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**POLISH ABSOLUTE RETURN FUNDS AND STOCK FUNDS.
SHORT AND LONG TERM PERFORMANCE COMPARISON**

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Abstract

In this paper I focus on analyzing whether Polish absolute return funds, which I call quasi-hedge funds, add value to a portfolio of an individual investor by reaching higher returns than Polish stock funds. I use a sample of 25 Polish absolute return investment funds to contrast their short and long term performance, measured by Sharpe, Sortino and Jensen ratios, to the short and long term performance of 20 biggest Polish stock funds and build rankings based on that performance. Later I build funds of funds (with a different number of stock funds and/or quasi-hedge funds) and check which of them is the most efficient. I find out that in both short and long term Polish quasi-hedge funds have better returns than stock funds and they add much value to the investors' portfolios. It can be explained by the fact that they are much smaller and younger than traditional funds, so they have much higher potential to grow and reach abnormal returns.

Keywords: absolute return funds, quasi-hedge funds, fund performance, portfolio efficiency, Poland.

JEL classification: G11, G23.

Introduction

Absolute return funds (commonly known as hedge funds) are supposed to be an alternative to traditional investment funds (also called mutual funds). The main difference between both types of funds is that the latter are passively and the former actively managed. Hedge fund managers use more advanced investment tools and build more sophisticated strategies which should lead them to reaching the goal of absolute return instead of relative return reached by mutual fund managers.

There is a strong evidence in literature that hedge funds reach abnormal returns¹ which are higher than relative returns of traditional funds, especially stock funds, including those which are hedged². Hedge fund returns are lowly correlated with the stock fund returns and stock indices, mainly due to their attributes such as fee structure, flow of capital, fund leverage or uniqueness of their strategies³. That makes them a perfect element for a well-diversified portfolio⁴, though not necessarily during financial crises⁵.

The evidence showing advantages of hedge funds concerns funds managed from the most developed fund market which is United States. To my knowledge there are not many (if any) studies on comparison of performance of both types of funds managed from other fund markets, including such emerging markets like Poland. That was my first motivation for the following study.

Another motivation for conducting this study were changes on the hedge fund market in Europe after the financial crisis of 2007/2008. There were two determinants of those changes: 1. high demand for alternative investments on retail capital markets; 2. new law which forced hedge funds operating in European Union to be authorized by the financial supervisory authorities⁶. The first determinant made hedge fund managers realize that there is some retail capital available for them. The second one that they must start being more transparent. So far they have not had to be because unlike mutual funds their operations were excluded from many law regulations⁷. Therefore they offered their funds only to professionals (like it is still today in America or Asia) and not to retail investors who had neither access to information nor tools to assess the potential risk of hedge funds.

The introduction of the new directive combined with high demand for alternative investments on European retail capital markets made authorized hedge fund managers include to their offer UCITS-hedge funds. Those are funds of hedge funds which aim at reaching the absolute return. In theory they are available for all European retail investors because they are quoted on public stock exchanges, e.g. in Luxembourg. However, in practice only some retail

investors (those internationally oriented) add them to their portfolios. Most of European retail investors are still home biased⁸ and Poland is no exception.

As a response some of the Polish investment companies created open-end “absolute return funds” which I call **quasi-hedge funds**. They are different to UCITS-hedge funds because their managers do not create a portfolio of hedge funds but they use some of the tools of hedge funds in their strategies. Quasi-hedge funds are regulated which forbids their managers to use all the tools used by hedge fund managers (e.g. advanced derivatives or high leverage). However that should not stop them from achieving the goal of abnormal return.

My last (and main) motivation for the following study is a desire to check whether Polish quasi-hedge fund managers reach absolute returns and whether they are higher than returns reached by Polish stock fund managers. In other words, I want to assess whether quasi-hedge funds add value to the portfolios of Polish investors by reaching positive returns which make their managers winners of fund rankings. I use Poland as a sample for two reasons: 1. because this is the biggest mutual fund emerging market in European Union; 2. it offers funds similar to hedge funds that additionally may be considered as an alternative for UCITS-hedge funds.

The rest of the paper is divided into three sections. In the next one I characterize the sample and describe the methodology. In the third section I present the results of the study. In the fourth and the last one I make conclusion and add a comment about possible solutions for the quasi-hedge fund market in Poland in the future.

1. Methodology

There are three steps of the analysis.

In step one I build the sample of funds, compare their characteristics and calculate short-term (1 year) and long term (5 years) fund performance, i.e. risk weighted returns from Sharpe and Sortino as well as one-factor Jensen models. In step two I rank funds according to those measures. There are two reasons why I decide to choose them. First, Sharpe and Sortino ratios are simple in their construction which makes them understandable for investors. Therefore they are commonly used for ranking mutual funds and hedge funds in practice. After I rank funds according to both measures I will be able to find out not only whether quasi-hedge funds are better managed than stock funds (which allows to conclude whether they should replace stock funds in an investor portfolio) but also whether there is a sense of using those measures interchangeably. Some academic evidence concerning US hedge funds shows that yes⁹. Second, Jensen alpha shows whether the fund managers have potential and skills to earn absolute returns.

If Jensen alpha of a fund is greater than zero ($\alpha > 0$), a fund manager earns positive returns. We say that she over-performs the market and has skills to add value to an investor portfolio. If Jensen alpha of a fund is lower than zero ($\alpha < 0$), its manager underperforms the market, which means that she has no (or does not use her) skills to manage a fund. Generally in order to assess the fund manager's skills the researchers calculate Jensen alphas from three-factor model of Fama and French (1993) or four-factor model of Carhart (1997) for mutual funds and seven-factor model of Fung and Hsieh (2004) for hedge funds. I use much simpler one-factor model of Jensen (1968, 1969), which concentrates on a relation between a fund return and a benchmark return. I do it after Perez (2012) who shows that more advanced models of calculating Jensen alphas do not work for Polish funds – the only statistically significant factor is the market factor.

I expect that (at least some) absolute return funds will have positive Jensen alphas which will be higher than alphas of stock funds.

Finally, in step three I make a simple exercise in which I build portfolios of stock funds and/or quasi-hedge funds and compare their returns and risk. By doing so I want to find out which portfolios are the most efficient: those which consist of only quasi-hedge funds or stock funds or those which combine both types of funds.

All calculations are made in Matlab. The details of the analysis are as follows.

Step one. Characteristics of a sample and fund performance

There are two parts of the step one of the study. First, I choose and characterize funds which are the elements of my sample as well as make initial calculations. Second, I calculate the performance of all funds.

The sample consists of two types of funds: **absolute return funds** of open-end and nondedicated type (herein named AR funds or quasi-hedge funds) and **stock funds** of open-end type as they are categorized by Polish Fund and Asset Management Association (Izba Zarządzających Funduszami i Aktywami, www.izfa.pl). I choose funds operating in Poland between **1.01.2010** and **31.12.2014** with at least half a year of history and frequency of pricing at least once a week. There are 25 open-end nondedicated absolute return funds which fulfill my requirements. They represent 95% of such funds and 40% of all nondedicated AR funds (of open-end and closed-end type). As a counterbalance I chose 20 stock funds with the highest net asset value as of the end of December 2014. They represent 50% of all open-end stock funds as far as NAV is concerned.

