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The Assessment of Investment Fund Classification Using Cluster Analysis

Abstract. *The aim of the article was to verify the research question, whether the fund classification which is based on fund policy, can provide investors with a reliable tool to anticipate return and investment risk of funds. In the research, it was used the cluster analysis. Results of the study show that criteria for grouping funds adopted by the Chamber of Fund and Asset Management (IZFA) (based on the investment policy, ie the structure of assets of fund portfolios) do not fully identify the basic characteristics of funds such as the rate of return and investment risk. This conclusion applies in particular to mixed and equity funds. This is most likely due to the fact that the funds' investment policy criteria defined by the IZFA in their classification of funds were defined in a too flexible way. However, it should be emphasized that the non-compliance of funds from the IZFA classification with the classification based on rates of return and investment risk was characterized by the fact that the selection of a fund with a theoretically higher level of risk and the expected rate of return has in reality, proved to be the choice of a fund with a lower rate of return and lower investment risk.*

Keywords: *classification of investment funds, investment funds' performance*

Introduction

Investors consider different criteria when choosing an investment fund. The literature indicates that the investor's decisions can be influenced by factors such as past rates of return generated by the fund, the variability of the fund's performance or the amount and number of fees. The way funds are advertised can also be important. Regardless of the factors that influence the investor's choices, what matters most for fund managers is that their clients are satisfied with the choices they make. This will guarantee continued inflows into funds in the future. In order to keep investors satisfied, however, managers have to select appropriate investment profiles that match individual preferences of their clients. It is necessary to provide investors with reliable information about expected risk and return associated with a given fund.

Investment funds are required to meet certain information requirements. Some of the information published by investment funds contains data that can help investors to identify the type of investment policy used. However, the amount of information provided by funds is so overwhelming that it is often very hard to process, especially by less experienced investors.

In order to facilitate investment decisions, particularly for less experienced investors, investment funds are grouped.

One of the most commonly used classifications is the division of funds based on their asset structure proposed by the Chamber of Fund and Asset Management (Izba Zarządzających Funduszami i Aktywami, IZFiA for short). This division is intended to provide investors with clear information about investment risks and expected rates of return. However, the question arises whether the applied methodology of the theoretical division of funds made on the basis of their investment policy adequately reflects their actual performance determined by actual rates of return and the accompanying total risk.

It is also important to determine whether groups of funds distinguished on the basis of their investment policy are homogeneous.

A division of investment funds can only be useful for investors if it differentiates between homogeneous groups of funds based on risk and rates of return.

The purpose of the article is to answer whether the fund classification which is based on the fund's investment policy can provide investors with a reliable tool to anticipate the fund's rate of return and investment risk.

The above question will be answered on the basis of results a study involving cluster analysis, which is used to facilitate objective grouping of funds in terms of rates of return and the investment risk level.

1. Factors determining the choice of investment funds by individual investors

In assessing the quality of a classification of investment funds, it is first necessary to establish the role of this type of division. In other words, it is necessary to determine whether these divisions can significantly influence choices made by investors. To answer this answer one needs to identify factors that influence investment decisions of investors.

Investment fund participants make decisions regarding the selection of funds on the basis of objective and subjective factors. In some cases, these decisions are based on prior analysis of more or less available information about the fund, in other situations, the selection is based on emotions.

There are many factors that can motivate n investor to select a particular investment fund. The most important ones include advertising/marketing, the fund's past performance, investment risk, the type and amount of fees charged by the fund, the type of fund, its investment strategy, the geographic location of the fund's investments, its social responsibility policy, etc.

Results of a study conducted by an American researcher, H. Cronqvist, indicate that one of the determinants of participation in funds is advertising. Advertisements of funds create positive emotions in investors and increase their willingness to choose funds with higher fees and higher investment risk [Cronqvist 2006: 28].

