóch instytucji. W badaniach dotyczących oceny zarządzających pod kątem efektywności polskich funduszy inwestycyjnych wyraźnie widoczne są dwa nurty badawcze. W pierwszym z nich wykorzystuje się klasyczne współczynniki: Sharpe'a i Treynora, alfę Jensena oraz ich modyfikacje. W przypadku tych metod nacisk kładziony jest na ryzyko całkowite i rynkowe oraz umiejętności zarządzających w zakresie selekcji instrumentów finansowych. W drugim podejściu do oceny efektywności funduszy inwestycyjnych są wykorzystywane nowoczesne miary efektywności inwestycji, które nie wymagają dodatkowego założenia o normalności rozkładu stóp zwrotu. Ocenę efektywności funduszy można przeprowadzić również z punktu widzenia umiejętności zarządzających.

Przedstawione podejścia do oceny efektywności funduszy inwestycyjnych nie są tożsame. W pierwszej metodzie ocenia się (pośrednio) efekty działalności zarządzających. W drugiej badaniu podlegają umiejętności zarządzających. Dopiero połączenie tych dwóch podejść pozwala na dokonanie pełnej oceny wyników funduszy inwestycyjnych. Taki syntetyczny obraz oceny zarządzających funduszami można uzyskać przy wykorzystaniu tzw. miernika rozwoju, narzędzia wielowymiarowej

analizy porównawczej. Miernik ten zawierałby informację na temat oceny SFIO pod względem wyników funduszu, stylu zarządzania oraz umiejętności doboru aktywów i przewidywania rynku przez zarządzających.

Aby w sposób syntetyczny ocenić zarządzających alternatywnymi funduszami inwestycyjnymi, wybrano grupę wskaźników, które oceniają menedżerów pod kątem nie tylko wyników poszczególnych funduszy, ale również ich stylu zarządzania i umiejętności zarówno doboru, jak i wycucia rynku. W artykule sięgnięto więc po następujące mierniki:

- *information ratio* (IR), oceniający umiejętności zarządzania menedżerów portfeli pod kątem osiąganych stóp zwrotu w porównaniu z rynkiem,
- *tracking error* (TR), oceniający styl inwestycyjny menedżera,
- Omega (O), oceniający atrakcyjność portfela inwestycyjnego pod kątem osiąganych wyników,
- zmodyfikowany współczynnik Jensena (J^M), oceniający zdolności zarządzającego w kwestii doboru aktywów do portfela inwestycyjnego,
- miarę Moseesa, Cheyneya i Veita ($I_{MCV,P}$), która ocenia wielkość arbitrażu, jaki uzyskuje menedżer funduszu pomiędzy poziomem dywersyfikacji portfela a jego rynkowym potencjałem,
- miarę tzw. *timing* (γ), oceniającą umiejętności wykorzystywania techniki *market-timing* (wyczuwania krótkookresowych trendów rynkowych).

Na podstawie tych wskaźników wyznaczono w trzech oknach czasowych, przed wprowadzeniem dyrektywy i po jej wprowadzeniu, syntetyczne miary oceny, które posłużyły do weryfikacji hipotezy mówiącej, że wprowadzenie ustawy o AFI wpłynęło pozytywnie na poziom ich zarządzania przez zarządzających specjalistycznymi funduszami inwestycyjnymi, co stanowiło główny cel pracy. Dodatkowo zbudowano syntetyczny miernik dla klasycznych funduszy inwestycyjnych, których dyrektywa już bezpośrednio nie dotyczyła. Miarę oceniającą umiejętności zarządzających zbudowano na podstawie tych samych wskaźników dla funduszy inwestycyjnych o zbliżonej polityce inwestycyjnej. Z przeprowadzonej analizy wynika, że zarządzający zareagowali na implementację nowej dyrektywy. Jednak pozytywny trend w zarządzaniu SOFI można było zauważyć tylko w krótkim okresie po wprowadzeniu nowych regulacji.

Słowa kluczowe: efektywność, alternatywne fundusze inwestycyjne, miernik syntetyczny