Table 1 presents the characteristics of analyzed funds. In table 1 and all other tables the absolute return funds are written with *Italic* letters so they may be distinguished from the stock funds.

Table 1. Characteristics of analyzed funds

Funds	Size (nav)	Age (months)	Management fee (%)	Performance fee (%)	Max distribution fee (%)
1	2	3	4	5	6
Absolute return funds					
<i>Agio Agresywny</i>	28,338,697.98	25.00	4.00	10	4.00
<i>Agio Aktywnej Alokacji</i>	7,595,883.53	66.00	2.50	20	5.00
<i>Agio Multistrategia</i>	30,883,863.96	65.00	4.00	20	4.00
<i>ALIOR SFIO Zmiennej Alokacji (dawny Selektywny)</i>	8,568,560.00	68.00	3.50	nd	4.00
<i>Altus FIO Parasolowy s ASZ Rynku PL</i>	218,844,645.62	27.00	4.00	nd	4.00
<i>Altus FIO Parasolowy Subfundusz ASZ Dłużny</i>	283,554,815.26	27.00	2.00	nd	2.00
<i>Aviva Investors Optymalnego Wzrostu</i>	76,495,892.02	55.00	2.50	10*	3.00
<i>BPH Subfundusz Selektywny</i>	105,411,632.00	76.00	3.00	nd	2.00
<i>ING P FIO sub Selektywny</i>	214,284,272.00	88.00	4.00	nd	5.00
<i>Millennium FIO S Absolute Return</i>	57,604,315.52	28.00	3.50	nd	2.50
<i>Noble Funds FIO Fund Tim.</i>	46,274,488.00	77.00	4.00	nd	4.00
<i>Noble Funds FIO GI Return</i>	62,711,004.00	69.00	4.00	nd	4.00
<i>Opera SFIO s O Alfa-plus.pl</i>	41,704,576.00	67.00	0.00	nd	1.50
<i>Pioneer Elastycznego Inwestowania</i>	15,375,859.96	41.00	2.50	nd	2.80
<i>Quercus P SFIO – Selektywny</i>	682,221,890.00	65.00	2.80	nd	2.80
<i>Skarbiec FIO Market neutral subfundusz Allianz Total Return</i>	7,655,196.00	28.00	4.00	nd	5.50
<i>Subfundusz Skarbiec – Market Opportunities</i>	255,782.43	13.00	4.00	nd	4.00
<i>Subfundusz Skarbiec – Market Opportunities</i>	14,246,630.00	11.00	3.00	nd	2.50
<i>Subfundusz Superfund Red (FoHF)</i>	2,667,356.07	108.00	1.20	n/a	4.50
<i>Superfund Alternatywny</i>	2,200,344.00	12.00	1.50	n/a	4.50
<i>Superfund GoldFuture (FoHF)</i>	1,870,440.21	86.00	3.50	n/a	4.50
<i>Superfund Subfundusz B</i>	10,612,644.46	108.00	1.20	n/a	4.50
<i>Superfund Subfundusz C</i>	5,686,998.55	108.00	1.20	n/a	4.50
<i>Superfund Trend powiązany Bis FIO</i>	19,152,708.52	98.00	1.50	n/a	4.50
<i>Superfund Trend Powiązany Plus FIO</i>	18,905,273.32	98.00	1.50	n/a	4.50
Total	1,963,123,769.41				
Average	78,524,950.78	60.56	2.80		3.80
Stock funds					
<i>Arka BZ WBK Akcji Subfundusz</i>	1,154,128,810.53	197.00	4.00	n/a	3.00
<i>Aviva Investors Polskich Akcji</i>	838,813,393.96	152.00	4.00	n/a	4.50
<i>ING (L) Globalny Spółek Dywidendowych</i>	627,343,604.71	61.00	2.50	n/a	5.00
<i>ING (PL) Akcji</i>	767,973,352.19	154.00	2.00	n/a	5.00
<i>ING SFIO Akcji 2</i>	1,850,518,757.35	198.00	3.50	n/a	5.00
<i>LM Parasol FIO Subfundusz Akcji</i>	1,299,935,717.83	192.00	3.50	n/a	4.00
<i>Millennium FIO S Akcji</i>	320,730,902.28	152.00	4.00	n/a	4.00
<i>Noble Fund Akcji</i>	484,904,159.06	93.00	4.00	n/a	4.00
<i>Noble Fund Akcji Małych i Średnich Spółek</i>	295,600,145.22	84.00	4.00	n/a	4.00
<i>Pioneer Akcji Amerykańskich</i>	337,478,319.44	174.00	3.50	n/a	5.00
<i>Pioneer Akcji Europejskich</i>	405,318,427.86	127.00	3.50	n/a	5.00
<i>Pioneer Akcji Polskich</i>	866,221,726.23	225.00	4.00	n/a	5.00

1	2	3	4	5	6
Pioneer Akcji Rynków Wschodzących	275,743,131.25	94.00	3.50	n/a	5.00
Pioneer Dynamicznych Spółek	298,657,244.92	31.00	4.00	n/a	5.00
PKO Akcji – fio	503,305,522.18	199.00	4.00	n/a	4.50
PZU Akcji KRAKOWIAK	502,448,086.88	178.00	4.00	n/a	4.00
PZU Energia Medycyna Ekologia	970,279,377.11	52.00	2.50	n/a	4.00
Quercus Agresywny	625,592,670.47	77.00	3.30	n/a	3.30
Subfundusz Akcji SKARBIEC-AKCJA	328,959,014.95	203.00	4.00	n/a	5.50
UniKorona Akcje	827,780,964.58	211.00	4.00	n/a	5.00
Total	13,581,733,329.00				
Average	679,086,666.45	142.70	3.59		4.49

* earned by all subfunds; n/a – not applicable; nd – no data available.

Source: IZFA, websites of investment companies managing the funds.

As we can see in Table 1 the net asset value (NAV) of absolute return funds varies significantly among funds. It ranges from 0.255 Mio PLN (*subfundusz Allianz Total return*) to 283.5 Mio PLN (*Altus FIO Parasolowy Absolutnej Stopy Zwrotu Dłużny*) and 682 Mio PLN (*Quercus Parasol Selektywny*), on average it is around 78.5 Mio PLN (without *Quercus Parasol Selektywny* it is 53.4 Mio PLN). In the case of stock funds it is from 275 Mio PLN (Pioneer Akcji Rynków Wschodzących) to 1.85 billion PLN (ING Akcji 2) and on average almost 680 Mio PLN. When we exclude *Quercus Parasol Selektywny* from the sample of quasi-hedge funds we see that the size of the biggest absolute return fund is similar to the size of the smallest stock fund used in the analysis. Besides quasi-hedge funds are much younger than the stock funds. On average they operate on the market for 60 months (5 years) whereas the stock funds for more than 142 months (almost 12 years). The average age of quasi-hedge funds was a motivation for choosing the last five years (meaning 2010–2014) as the time scope of the study.

Dealing with smaller and younger funds is motivating for the quasi-hedge fund managers – they are strongly concentrated on active management leading to superior returns which eventually brings them higher bonuses. It is interesting to see that only few absolute return funds charge their clients the performance fee. Most of them charge only the management fee, which – as for Polish standards – is quite low. On average it is 2.8% whereas the fee charged by stock funds is 3.6%. In my opinion it should be the opposite, especially since quasi-hedge funds are assumed to be managed much more actively than the stock funds. Presumably lower fees in Polish absolute return funds are supposed to attract new clients.