However, it is worth pointing out that although information provided by the media does influence investors' decisions, the priority for investors is to make financial decisions independently [Suyam Praba 2010: 9-10]. According to some studies, the choice of investment funds can also depend on the investor's intelligence and educational and profession background, e.g. highly intelligent investors are less likely to participate in funds with high fees [Grinblatt et al. 2013: 35]. This is particularly true with respect to actively managed funds but also applies to balanced funds. Results of research in this area are not consistent [Wilcox 2003: 645-663; Engström 2007: 1-30]. It is worth pointing out, however, that if investors decide to choose funds with high fees they also expect higher return rates than compared to other funds [Ehm, Müller & Weber 2014: 29].

In addition to being attracted by advertising, or promotions involving reduced fees, some investors care about the fund's investment policy, and want to know whether a fund invests only in securities owned by environmentally responsible entities, or if it invests in companies with high ethical standards, so-called SRI (Socially Responsible Investing or Sustainable and Responsible Investing) [Lulewicz-Sas & Kilon 2014: 344].

In some cases the choice of a fund depends on the investor's geographic preferences and is similar to choosing a fund with high fees. These decisions can usually be attributed to the conviction that funds investing abroad or funds with high fees achieve higher rates of return. Investors *ex-ante* assume that high fees reflect the high quality of management, which must lead to high rates of return. This applies to funds with a diversified management style. Hence, actively managed funds usually charge higher fees, while passive funds charge lower fees.

According to Elton, Gruber and Andre de Souza, both theorists and practitioners recognize that investors do not make good investment decisions [Elton, Gruber & de Souza 2016: 537]. Perhaps this is the result of their over-emotional attitude to the selection of investment funds.

Meanwhile, seemingly subjective decisions of investors are based on their belief that the fund they have selected will generate a high return with a relatively low level of investment risk. Therefore, the selection of funds by investors mainly depends on objective factors. These factors include investor's experience, the fund's investment policy and its past performance. One of the most important determinants of fund performance is investment policy. It reflects managers' decisions about what assets to include in the fund's portfolio and, ultimately, the fund's performance. It is therefore not surprising that from the investor's perspective the most important selection criteria to consider are the fund's performance its persistence [Kang, Lee & Lee 2014: 132]. That is why they are the two main factors that determine what funds investors select.

One may assume that funds are most commonly selected on the basis of their past performance and the accompanying investment risk, that is, the choice mainly is based on the fund's investment policy. In other words, the investor selects a fund that best matches their individual investment profile. However, the practical problem is the sheer number of funds. To facilitate investment decisions, some institutions have taken on the task of preparing classifications of investment funds.

One of such institutions that have developed a classification of investment funds is the European Association of Funds and Asset Management (EFAMA). The classification of developed by this institution is used by virtually all market participants. It divides funds according to their investment policy. According to this classification, funds can be divided into six types:

– equity funds,
– multi-asset funds,
– bond funds,
– money market funds,
– Absolute Return Innovative Strategies (ARIS) funds,
– other funds [EFAMA 2017].

Moreover, this general division of investment fund types is further refined, for example the first four fund types, the universe of equity, bond, multi-assets and money market funds are segmented according to nine criteria: country/region, sector, market capitalization, currency exposure, credit quality, interest rate exposure, emerging market exposure, asset allocation and structural characteristics.

This division of funds is mainly intended to allow comparisons of performance between funds in groups and facilitate quick identification of risk classes and the expected rate of return.

A similar classification has been developed by the Polish Chamber of Funds and Asset Management – IZFA, which divides funds operating in Poland into:

– equity funds,
– mixed funds,
– bond funds,

– cash funds and money market funds,
– real estate funds,
– private equity funds,
– absolute return funds,
– commodity funds,
– securitization funds [IZFA 2017].

In addition, in the Polish classification, some types of funds, such as equity and mixed funds, fall into specialized categories. Moreover, e.g. equity funds are divided into universal funds, index funds, small and medium-sized enterprises' funds, sector funds.