I use daily prices (net asset value per unit of participation, $NAVUP = P$) of those 25 absolute return funds and 20 stock funds from 01.01.2010 to 31.12.2014 to calculate their daily log returns (R). The formula is as follows:

$$R_{i,t} = \ln\left(\frac{NAVUP_{i,t}}{NAVUP_{i,t-1}}\right) = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right), \quad t = 1, 2, \dots, T \quad (1)$$

where:

$R_{i,t}$ is a return of a fund i in day t ,

$NAVUP_{i,t} = P_{i,t}$ is the price of a fund i in day t ,

$NAVUP_{i,t-1} = P_{i,t-1}$ is the price of a fund i in day $t - 1$.

I also use this formula to calculate daily log returns of the benchmarks. The majority of Polish stock funds use the WIG index as the benchmark. However Perez (2012) shows that returns of WIG have no significant influence on the returns of Polish stock funds. Additionally those funds concentrate in their strategies on investing not only on Warsaw Stock Exchange but also on foreign capital markets (e.g. Istanbul or Vienna Stock Exchanges). That is the reason why – like Perez (2012) – I decide to choose MSCI World index as the benchmark for the stock funds. As far as Polish absolute return funds are concerned generally they do not define a benchmark. However for the purpose of the study I decide to choose Hedge Fund Research Equity Hedge (Total) Index.

The second part of the step one of the study is to measure the short and long term fund performance. I use **Sharpe and Sortino ratios as well as Jensen alpha** from one-factor model to do that. As mentioned above as a benchmark (RM) for funds I use HFR Equity Hedge (Total) Index or MSCI World index, as a minimum acceptable rate (MAR) which replaces a risk free rate I use WIBID 1Y. The models are as follows:

$$S_{i,y} = \frac{R_{i,y} - MAR_y}{\sigma_{i,y}} \quad (2)$$

$$Sor_{i,y} = \frac{R_{i,y} - MAR_y}{s\sigma_{i,y}} \quad (3)$$

$$\alpha_{i,y} = (R_{i,y} - MAR_y) - \beta_i(R_{M,y} - MAR_y) - u_{i,y} \quad (4)$$

where:

$S_{i,y}$ is a yearly value of a Sharpe ratio for a fund i ,

$Sor_{i,y}$ is a yearly value of a Sortino ratio for a fund i ,

$\alpha_{i,y}$ is a yearly value of a Jensen alpha for a fund i ,

$R_{i,y}$ is a yearly log return of a fund i ,

$R_{M,y}$ is a yearly log return of a benchmark,

MAR_y is a yearly value of a minimum acceptable rate,

$\sigma_{i,y}$ is a yearly value of a standard deviation of a fund i ,

$s\sigma_{i,y}$ is a yearly value of a semi-standard deviation of a fund i .

The highest the values of the measures the better the performance of the funds.

Step two. Fund rankings

I rank the funds from the best ones (having the highest values of Sharpe, Sortino and Jensen ratios) to the worst ones (having the lowest values of the ratios) according to each ratio in short term (in each year from 2010 through 2011, 2012 and 2013 till 2014) and in long term (five years, i.e. 2010–2014). I get three rankings of short term fund performance based on three performance measures for each year and three rankings of long term fund performance. In that I am able to see two things: 1. whether the quasi-hedge fund managers over-performed stock fund managers in short or long term, 2. whether there are any (and if yes – how big) differences in places of funds in those rankings among years and among measures.

Step three. Performance of funds of stock funds and/or quasi-hedge funds

Additionally to the above in step three of the analysis I build different funds of funds consisting of stock and/or absolute return funds and check whether they are efficient in Markowitz sense of portfolio efficiency. Since Jensen alpha is the performance measure showing the skills of the fund managers I decide to use the long term ranking based on that measure in order to create three groups of three funds of funds (FoF):

- only funds of stock funds consisting of 5 best or 10 best or all 20 analyzed stock funds (3 cases),
- only funds of absolute return funds consisting of 5 best or 10 best or all 25 analyzed quasi-hedge funds (3 cases),
- mixed funds of funds: a fund of 10 best funds (5 best stock funds and 5 best quasi-hedge funds), a fund of 20 best funds (10 best stock funds and 10 best quasi-hedge funds) and a fund of all 45 analyzed funds (3 cases).

I assume that the weight of each fund in each FoF is in the range of (0; 1) and may change every one tenth (0,1). So the weight of a fund in the FoF may be equal $w_i = 0,1$ or $0,2$ etc. up to $0,9$.

I then calculate Sharpe ratio and standard deviation of those portfolios and compare the results. By doing so I hope to find out whether the portfolios with/of absolute return funds are in

long term more efficient than those without them. In other words, I hope to see whether absolute return funds add value to a portfolio of funds of any investor.

2. Results

Step one and step two

Tables 2, 3 and 4 show the short and long term performance of absolute return funds and stock funds which are ranked according to their values of Sharpe, Sortino and Jensen ratios.

There are few interesting things we may conclude from the fund performance. First of all, the performance of both types of funds measured by Sharpe and Sortino ratios was in short and long term positive and in many cases higher than the benchmarks. The only exceptions were 2011 and 2014, when majority of the funds had negative returns and underperformed the benchmarks. Such results were however not surprising since at that time the world capital markets were suffering losses. Second of all, many of the funds ranked according to the Sharpe and Sortino ratios had the same or comparable places in the rankings. From the statistical point of view it means that the values of standard deviation of stock fund returns were close to the values of semi-standard deviation of quasi-hedge fund returns. I analyzed only five years of the Polish fund industry history so it might not be a general rule, however, I believe for emerging markets like Poland it is worth considering building fund rankings according to those measures interchangeably.

The fund rankings according to Sharpe and Sortino ratios reflected the fund ranking built according to Jensen alphas of the funds only partially. In this case in both short and long terms we could observe more negative results, which – as wanted – were more common for stock funds. In different years different stock fund managers were not able to use their skills and beat the market. Presumably their poor performance may be explained by the long nature of their operations which depends on the turbulence on the world and Polish capital markets. As far as Polish quasi-hedge funds are concerned, even though they are open-end type, they are supposed to use different tools and opportunities on both long and short sides of the market to reach the goal of the abnormal return. It seems many of them succeeded, especially in long term – all the absolute return funds were ranked higher than stock funds, though we must see that not all of them overperformed the market. Those which did, were not necessarily persistent. However, we may notice that most of the winners belonged to the group of *Altus*, *Superfund* or *Quercus*. In the group of stock funds the best were some Pioneer or ING funds or PZU Energia Medycyna Ekologia, which is one of the biggest in that group.

Table 2. Ranking of fund performance measured by Sharpe ratio in short and long term

	2010	2011	2012	2013	2014	2010-2014	
	1	2	3	4	5	6	
Aviva Investors Optymalnego Wzrostu	0.2394	Pioneer Elastycznego Inwestowania	0.1215	Superfund Alternatywny	0.5795	Atlas FIO Parasolowy s ASZ	Atlas FIO Parasolowy s ASZ
Quercus P SFIO – Selektywny	0.2125	PZU Energia Medycyna Ekologia	0.1044	Atlas FIO Parasolowy s ASZ	0.2232	Atlas FIO Parasolowy s ASZ	Atlas FIO Parasolowy s ASZ
PZU Energia Medycyna Ekologia	0.1608	HFR	0.0476	Quercus P SFIO – Selektywny	0.2187	Pioneer Dynamicznych Spolek	Pioneer Dynamicznych Spolek
BPH Subfundusz Selektywny	0.1426	Pioneer Akcji Amerykanskich	0.0068	Quercus P SFIO – Selektywny	0.1667	ING (L) Globalnych Spolek Dywidendowych	Quercus P SFIO – Selektywny
Quercus Agresywny	0.1409	Agro Maltystyczna Alokacji	0.0033	Opera SFIO s O Alfa-plus.pl	0.1409	Superfund Alternatywny	Superfund Alternatywny
Noble Funds FIO GI Return	0.1048	Pioneer Akcji Europejskich	-0.0167	Pioneer Dynamicznych Spolek	0.1368	Starbice FIO Market neutral	PZU Energia Medycyna Ekologia
Noble Fund Akcji MIS	0.1026	ING (L) Globalnych Spolek Dywidendowych	-0.0172	Noble Funds FIO Fund Tim.	0.1355	Superfund Trend Plus FIO	Millennium FIO s Absolute Return
ALIOR SFIO Zmiennej Alokacji	0.0789	Superfund GoldFuture (FoHF)	-0.0362	Quercus Agresywny	0.1205	Opera SFIO s O Alfa-plus.pl	Starbice FIO Market neutral
Aviva Investors Polskich Akcji	0.0739	MSCI World	-0.0364	Millennium FIO s Absolute Return	0.1102	Superfund Subfundusz C	ING (L) Globalnych Spolek Dywidendowych
LM Parasol FIO s Akcji	0.0658	Opera SFIO s O Alfa-plus.pl	-0.0379	Aviva Investors Polskich Akcji	0.0961	Agro Agresywny	Quercus Agresywny
ING (L) Globalnych Spolek Dywidendowych	0.0654	Aviva Investors Optymalnego Wzrostu	-0.0551	Noble Fund Akcji	0.0941	Opera SFIO s O Alfa-plus.pl	Pioneer Akcji Amerykanskich
Noble Fund Akcji	0.0650	UniKorona Akcje	-0.0699	ING (PL) Akcji	0.0865	Quercus Agresywny	Agro Agresywny
PKO Akcji – fo	0.0518	LM Parasol FIO s Akcji	-0.0735	Noble Fund Akcji MIS	0.0844	Millennium FIO s Absolute Return	MSCI World
ING SFIO Akcji 2	0.0508	Superfund Trend Bis FIO	-0.0751	ING SFIO Akcji 2	0.0840	Subfundusz Superfund Red (FoHF)	Pioneer Akcji Europejskich
HFR	0.0484	Agro Maltystyczna	-0.0773	Arka BZ WBK Akcji Subfundusz	0.0826	Aviva Investors Polskich Akcji	Subfundusz Starbice – Market Opportunities
Pioneer Akcji Amerykanskich	0.0443	Superfund Trend Plus FIO	-0.0775	UniKorona Akcje	0.0786	ING P FIO sub Selektywny	Noble Fund Akcji MIS
PZU Akcji KRAKOWIAK	0.0428	Superfund Subfundusz C	-0.0852	Millennium FIO s Akcji	0.0765	Pioneer Akcji Europejskich	Subfundusz Starbice – Market Opportunities
ING (PL) Akcji	0.0362	ING SFIO Akcji 2	-0.0853	Subfundusz Akcji SKARBIEC-AKCHA	0.0760	LM Parasol FIO s Akcji	Subfundusz Allianz Total Return
Millennium FIO s Akcji	0.0350	Superfund Subfundusz B	-0.0873	PKO Akcji – fo	0.0729	Agro Aktywny Alokacji	Aviva Investors Optymalnego Wzrostu
UniKorona Akcje	0.0349	Noble Fund Akcji	-0.0876	PZU Akcji KRAKOWIAK	0.0676	Superfund Subfundusz C	ING SFIO Akcji 2
ING P FIO sub Selektywny	0.0336	Subfundusz Superfund Red (FoHF)	-0.0881	Aviva Investors Optymalnego Wzrostu	0.0670	Superfund Subfundusz B	ING SFIO Akcji 2
Superfund GoldFuture (FoHF)	0.0306	Pioneer Akcji Rynkow Wsch	-0.0936	LM Parasol FIO s Akcji	0.0657	PZU Energia Medycyna Ekologia	Aviva Investors Polskich Akcji
Arka BZ WBK Akcji Subfundusz	0.0277	Noble Fund Akcji MIS	-0.0955	Superfund Trend Plus FIO	0.0604	Superfund Trend Bis FIO	LM Parasol FIO s Akcji
MSCI World	0.0177	Quercus P SFIO – Selektywny	-0.0968	Superfund Trend Bis FIO	0.0481	Superfund Trend Bis FIO	UniKorona Akcje
Subfundusz Akcji SKARBIEC-AKCHA	0.0152	Noble Funds FIO Fund Tim.	-0.0978	Atlas FIO Parasolowy s ASZ	0.0454	Atlas FIO Parasolowy s ASZ	PKO Akcji – fo
Pioneer Akcji Rynkow Wsch	0.0151	Quercus Agresywny	-0.0990	ING SFIO Akcji 2	0.0401	LM Parasol FIO s Akcji	Opera SFIO s O Alfa-plus.pl
Pioneer Akcji Polskich	0.0137	PKO Akcji – fo	-0.0991	Noble Funds FIO GI Return	0.0385	Aviva Investors Optymalnego Wzrostu	Noble Fund Akcji
					0.0142	Starbice FIO Market neutral	ING (PL) Akcji