The classification defines what should be included in the fund's investment portfolio so that it can be classified into a given type of fund, e.g. in the case of equity funds, shares and/or other equity securities in the fund's portfolio should make up at least 66%. In our opinion the classification of funds is a way of organising the investment fund market. However, some authors believe that an increase in the number of funds and classifications is a marketing strategy of investment fund companies [Massimo 1998].

Each fund determines its investment policy, which it must strictly adhere to. This defines the categories and share of individual assets that can be included in the fund's investment portfolio.

The fund's investment policy is the basis for classifying it into a given group of funds. Theoretically, using the classification of funds, investors can more easily and reliably choose a fund that matches their investment profile and has an acceptable investment risk, without having to study the structure of its investment portfolio.[1]

Investment fund classification is a valuable source of information for investors who want to rationalize their choice. Moreover, fund classification helps investors to choose funds by allocating individual investment funds to relevant groups with different expected returns and risks.

2. Description of the study

To determine whether the methodology of grouping investment funds based on the structure of their assets adequately reflects the investment profile of funds it is necessary to compare groups of funds. The first group considered in the study was identified on the basis of the investment policy (on the basis of the structure of assets), and the second group was created on the basis of two main characteristics of funds, the rate of return and investment risk.

[1] The investor's investment profile is determined by completing the adequacy test.

A fund classification based on rates of return and total risk (as measured by the standard deviation of return rates) was constructed using the population of all domestic investment funds consistent with the IZFA classification. These were equity funds, mixed funds, bond funds and cash and money market funds. In total, 151 Polish investment funds were included. It was also assumed that the classification would consists of four groups, each containing funds that are most similar in terms of return and risk, as is the case in the traditional classification. The classification was created by applying the k-means grouping method, which is one of the methods of cluster analysis.

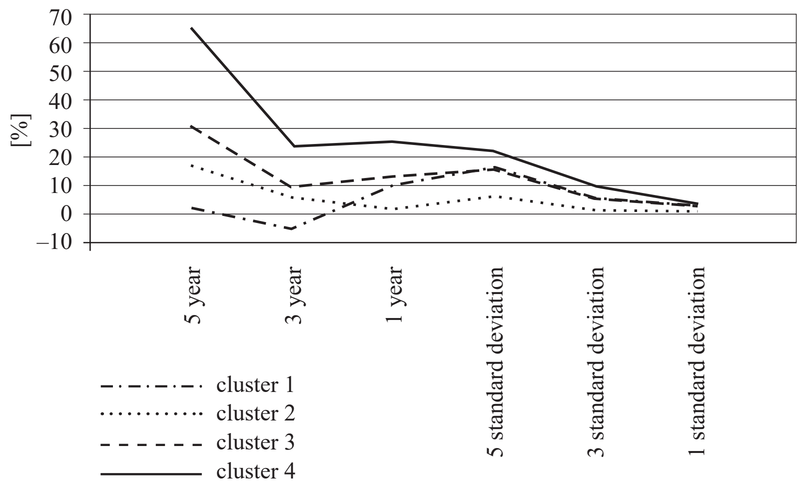
Equity funds with the highest return rates and the highest standard deviation of return rates (total risk) were assigned to the equity fund group. The second group, with slightly lower rates of return and risk, was labelled as the mixed funds group. The third group of funds was termed as the bond funds group. Funds with the lowest risk level (the lowest standard deviation of return rates) and with the lowest return rates were classified into the group of cash and money market funds.

An important problem to be resolved when grouping funds according to past rates of return and risk was to indicate the reference period for these parameters.

The first possibility was to adopt the criteria for grouping simultaneously the rates of return and deviation of rates of return for annual, three-year and five-year periods (Chart 1).