	1	2	3	4	5	6			
<i>Noble Funds FIO Fund Tm.</i>	0.0135	ING (PL) Akcji	-0.1002	PKO Akcji – flo	0.0109	Pioneer Elastycznego Investowania	-0.0335	Millennium FIO S Akcji	-0.0087
Pioneer Akcji Europejskich	0.0122	Subfundusz Akcji SKARBIEC-AKCJA	-0.1029	ING (L) Globalnych Spółek Dywidendowych	0.0105	Pioneer Akcji Europejskich	0.0048	Noble Funds FIO Fund Tm.	-0.0124
<i>Agio Aktywnej Alokacji</i>	0.0104	Aviva Investors Polskich Akcji	-0.1052	PZU Energia Miedzyna Ekologia	0.0082	Pioneer Akcji Amerykańskich	0.0007	Noble Funds FIO GI Return	-0.0141
<i>Superfund Trend Plus FIO</i>	0.0025	Millennium FIO S Akcji	-0.1054	Pioneer Elastycznego Investowania	0.0068	Millennium FIO S Akcji	0.0007	Subfundusz Akcji SKARBIEC-AKCJA	-0.0147
<i>Superfund Trend Bis FIO</i>	0.0023	PZU Akcji KRAKOWIAK Subfundusz	-0.1092	Agio Multistrategia	-0.0281	Noble Fund Akcji	0.0058	Superfund Trend Bis FIO	-0.0149
<i>Superfund Subfundusz B</i>	-0.0001	Aka BZ WBK Akcji Subfundusz	-0.1306	Pioneer Akcji Amerykańskich	-0.0326	Pioneer Elastycznego Investowania	0.0053	Subfundusz Akcji SKARBIEC-AKCJA	-0.0164
<i>Superfund Subfundusz C</i>	-0.0022	BPH Subfundusz Selskiowy	-0.1359	Agio Aktywnej Alokacji	-0.0355	Noble Funds FIO Fund Tm.	0.0044	Superfund Trend Plus FIO	-0.0170
<i>Subfundusz Superfund Red (FroHF)</i>	-0.0096	Noble Funds FIO GI Return	-0.1453	ALIOR SFIO Zmiennej Alokacji	-0.0436	ING (PL) Akcji	-0.0007	Agio Aktywnej Alokacji	-0.0176
<i>Opera SFIO s O Alfa-plus.pl</i>	-0.0109	ING P FIO sub Selskiowy	-0.1455	Superfund Trend Bis FIO	-0.0452	UmKorona Akcje	-0.0007	Quercus Agresywny	-0.0188
<i>Agio Multistrategia</i>	-0.0111	Pioneer Akcji Polskich	-0.1579	Superfund GoldFuture (FroHF)	-0.0458	PZU Akcji KRAKOWIAK	-0.0028	Noble Fund Akcji	-0.0190
		ALIOR SFIO Zmiennej Alokacji	-0.2770	Superfund Trend Plus FIO	-0.0515	Subfundusz Akcji SKARBIEC-AKCJA	-0.0061	Noble Funds FIO Fund Tm.	-0.0210
				Superfund Subfundusz C	-0.0517	Pioneer Akcji Polskich	-0.0069	PZU Akcji KRAKOWIAK	-0.0221
				Superfund Subfundusz B	-0.0523	Aka BZ WBK Akcji Subfundusz	-0.0126	ING P FIO sub Selskiowy	-0.0258
				BPH Subfundusz Selskiowy	-0.0562	HFR	-0.0159	Agio Aktywnej Alokacji	-0.0274
				HFR	-0.0593	ALIOR SFIO Zmiennej Alokacji	-0.0186	Pioneer Akcji Rynków Wsch	-0.0275
				Subfundusz Superfund Red (FroHF)	-0.0656	Pioneer Akcji Rynków Wsch	-0.0198	Agio Agresywny	-0.0299
				Skarbusz FIO Market neutral	-0.1582	Noble Funds FIO GI Return	-0.0471	Noble Fund Akcji MIS	-0.0351
						BPH Subfundusz Selskiowy	-0.0715	Subfundusz Superfund Red (FroHF)	-0.0359
						Superfund GoldFuture (FroHF)	-0.0903	ALIOR SFIO Zmiennej Alokacji	-0.0416
								Agio Multistrategia	-0.0697

Source: own calculation.

Table 3. Ranking of fund performance measured by Sortino ratio in short and long terms

	2010	2011	2012	2013	2014	2010–2014					
	1	2	3	4	5	6					
PZU Energia Medyczna Ekologia	0.6829	Pioneer Elacznego Inwestowania	0.2901	Agro Agresywny	56.7039	Superfund Alternatywny	34.2344	Atlas FIO Parasolowy s ASZ Rynku PL	0.2503	Atlas FIO Parasolowy s ASZ Rynku PL	0.3641
Aviva Investors Optymalnego Wzrostu	0.5156	PZU Energia Medyczna Ekologia ASZ Dłuzny	0.1870	Subfundusz Allianz Total Return	12.9653	Subfundusz Allianz Total Return	0.5303	Pioneer Akcji Amerykańskich	0.1528	Atlas FIO Parasolowy Subfundusz ASZ Dłuzny	0.2591
Quercus P SFIO – Selektywny	0.3295	HFR	0.0812	Atlas FIO Parasolowy s ASZ Rynku PL	1.3533	Atlas FIO Parasolowy s ASZ Rynku PL	0.4521	PZU Energia Medyczna Ekologia	0.1014	Superfund Alternatywny	0.1675
BPH Subfundusz Selektywny	0.2435	Pioneer Akcji Amerykańskich	0.0095	Opera SFIO s O Alfa-plus.pl	0.3213	Opera SFIO s O Alfa-plus.pl	0.3213	Quercus P SFIO – Selektywny	0.1004	Pioneer Dynamicznych Spółek Dywidendowych	0.1119
Quercus Agresywny	0.2063	Agro Aktywnej Akcji	0.0055	Quercus P SFIO – Selektywny	0.2769	Quercus P SFIO – Selektywny	0.1677	MSCI World	0.0619	Quercus P SFIO – Selektywny	0.0793
Noble Funds FIO GI Return	0.1614	Pioneer Akcji Europejskich	-0.0230	Millennium FIO S Absolute Return	0.2564	Starbuc FIO Marker neutral	0.1576	Superfund Trend Bis FIO	0.0604	Millennium FIO S Absolute Return	0.0716
Noble Fund Akcji MIS	0.1474	ING (L) Globalnych Spółek Dywidendowych	-0.0231	Pioneer Dynamicznych Spółek	0.2202	Noble Fund Akcji MIS	0.1240	Superfund Trend Plus FIO	0.0595	PZU Energia Medyczna Ekologia	0.0671
ALIOR SFIO Zmiennej Akcji	0.1175	Opera SFIO s O Alfa-plus.pl	-0.0422	Noble Funds FIO Fund Tm.	0.2093	Agro Multistrategia	0.1223	Opera SFIO s O Alfa-plus.pl	0.0477	Starbuc FIO Marker neutral	0.0519
Aviva Investors Polskich Akcji	0.1062	Superfund GoldFuture (FoHF)	-0.0457	Quercus Agresywny	0.1794	Agro Agresywny	0.1150	Superfund Subfundusz C	0.0402	Agro Agresywny	0.0444
LM Parasol FIO s Akcji	0.0806	MSCI World	-0.0469	Aviva Investors Polskich Akcji	0.1401	Pioneer Dynamicznych Spółek	0.0997	Superfund Alternatywny	0.0366	Subfundusz Starbuc – Marker Opportunities	0.0343
HFR	0.0793	Aviva Investors Optymalnego Wzrostu	-0.0672	Noble Fund Akcji	0.1398	Opera SFIO s O Alfa-plus.pl	0.0974	Pioneer Akcji Europejskich	0.0180	ING (L) Globalnych Spółek Dywidendowych	0.0341
ING (L) Globalnych Spółek Dywidendowych	0.0786	Superfund Trend Bis FIO	-0.0872	ING (PL) Akcji	0.1261	Quercus Agresywny	0.0758	Subfundusz Starbuc – Marker Opportunities	0.0154	Pioneer Akcji Amerykańskich	0.0275
Noble Fund Akcji	0.0772	UniKorona Akcje	-0.0882	Noble Fund Akcji MIS	0.1213	Subfundusz Superfund Red (FoHF)	0.0753	MSCI World	0.0080	Quercus Agresywny	0.0268
PKO Akcji – flo	0.0729	LM Parasol FIO s Akcji	-0.0925	ING SFIO Akcji 2	0.1205	Millennium FIO S Absolute Return	0.0686	ING SFIO Akcji 2	0.0056	Subfundusz Allianz Total Return	0.0246
ING SFIO Akcji 2	0.0720	Superfund Trend Plus FIO	-0.0931	Arka BZ WBK Akcji Subfundusz	0.1203	Aviva Investors Polskich Akcji	0.0669	ING P FIO sub Selektywny	0.0051	MSCI World	0.0228
Pioneer Akcji Amerykańskich	0.0652	Agro Multistrategia	-0.1002	UniKorona Akcje	0.1172	Pioneer Akcji Europejskich	0.0574	Superfund GoldFuture (FoHF)	-0.0001	Pioneer Elacznego Inwestowania	0.0213
PZU Akcji KRAKOWIAK	0.0591	Subfundusz Superfund Red (FoHF)	-0.1014	Millennium FIO S Akcji	0.1118	ING P FIO sub Selektywny	0.0572	Subfundusz Allianz Total Return	-0.0006	Pioneer Akcji Europejskich	0.0198
ING (PL) Akcji	0.0507	Superfund Subfundusz B	-0.1021	Subfundusz Akcji SKARBIEC- AKCIA	0.1101	Agro Aktywnej Akcji	0.0542	ING (PL) Akcji	-0.0137	Noble Fund Akcji MIS	0.0167
Millennium FIO S Akcji	0.0488	Superfund Subfundusz C	-0.1034	PKO Akcji – flo	0.1059	LM Parasol FIO s Akcji	0.0498	UniKorona Akcje	-0.0159	Aviva Investors Optymalnego Wzrostu	0.0095
UniKorona Akcje	0.0468	ING SFIO Akcji 2	-0.1052	LM Parasol FIO s Akcji	0.0966	Superfund Subfundusz C	0.0354	PKO Akcji – flo	-0.0203	ING SFIO Akcji 2	0.0085
ING P FIO sub Selektywny	0.0466	Noble Fund Akcji	-0.1088	PZU Akcji KRAKOWIAK	0.0963	Superfund Subfundusz B	0.0324	Noble Funds FIO GI Return	-0.0249	Aviva Investors Polskich Akcji	0.0069
Superfund GoldFuture (FoHF)	0.0395	Noble Fund Akcji MIS	-0.1138	Aviva Investors Optymalnego Wzrostu	0.0955	Superfund Trend Plus FIO	0.0317	Arka BZ WBK Akcji Subfundusz	-0.0273	LM Parasol FIO s Akcji	0.0029
Arka BZ WBK Akcji Subfundusz	0.0379	Quercus P SFIO – Selektywny	-0.1170	ING (L) Globalnych Spółek Dywidendowych	0.0885	Superfund Trend Bis FIO	0.0303	HFR	-0.0277	UniKorona Akcje	0.0006
MSCI World	0.0249	Pioneer Akcji Rynków Wsch	-0.1180	Pioneer Akcji Polskich	0.0686	PZU Energia Medyczna Ekologia	0.0302	Atlas FIO Parasolowy s ASZ Rynku PL	-0.0279	PKO Akcji – flo	0.0002
Subfundusz Akcji SKARBIEC- AKCIA	0.0208	Quercus Agresywny	-0.1192	Pioneer Akcji Rynków Wsch	0.0655	Atlas FIO Parasolowy Subfundusz ASZ Dłuzny	0.0270	Millennium FIO S Absolute Return	-0.0289	Opera SFIO s O Alfa-plus.pl	-0.0002
Pioneer Akcji Rynków Wsch.	0.0206	PKO Akcji – flo	-0.1219	MSCI World	0.0588	ING SFIO Akcji 2	0.0240	LM Parasol FIO s Akcji	-0.0373	Noble Fund Akcji	-0.0047

	1	2	3	4	5	6			
Pioneer Akcji Polskich	0.0191	Noble Funds FTO Fund Tim.	-0.1226	Noble Funds FTO GI Return	0.0170	Skarbee FTO Market neutral	-0.0423	ING (PL) Akcji	-0.0055
Noble Funds FTO Fund Tim.	0.0183	ING (PL) Akcji	-0.1230	ING P FTO sub Selektyny	0.0150	Pioneer Elastycznego Investowania	-0.0450	Millennium FIO S Akcji	-0.0116
Agro Aktywny/ Alokacji	0.0174	Subfundusz Akcji SKARBIEC- AKCJA	-0.1263	Pioneer Akcji Europejskich	0.0067	ING (L) Globalnych Spółek Dywidendowych	-0.0448	Noble Funds FTO Fund Tim.	-0.0165
Pioneer Akcji Europejskich	0.0168	Millennium FIO S Akcji	-0.1298	PZU Energia Medycyna Ekologia	0.0038	Pioneer Akcji Amerykańskich	0.0112	Pioneer Dynamiczny Spółek	-0.0471
Superfund Trend Plus FIO	0.0032	Aviva Investors Polskich Akcji	-0.1303	Pioneer Elastycznego Investowania	0.0010	Millennium FIO S Akcji	0.0094	Superfund Trend Bis FIO	-0.0188
Superfund Trend Bis FIO	0.0027	PZU Akcji KRAKOWIAK AKCJA	-0.1332	Agro Multistrategia	-0.0369	Noble Fund Akcji	0.0080	Noble Funds FTO GI Return	-0.0190
Superfund Subfundusz B	-0.0001	Arka BZ WBK Akcji Subfundusz AKCJA	-0.1586	Pioneer Elastycznego Investowania	0.0069	Pioneer Akcji Polskich	-0.0640	Superfund Trend Plus FIO	-0.0212
Superfund Subfundusz C	-0.0028	BPH Subfundusz Selektyny	-0.1649	Pioneer Akcji Amerykańskich	-0.0569	Agro Aktywny/ Alokacji	0.0061	PZU Akcji KRAKOWIAK	-0.0233
Subfundusz Superfund Red (FoHF)	-0.0121	ING P FTO sub Selektyny	-0.1709	ALIOR SFIO Zmiennej Alokacji	-0.0583	ALIOR SFIO Zmiennej Alokacji	-0.0010	Quercus P. SFIO - Selektyny	-0.0240
Opera SFIO s O Alfr-plus.pl	-0.0145	Noble Funds FTO GI Return	-0.1739	HFR	-0.0595	Uni Korona Akcje	-0.0010	Quercus Agresywny	-0.0244
Agro Multistrategia	-0.0157	Pioneer Akcji Polskich	-0.1823	Superfund GoldFinare (FoHF)	-0.0613	PZU Akcji KRAKOWIAK Subfundusz Akcji SKARBIEC- AKCJA	-0.0038	Noble Fund Akcji	-0.0253
		ALIOR SFIO Zmiennej Alokacji	-0.3122	Superfund Trend Bis FIO	-0.0616	Subfundusz Akcji SKARBIEC- AKCJA	-0.0084	Noble Funds FTO Fund Tim.	-0.0276
				Superfund Subfundusz C	-0.0699	Pioneer Akcji Polskich	-0.0093	PZU Akcji KRAKOWIAK	-0.0278
				Superfund Trend Powi_zamy Plus FIO	-0.0700	Arka BZ WBK Akcji Subfundusz	-0.0172	Agro Aktywny/ Alokacji	-0.0282
				Superfund Subfundusz B	-0.0709	HFR	-0.0177	Agro Agresywny	-0.0336
				BPH Subfundusz Selektyny	-0.0769	ALIOR SFIO Zmiennej Alokacji	-0.0238	Noble Fund Akcji MIS	-0.0363
				Subfundusz Superfund Red (FoHF)	-0.0875	Pioneer Akcji Rynków Wsch	-0.0262	Pioneer Akcji Rynków Wsch	-0.0405
				Skarbee FTO Market neutral	-0.3108	Noble Funds FTO GI Return	-0.0594	Subfundusz Superfund Red (FoHF)	-0.0454
						BPH Subfundusz Selektyny	-0.0948	ALIOR SFIO Zmiennej Alokacji	-0.0457
						Superfund GoldFinare (FoHF)	-0.1172	Agro Multistrategia	-0.0562
								BPH Subfundusz Selektyny	-0.0582
								ALIOR SFIO Zmiennej Alokacji	-0.0904

Source: own calculation.