In the case of annual and three-year rates of return and standard deviations, it was not possible to unambiguously assign separate clusters to groups of funds

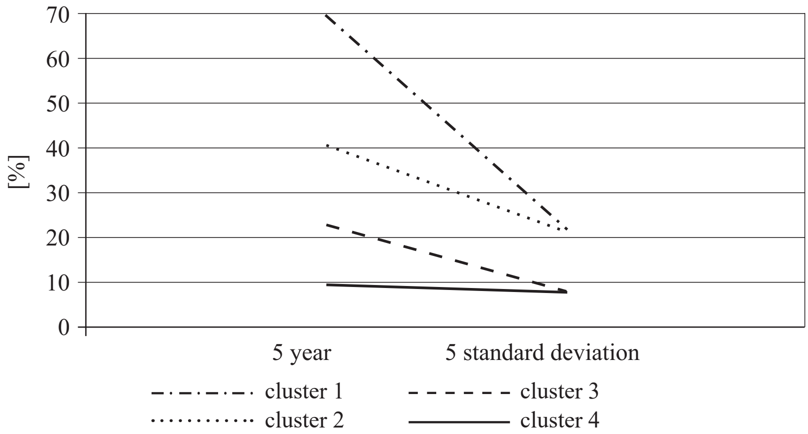
Chart 1. Average annual, three-year and five-year return rates and standard deviations of return rates



Source: own work in Statistica 13.1.

generated on the basis of the structure of assets. Therefore, the rates of return and standard deviations of return rates for five-year periods were used to group funds. The adoption of such grouping criteria has ensured the best fit with the classification based on the structure of assets (Chart 2).

Chart 2. Average five-year return rates and standard deviations of return rates



Source: own work in Statistica 13.1.

In Chart 2 funds are categorized based on five-year rates of return and five--year standard deviations; four groups of funds can be distinguished, ranging from equity funds, represented by the pink line, to cash and money market funds, marked by the blue line. The next step in the study was to compare the classification of funds based on the structure of assets (IZFA) with the classification based on return rates and standard deviations. The data are presented in Table 1.

Table 1. Comparison of two classifications of funds: based on investment policy and based on return rates and total risk

	Classification of funds based on return rates and total risk						
	Type of fund	Equity funds	Mixed funds	Bond funds	Cash funds and money market funds	Total	% of overlap
IZFA Classification	Equity funds	16	17	13	7	**53**	30
	Mixed funds	1	3	18	12	**34**	9
	Bond funds	0	0	30	3	**33**	91
	Cash funds and money market funds	0	0	7	24	**31**	77
	Total	**17**	**20**	**68**	**46**	**151**	48

Source: own work.

As can be seen in Table 1, less than half of the funds classified by asset structure overlap with the division based on return rates and the standard deviation of return rates. In other words, only in half of the cases, investors received return rates and standard deviations that were consistent with the types of funds they had acquired.

The bond funds were the ones where the level of return and risk was actually similar to the expectations associated with the type of fund acquired (91%). The lowest degree of overlap between the classifications based on return rates and standard deviations and what would be expected taking into account the structure of assets was in the mixed fund's group (9%). It should be noted that, in most cases, where the fund was inappropriately classified, its actual investment profile was more conservative (with a lower return and a standard deviation), than would have been attributed to the fund's asset structure.

Conclusions

The above considerations suggest that investment fund classifications can be an important factor influencing investors' choice of funds. The criteria grouping adopted by IZFA (asset structure) do not adequately account for the basic characteristics of funds, such as return and risk. This is particularly true with respect to funds classified as mixed and equity funds. The discrepancy between the expected level of return and risk of funds and their actual performance is most probably due to the fact that the fund's investment policy criteria used to define the structure of assets are very flexible.

One solution to improve the classification of funds based on investment policies using groupings based on actual rates of return and the level of risk consists in limiting the share of individual instruments in the fund's portfolio, or possibly including additional classification criteria. As it is, the commonly used classifications based on the structure of assets are rather poor indicators of the actual level of profit and risk, which may discourage investors from choosing this form of investment.