Table 4. Ranking of fund performance measured by Jensen ratio in short and long terms

	2010	2011	2012	2013	2014	2010-2014		
	1	2	3	4	5	6		
Aviva Investors Optymalnego Wzrostu	8.4E-04	Pioneer Elastycznego Inwestowania	0.0039	Superfund Alternatywny	0.0050	Superfund Subfundusz B	0.0005	Superfund Alternatywny
Noble Funds FIO GI Return	5.9E-04	Agio Aktywnej Alokacji	0.0018	Skarbiec FIO Market neutral	0.0016	Superfund Trend Plus FIO	0.0004	Atlas FIO Parasolowy s ASZ Rynda PL
Quercus P SFTO – Selektywny	5.3E-04	PZU Energia Medycyna Ekologia	0.0008	Agio Multistrategia	0.0006	Superfund Trend Bis FIO	0.0004	Quercus P SFTO – Selektywny
Superfund GoldFuture (FoHF)	5.1E-04	Quercus P SFTO – Selektywny	0.0004	Agio Agresywny	0.0005	Superfund Subfundusz C	0.0004	Skarbiec FIO Market neutral
ALIOR SFTO Zmiennej Alokacji	5.1E-04	Opera SFTO s O Alfa-plus.pl	0.0004	Stofundusz Superfund Red (FoHF)	0.0005	Superfund Alternatywny	0.0002	Agio Agresywny
BPH Subfundusz Selektywny	5.0E-04	BPH Subfundusz Selektywny	0.0004	Quercus P SFTO – Selektywny	0.0005	Atlas FIO Parasolowy Subfundusz ASZ Dłuzny	0.0002	Atlas FIO Parasolowy Subfundusz ASZ Dłuzny
PZU Energia Medycyna Ekologia	2.7E-04	Aviva Investors Optymalnego Wzrostu	0.0003	Atlas FIO Parasolowy s ASZ	0.0004	Opera SFTO s O Alfa-plus.pl	0.0001	Millennium FIO S Absolute Return
ING P FIO sub Selektywny	2.4E-04	Superfund GoldFuture (FoHF)	0.0003	Atlas FIO Parasolowy s ASZ Rynda PL	0.0004	Superfund Scharbiec – Market Opportunities	0.0001	Aviva Investors Optymalnego Wzrostu
Noble Funds FIO Fund Tim.	9.7E-05	Agio Multistrategia	0.0002	ING P FIO sub Selektywny	0.0003	ING P FIO sub Selektywny	0.0000	Stofundusz Scharbiec – Market Opportunities
Superfund Trend Plus FIO	6.0E-05	Pioneer Akcji Amerykańskich	0.0001	Superfund Subfundusz B	0.0003	Superfund GoldFuture (FoHF) Inwestowania	0.0000	Pioneer Elastycznego Inwestowania
Agio Aktywnej Alokacji	5.3E-05	Noble Funds FIO GI Return	0.0001	Superfund Trend Plus FIO	0.0003	Subfundusz Allianz Total Return	0.0000	Superfund Allianz Total Return
Superfund Trend Bis FIO	5.4E-05	Noble Funds FIO Fund Tim.	0.0000	Superfund Trend Bis FIO	0.0003	Atlas FIO Parasolowy s ASZ Rynda PL	0.0000	Opera SFTO s O Alfa-plus.pl
Superfund Subfundusz B	-1.8E-06	Subfundusz Superfund Red (FoHF)	-0.0011	Superfund Trend Plus FIO	0.0002	Millennium FIO S Absolute Return	-0.0001	Agio Aktywnej Alokacji
Superfund Subfundusz C	-6.4E-05	ING (L) Globalnych Spółek Dywidendowych	-0.0012	Agio Aktywnej Alokacji	0.0001	Pioneer Elastycznego Inwestowania	-0.0001	Noble Funds FIO GI Return
Agio Multistrategia	-7.4E-05	Superfund Trend powiązany Bis FIO	-0.0012	Agio Multistrategia	0.0001	Opera SFTO s O Alfa-plus.pl	-0.0001	Noble Funds FIO Fund Tim.
Quercus Agresywny	-1.0E-04	Pioneer Akcji Europejskich Plus FIO	-0.0013	Quercus Agresywny	0.0001	Millennium FIO S Absolute Return	-0.0002	BPH Subfundusz Selektywny
Opera SFTO s O Alfa-plus.pl Subfundusz Superfund Red (FoHF)	-1.2E-04	Superfund Trend Powiązany Plus FIO	-0.0013	Skarbiec FIO Market neutral	0.0001	Aviva Investors Optymalnego Wzrostu	-0.0002	ING P FIO sub Selektywny
Noble Fund Akcji MIS	-1.4E-04	Superfund Subfundusz B	-0.0015	ALIOR SFTO Zmiennej Alokacji	-0.0003	Noble Fund Akcji MIS	-0.0002	Agio Multistrategia
Aviva Investors Polskich Akcji	-3.3E-04	ALIOR SFTO Zmiennej Alokacji	-0.0017	ING (PL) Akcji	-0.0003	Noble Funds FIO Fund Tim.	-0.0002	Superfund Trend Bis FIO
Noble Fund Akcji	-5.0E-04	Superfund Subfundusz C	-0.0017	Noble Fund Akcji	-0.0003	Atlas FIO Parasolowy Subfundusz ASZ Dłuzny	-0.0003	Superfund Trend Powl_zany Plus FIO
LM Parosol FIO s Akcji	-5.6E-04	ING P FIO sub Selektywny	-0.0020	ALIOR SFTO Zmiennej Alokacji	-0.0003	Investowania	-0.0004	Superfund Subfundusz B (FoHF)
Pioneer Akcji Amerykańskich	-5.8E-04	LM Parosol FIO s Akcji	-0.0020	ING SFIO Akcji 2	-0.0004	Noble Funds FIO Fund Tim.	-0.0005	Superfund GoldFuture (FoHF)
ING SFTO Akcji 2	-6.0E-04	ING SFTO Akcji 2	-0.0020	Arka BZ WBK Akcji Subfundusz	-0.0004	Agio Agresywny	-0.0005	Superfund Subfundusz C
PKO Akcji – fo	-6.1E-04	Unikorona Akcje	-0.0021	Aviva Investors Polskich Akcji	-0.0004	ALIOR SFTO Zmiennej Alokacji	-0.0006	Subfundusz Superfund Red (FoHF)
ING (PL) Akcji	-6.7E-04	Quercus Agresywny	-0.0022	Unikorona Akcje	-0.0004	Pioneer Dynamicznych Spółek Dywidendowych	-0.0006	ALIOR SFTO Zmiennej Alokacji
		PKO Akcji – fo	-0.0022	Noble Fund Akcji MIS	-0.0005	Pioneer Akcji Europejskich Ekologia	-0.0006	PZU Energia Medycyna Ekologia

1	2	3	4	5	6	
ING (L) Globalnych Spółek Dywidendowych	-6,7E-04	PZU Akcji KRAKOWIAK	Queerus Agresywny	-0,0005	-0,0007	Pioneer Akcji Amerykańskich
Unikورونا Akcje	-6,7E-04	PKO Akcji – fo	PZU Energia Medycyna Ekologia	-0,0005	-0,0010	ING (L) Globalnych Spółek Dywidendowych
Pioneer Akcji Rynków Wsch	-8,6E-04	Superfund GoldFuture (FoHF)	ING (L) Globalnych Spółek Dywidendowych	-0,0006	-0,0011	Pioneer Akcji Europejskich
Subfundusz Akcji SKARBIEC- AKCJA	-9,0E-04	Pioneer Akcji Polskich	Pioneer Akcji Amerykańskich	-0,0006	-0,0012	Noble Fund Akcji MIS
Pioneer Akcji Polskich	-9,3E-04	ING (L) Globalnych Spółek Dywidendowych	ING SFIO Akcji 2	-0,0009	-0,0012	ING SFIO Akcji 2
Pioneer Akcji Europejskich	-9,4E-04	Subfundusz Superfund Red (FoHF)	PKO Akcji – fo	-0,0009	-0,0012	Aviva Investors Polskich Akcji
		Superfund Trend Bis FIO	Noble Fund Akcji	-0,0010	-0,0013	Unikورونا Akcje
		Superfund Subfundusz B	ING (PL) Akcji	-0,0011	-0,0013	PKO Akcji – fo
		Superfund Trend Powi_zany Plus FIO	Unikورونا Akcje	-0,0011	-0,0014	Noble Fund Akcji
		Superfund Subfundusz C	PZU Akcji KRAKOWIAK	-0,0011	-0,0015	ING (PL) Akcji
		Pioneer Akcji Europejskich	Superfund GoldFuture (FoHF)	-0,0011	-0,0015	Millemium FIO S Akcji
		ING (L) Energia Medycyna Ekologia	Subfundusz Akcji SKARBIEC-AKCJA	-0,0011	-0,0015	Subfundusz Akcji SKARBIEC-AKCJA
		Pioneer Akcji Amerykańskich	Pioneer Akcji Polskich	-0,0012	-0,0016	PZU Akcji KRAKOWIAK
			Pioneer Akcji Rynków Wsch	-0,0012	-0,0017	Akta BZ WBK Akcji Subfundusz
			Akta BZ WBK Akcji Subfundusz	-0,0012	-0,0018	Pioneer Akcji Rynków Wsch
				-0,0012	-0,0018	Pioneer Akcji Polskich

Source: own calculation.

Step three

The above results suggest that adding Polish quasi-hedge funds to a fund of funds owned by an individual investor may be justified. In order to make sure that those funds have some power to increase the return of such portfolio or decrease its risk I decide to build 9 funds of funds (FoF) and diversify them with a different number of stock and/or absolute return funds. The values of Sharpe ratio and standard deviation of those FoF are shown in Table 5.

Table 5. Funds of funds performance

Funds of stock funds (FoSF)	top 5	top 10	all funds (20)
Sharpe ratio	0.6276	1.0094	1.0792
Standard deviation	0.0078	0.0071	0.0069
Funds of absolute return funds (FoQHF)	top 5	top 10	all funds (25)
Sharpe ratio	1.0500	2.5644	2.0300
Standard deviation	0.0028	0.0026	0.0016
Funds of mixed funds (stock funds + absolute return funds) (FoMF)	top 10	top 20	all funds (45)
Sharpe ratio	0.8934	2.4217	1.4282
Standard deviation	0.0027	0.0028	0.0033

Source: own calculations.

The outcome is somehow not surprising but still interesting. As expected, as far as the returns are concerned, the best funds of funds were those consisting of only quasi hedge funds (FoQHF) and no stock funds (FoSF). The values of Sharpe ratio of FoQHF were from 1.0500 (top 5 funds) to 2.5644 (top 10 funds) whereas in case of the other funds of funds (FoSF and FoMF) it was not more than 2.4217 (top 20 mixed funds). What grabs attention is that the winner portfolio consists of 10 top quasi-hedge funds. This suggests that the best diversified funds of funds operating on Polish fund market should have around ten (and not e.g. five) elements. Especially since FoFs consisting of top 5 funds or all funds are more risky than the winner fund of funds.

Conclusions

The results of the study conducted in the paper are very interesting and quite optimistic. They show that between January 2010 and December 2014 most Polish absolute return fund managers had and used their management skills. Alphas of majority of those funds were not only positive but also higher than the alphas of most of the traditional stock funds. We may only guess that it was caused by activity as well as intuition and experience to open and close long and short positions at the accurate time. As a consequence quasi-hedge funds added value to the

funds of funds of an individual investor. If this is the case they deserved to charge their clients the management and/or performance fee.

The results of the study are similar to those on other markets like the one in USA. Obviously they consider much smaller sample and different time scope. Therefore they are not final. Building a sample of a larger number of funds which could be analyzed in a longer period and assessed according to more advanced performance measures will surely give more accurate results. I think, however, that they would also show that Polish absolute return funds of open-end type are worth considering by every Polish individual investor. So far they proved it. If they continue to do so and use their potential to grow further, Polish individual investors will consider them as a serious alternative for traditional funds allowing them to build well diversified portfolios.

Notes

¹ See e.g. Agarwal, Naik (2000); Agarwal et. al. (2013); Boyson (2002); Brown et. al. (2001); Eling (2009); Harri, Brorsen (2004).

² See e.g. Ackermann et. al. (1999); Agarwal, Naik (2004); Agarwal et. al. (2009); Capocci, Hübner (2004); Fung, Hsieh (1997); Liang (1999).

³ See e.g. Ahoniemi, Jylha (2014); Ammann et. al. (2010); Aspadarec (2013); Brandon, Wang (2013); Mozes, Cooks (2012); Soydemir et. al. (2014).

⁴ See e.g. Amenc, Martellini (2002); Capocci, Hübner (2004); Fung, Hsieh (1999a, 1999b); Henker, Martin (1998); Kooli (2007); Liang (1999); Schneeweis, Kazemi (2001); Schneeweis, Spurgin (1998).

⁵ For evidence see Kanuri, McLeod (2014).

⁶ See Directive 2011/61/EU...

⁷ See Lhabitant (2006) and Athanassiou (2009).

⁸ For evidence see Baele et al. (2007).

⁹ See e.g. Eling, Schuhmacher (2007) and Eling et. al. (2011).

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