References

Cronqvist H., 2006, *Advertising and Portfolio Choice*, Chicago: The University of Chicago Graduate School of Business.

EFAMA, 2017, *New European Fund Classification Categories*, www.efama.org/Pages/EFAMA-publishes-new-European-Fund-Classification-Categories.aspx [access: 25.09.2017].

Ehm Ch., Müller S., Weber M., 2014, *When risk and return are not enough: the role of loss aversion in private investors' choice of mutual fund fee structures*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2252646 [access: 25.09.2017].

Elton E.J., Gruber M.J., Souza A. de, 2016, Target Risk Funds, *European Financial Management*, 22(4), 519-539.

Engström S., 2007, *Preferences and characteristics of mutual fund investors*, Working Paper, Stockholm: Stockholm School of Economics.

Grinblatt M., Ikäheimo S., Keloharju M., Knüpfer S., 2013, *IQ and Mutual Fund Choice*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2021957 [access: 25.09.2017].

IZFA, 2017a, *Classification of investment funds*, www.izfa.pl/download/file/id/699/n/the-classification-of-investment-funds-pdf [access: 20.09.2017].

IZFA, 2017b, *Test adekwatności*, www.izfa.pl/download/file/id/8/n/test-adekwatnosci-izfia [access: 20.09.2017].

Kang J., Lee Ch., Lee D., 2014, Equity Fund Performance Persistence with Investment Style: Evidence from Korea, *Emerging Markets Finance & Trade*, Dec, 111-135.

Lulewicz-Sas A., Kilon J., 2014, Analysis of the effectiveness of socially responsible investment funds in Poland, *Economics and Managment*, 19(4), 338-345.

Massimo M., 1998, *Why So Many Mutual Funds? Mutual Fund Families, Market Segmentation and Financial Performance*, https://ssrn.com/abstract=239851 [access: 20.09.2017].

Suyam Praba R., 2010, Investors' Decision Making Process and Pattern, of Investments: A Study of Individual Investors in Coimbatore, *SIES Journal of Management*, 7(1), 1-12.

Wilcox R.T., 2003, Bargain hunting or star gazing? Investors' preferences for stock mutual funds, *Journal of Business*, 76, 645-653.

Ocena klasyfikacji funduszy inwestycyjnych z wykorzystaniem analizy skupień

Streszczenie. *Celem artykułu była weryfikacja pytania badawczego, czy bazująca na polityce inwestycyjnej funduszy klasyfikacja funduszy może stanowić dla inwestorów wiarygodną wskazówkę pozwalającą antycypować oczekiwaną stopę zwrotu oraz ryzyko inwestycyjne. W badaniu wykorzystano metodę analizy skupień. Na podstawie uzyskanych wyników badania można stwierdzić, że przyjęte przez Izbę Zarządzających Funduszami i Aktywami (IZFA) kryteria grupowania funduszy (bazujące na polityce inwestycyjnej, tj. strukturze aktywów portfeli funduszy) nie w pełni pozwalają na identyfikację podstawowych charakterystyk funduszy jakimi są stopa zwrotu oraz ryzyko. Wniosek ten odnosi się w szczególności do funduszy mieszanych oraz akcyjnych. Wynika to najprawdopodobniej z tego, że kryteria polityki inwestycyjnej funduszy zapisane w klasyfikacji funduszy, definiują strukturę aktywów w zbyt elastyczny sposób. Należy jednak podkreślić, iż niezgodność funduszy z klasyfikacji IZFA z klasyfikacją opartą na stopach zwrotu i ryzyka, charakteryzowała się tym, iż wybór funduszu o teoretycznie wyższym poziomie ryzyka i oczekiwanej stopie zwrotu w rzeczywistości okazał się wyborem funduszu o niższej stopie zwrotu i niższym ryzyku.*

Słowa kluczowe: *klasyfikacja funduszy inwestycyjnych, wyniki funduszy inwestycyjnych*